



YAMAHA

2014

SERVICE MANUAL

**XVS950CU
XVS950CUE**

1XC-28197-E0

EAS20040

**XVS950CU/XVS950CUE 2014
SERVICE MANUAL
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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.

IMPORTANT MANUAL INFORMATION

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

	<p>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.</p>
	<p>A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>
	<p>A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.</p>
<p>TIP</p>	<p>A TIP provides key information to make procedures easier or clearer.</p>

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.

1
↓
CLUTCH

CLUTCH

REMOVING THE PRIMARY DRIVE GEAR

Job Instruction Chart

Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-21.
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-3.
	Clutch cable		Disconnect. Refer to "ENGINE REMOVAL" on page 5-3.
	Left footrest assembly		Refer to "ENGINE REMOVAL" on page 5-3.
	Generator cover		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-42.
	Rear brake master cylinder/Right footrest assembly/Rear brake light switch		Refer to "REAR BRAKE" on page 4-35.
1	Circlip	1	
2	Pull lever	1	
3	Pull lever spring	1	
4	Clutch plastic cover 1	1	
5	Clutch plastic cover 2	1	
6	Clutch cover	1	
7	Clutch cable holder	1	

5-48

CLUTCH

REMOVING THE PRIMARY DRIVE GEAR

1. Straighten the lock washer tab.
2. Remove:
 - Primary drive gear nut "1"
 - Lock washer "2"

TIP

- While holding the generator rotor "3" with the sheave holder "4", loosen the primary drive gear nut.
- Do not allow the sheave holder to touch the projection on the generator rotor.

Parts:

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

TIP

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

Parts:

- Universal clutch holder 90890-04086
- YM-91042

3. Remove:
 - Clutch boss nut "1"
 - Conical spring washer "2"
 - Clutch boss "3"

REMOVING THE CLUTCH

FAULTS:

1. Straighten the clutch boss nut rib "a".

2. Loosen:
 - Clutch boss nut "1"

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 each friction plate at four places.

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SYMBOLS

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

TIP

The following symbols are not relevant to every vehicle.



















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

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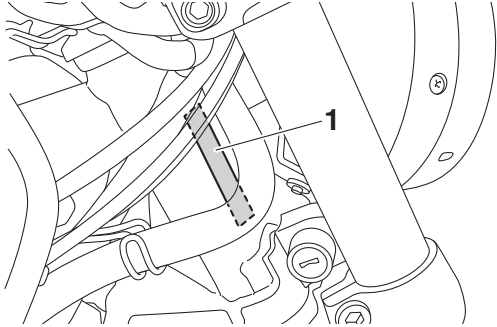
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IDENTIFICATION

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VEHICLE IDENTIFICATION NUMBER

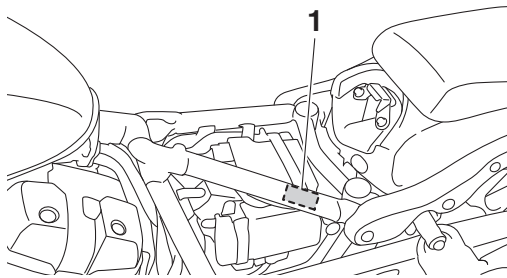
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



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MODEL LABEL

The model label “1” is affixed to the frame under the rider seat. This information will be needed to order spare parts.



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FEATURES

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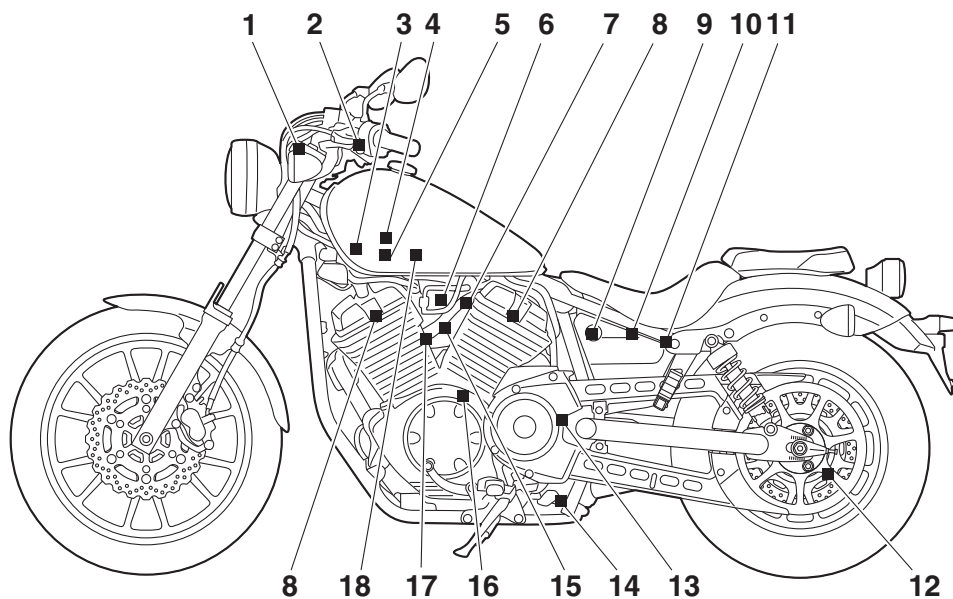
OUTLINE OF THE FI SYSTEM

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. Intake air temperature sensor | 14. O ₂ sensor |
| 2. Engine trouble warning light | 15. ISC (idle speed control) unit |
| 3. Intake air pressure sensor | 16. Crankshaft position sensor |
| 4. Rear cylinder ignition coil | 17. Engine temperature sensor |
| 5. Front cylinder ignition coil | 18. Fuel pump |
| 6. Injectors | |
| 7. Throttle position sensor | |
| 8. Spark plug | |
| 9. Relay unit (fuel pump relay) | |
| 10. ECU (engine control unit) | |
| 11. Lean angle sensor | |
| 12. Rear wheel sensor (for ABS models) | |
| 13. Speed sensor (except for ABS models) | |

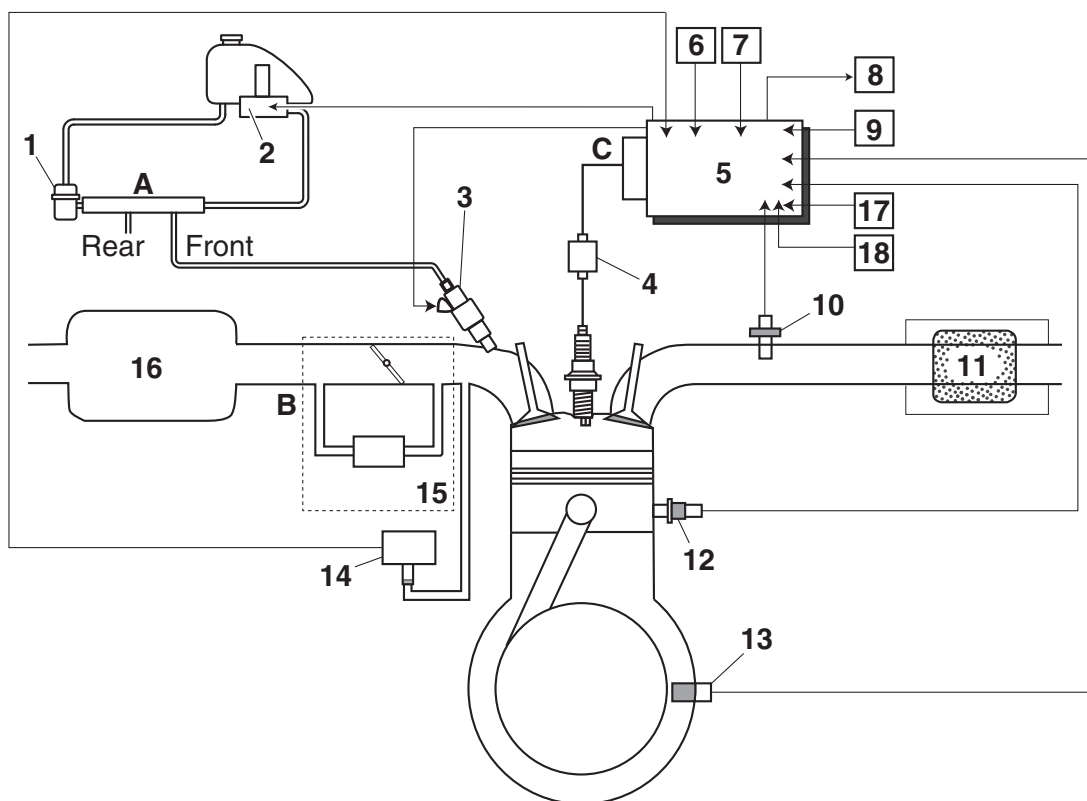
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FI SYSTEM

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 220–300 kPa (2.20–3.00 kg/cm², 31.3–42.7 psi). Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.

The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, crankshaft position sensor, intake air pressure sensor, air temperature sensor, engine temperature sensor, lean angle sensor, speed sensor (except for ABS models), rear wheel sensor (for ABS models) and O₂ 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.



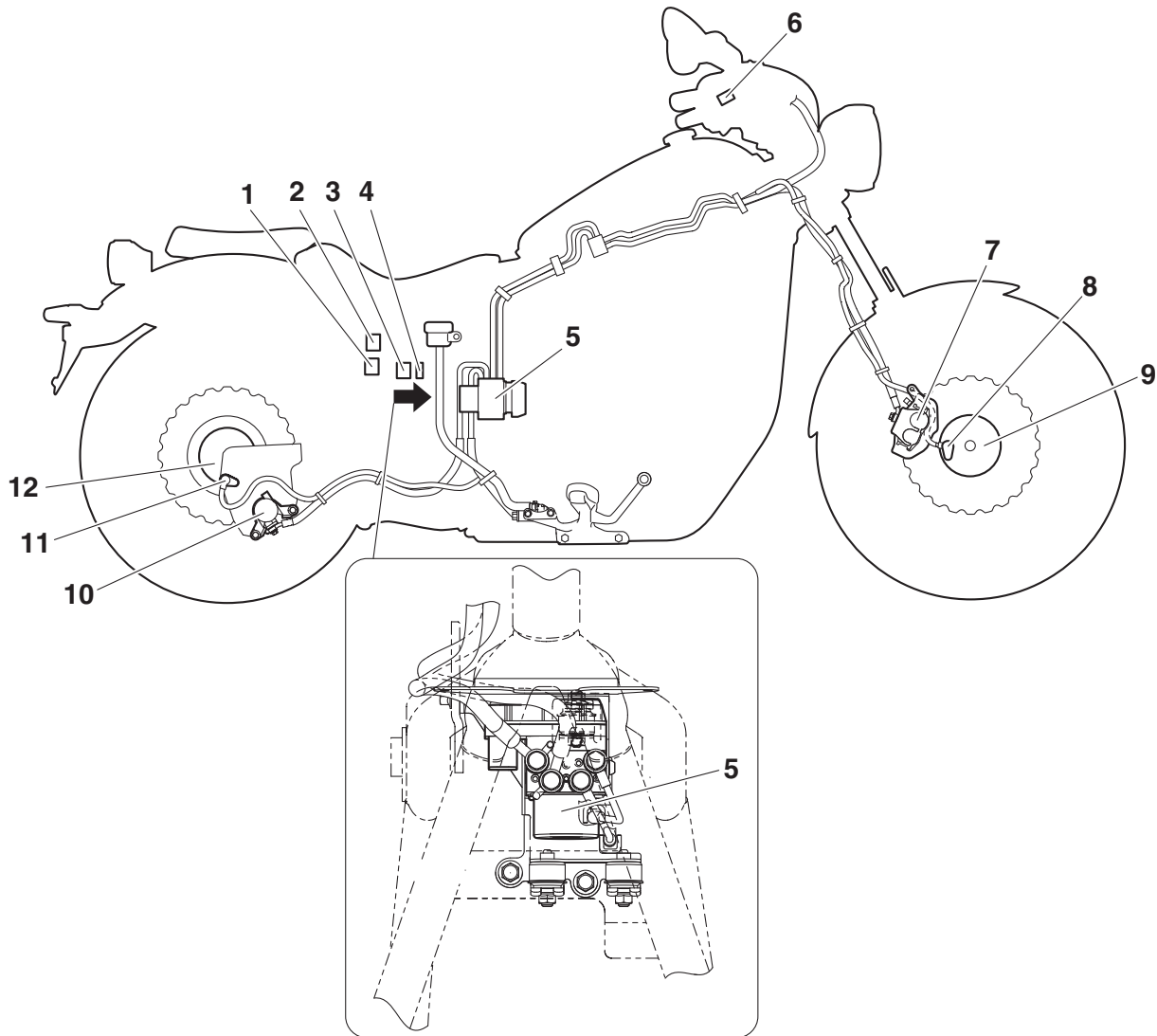
- | | |
|----------------------------------|--|
| 1. Pressure regulator | 13. Crankshaft position sensor |
| 2. Fuel pump | 14. Intake air pressure sensor |
| 3. Fuel injector | 15. Throttle body |
| 4. Ignition coil | 16. Air filter case |
| 5. ECU (engine control unit) | 17. Speed sensor (except for ABS models) |
| 6. Air temperature sensor | 18. Rear wheel sensor (for ABS models) |
| 7. Lean angle sensor | |
| 8. ISC (idle speed control) unit | A. Fuel system |
| 9. Throttle position sensor | B. Air system |
| 10. O ₂ sensor | C. Control system |
| 11. Catalytic converter | |
| 12. Engine temperature sensor | |

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OUTLINE OF THE ABS (for ABS models)

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. ABS motor fuse
2. ABS test coupler
3. ABS ECU fuse
4. ABS solenoid fuse
5. Hydraulic unit assembly
6. ABS warning light
7. Front brake caliper
8. Front wheel sensor
9. Front wheel sensor rotor
10. Rear brake caliper
11. Rear wheel sensor
12. Rear wheel sensor rotor

ABS

The operation of the Yamaha ABS brakes is the same as conventional brakes on other vehicles, with a brake lever for operating the front brake and a brake pedal for operating the rear brake.

When wheel lock is detected during emergency braking, hydraulic control is performed by the hydraulic system on the front and rear brakes independently.

Useful terms

- **Wheel speed:**
The rotation speed of the front and rear wheels.
- **Chassis speed:**
The speed of the chassis.
When the brakes are applied, wheel speed and chassis speed are reduced. However, the chassis travels forward by its inertia even though the wheel speed is reduced.
- **Brake force:**
The force applied by braking to reduce the wheel speed.
- **Wheel lock:**
A condition that occurs when the rotation of one or both of the wheels has stopped, but the vehicle continues to travel.
- **Side force:**
The force on the tires which supports the vehicle when cornering.
- **Slip ratio:**
When the brakes are applied, slipping occurs between the tires and the road surface. This causes a difference between the wheel speed and the chassis speed.
Slip ratio is the value that shows the rate of wheel slippage and is defined by the following formula.

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

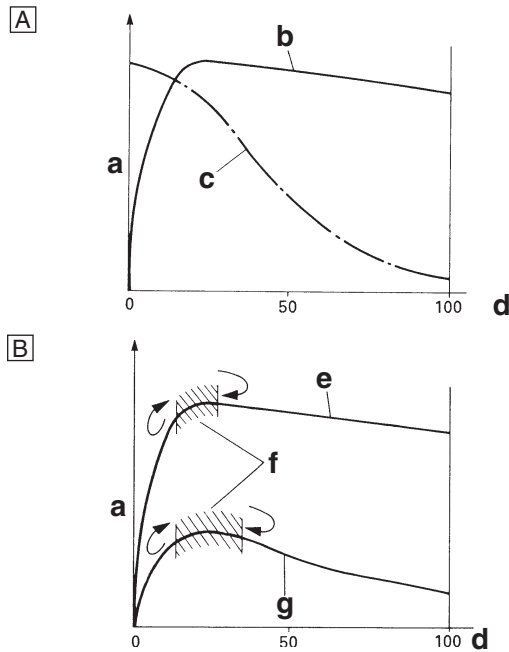
0%: There is no slipping between the wheel and the road surface. The chassis speed is equal to the wheel speed.

100%: The wheel speed is "0", but the chassis is moving (i.e., wheel lock).

Brake force and vehicle stability

When the brake pressure is increased, wheel speed is reduced. Slipping occurs between the tire and the road surface and brake force is generated. The limit of this brake force is determined by the friction force between the tire and the road surface and is closely related to wheel slippage. Wheel slippage is represented by the slip ratio.

Side force is also closely related to wheel slippage. See figure "A". If the brakes are applied while keeping the proper slip ratio, it is possible to obtain the maximum brake force without losing much side force. ABS allows full use of the tires' capabilities even on slippery road surfaces or less slippery road surfaces. See figure "B".



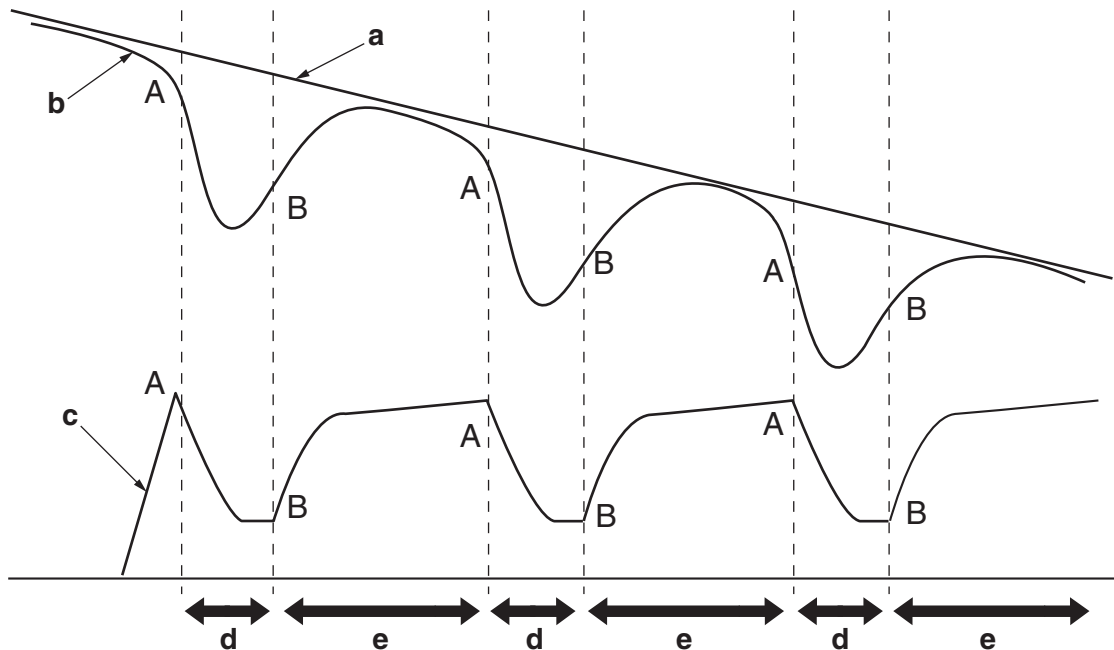
- a. Friction force between the tire and road surface
- b. Brake force
- c. Side force
- d. Slip ratio (%)
- e. Less slippery road surface
- f. Controlling zone
- g. Slippery road surface

Wheel slip and hydraulic control

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

The difference between the chassis speed and the wheel speed calculated in the slip ratio formula is equal to the wheel slip. When the wheel speed is suddenly reduced, the wheel has a tendency to lock. When the wheel slip and the wheel speed reduction rate exceed the preset values, the ABS ECU determines that the wheel has a tendency to lock.

If the slip is large and the wheel has a tendency to lock (point A in the following figure), the ABS ECU reduces the brake fluid pressure in the brake caliper. Once the ABS ECU determines that the tendency of the wheel to lock has diminished after the brake fluid pressure is reduced, it increases the hydraulic pressure (point B in the following figure). The hydraulic pressure is initially increased quickly, and then it is increased gradually.



- a. Chassis speed
- b. Wheel speed
- c. Brake force

- d. Depressurizing phase
- e. Pressurizing phase

ABS operation and vehicle control

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

TIP

When the ABS is activated, a pulsating action may be felt at the brake lever or 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.

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WARNING

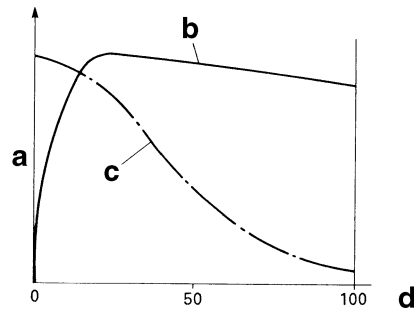
The braking of the vehicle, even in the worst case, is principally executed when the vehicle is advancing straight ahead. During a turn, sudden braking is liable to cause a loss of traction of the tires. Even in vehicles equipped with ABS, overturning of the vehicle cannot be prevented if it is braked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

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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.

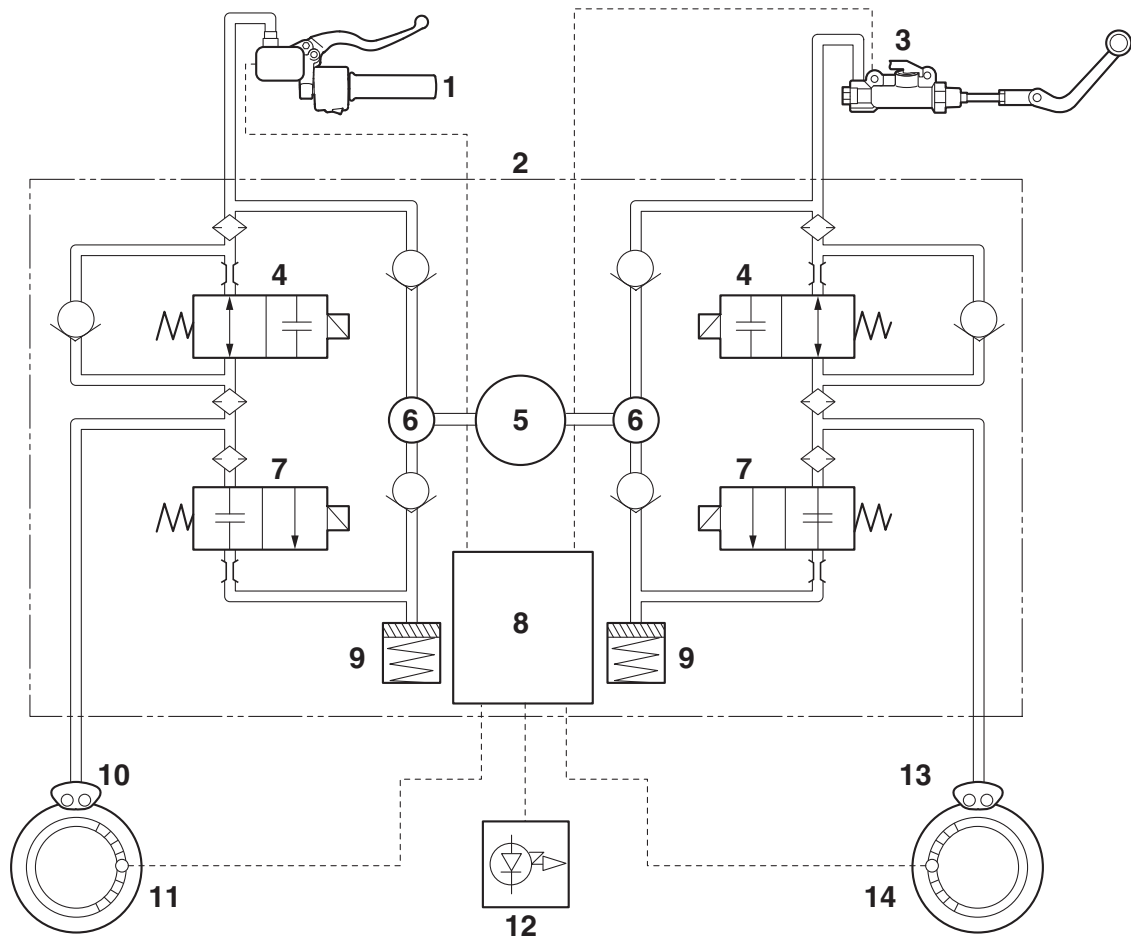
The ABS control is processed with good response under various vehicle travel conditions.

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

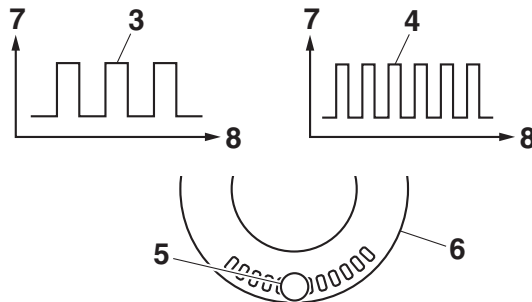
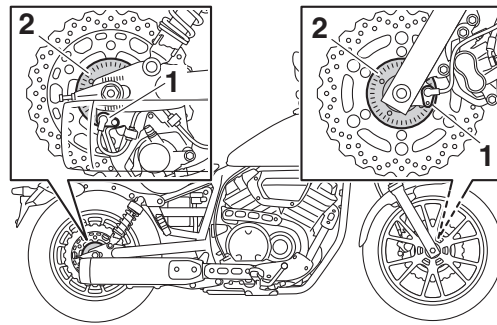
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ABS COMPONENT FUNCTIONS

Wheel sensors and wheel sensor rotors

Wheel sensors “1” detect the wheel speed and transmit the rotation signal to the ABS ECU. Each wheel sensor is composed of a permanent magnet and a hall IC. The front wheel sensor is installed to the front fork outer tube and the rear wheel sensor is installed to the rear brake caliper bracket. The sensor rotors “2” are installed to the wheel hub of each wheel and rotate with the wheels. The sensor rotors “2” have 46 slots and are installed close to the wheel sensors. As the sensor rotor rotates, the hall element in the hall IC installed in the wheel sensor generates the voltage which is proportional to the magnetic flux density, and the generated voltage is processed for waveform shaping in the hall IC to output.

The ABS ECU calculates the wheel rotation speed by detecting the frequency of this voltage.



- 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 during the ABS self-diagnosis to check the electrical circuit of the light. If there are no problems detected during the ABS self-diagnosis, the ABS warning light goes off when the vehicle is ridden at a speed of 10 km/h (6 mi/h) or higher.

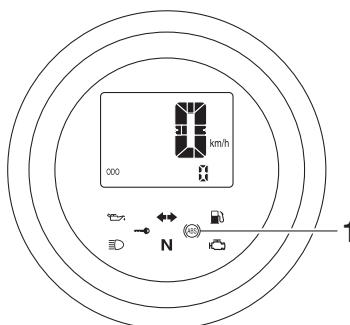
TIP

After all checks and servicing are completed, the ABS warning light will go off when the vehicle is ridden or pushed at a speed of 7 km/h (4 mph) or faster.

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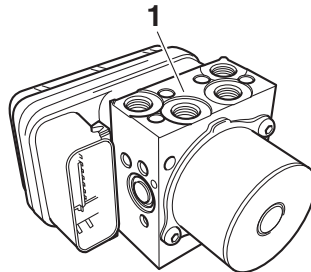
NOTICE

If the rear wheel is raced with the vehicle on a suitable stand, 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 goes off after the vehicle starts off. If the fault codes are not deleted, the ABS warning light goes off after the vehicle is ridden at a speed of approximately 30 km/h (19 mph).



Hydraulic unit assembly

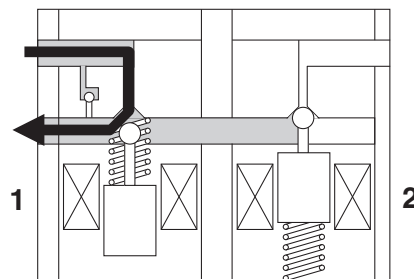
The hydraulic unit assembly “1” is composed of hydraulic control valves (each with a outlet solenoid valve and inlet solenoid valve), buffer chambers, hydraulic pumps, an ABS motor, and ABS ECU. The hydraulic unit adjusts the front and rear wheel brake fluid pressure to control the wheel speed according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



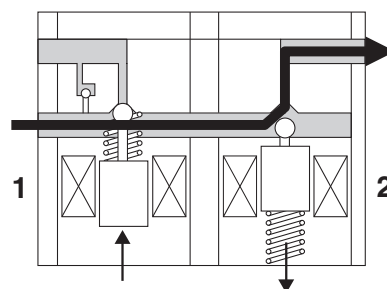
• Hydraulic control valve

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.

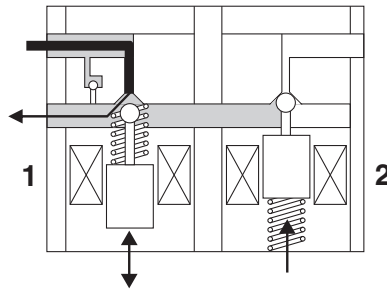
1. When the brakes are operated normally, the inlet solenoid valve “1” is open and the outlet solenoid valve “2” is closed. The brake line between the brake master cylinder and brake caliper is open.



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.

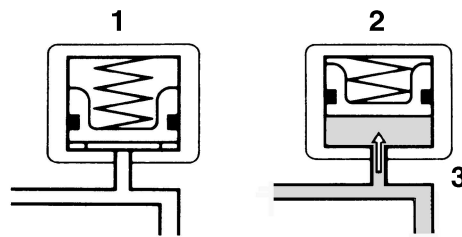


3. When the ABS ECU sends a signal to stop reducing the hydraulic pressure, the outlet solenoid valve “2” closes and the brake fluid is pressurized again. The inlet solenoid valve “1” controls the hydraulic pressure difference between the brake fluid in the upper brake lines (brake master cylinder side)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



- **Buffer chamber**

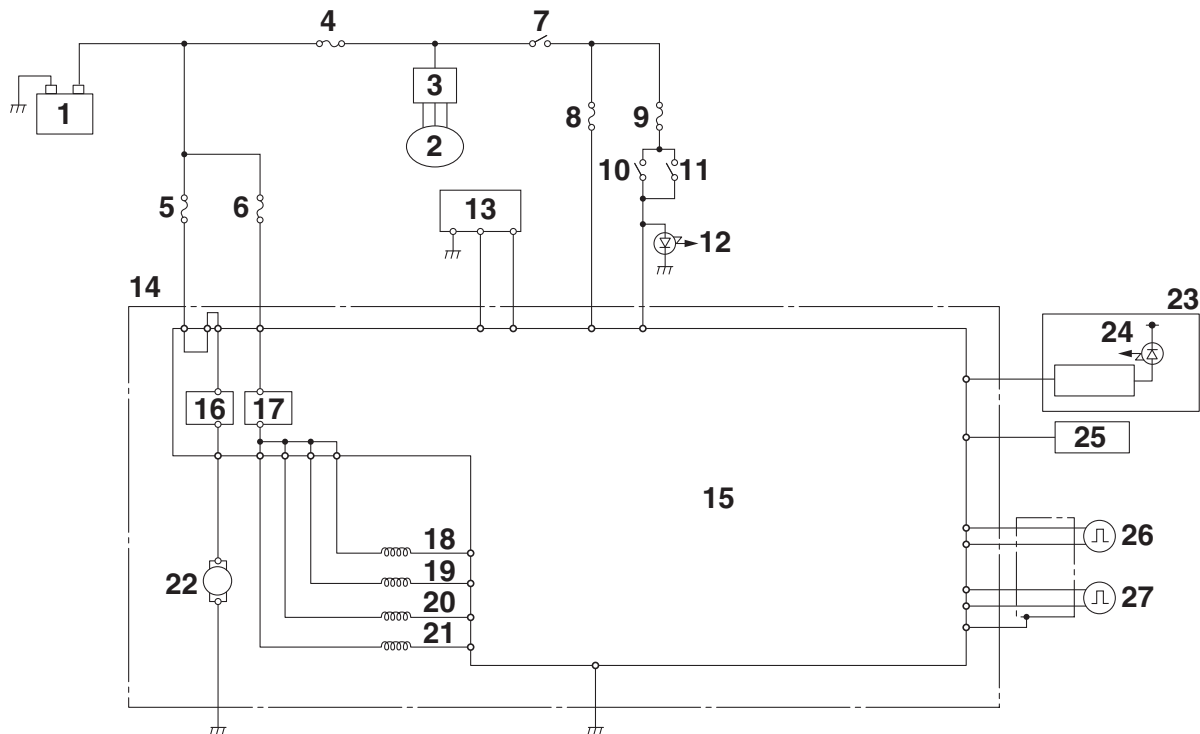
The buffer chamber accumulates the brake fluid that is depressurized while the ABS is operating.



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 | 15. ABS ECU |
| 2. AC magneto | 16. ABS motor relay |
| 3. Rectifier/regulator | 17. Solenoid relay |
| 4. Main fuse | 18. Front brake outlet solenoid |
| 5. ABS motor fuse | 19. Front brake inlet solenoid |
| 6. ABS solenoid fuse | 20. Rear brake outlet solenoid |
| 7. Main switch | 21. Rear brake inlet solenoid |
| 8. ABS ECU fuse | 22. ABS motor |
| 9. Signaling system fuse | 23. Meter assembly |
| 10. Rear brake light switch | 24. ABS warning light |
| 11. Front brake light switch | 25. ECU (engine control unit) |
| 12. Tail/brake light | 26. Front wheel sensor |
| 13. ABS test coupler | 27. Rear wheel sensor |
| 14. Hydraulic unit assembly | |

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

ABS control operation

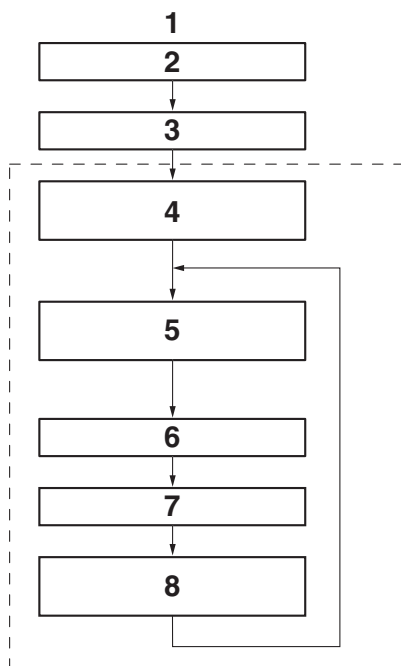
The ABS control operation performed in the ABS ECU is divided into the following two parts.

- 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 brake lever or brake pedal are even slightly applied, a vibration can be felt at the lever and 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

EAS1XC1024

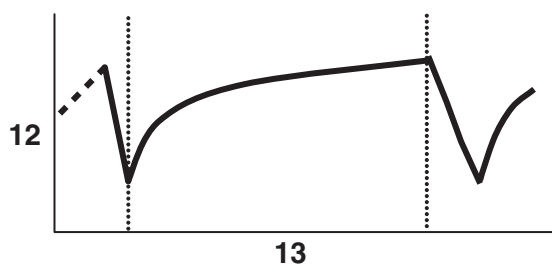
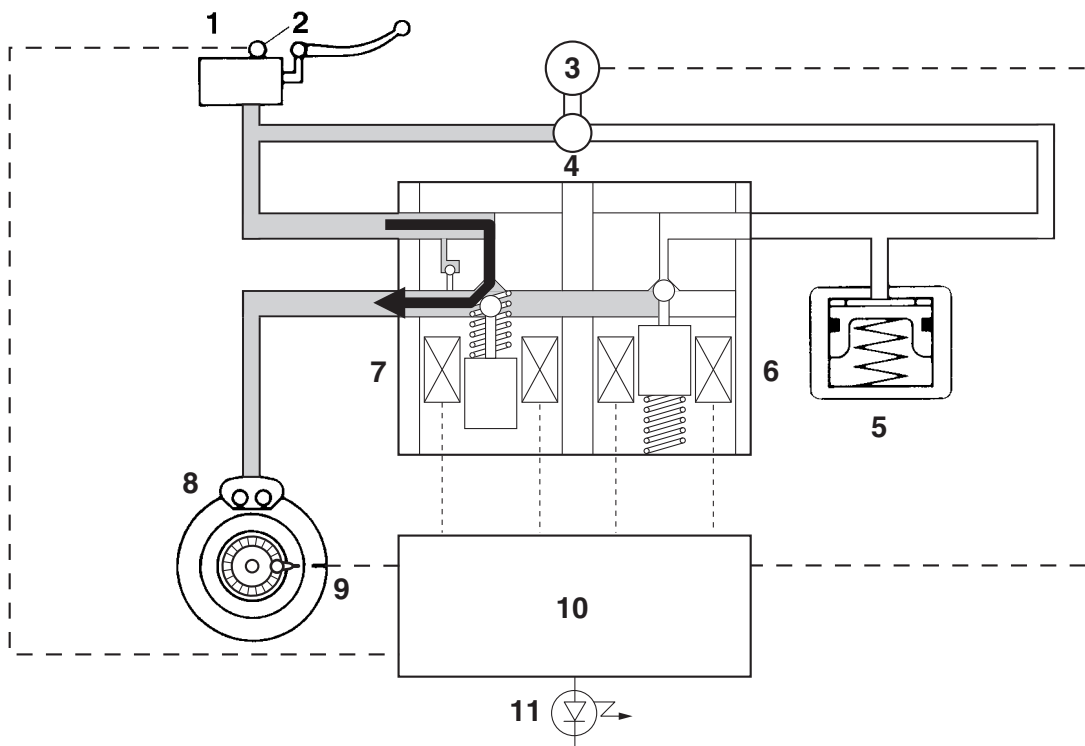
ABS OPERATION

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.



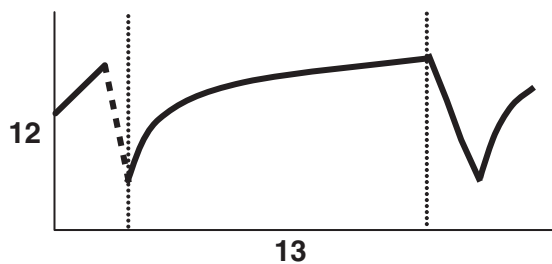
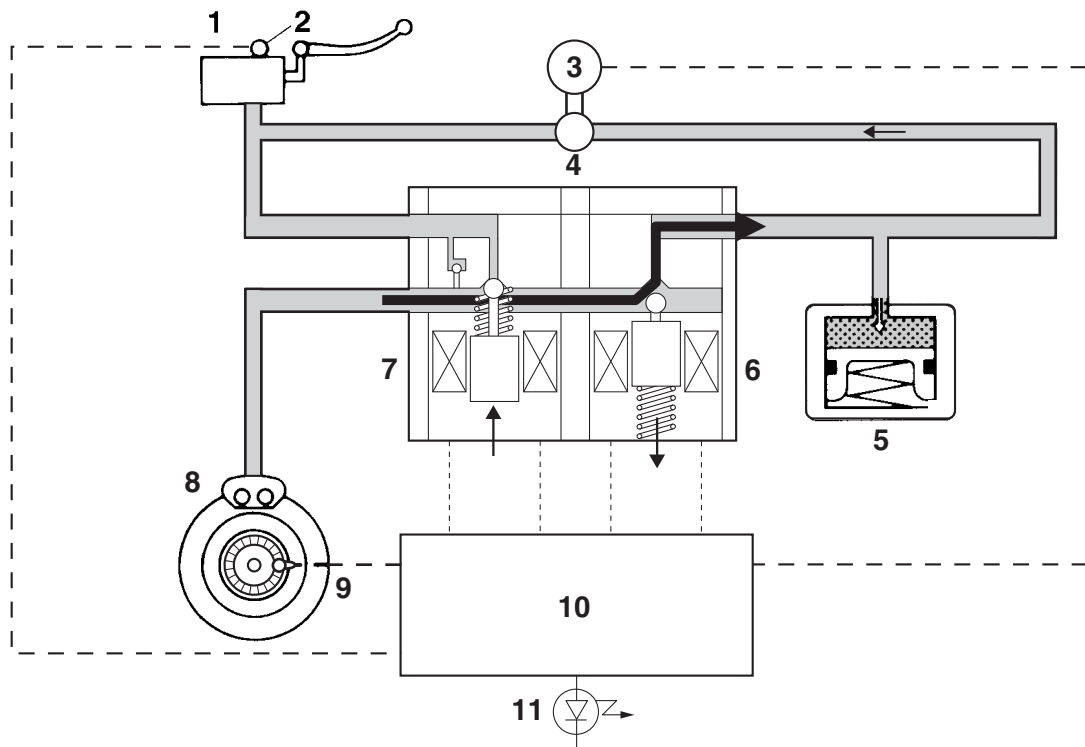
- | | |
|--------------------------|--------------------------|
| 1. Brake master cylinder | 11. ABS warning light |
| 2. Brake light switch | 12. Brake fluid pressure |
| 3. ABS motor | 13. Time |
| 4. Hydraulic pump | |
| 5. Buffer chamber | |
| 6. Outlet solenoid valve | |
| 7. Inlet solenoid valve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

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.

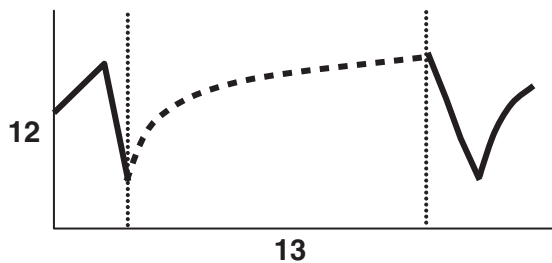
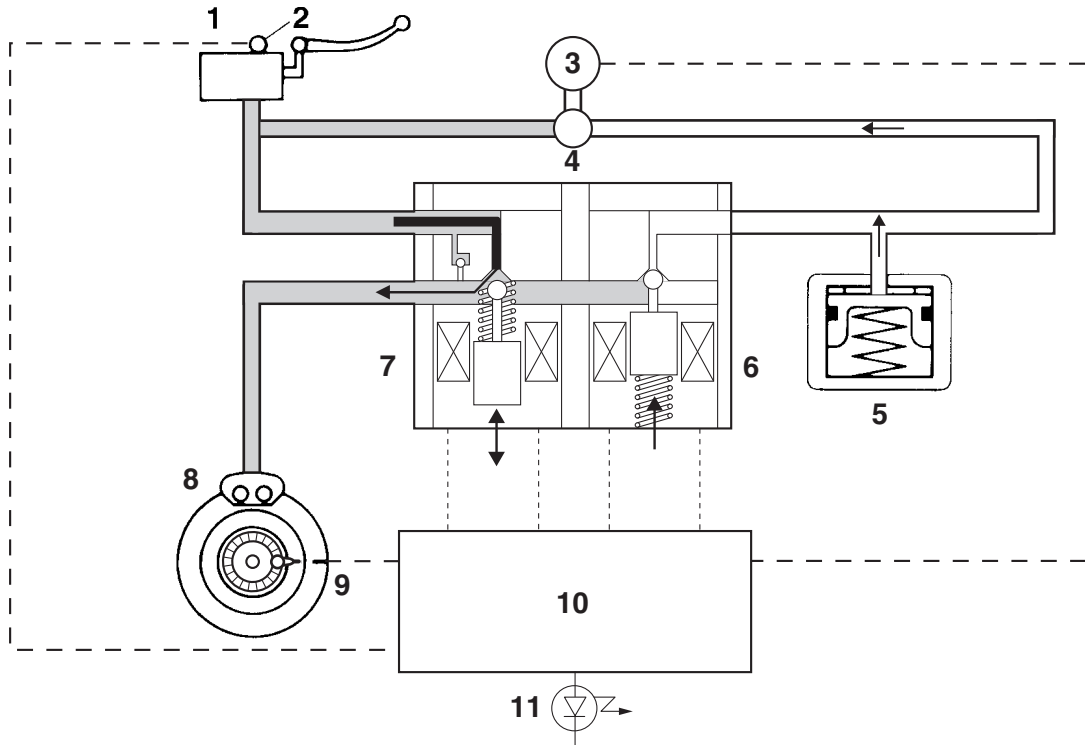
The brake fluid stored in the buffer chamber is pumped back to the brake master cylinder by the hydraulic pump linked to the ABS motor.



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

EAS1XC1025

ABS WARNING LIGHT AND OPERATION

ABS function

EWA1XC1005

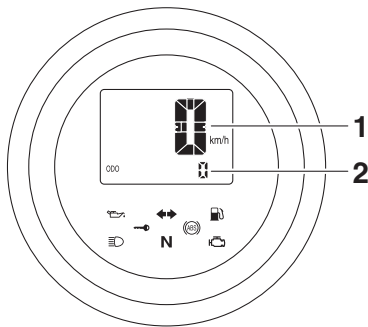


-
- When hydraulic control is performed by the ABS, the brake system alerts the rider that the wheels have a tendency to lock by generating a reaction-force pulsating action in the brake lever or brake pedal. When the ABS is activated, the grip between the road surface and tires is close to the limit. 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.
Use extreme care when operating the vehicle under these conditions.
 - 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.
-

EAS5S71021

INSTRUMENT FUNCTIONS

Multi-function meter unit



1. Speedometer
2. Odometer/tripmeter/fuel reserve tripmeter/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:

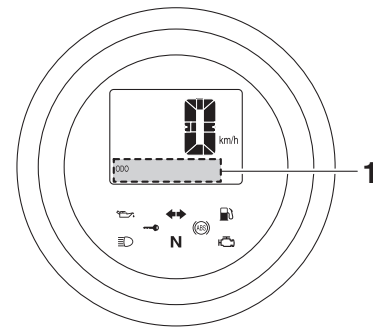
- a speedometer
- an odometer
- two tripmeters (which show the distance traveled since they were last set to zero)
- a fuel reserve tripmeter (which shows the distance traveled on the fuel reserve)
- a clock
- a self-diagnosis device

TIP

- Be sure to turn the key to “ON” before using the “SELECT” and “RESET” switches.
- To switch the speedometer and odometer/tripmeter displays between kilometers and miles, push the “SELECT” switch for at least three seconds. (for U.K. only)

2. “RESET” switch

Odometer, tripmeters, fuel reserve tripmeter and clock



1. Odometer/tripmeter/fuel reserve tripmeter

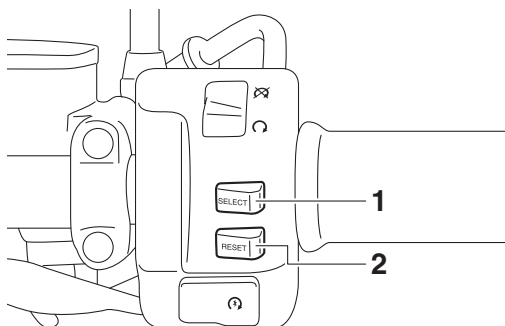
Push the “SELECT” switch to switch the display between the odometer mode “ODO”, the tripmeter modes “TRIP 1” and “TRIP 2” and the clock mode in the following order:

ODO → TRIP 1 → TRIP 2 → clock → ODO

If the fuel level warning light comes on, the odometer display will automatically change to the fuel reserve tripmeter mode “TRIP F” and start counting the distance traveled from that point. In that case, push the “SELECT” switch to change the display between the various tripmeter and odometer modes in the following order: TRIP F → TRIP 1 → TRIP 2 → clock → ODO → TRIP F

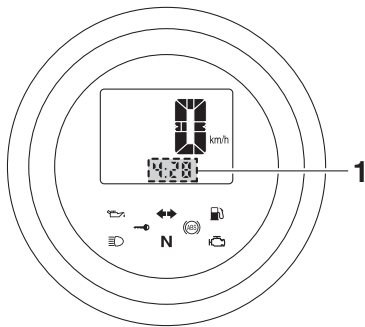
To reset a tripmeter, select it by pushing the “SELECT” switch, and then push the “RESET” switch for at least one second. If you do not reset the fuel reserve tripmeter manually, it will reset itself automatically, and the display will return to the prior mode after refueling and traveling 5 km (3 mi).

After refueling, the fuel level warning light will go off after 5 seconds if the engine is stopped. If the vehicle is traveling or the vehicle speed error (fault code No. 42) is indicated, the fuel level warning light will go off after 90 seconds.



1. “SELECT” switch

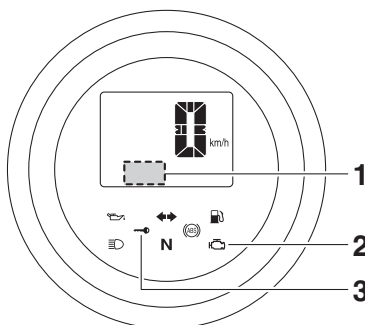
To set the clock





1. Clock

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

Self-diagnosis device



1. Fault code display
2. Engine trouble warning light “ ”
3. Immobilizer system indicator light “ ”

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 a fault code.

If the display indicates any fault codes, note the code number, and then check the fuel injection system. Refer to “FUEL INJECTION SYSTEM” on page 7-39.

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 a fault code.

TIP

If the display indicates fault code 52, this could be caused by transponder interference. If this fault 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.

If the information display indicates any fault codes, note the code number, and then check the immobilizer system. Refer to “IMMOBILIZER SYSTEM” on page 7-97.

ECA1TP1028

NOTICE

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

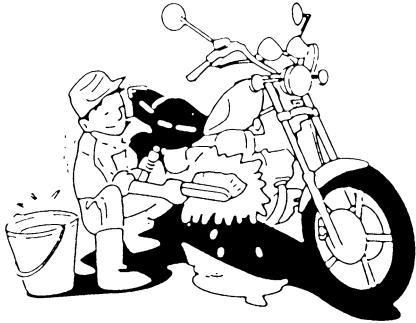
EAS20180

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 1-28.

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.

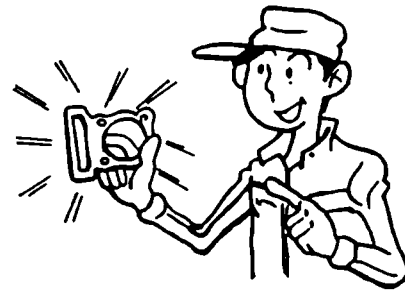


4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EAS20200

REPLACEMENT PARTS

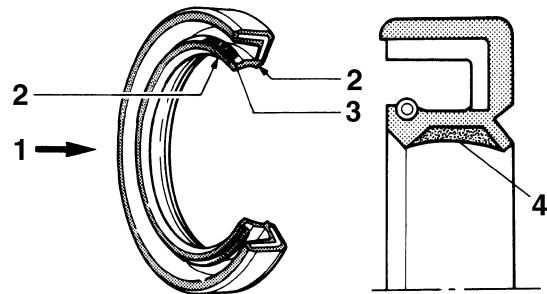
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



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.

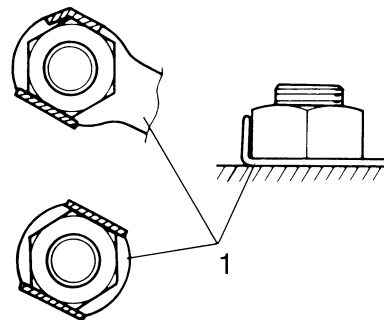


1. Oil
2. Lip
3. Spring
4. Grease

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.

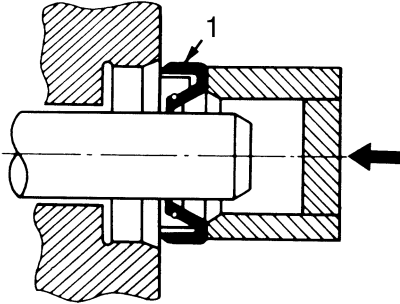


IMPORTANT INFORMATION

EAS20230

BEARINGS AND OIL SEALS

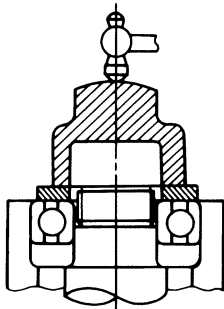
Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals "1", lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.



ECA13300

NOTICE

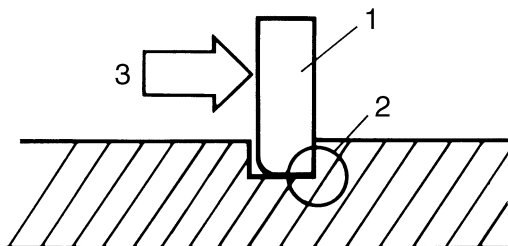
Do not spin the bearing with compressed air because this will damage the bearing surfaces.



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

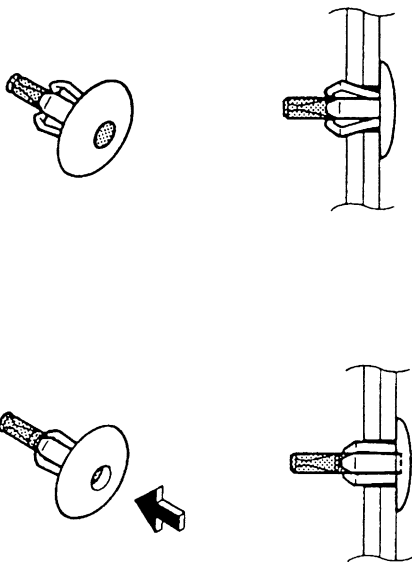
QUICK FASTENERS

Rivet type

1. Remove:
 - Quick fastener

TIP

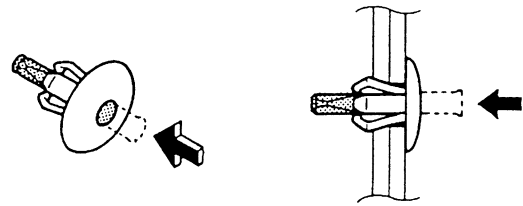
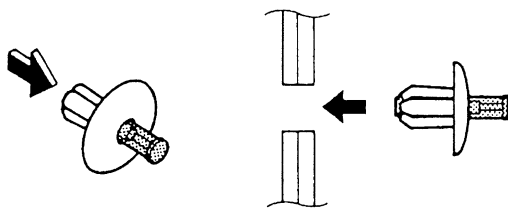
To remove the quick fastener, push its pin with a screwdriver, then pull the fastener out.



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 in with a screwdriver. Make sure that the pin is flush with the fastener's head.

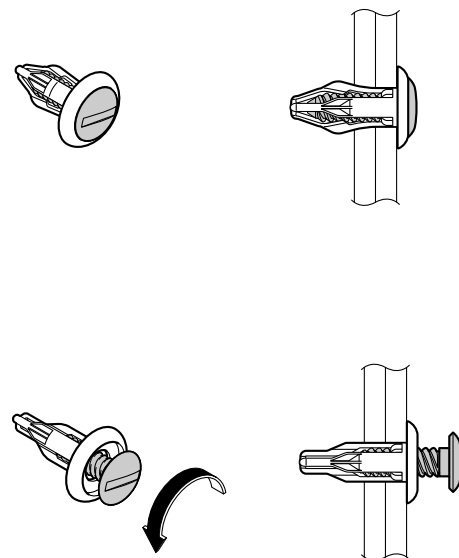


Screw type

1. Remove:
 - Quick fastener

TIP

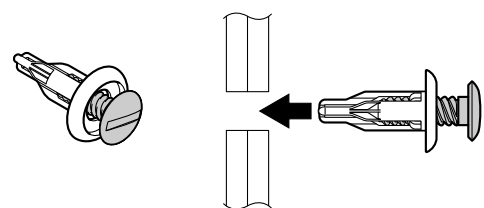
To remove the quick fastener, loosen the screw with a screwdriver, then pull the fastener out.

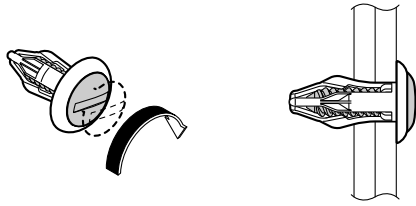


2. Install:
 - Quick fastener

TIP

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





EAS30402

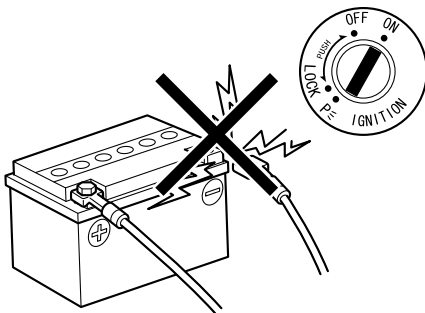
ELECTRICAL SYSTEM

Electrical parts handling

ECA16600

NOTICE

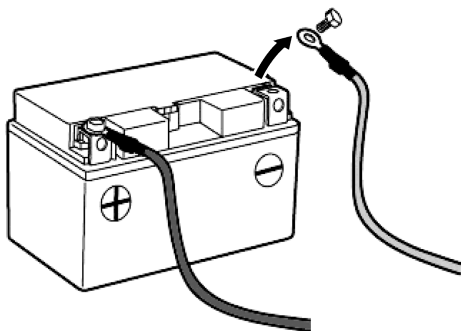
Never disconnect a battery lead while the engine is running; otherwise, the electrical components could be damaged.



ECA16751

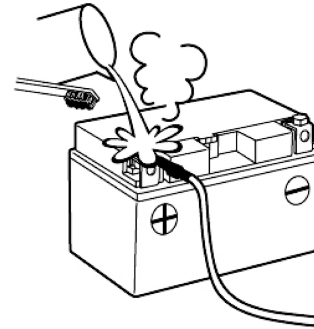
NOTICE

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



TIP

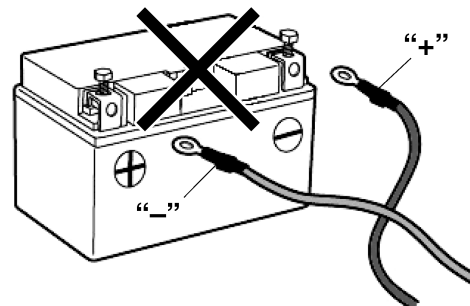
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



ECA16760

NOTICE

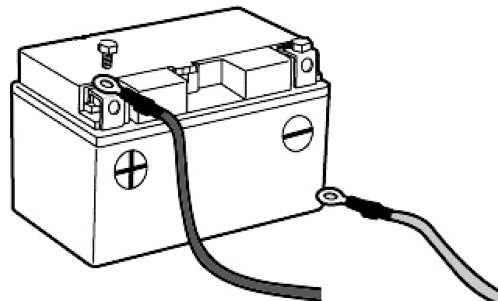
Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



ECA16771

NOTICE

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

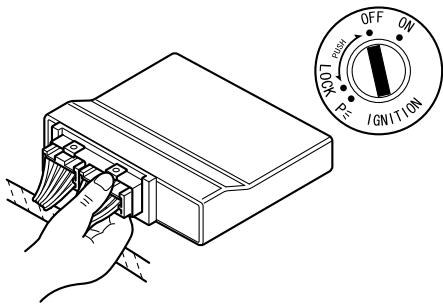


ECA16610

NOTICE

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

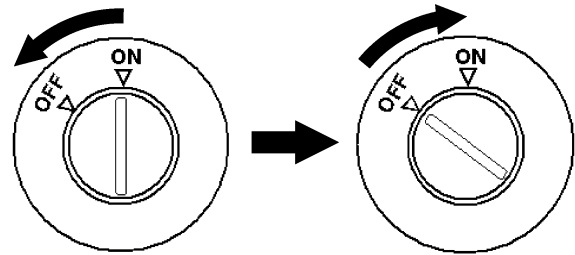
BASIC SERVICE INFORMATION



ECA16620

NOTICE

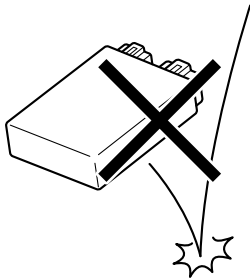
Handle electrical components with special care, and do not subject them to strong shocks.



Checking the electrical system

TIP

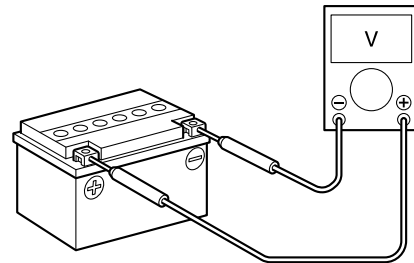
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA16630

NOTICE

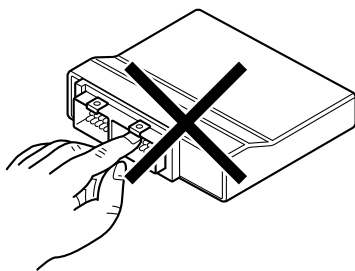
Electrical components are very sensitive to and can be damaged by static electricity. Therefore, never touch the terminals and be sure to keep the contacts clean.



ECA14371

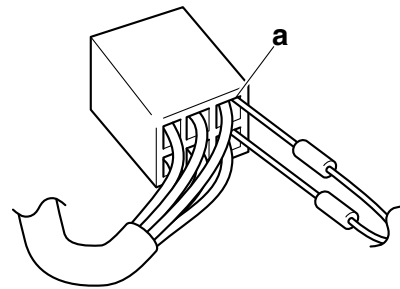
NOTICE

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.



TIP

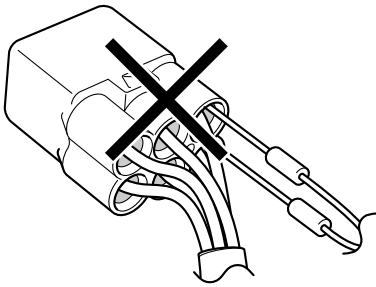
When resetting the ECU by turning the main switch to "OFF", be sure to wait approximately 5 seconds before turning the main switch back to "ON".



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.

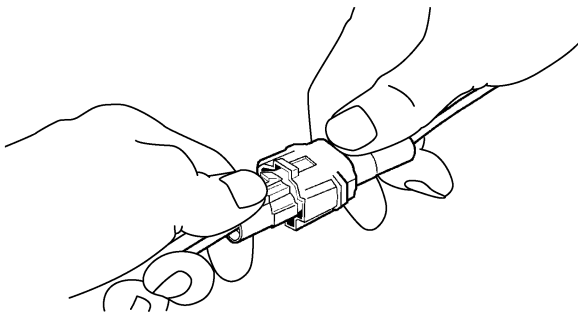
1. Disconnect:

- Lead
- Coupler
- Connector

ECA16780

NOTICE

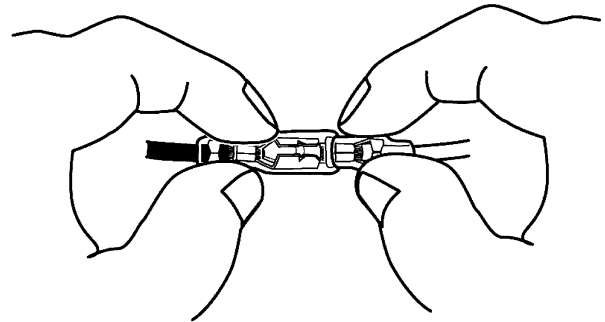
- When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.
- There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.



ECA16790

NOTICE

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

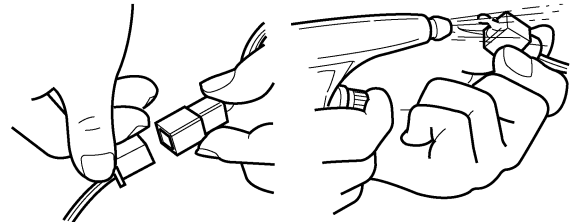


2. Check:

- Lead
- Coupler
- Connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.

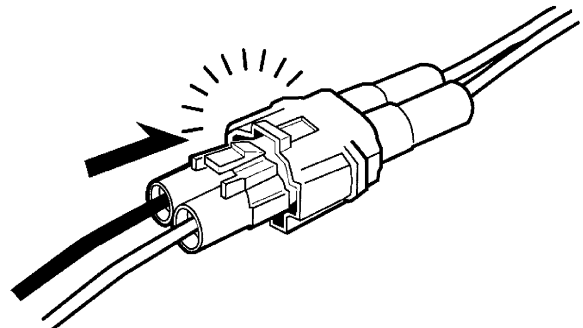


3. Connect:

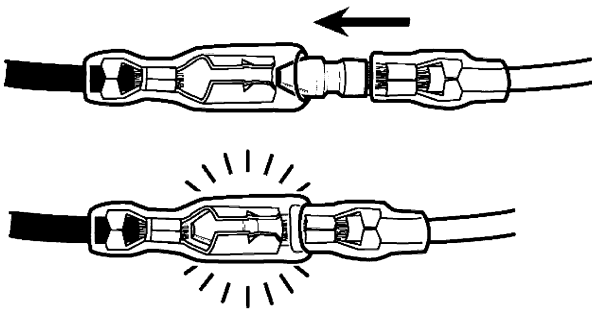
- Lead
- Coupler
- Connector

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.



BASIC SERVICE INFORMATION



4. Check:

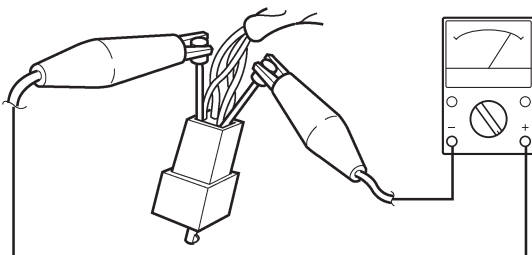
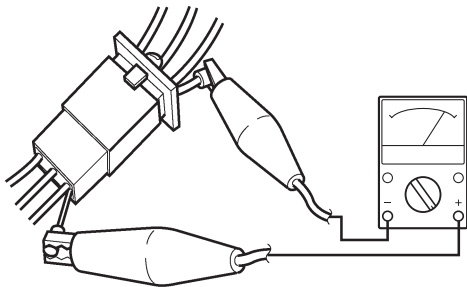
- Continuity
(with the pocket tester)



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.



5. Check:

- Resistance



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

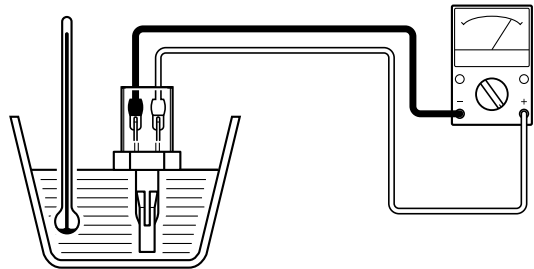
TIP

The resistance values shown were obtained at the standard measuring temperature of 20 °C (68 °F). If the measuring temperature is not 20 °C (68 °F), the specified measuring conditions will be shown.



Intake air temperature sensor resistance

5.40–6.60 k Ω at 0 °C (32 °F)
290–390 Ω at 80 °C (176 °F)



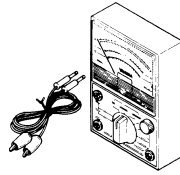
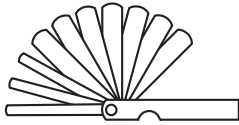
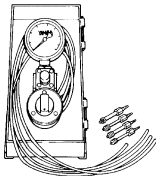

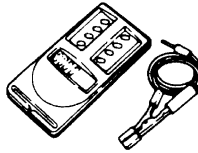
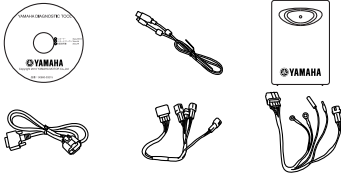
EAS20260

SPECIAL TOOLS


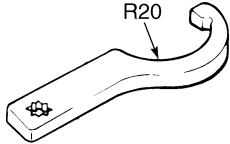
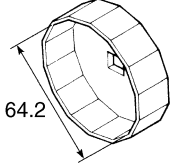
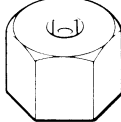
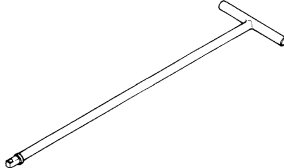
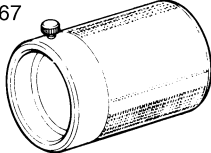
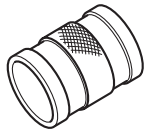
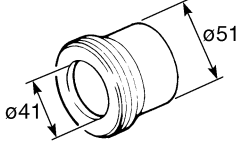
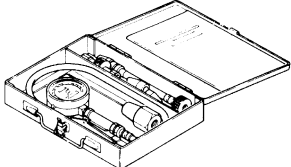
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

TIP

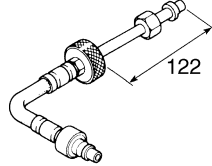
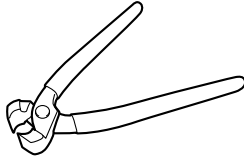
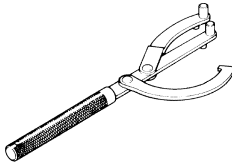
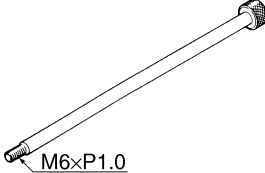
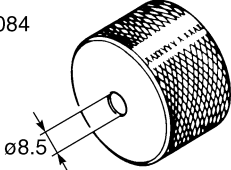
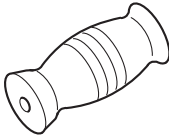
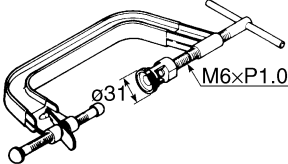
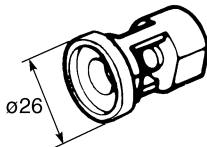
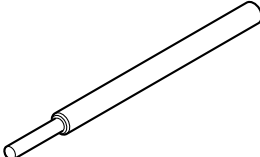
- For U.S.A. and Canada, use part numbers starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part numbers starting with “90890-”.

Tool name/Tool No.	Illustration	Reference pages
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-27, 1-27, 7-153, 7-154, 7-155, 7-155, 7-159, 7-160, 7-160, 7-161, 7-162, 7-162, 7-163, 7-163, 7-164, 7-165, 7-165, 7-166, 7-167, 7-167, 7-168, 7-168, 7-169, 7-169
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		3-6, 3-6, 3-6, 4-18, 4-29
Vacuum gauge 90890-03094 Vacuummate YU-44456	90890-03094  YU-44456 	3-8
Digital tachometer 90890-06760 YU-39951-B		3-8, 7-165
Yamaha diagnostic tool 90890-03215		3-9, 4-67, 4-69, 7-45, 7-119, 7-145

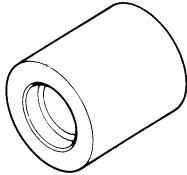
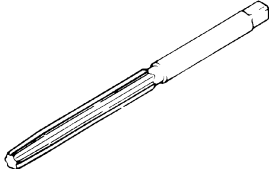
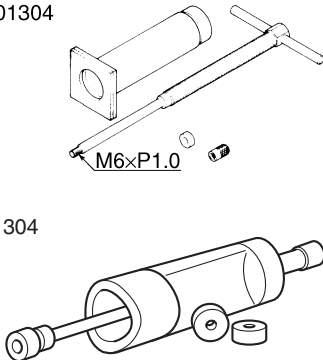
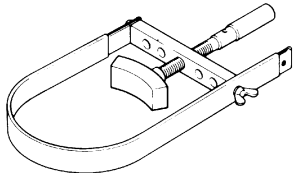
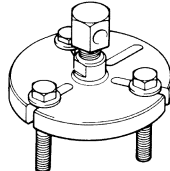
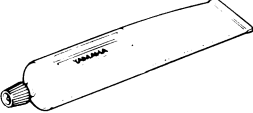
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Belt tension gauge 90890-03170 Rear drive belt tension gauge YM-03170		3-18
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-19, 4-87
Oil filter wrench 90890-01426 YU-38411		3-24
Damper rod holder (22 mm) 90890-01365		4-80, 4-82
T-handle 90890-01326 T-handle 3/8" drive 60 cm long YM-01326		4-80, 4-82
Fork seal driver weight 90890-01367 Replacement hammer YM-A9409-7	90890-01367  YM-A9409-7/YM-A5142-4 	4-82, 4-82, 4-83
Fork seal driver attachment (ø41) 90890-01381 Replacement 41 mm YM-A5142-2		4-82, 4-82
Compression gauge 90890-03081 Engine compression tester YU-33223		5-1

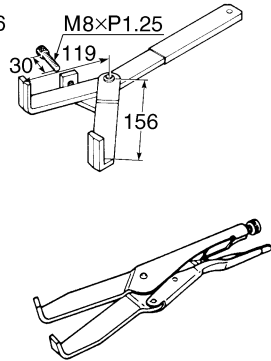
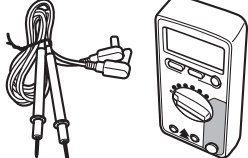

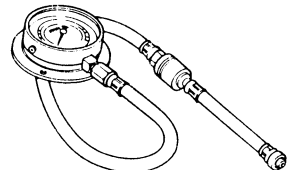
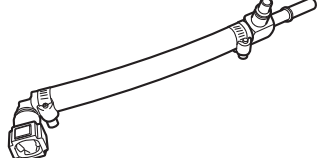
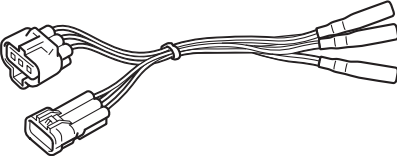
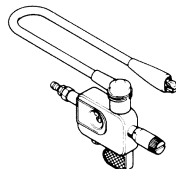
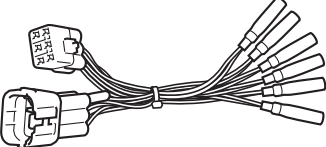
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Extension 90890-04136		5-1
Boots band installation tool 90890-01526 YM-01526		5-5
Rotor holding tool 90890-01235 Universal magneto & rotor holder YU-01235		5-19, 5-23, 5-24
Slide hammer bolt 90890-01083 Slide hammer bolt 6 mm YU-01083-1		5-20
Weight 90890-01084 YU-01083-3	<p>90890-01084</p>  <p>ø8.5</p> <p>YU-01083-3</p> 	5-20
Valve spring compressor 90890-04019 YM-04019		5-30, 5-35
Valve spring compressor attachment 90890-01243 Valve spring compressor adapter (26 mm) YM-01253-1		5-30, 5-35
Valve guide remover (ø6) 90890-04064 Valve guide remover (6.0 mm) YM-04064-A		5-31

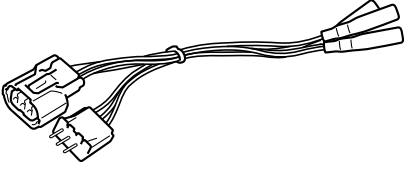
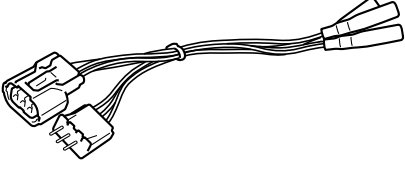
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Valve guide installer (ø6) 90890-04065 Valve guide installer (6.0 mm) YM-04065-A		5-31
Valve guide reamer (ø6) 90890-04066 Valve guide reamer (6.0 mm) YM-04066		5-31
Piston pin puller set 90890-01304 Piston pin puller YU-01304	<p>90890-01304</p>  <p>M6×P1.0</p> <p>YU-01304</p>	5-37
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-45, 5-45, 5-46, 5-46, 5-53, 5-58
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-45
Yamaha bond No. 1215 90890-85505 (Three Bond No.1215®)		5-46, 5-70

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Universal clutch holder 90890-04086 YM-91042		5-53, 5-56
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		5-63, 6-10, 7-164
Vacuum/pressure pump gauge set 90890-06756 Mityvac brake bleeding tool YS-42423		6-10
Pressure gauge 90890-03153 YU-03153		6-10
Fuel pressure adapter 90890-03176 YM-03176		6-10
Test harness– TPS (3P) 90890-03204 YU-03204		6-10
Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487		7-162
Test harness– lean angle sensor (6P) 90890-03209 YU-03209		7-164

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Test harness S– pressure sensor (3P) 90890-03207 YU-03207	 A line drawing of a test harness. It features a three-pin connector on the left side and a bundle of three wires on the right side, which are secured by a zip tie. The wires are bundled together and extend to the right.	7-167
Test harness S– pressure sensor 5S7 (3P) 90890-03211 YU-03211	 A line drawing of a test harness, identical in design to the one above. It has a three-pin connector on the left and a bundle of three wires on the right, secured with a zip tie.	7-168

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ENGINE SPECIFICATIONS	2-2
CHASSIS SPECIFICATIONS	2-9
ELECTRICAL SPECIFICATIONS	2-12
TIGHTENING TORQUES	2-15
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ENGINE OIL LUBRICATION CHART	2-31
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CABLE ROUTING (except for ABS models)	2-41
CABLE ROUTING (for ABS models)	2-75

GENERAL SPECIFICATIONS

EAS20280

GENERAL SPECIFICATIONS

Model

Model	XVS950CU 1XC1 (Europe)(for ABS models) XVS950CU 2DX7 (Europe)(for ABS models) XVS950CU 2DE1 (Europe)(except for ABS models) XVS950CU 2DA1 (AUS)(except for ABS models) XVS950CUE 2DX5 (AUS)(except for ABS models)
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Dimensions

Overall length	2290 mm (90.2 in)
Overall width	830 mm (32.7 in)
Overall height	1120 mm (44.1 in)
Seat height	690 mm (27.2 in)
Wheelbase	1570 mm (61.8 in)
Ground clearance	130 mm (5.12 in)
Minimum turning radius	3290 mm (129.5 in)

Weight

Curb weight	247 kg (545 lb) (except for ABS models) 251 kg (553 lb) (for ABS models)
Maximum load	206 kg (454 lb) (except for ABS models) 202 kg (445 lb) (for ABS models)

ENGINE SPECIFICATIONS

EAS20291

ENGINE SPECIFICATIONS

Engine

Engine type	Air cooled 4-stroke, SOHC
Displacement	942 cm ³
Cylinder arrangement	V-type 2-cylinder
Bore × stroke	85.0 × 83.0 mm (3.35 × 3.27 in)
Compression ratio	9.00 : 1
Standard compression pressure (at sea level)	1400 kPa/400 r/min (14.0 kgf/cm ² /400 r/min, 199.1 psi/400 r/min)
Minimum-maximum	1250–1500 kPa (12.5–15.0 kgf/cm ² , 177.8–213.3 psi)
Starting system	Electric starter

Fuel

Recommended fuel	Regular unleaded gasoline (Gasohol (E10) acceptable)
Fuel tank capacity	12.2 L (3.22 US gal, 2.68 Imp.gal)
Fuel reserve amount	2.8 L (0.74 US gal, 0.62 Imp.gal)

Engine oil

Lubrication system	Wet sump
Recommended brand	YAMALUBE
Type	SAE 10W-30, 10W-40, 10W-50, 15W-40, 20W-40 or 20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Engine oil quantity	
Quantity (disassembled)	4.30 L (4.55 US qt, 3.78 Imp.qt)
Without oil filter cartridge replacement	3.70 L (3.91 US qt, 3.26 Imp.qt)
With oil filter cartridge replacement	4.00 L (4.23 US qt, 3.52 Imp.qt)

Oil filter

Oil filter type	Cartridge
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Oil pump

Oil pump type	Trochoid
Inner-rotor-to-outer-rotor-tip clearance	Less than 0.120 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)
Bypass valve opening pressure	80–120 kPa (0.8–1.2 kgf/cm ² , 11.4–17.1 psi)
Relief valve operating pressure	391.0–489.0 kPa (3.91–4.89 kgf/cm ² , 56.7–70.9 psi)

Spark plug(s)

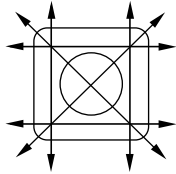
Manufacturer/model	NGK/CPR7EA-9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)

Cylinder head

Combustion chamber volume	40.50–42.70 cm ³ (2.47–2.61 cu.in)
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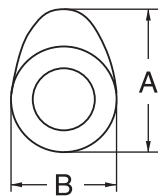
ENGINE SPECIFICATIONS

Warpage limit 0.03 mm (0.0012 in)



Camshaft

Drive system	Chain drive (left and right)
Camshaft lobe dimensions	
Intake A	42.470–42.570 mm (1.6720–1.6760 in)
Limit	42.370 mm (1.6681 in)
Intake B	37.041–37.141 mm (1.4583–1.4622 in)
Limit	36.941 mm (1.4544 in)
Exhaust A	42.138–42.238 mm (1.6590–1.6629 in)
Limit	42.038 mm (1.6550 in)
Exhaust B	37.015–37.115 mm (1.4573–1.4612 in)
Limit	36.915 mm (1.4533 in)



Camshaft runout limit 0.030 mm (0.0012 in)

Timing chain

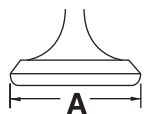
Tensioning system	Automatic
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Rocker arm/rocker arm shaft

Rocker arm inside diameter	12.000–12.018 mm (0.4724–0.4731 in)
Limit	12.036 mm (0.4739 in)
Rocker arm shaft outside diameter	11.981–11.991 mm (0.4717–0.4721 in)
Limit	11.941 mm (0.4701 in)
Rocker-arm-to-rocker-arm-shaft clearance	0.009–0.037 mm (0.0004–0.0015 in)
Limit	0.095 mm (0.0037 in)

Valve, valve seat, valve guide

Valve clearance (cold)	
Intake	0.08–0.12 mm (0.0031–0.0047 in)
Exhaust	0.22–0.26 mm (0.0087–0.0102 in)
Valve dimensions	
Valve head diameter A (intake)	31.40–31.60 mm (1.2362–1.2441 in)
Valve head diameter A (exhaust)	27.90–28.10 mm (1.0984–1.1063 in)

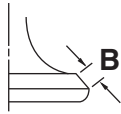


Valve face width B (intake) 2.300 mm (0.0906 in)

ENGINE SPECIFICATIONS

Valve face width B (exhaust)

2.300 mm (0.0906 in)



Valve seat width C (intake)

1.00–1.20 mm (0.0394–0.0472 in)

Limit

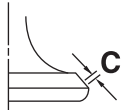
1.6 mm (0.06 in)

Valve seat width C (exhaust)

1.00–1.20 mm (0.0394–0.0472 in)

Limit

1.6 mm (0.06 in)

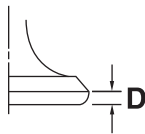


Valve margin thickness D (intake)

1.00 mm (0.0394 in)

Valve margin thickness D (exhaust)

1.00 mm (0.0394 in)



Valve stem diameter (intake)

5.975–5.990 mm (0.2352–0.2358 in)

Limit

5.945 mm (0.2341 in)

Valve stem diameter (exhaust)

5.960–5.975 mm (0.2346–0.2352 in)

Limit

5.930 mm (0.2335 in)

Valve guide inside diameter (intake)

6.000–6.012 mm (0.2362–0.2367 in)

Limit

6.050 mm (0.2382 in)

Valve guide inside diameter (exhaust)

6.000–6.012 mm (0.2362–0.2367 in)

Limit

6.050 mm (0.2382 in)

Valve-stem-to-valve-guide clearance (intake)

0.010–0.037 mm (0.0004–0.0015 in)

Limit

0.080 mm (0.0032 in)

Valve-stem-to-valve-guide clearance (exhaust)

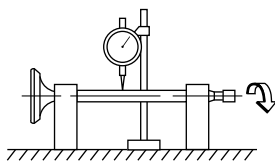
0.025–0.052 mm (0.0010–0.0020 in)

Limit

0.100 mm (0.0039 in)

Valve stem runout

0.010 mm (0.0004 in)



Valve spring

Free length (intake)

42.43 mm (1.67 in)

Limit

40.31 mm (1.59 in)

Free length (exhaust)

42.43 mm (1.67 in)

Limit

40.31 mm (1.59 in)

Installed length (intake)

35.00 mm (1.38 in)

Installed length (exhaust)

35.00 mm (1.38 in)

Spring rate K1 (intake)

24.75 N/mm (2.52 kgf/mm, 141.32 lbf/in)

Spring rate K2 (intake)

33.32 N/mm (3.40 kgf/mm, 190.26 lbf/in)

Spring rate K1 (exhaust)

24.75 N/mm (2.52 kgf/mm, 141.32 lbf/in)

Spring rate K2 (exhaust)

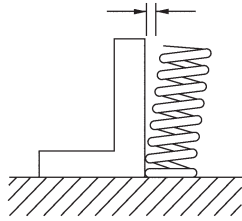
33.32 N/mm (3.40 kgf/mm, 190.26 lbf/in)

Installed compression spring force (intake)

171.00–197.00 N (17.44–20.09 kgf, 38.44–44.29 lbf)

ENGINE SPECIFICATIONS

Installed compression spring force (exhaust)	171.00–197.00 N (17.44–20.09 kgf, 38.44–44.29 lbf)
Spring tilt (intake)	2.5 °/1.9 mm (0.07 in)
Spring tilt (exhaust)	2.5 °/1.9 mm (0.07 in)



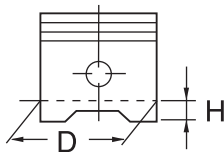
Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise

Cylinder

Bore	85.000–85.010 mm (3.3465–3.3468 in)
Wear limit	85.100 mm (3.3504 in)
Measuring point H	40.0 mm (1.57 in)
Out of round limit	0.050 mm (0.0020 in)

Piston

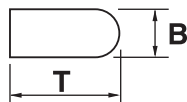
Piston-to-cylinder clearance	0.030–0.055 mm (0.0012–0.0022 in)
Limit	0.15 mm (0.0059 in)
Diameter D	84.955–84.970 mm (3.3447–3.3453 in)
Height H	8.0 mm (0.31 in)



Offset	0.50 mm (0.0197 in)
Piston pin bore inside diameter	21.004–21.015 mm (0.8269–0.8274 in)
Limit	21.045 mm (0.8285 in)
Piston pin outside diameter	20.991–21.000 mm (0.8264–0.8268 in)
Limit	20.971 mm (0.8256 in)
Piston-pin-to-piston-pin-bore clearance	0.004–0.024 mm (0.00016–0.00094 in)
Limit	0.074 mm (0.0029 in)

Piston ring

Top ring	
Ring type	Barrel
Dimensions (B × T)	1.20 × 2.90 mm (0.05 × 0.11 in)



End gap (installed)	0.15–0.30 mm (0.0059–0.0118 in)
Limit	0.60 mm (0.0236 in)
Ring side clearance	0.040–0.080 mm (0.0016–0.0032 in)
Limit	0.100 mm (0.0039 in)
2nd ring	
Ring type	Taper

ENGINE SPECIFICATIONS

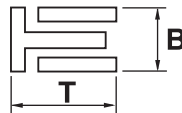
Dimensions (B × T) 1.20 × 3.30 mm (0.05 × 0.13 in)



End gap (installed) 0.30–0.45 mm (0.0118–0.0177 in)
 Limit 0.80 mm (0.0315 in)
 Ring side clearance 0.030–0.070 mm (0.0012–0.0028 in)
 Limit 0.100 mm (0.0039 in)

Oil ring

Dimensions (B × T) 2.00 × 2.50 mm (0.08 × 0.10 in)



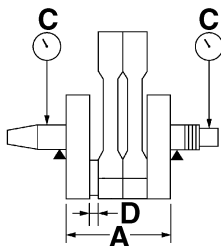
End gap (installed) 0.20–0.70 mm (0.0079–0.0276 in)

Connecting rod

Oil clearance 0.023–0.046 mm (0.0009–0.0018 in)
 Bearing color code 4. Black 5. Brown 6. Green
 Small end inside diameter 21.015–21.028 mm (0.8274–0.8279 in)

Crankshaft

Width A 97.95–98.00 mm (3.856–3.858 in)
 Runout limit C 0.020 mm (0.0008 in)
 Big end side clearance D 0.320–0.474 mm (0.0126–0.0187 in)



Clutch

Clutch type Wet, multiple-disc
 Clutch release method Outer pull, rack and pinion pull
 Operation Left hand operation
 Clutch lever free play 5.0–10.0 mm (0.20–0.39 in)
 Friction plate 1 thickness 2.90–3.10 mm (0.114–0.122 in)
 Wear limit 2.80 mm (0.110 in)
 Plate quantity 2 pcs
 Friction plate 2 thickness 2.92–3.08 mm (0.115–0.121 in)
 Wear limit 2.82 mm (0.111 in)
 Plate quantity 7 pcs
 Clutch plate thickness 1.90–2.10 mm (0.075–0.083 in)
 Plate quantity 8 pcs
 Warpage limit 0.20 mm (0.008 in)
 Clutch spring height 7.40 mm (0.29 in)
 Minimum height 7.03 mm (0.28 in)
 Spring quantity 1 pc

ENGINE SPECIFICATIONS

Transmission

Transmission type	Constant mesh 5-speed
Primary reduction ratio	1.674 (72/43)
Final drive	Belt
Secondary reduction ratio	2.333 (70/30)
Operation	Left foot operation
Gear ratio	
1st	3.067 (46/15)
2nd	2.063 (33/16)
3rd	1.579 (30/19)
4th	1.259 (34/27)
5th	1.042 (25/24)
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	Guide bar
Shift fork thickness	6.26–6.39 mm (0.2465–0.2516 in)

Air filter

Air filter element	Oil-coated paper element
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Fuel pump

Pump type	Electrical
Maximum consumption amperage	2.0 A

Fuel injector

Model/quantity	1450/2
Resistance	12.0 Ω

Throttle body

Type/quantity	ACW35/1
ID mark	1TP1 00
Fuel line pressure at idling	220 – 300 kPa (2.20 – 3.00 kgf/cm ² , 31.3 – 42.7 psi)

Throttle position sensor

Resistance	3.08–5.72 k Ω (L-B/L)(at idle)
Output voltage (at idle)	0.63–0.73 V

Fuel injection sensor

Crankshaft position sensor resistance	248–372 Ω
Intake air pressure sensor output voltage	3.57–3.71 V
Intake air temperature sensor resistance	5.4–6.6 k Ω at 0 °C (32 °F) 290–390 Ω at 80 °C (176 °F)
Engine temperature sensor resistance	2.63–2.78 k Ω at 20 °C (68 °F) 210–221 Ω at 100 °C (212 °F)

Idling condition

Engine idling speed	950–1050 r/min
Intake vacuum	34.7–40.0 kPa (260–300 mmHg, 10.2–11.8 inHg)

ENGINE SPECIFICATIONS

Oil temperature	60.0–70.0 °C (140.00–158.00 °F)
Throttle grip free play	4.0–6.0 mm (0.16–0.24 in)

CHASSIS SPECIFICATIONS

EAS20300

CHASSIS SPECIFICATIONS

Chassis

Frame type	Double cradle
Caster angle	29.00 °
Trail	130 mm (5.1 in)

Front wheel

Wheel type	Cast wheel
Rim size	19M/C × MT2.50
Rim material	Aluminum
Wheel travel	120.0 mm (4.72 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	16M/C × MT3.50
Rim material	Aluminum
Wheel travel	70.0 mm (2.76 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	100/90-19M/C 57H
Manufacturer/model	BRIDGESTONE/EXEDRA G721
Wear limit (front)	XVS950CU 1.6 mm (0.06 in) XVS950CUE 1.0 mm (0.04 in)

Rear tire

Type	Tubeless
Size	150/80B16M/C 71H
Manufacturer/model	BRIDGESTONE/EXEDRA G722
Wear limit (rear)	XVS950CU 1.6 mm (0.06 in) XVS950CUE 1.0 mm (0.04 in)

Tire air pressure (measured on cold tires)

Loading condition	0-90 kg (0-198 lb)
Front	225 kPa (2.25 kgf/cm ² , 33 psi)
Rear	250 kPa (2.50 kgf/cm ² , 36 psi)
Loading condition	90-206 kg (198-454 lb) (except for ABS models)
	90-202 kg (198-445 lb) (for ABS models)
Front	250 kPa (2.50 kgf/cm ² , 36 psi)
Rear	280 kPa (2.80 kgf/cm ² , 41 psi)

Front brake

Type	Single disc brake
Operation	Right hand operation
Front disc brake	
Disc outside diameter × thickness	298.0 × 5.0 mm (11.73 × 0.20 in)

CHASSIS SPECIFICATIONS

Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	6.0 mm (0.24 in)
Limit	0.8 mm (0.03 in)
Brake pad lining thickness (outer)	6.0 mm (0.24 in)
Limit	0.8 mm (0.03 in)
Master cylinder inside diameter	12.70 mm (0.50 in)
Caliper cylinder inside diameter	30.16 mm (1.19 in)
Caliper cylinder inside diameter	33.34 mm (1.31 in)
Specified brake fluid	DOT 4

Rear brake

Type	Single disc brake
Operation	Right foot operation
Brake pedal position	21.0 mm (0.83 in)
Rear disc brake	
Disc outside diameter × thickness	298.0 × 6.0 mm (11.73 × 0.24 in)
Brake disc thickness limit	5.5 mm (0.22 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	5.8 mm (0.23 in)
Limit	0.8 mm (0.03 in)
Brake pad lining thickness (outer)	5.8 mm (0.23 in)
Limit	0.8 mm (0.03 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	41.30 mm (1.63 in)
Specified brake 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	120.0 mm (4.72 in)
Fork spring free length	322.2 mm (12.69 in)
Limit	315.8 mm (12.43 in)
Collar length	300.0 mm (11.81 in)
Fork spring installed length	295.6 mm (11.64 in)
Spring rate K1	6.20 N/mm (0.63 kgf/mm, 35.40 lbf/in)
Spring stroke K1	0.0–120.0 mm (0.00–4.72 in)
Inner tube outer diameter	41.0 mm (1.61 in)
Optional spring available	No
Recommended oil	Yamaha fork oil 10WT
Quantity	547.0 cm ³ (18.49 US oz, 19.29 Imp.oz)
Level	116.0 mm (4.57 in)

Rear suspension

Type	Swingarm
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CHASSIS SPECIFICATIONS

Spring/shock absorber type	Coil spring/oil damper (for models not equipped with gas cylinders) Coil spring/gas-oil damper (for models equipped with gas cylinders)
Rear shock absorber assembly travel	51.0 mm (2.01 in)
Spring free length	167.7 mm (6.60 in) (for models not equipped with gas cylinders) 128.5 mm (5.06 in) (for models equipped with gas cylinders)
Spring installed length	159.7 mm (6.29 in) (for models not equipped with gas cylinders) 120.5 mm (4.74 in) (for models equipped with gas cylinders)
Spring rate K1	37.30 N/mm (3.80 kgf/mm, 212.98 lbf/in)
Spring rate K2	52.00 N/mm (5.30 kgf/mm, 296.92 lbf/in)
Spring stroke K1	42.0 mm (1.65 in)
Spring stroke K2	9.0 mm (0.35 in)
Enclosed gas/air pressure (STD)	1200 kPa (12.0 kgf/cm ² , 170.7 psi)

Drive belt

Drive belt slack (on the sidestand)	6.0–8.0 mm (0.24–0.31 in)
Drive belt slack (on a suitable stand)	7.0–9.0 mm (0.28–0.35 in)

ELECTRICAL SPECIFICATIONS

EAS20310

ELECTRICAL SPECIFICATIONS

Voltage

System voltage 12 V

Ignition system

Ignition system TCI
Advancer type Throttle position sensor and electrical
Ignition timing (B.T.D.C.) 5.0 °/1000 r/min

Ignition coil

Minimum ignition spark gap 6.0 mm (0.24 in)
Primary coil resistance 2.16–2.64 Ω
Secondary coil resistance 8.64–12.96 kΩ

Spark plug cap

Material Rubber
Resistance 7.5–12.5 kΩ

AC magneto

Standard output 14.0 V, 460 W@5000 r/min

Rectifier/regulator

Regulator type Semi conductor-short circuit
Regulated voltage (DC) 14.3–14.7 V
Rectifier capacity 50.0 A
Withstand voltage 40.0 V

Battery

Model YTZ14S
Voltage, capacity 12 V, 11.2 Ah
Manufacturer GS YUASA
Ten hour rate charging current 1.12 A

Headlight

Bulb type Halogen bulb

Bulb voltage, wattage × quantity

Headlight 12 V, 60.0 W/55.0 W × 1
Auxiliary light 12 V, 5.0 W × 1
Tail/brake light LED
Front turn signal light 12 V, 21.0 W × 2
Rear turn signal light 12 V, 21.0 W × 2
License plate light 12 V, 5.0 W × 1
Meter lighting EL (Electroluminescent)

Indicator light

Neutral indicator light LED
Turn signal indicator light LED
Oil level warning light LED
High beam indicator light LED
Fuel level warning light LED

ELECTRICAL SPECIFICATIONS

Engine trouble warning light	LED
ABS warning light	LED (for ABS models)
Immobilizer system indicator light	LED

Electric starting system	
System type	Constant mesh

Starter motor	
Power output	0.80 kW
Armature coil resistance	0.0050–0.0150 Ω
Brush overall length	12.0 mm (0.47 in)
Limit	6.50 mm (0.26 in)
Brush spring force	6.025–6.515 N (614–664 gf, 21.69–23.45 oz)
Mica undercut (depth)	0.70 mm (0.03 in)

Starter relay	
Amperage	180.0 A
Coil resistance	4.18–4.62 Ω

Horn	
Horn type	Plane
Quantity	1
Maximum amperage	3.0 A

Turn signal/hazard relay	
Relay type	Semi transistor
Built-in, self-canceling device	No

Oil level switch	
Maximum level position resistance	484–536 Ω
Minimum level position resistance	114–126 Ω

Starting circuit cut-off relay	
Coil resistance	162.0–198.0 Ω

Headlight relay	
Coil resistance	96 Ω

Fuel pump relay	
Coil resistance	162–198 Ω

Fuses	
Main fuse	40.0 A
Headlight fuse	20.0 A
Signaling system fuse	7.5 A
Ignition fuse	15.0 A
Hazard lighting fuse	15.0 A
Fuel injection system fuse	10.0 A
ABS motor fuse	30.0 A (for ABS models)
ABS control unit fuse	7.5 A (for ABS models)
ABS solenoid fuse	15.0 A (for ABS models)
Backup fuse	7.5 A
Spare fuse	20.0 A

ELECTRICAL SPECIFICATIONS

Spare fuse	15.0 A
Spare fuse	10.0 A
Spare fuse	7.5 A
Spare fuse	30.0 A (for ABS models)

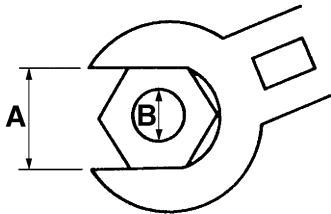
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TIGHTENING TORQUES

EAS20330

GENERAL TIGHTENING TORQUE SPECIFICATIONS

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











- A. Distance between flats
- B. Outside thread diameter

A (nut)	B (bolt)	General tightening torques		
		Nm	m·kgf	ft·lbf
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13	94


















TIGHTENING TORQUES

EAS20340
















ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Cylinder head stud bolt (exhaust pipe)	M8	4	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Oil check bolt	M8	2	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Cylinder head nut	M12	8	65 Nm (6.5 m·kgf, 47 ft·lbf)	 See TIP
Cylinder head bolt	M8	4	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
Spark plug	M10	2	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
Front cylinder left cover bolt	M6	2	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Front cylinder right cover bolt	M6	2	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Rear cylinder left cover bolt	M6	2	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Rear cylinder right cover bolt	M6	2	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Front cylinder left cover bracket bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Front cylinder right cover bracket bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Rear cylinder head guard bolt	M8	2	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Rear cylinder left cover bracket bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Rear cylinder right cover bracket bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Shift arm pinch bolt	M6	1	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Tappet cover bolt	M6	18	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Fuel filter bracket bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Camshaft retainer	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Engine temperature sensor	M10	1	18 Nm (1.8 m·kgf, 13 ft·lbf)	
Front cylinder side cover bolt	M6	5	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Rear cylinder side cover bolt	M6	5	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Connecting rod bolt (1st)	M8	4	15 Nm (1.5 m·kgf, 11 ft·lbf)	 See TIP
Connecting rod bolt (final)	M8	4	Specified angle 125–135°	 See TIP
Generator rotor bolt	M12	1	90 Nm (9.0 m·kgf, 65 ft·lbf)	
Timing chain tensioner bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Timing chain tensioner cap bolt	M11	2	24 Nm (2.4 m·kgf, 17 ft·lbf)	
Locknut (rocker arm adjusting screw)	M8	8	27 Nm (2.7 m·kgf, 19 ft·lbf)	
Timing chain guide stopper bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Camshaft sprocket bolt	M10	2	55 Nm (5.5 m·kgf, 40 ft·lbf)	
Oil pump assembly bolt	M8	3	24 Nm (2.4 m·kgf, 17 ft·lbf)	


TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Oil pump housing screw	M6	3	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Oil filter cartridge	M20	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	
Oil filter cartridge union bolt	M20	1	70 Nm (7.0 m·kgf, 51 ft·lbf)	
Oil level switch bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kgf, 31 ft·lbf)	
Crankcase blind plug	M10	4	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Oil delivery pipe 1 bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil delivery pipe 2 bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Air filter case	M5	3	4.2 Nm (0.42 m·kgf, 3.0 ft·lbf)	
Front cylinder intake manifold joint bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Rear cylinder intake manifold joint bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Air filter case cover bolt	M5	4	2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)	
Intake air pressure sensor bolt	M5	1	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
Air filter case stay nut	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Muffler and exhaust pipe bolt	M8	1	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Muffler and muffler bracket bolt	M10	2	35 Nm (3.5 m·kgf, 25 ft·lbf)	
Muffler protector 1	M6	2	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Muffler protector 2	M6	2	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Muffler protector (inner)	M6	3	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Muffler cap	M6	5	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Exhaust pipe nut	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Exhaust pipe bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Exhaust pipe joint cover bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Exhaust pipe joint nut	M8	2	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Exhaust pipe protector 1 bolt	M6	2	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Exhaust pipe protector 2 bolt	M6	3	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Exhaust pipe protector 3 bolt	M6	2	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Oil pump driven sprocket bolt	M6	1	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Crankcase stud bolt (long)	M12	6	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Crankcase stud bolt (short)	M12	2	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Left crankcase bolt	M6	19	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Right crankcase bolt	M10	3	36 Nm (3.6 m·kgf, 25 ft·lbf)	
Right crankcase bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Generator cover bolt	M6	12	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	 See TIP

TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Clutch cover bolt	M6	11	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	l = 40 mm (1.57 in)  See TIP
Clutch cover bolt (with washer)	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	l = 40 mm (1.57 in)  See TIP
Clutch cover bolt	M6	3	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	l = 65 mm (2.56 in)  See TIP
Oil nozzle	M6	1	0.5 Nm (0.05 m·kgf, 0.35 ft·lbf)	
Stator coil bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Crankshaft position sensor bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil baffle plate 1 bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil baffle plate 2 bolt	M6	5	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Primary drive gear bearing plate bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Drive pulley cover bolt	M6	5	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Clutch plastic cover 1 bolt	M6	3	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Clutch plastic cover 2 bolt	M6	2	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Starter clutch bolt	M8	3	24 Nm (2.4 m·kgf, 17 ft·lbf)	
Primary drive gear nut	M18	1	100 Nm (10 m·kgf, 72 ft·lbf)	 Use a lock washer.
Clutch boss nut	M20	1	125 Nm (12.5 m·kgf, 90 ft·lbf)	 Stake.
Clutch spring plate retainer bolt	M6	6	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Drive pulley nut	M22	1	140 Nm (14 m·kgf, 100 ft·lbf)	 Stake.
Drive pulley housing bolt	M8	5	24 Nm (2.4 m·kgf, 17 ft·lbf)	
Bearing retainer bolt	M6	4	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Shift shaft spring stopper	M8	1	22 Nm (2.2 m·kgf, 16 ft·lbf)	
Neutral switch	M10	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	
Starter motor bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Starter motor lead nut	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Starter motor terminal nut	M6	1	11 Nm (1.1 m·kgf, 8.0 ft·lbf)	
Starter motor set bolt	M5	2	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Speed sensor bolt (except for ABS models)	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	

TIGHTENING TORQUES

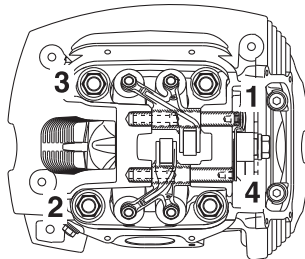
Item	Thread size	Q'ty	Tightening torque	Remarks
Speed sensor bracket bolt (except for ABS models)	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Throttle position sensor screw	M5	2	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
Inlet pipe assembly bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Pressure regulator	M5	2	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	

TIP

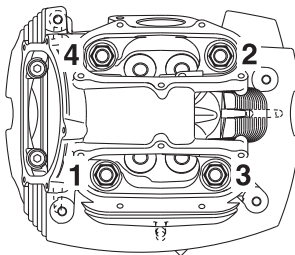
Cylinder head nut

1. Apply engine oil on the screw part of the bolt and both sides of the washer well.
2. Follow the tightening direction and tighten to 15 Nm (1.5 m·kgf, 11 ft·lbf).
3. Follow the tightening direction and tighten to 25 Nm (2.5 m·kgf, 18 ft·lbf).
4. Follow the tightening direction and tighten to 65 Nm (6.5 m·kgf, 47 ft·lbf).

Front cylinder head



Rear cylinder head



TIP

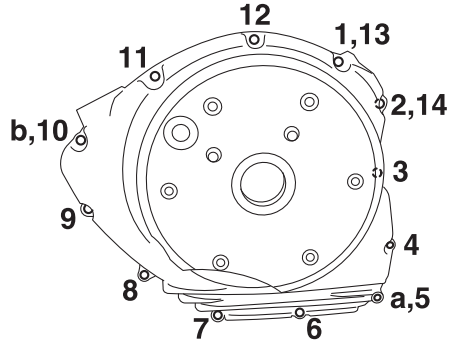
Connecting rod bolt

Tighten the connecting rod bolts to 15 Nm (1.5 m·kgf, 11 ft·lbf), and then tighten them further to reach the specified angle 125–135°.

TIGHTENING TORQUES

TIP**Generator cover bolt**

Temporarily tighten “a” and “b” and then tighten the generator cover bolts in the order shown in the illustration.

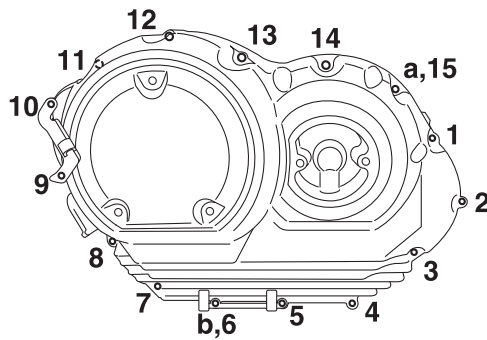


TIP**Clutch cover bolt**

Temporarily tighten the bolts “a” and “b”, and then tighten the clutch cover bolts in the order shown in the illustration.

Bolt “1”–“13”, “15”: 12 Nm (1.2 m·kgf, 8.7 ft·lbf)







Bolt “14”: 10 Nm (1.0 m·kgf, 7.2 ft·lbf)








TIGHTENING TORQUES

EAS20350




CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Engine mounting nut (front upper side)	M12	1	88 Nm (8.8 m·kgf, 64 ft·lbf)	
Engine mounting nut (front lower side)	M12	1	88 Nm (8.8 m·kgf, 64 ft·lbf)	
Engine mounting nut (rear upper side)	M12	1	88 Nm (8.8 m·kgf, 64 ft·lbf)	
Engine mounting nut (rear lower side)	M12	1	88 Nm (8.8 m·kgf, 64 ft·lbf)	
Engine bracket nut (front upper side)	M10	2	48 Nm (4.8 m·kgf, 35 ft·lbf)	
Engine bracket bolt (front lower side)	M10	2	48 Nm (4.8 m·kgf, 35 ft·lbf)	
Engine bracket bolt (rear upper side)	M10	2	48 Nm (4.8 m·kgf, 35 ft·lbf)	
Engine bracket bolt (rear lower side)	M10	2	48 Nm (4.8 m·kgf, 35 ft·lbf)	
Muffler bracket and flame bolt	M10	2	53 Nm (5.3 m·kgf, 38 ft·lbf)	
Muffler bracket and engine bracket (rear lower side) bolt	M10	1	53 Nm (5.3 m·kgf, 38 ft·lbf)	
Ignition coil bolt	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Ignition coil bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Clutch cable locknut (crankcase side)	M8	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rectifier/regulator bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rectifier/regulator nut	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Cable and wire harness guide bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Right handlebar switch lead holder bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Fuel tank breather/overflow hose guide bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Main switch bolt	M6	2	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
Wire harness bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Intake air pressure sensor bracket bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Pivot shaft nut	M16	1	85 Nm (8.5 m·kgf, 61 ft·lbf)	
Rear shock absorber assembly upper bolt	M8	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Rear shock absorber assembly lower nut	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Drive belt upper guard bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Drive belt lower guard bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	







TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Front wheel axle	M16	1	59 Nm (5.9 m·kgf, 43 ft·lbf)	
Front wheel axle pinch bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	See TIP
Front brake caliper bracket bolt	M10	2	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Front brake caliper retaining bolt	M10	2	27 Nm (2.7 m·kgf, 20 ft·lbf)	
Front brake disc bolt	M8	6	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Bleed screw (front brake caliper)	M7	1	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Rear wheel axle nut	M18	1	150 Nm (15 m·kgf, 108 ft·lbf)	
Rear brake caliper retaining bolt	M10	2	27 Nm (2.7 m·kgf, 20 ft·lbf)	
Rear brake disc bolt	M8	6	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Bleed screw (rear brake caliper)	M7	1	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Rear wheel pulley and gear ring bolt	M6	5	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
Rear wheel pulley self-locking nut	M12	5	95 Nm (9.5 m·kgf, 69 ft·lbf)	
Rear wheel drive hub stud bolt	M12	5	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Drive belt adjusting bolt locknut	M8	2	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Upper bracket pinch bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Steering stem nut	M22	1	110 Nm (11 m·kgf, 80 ft·lbf)	
Lower ring nut (initial tightening torque)	M25	1	52 Nm (5.2 m·kgf, 38 ft·lbf)	See TIP
Lower ring nut (final tightening torque)	M25	1	18 Nm (1.8 m·kgf, 13 ft·lbf)	See TIP
Lower bracket pinch bolt	M10	4	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Front fork damper rod bolt	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Front fork cap bolt	M38	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Front brake master cylinder reservoir cap screw	M4	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Lower handlebar holder nut	M12	2	32 Nm (3.2 m·kgf, 23 ft·lbf)	
Upper handlebar holder bolt	M8	4	28 Nm (2.8 m·kgf, 20 ft·lbf)	
Right handlebar switch screw	M5	2	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
Left handlebar switch screw	M5	2	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
Throttle cable bracket screw	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Meter assembly bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Meter assembly screw	M5	3	1.3 Nm (0.13 m·kgf, 0.94 ft·lbf)	
Clutch lever holder bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Front brake master cylinder holder bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Brake lever pivot bolt	M6	1	1.0 Nm (0.10 m·kgf, 0.72 ft·lbf)	
Brake lever pivot nut	M6	1	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Front brake light switch screw	M4	1	1.0 Nm (0.10 m·kgf, 0.72 ft·lbf)	
Front brake hose union bolt	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	

TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Front brake hose holder and lower bracket bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Front brake hose holder bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Front fender bolt	M8	4	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Headlight bracket bolt	M8	2	19 Nm (1.9 m·kgf, 14 ft·lbf)	
Headlight lens unit screw	M5	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Headlight body bolt	M6	3	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front turn signal light assembly pinch bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Air temperature sensor screw	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Air temperature sensor bracket bolt	M8	1	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Front turn signal light assembly and upper bracket bolt	M8	1	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Throttle cable locknut	M6	2	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Steering lock bolt	M8	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Rear fender and rear fender bracket bolt	M8	4	28 Nm (2.8 m·kgf, 20 ft·lbf)	
Rear fender bracket and frame bolt	M10	4	65 Nm (6.5 m·kgf, 47 ft·lbf)	
Tail/brake light and rear fender nut	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
License plate bracket and rear fender bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
License plate light nut	M5	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Mudguard and rear fender nut	M6	2	8.5 Nm (0.85 m·kgf, 6.1 ft·lbf)	
Mudguard and rear fender bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Rear turn signal light nut	M12	2	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Right side cover bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Battery cover holder bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Brake fluid reservoir cover bolt	M6	1	2.8 Nm (0.28 m·kgf, 2.0 ft·lbf)	
Key cylinder locknut	M22	1	2.3 Nm (0.23 m·kgf, 1.7 ft·lbf)	
Positive battery lead bolt (starter relay side)	M6	1	3.6 Nm (0.36 m·kgf, 2.6 ft·lbf)	
Starter motor lead bolt (starter relay side)	M6	1	3.6 Nm (0.36 m·kgf, 2.6 ft·lbf)	
Battery box bolt	M6	5	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Battery box bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Owner's tool kit guide bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Lean angle sensor screw	M4	2	2 Nm (0.20 m·kgf, 1.4 ft·lbf)	
Fuel pump bolt	M5	4	4 Nm (0.40 m·kgf, 2.9 ft·lbf)	See TIP

TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Fuel sender screw	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Fuel tank and fuel tank bracket bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Fuel tank bracket and frame bolt	M8	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Rider seat bolt	M8	1	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Rider seat holder bolt	M8	2	19 Nm (1.9 m·kgf, 14 ft·lbf)	
Passenger seat bolt	M8	2	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Passenger seat bracket bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Passenger seat guide bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Sidestand bracket bolt	M10	2	48 Nm (4.8 m·kgf, 35 ft·lbf)	
Sidestand switch bolt	M5	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Sidestand nut	M10	1	64 Nm (6.4 m·kgf, 46 ft·lbf)	
Rear brake master cylinder bracket bolt	M8	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Rider footrest cover nut	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Brake pedal bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear brake master cylinder lock-nut	M8	1	18 Nm (1.8 m·kgf, 13 ft·lbf)	
Brake pedal holder bolt	M8	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Rear brake hose guide bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear brake hose union bolt	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Rear brake hose holder bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Rider footrest assembly bolt	M10	2	48 Nm (4.8 m·kgf, 35 ft·lbf)	
Horn bracket and down tube bolt	M8	1	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Brake pipe/hose assembly bolt (for ABS models)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Brake pipe/hose assembly bracket bolt (for ABS models)	M6	2	10 Nm (1 m·kgf, 7.2 ft·lbf)	
Brake pipe/hose assembly (front brake master cylinder to hydraulic unit) bolt (for ABS models)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Brake pipe/hose assembly (hydraulic unit to front brake caliper) (for ABS models)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Brake hose bracket bolt (for ABS models)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front brake hose joint union bolt (for ABS models)	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Front wheel sensor rotor bolt (for ABS models)	M5	3	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Rear wheel sensor rotor bolt (for ABS models)	M5	3	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	

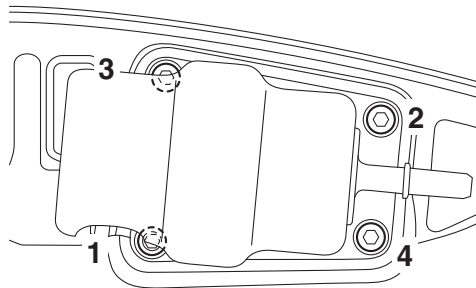
TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Front wheel sensor bolt (for ABS models)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear wheel sensor bolt (for ABS models)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear wheel sensor lead holder bolt (for ABS models)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Hydraulic unit assembly union bolt (for ABS models)	M10	4	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Hydraulic unit assembly lower bracket bolt (for ABS models)	M8	3	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Hydraulic unit assembly and bracket holding nut	M8	3	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Hydraulic unit assembly bolt (for ABS models)	M6	3	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Damper holder and hydraulic unit assembly upper bracket bolt	M6	3	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	

TIP

Fuel pump bolt

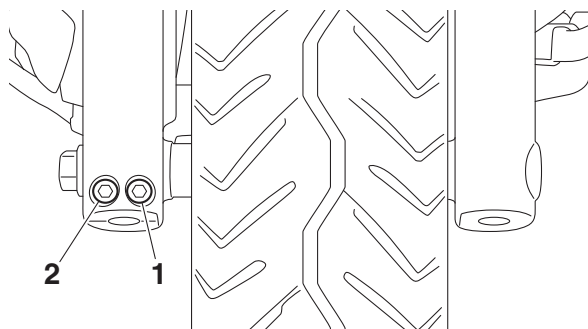
Tighten the fuel pump bolts in the proper tightening sequence as shown in the illustration.



TIP

Front wheel axle pinch bolt

1. Insert the front wheel axle from the right side and tighten it to 59 Nm (5.9 m·kgf, 43 ft·lbf).
2. In the order pinch bolt "1" → pinch bolt "2" → pinch bolt "1", tighten each bolt to 20 Nm (2.0 m·kgf, 14 ft·lbf) without performing temporary tightening.



TIGHTENING TORQUES

TIP

Lower ring nut

1. First, tighten the lower ring nut to approximately 52 Nm (5.2 m·kgf, 37 ft·lbf) with a torque wrench, then loosen the lower ring nut completely.
 2. Retighten the lower ring nut to 18 Nm (1.8 m·kgf, 13 ft·lbf) with a torque wrench.
-































LUBRICATION POINTS AND LUBRICANT TYPES

EAS20360

LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370

ENGINE

Lubrication point	Lubricant
Oil seals (lip)	
O-rings	
Bearings	
Cylinder head bolts, nuts and washers	
Connecting rods (small end and big end)	
Crankshaft journals	
Pistons (outer surface)	
Piston pins (outer surface)	
Camshaft cam lobes and camshaft journals	
Valve stems (intake and exhaust)	
Valve stem ends (intake and exhaust)	
Rocker arm shafts	
Oil strainer	
Oil filter cartridge union bolt	
Crankcase stud bolts	
Starter clutch idle gear 1 shaft	
Starter clutch idle gear 1	
Starter clutch gear (inner and outer surfaces)	
Starter clutch and metal-to-metal moving parts	
Starter clutch idle gear 2 shaft	
Starter clutch idle gear 2	
Primary driven gear (inner surface) and collar	
Clutch pull rod	
Oil pump drive sprocket (inner surface)	
Clutch thrust washers	
Clutch boss nut and washer	
Transmission gears (wheel and pinion) and collar	
Shift forks and shift fork guide bars	
Shift drum	
Shift shaft and shift	
Crankcase (mating surface)	Yamaha bond No.1215 (Three Bond No.1215®)



















LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication point	Lubricant
Crankshaft position sensor lead grommet	Yamaha bond No.1215 (Three Bond No.1215®)
Crankcase breather pipe	Yamaha bond No.1215 (Three Bond No.1215®)

LUBRICATION POINTS AND LUBRICANT TYPES

EAS20380

CHASSIS

Lubrication point	Lubricant
Steering bearings and upper bearing race cover (lip)	
Lower bearing steering seal (lip)	
Front wheel oil seals (lip)	
Rear wheel oil seal (lip)	
Rear wheel drive hub (mating surface)	
Brake pedal shaft (pivoting point)	
Shift pedal (pivoting point)	
Sidestand (pivoting point) and metal-to-metal moving parts	
Footrest assembly (pivoting point)	
Throttle grip tube guide (inner surface) and throttle cables	
Brake lever (pivoting point) and metal-to-metal moving parts	
Brake master cylinder push rod (contact surface)	
Clutch lever (pivoting point) and metal-to-metal moving parts	
Swingarm pivot bearings (inner surface)	
Swingarm pivot oil seals (lip)	
Pivot shaft (outer surface)	
Rear wheel axle (outer surface)	
Engine mounting bolt (front lower side) (thread part)	

LUBRICATION POINTS AND LUBRICANT TYPES

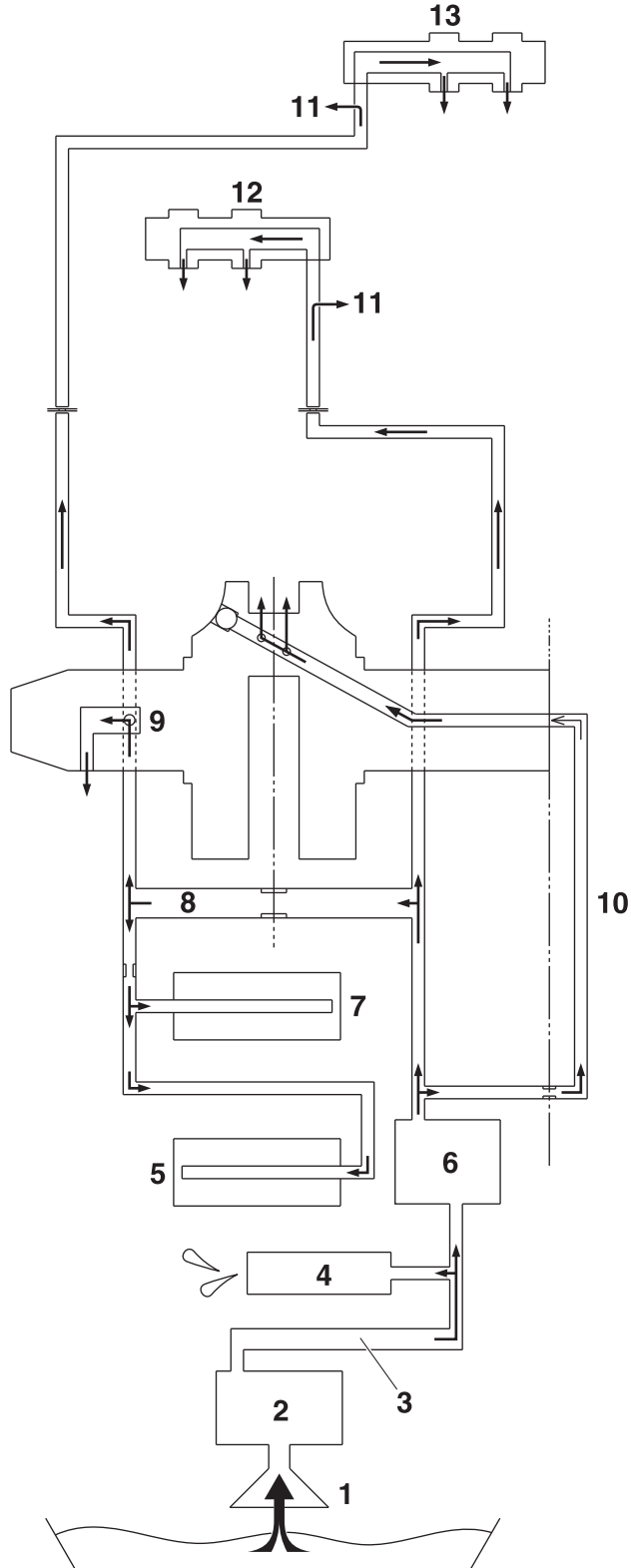
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20390

LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20400

ENGINE OIL LUBRICATION CHART



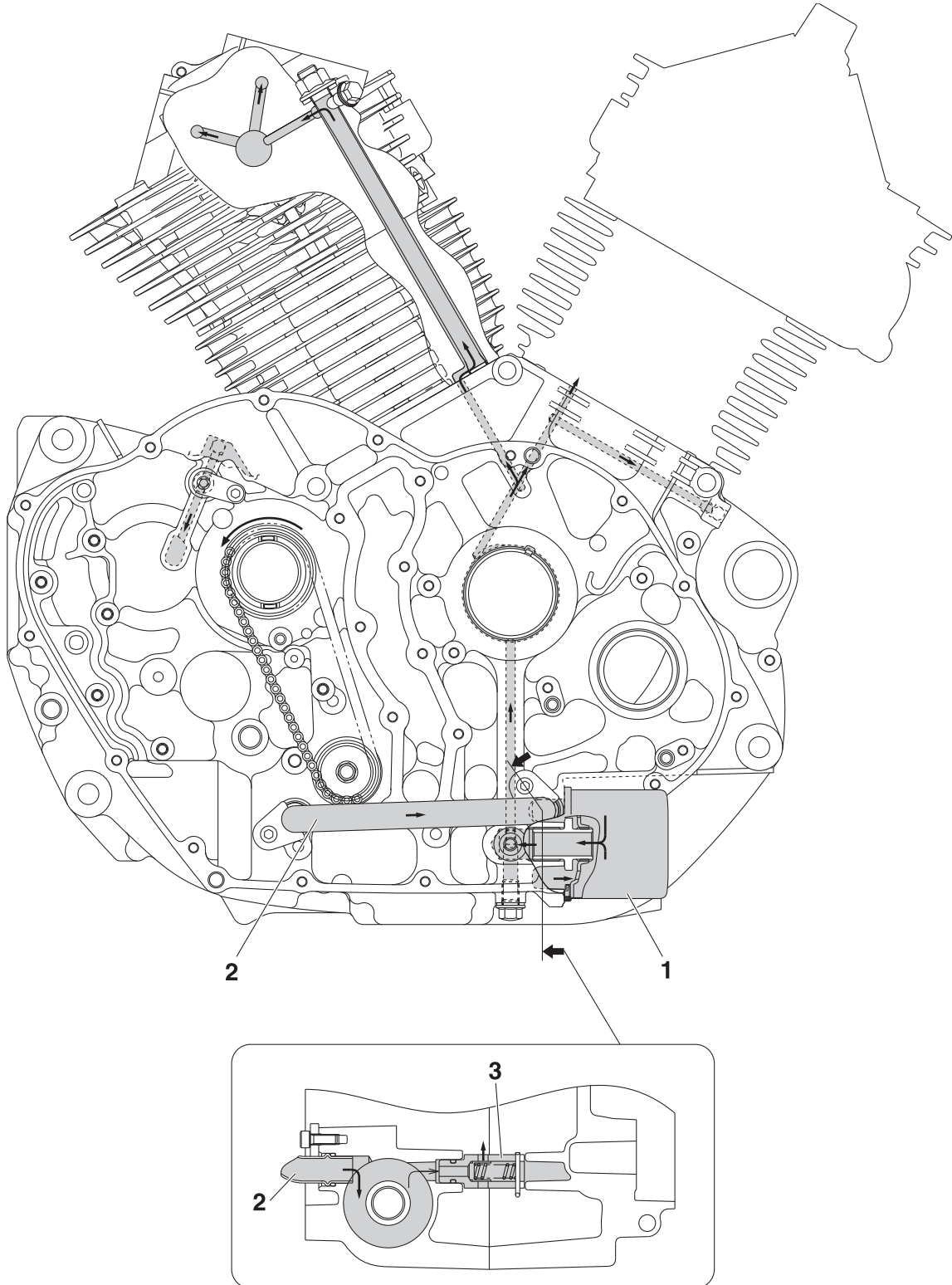
LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Oil strainer
2. Oil pump assembly
3. Oil delivery pipe 2
4. Relief valve assembly
5. Drive axle
6. Oil filter cartridge
7. Main axle
8. Main gallery
9. Crankshaft
10. Clutch cover
11. Valve stem end (intake side)
12. Rear cylinder camshaft
13. Front cylinder camshaft

LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20410

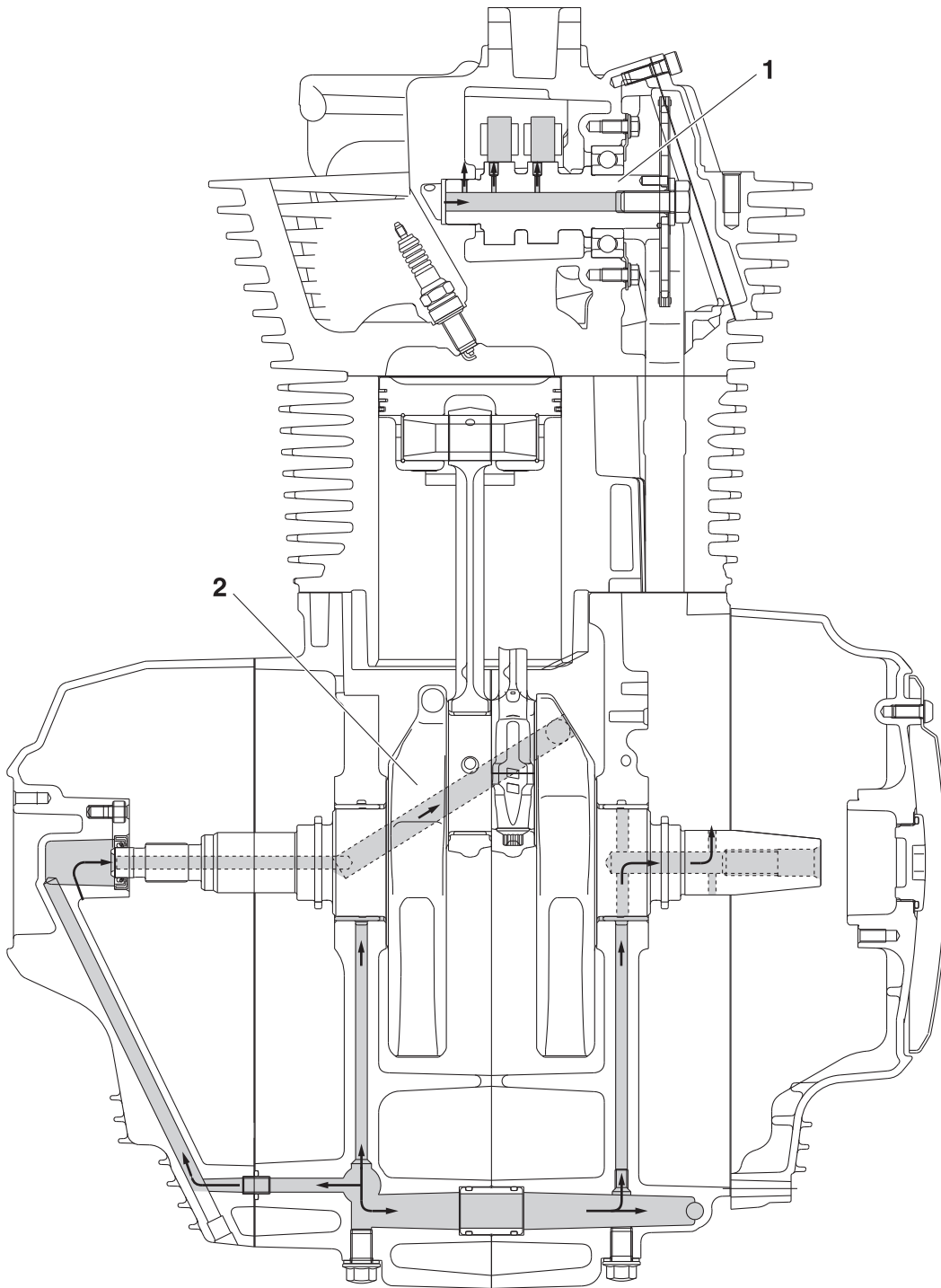
LUBRICATION DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Oil filter cartridge
2. Oil delivery pipe 2
3. Relief valve assembly

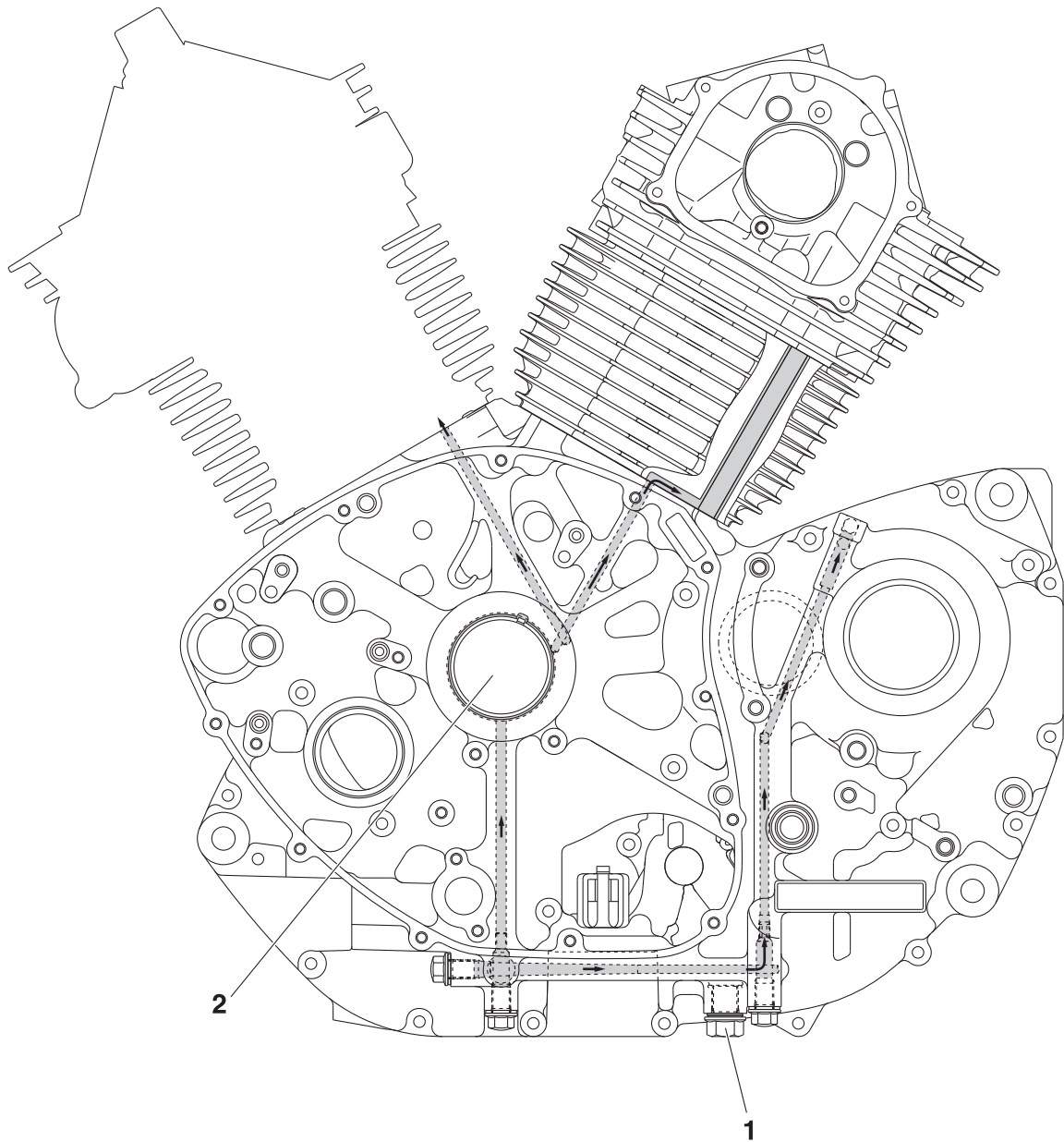
LUBRICATION SYSTEM CHART AND DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Camshaft
2. Crankshaft

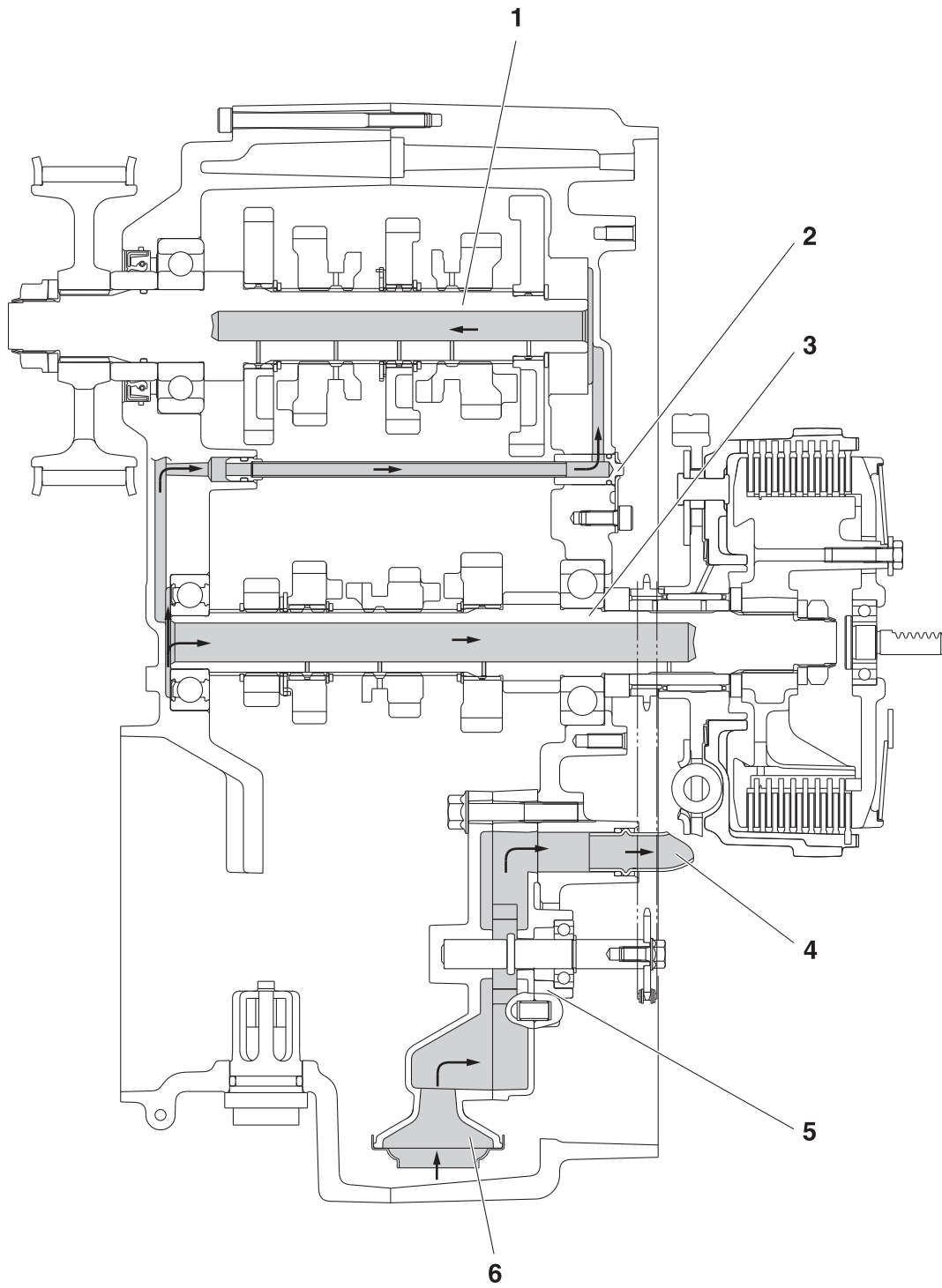
LUBRICATION SYSTEM CHART AND DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Oil drain bolt
2. Crankshaft

LUBRICATION SYSTEM CHART AND DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

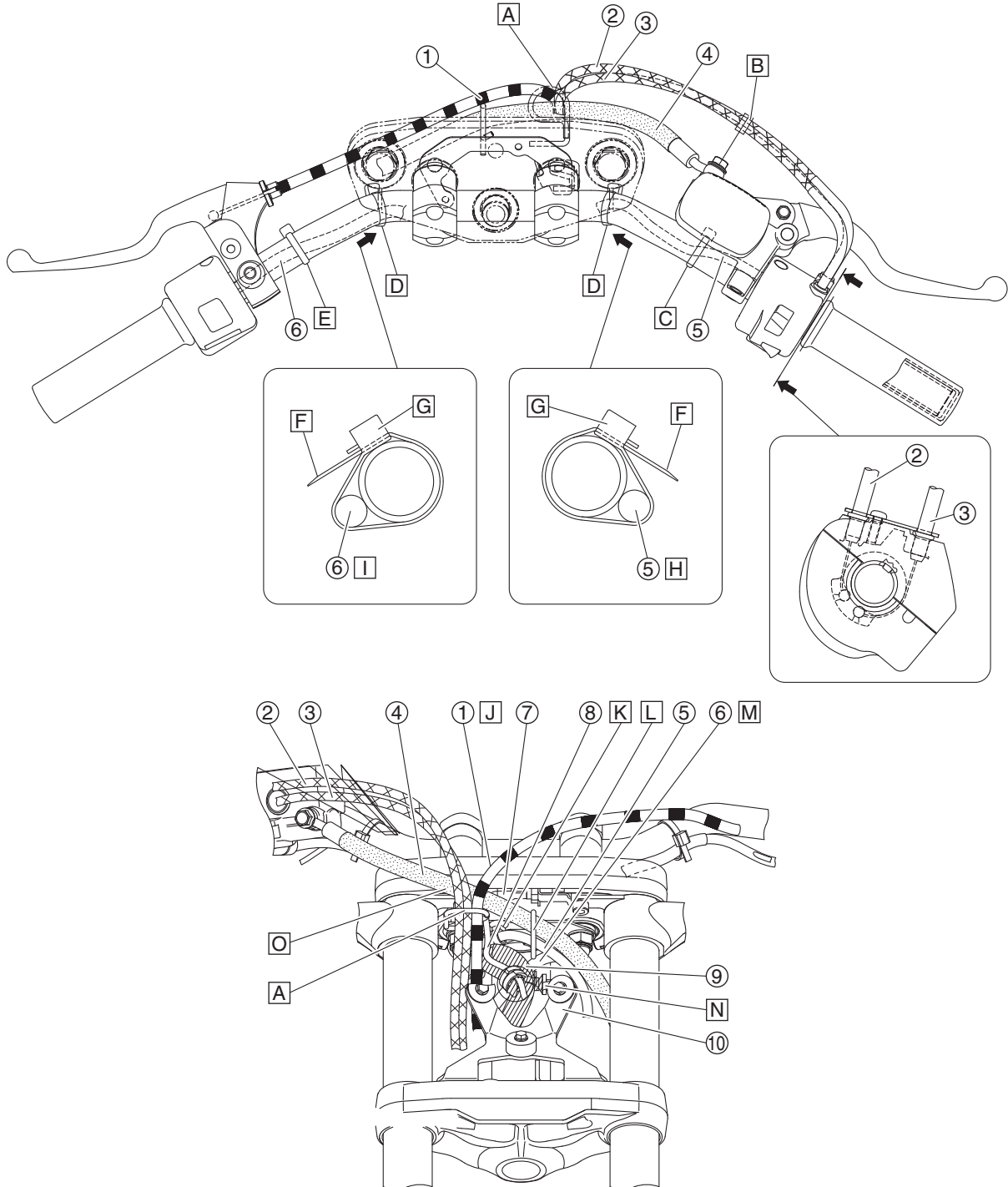
1. Drive axle
2. Oil delivery pipe 1
3. Main axle
4. Oil delivery pipe 2
5. Oil pump assembly
6. Oil strainer

CABLE ROUTING (except for ABS models)

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CABLE ROUTING (except for ABS models)

Handlebar (top and front view)

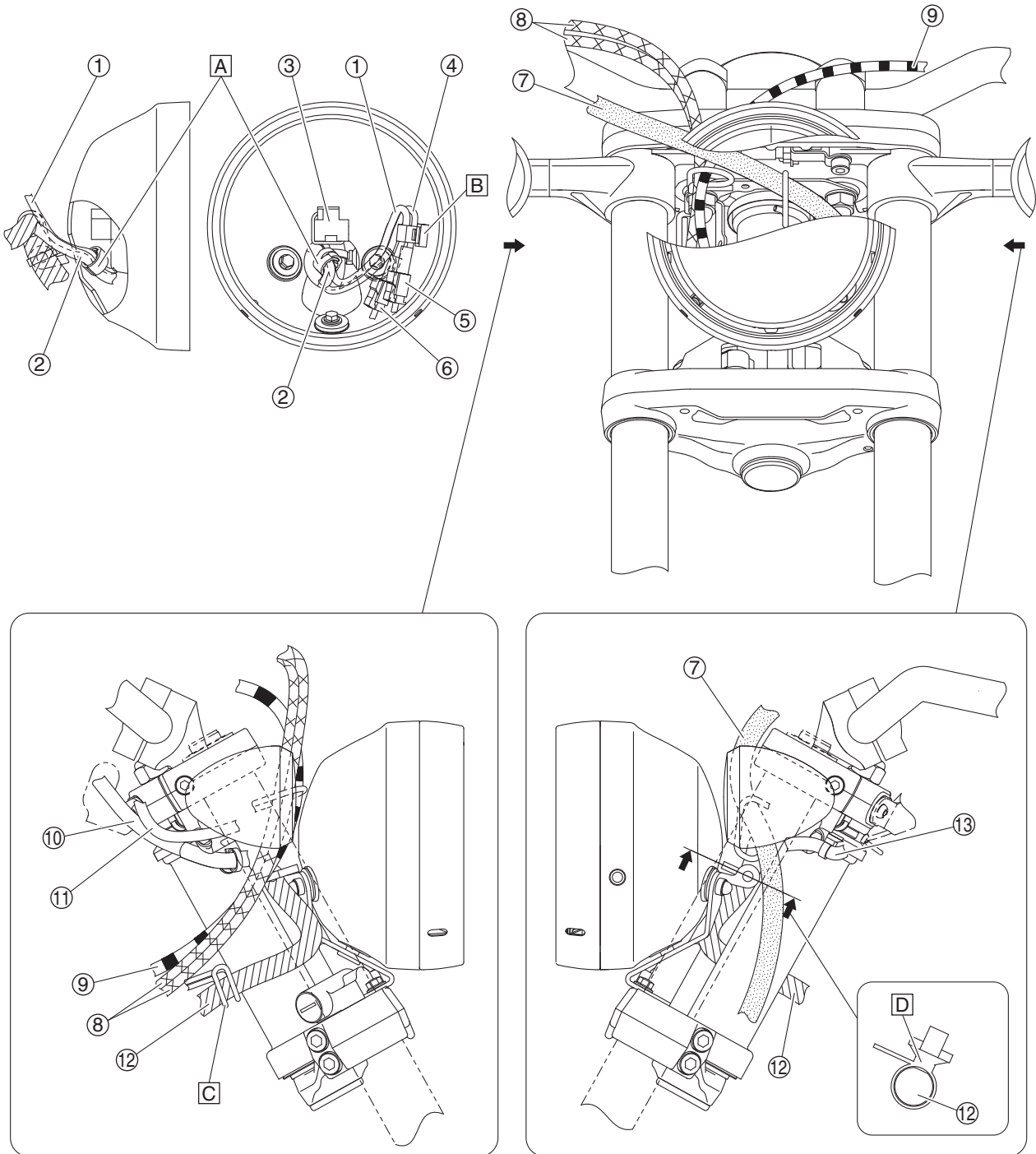


CABLE ROUTING (except for ABS models)

1. Clutch cable
 2. Throttle cable (accelerator cable)
 3. Throttle cable (decelerator cable)
 4. Front brake hose
 5. Right handlebar switch lead
 6. Left handlebar switch lead
 7. Intake air temperature sensor
 8. Intake air temperature sensor sub-wire harness
 9. Wire harness
 10. Headlight stay
- A. Route the clutch cable, throttle cable (accelerator cable), and throttle cable (decelerator cable) through the cable guide.
 - B. Align the holder with the brake hose union bolt and face the catch of the holder rearward.
 - C. Fasten the right handlebar switch lead with the plastic band. Align the plastic band with the middle of the front brake master cylinder.
 - D. Fasten the handlebar switch lead with the plastic band at the bend in the handlebar.
 - E. Fasten the left handlebar switch lead with the plastic band. Align the plastic band with the locknut.
 - F. Point the end of the plastic band downward.
 - G. Face the buckle of the plastic band forward.
 - H. Route the right handlebar switch lead under the handlebar.
 - I. Route the left handlebar switch lead under the handlebar.
 - J. Route the clutch cable to the front of the front brake hose.
 - K. Insert the projection on the right handlebar switch lead holder into the hole in the cable guide.
 - L. Route the front brake hose and right handlebar switch lead through the cable guide.
 - M. Route the left handlebar switch lead to the rear of the right handlebar switch lead and wire harness.
 - N. Insert the projection on the wire harness holder into the hole in the headlight stay.
 - O. Route the front brake hose to the rear of the throttle cables and clutch cable.

CABLE ROUTING (except for ABS models)

Headlight

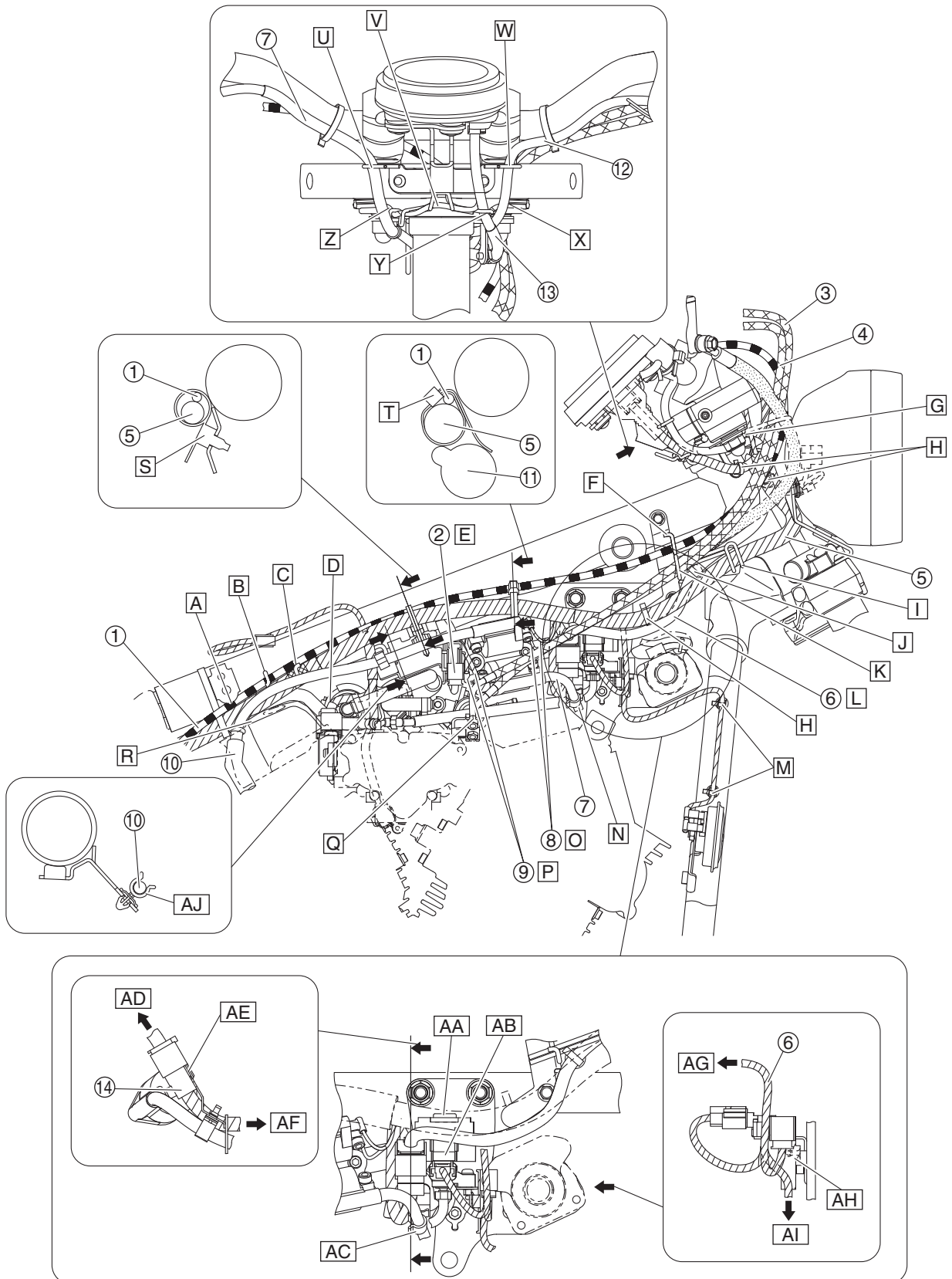


CABLE ROUTING (except for ABS models)

1. Intake air temperature sensor sub-wire harness
 2. Headlight lead
 3. Headlight coupler
 4. Auxiliary light lead
 5. Auxiliary light coupler
 6. Intake air temperature sensor coupler
 7. Front brake hose
 8. Throttle cables
 9. Clutch cable
 10. Meter assembly lead
 11. Right handlebar switch lead
 12. Wire harness
 13. Left handlebar switch lead
- A. Fasten the headlight lead and intake air temperature sensor sub-wire harness with the holder. Be sure to position the holder inside the headlight assembly.
 - B. Fasten the intake air temperature sensor sub-wire harness and auxiliary light lead with the holder.
 - C. Route the wire harness through the guide.
 - D. Insert the projection on the wire harness holder into the hole in the headlight stay.

CABLE ROUTING (except for ABS models)

Steering head cable (right side view)

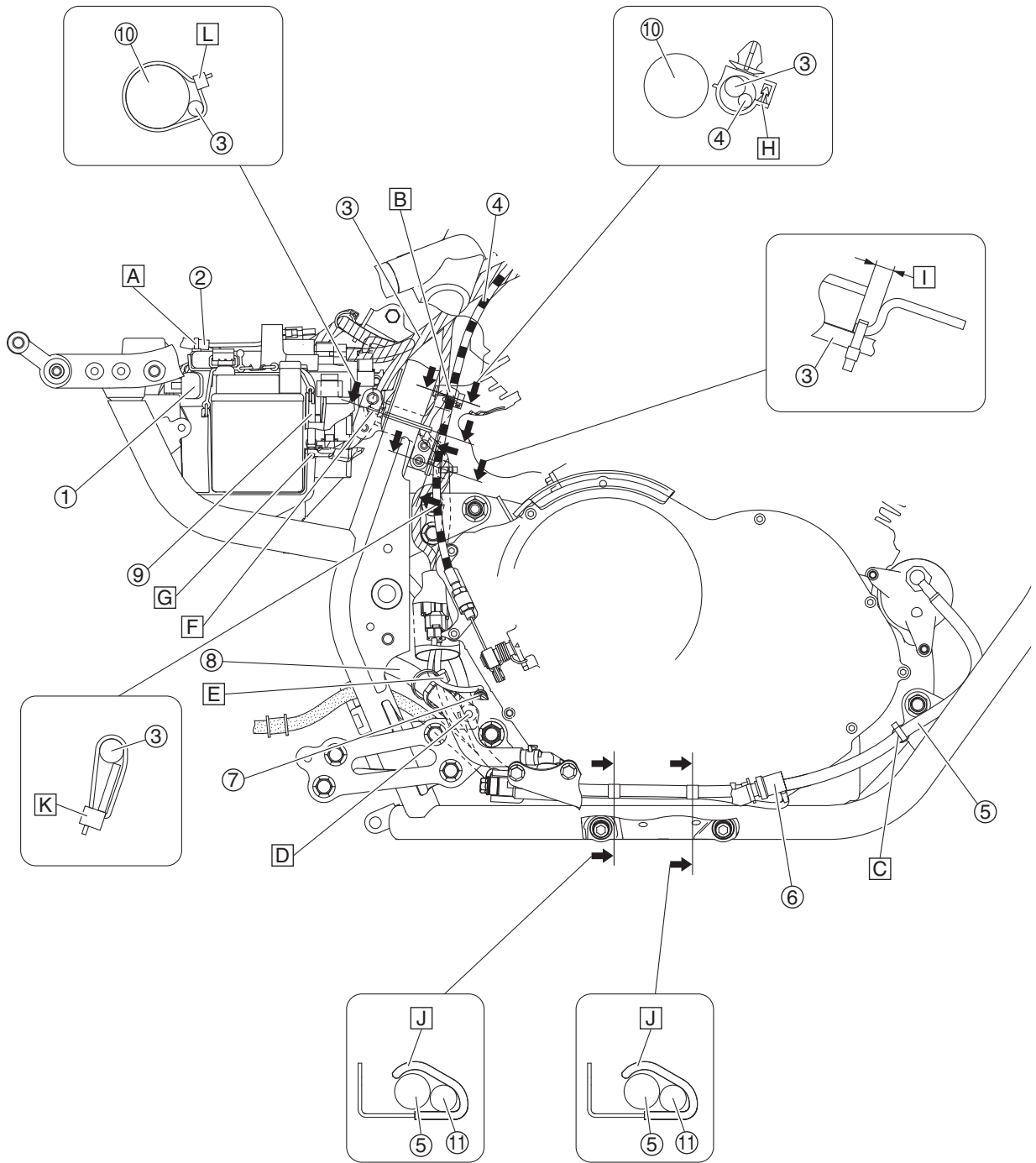


CABLE ROUTING (except for ABS models)

1. Clutch cable
 2. Joint coupler
 3. Throttle cable (accelerator cable)
 4. Throttle cable (decelerator cable)
 5. Wire harness
 6. Left handlebar switch lead
 7. Front cylinder spark plug lead
 8. Front cylinder ignition coil lead
 9. Rear cylinder ignition coil lead
 10. Rear cylinder spark plug lead
 11. Rear cylinder ignition coil
 12. Right handlebar switch lead
 13. Meter assembly lead
 14. Left handlebar switch coupler
- A. Route the clutch cable to the inside of the fuel tank bracket.
- B. Route the clutch cable through the guide on the frame.
- C. Route the wire harness through the guide on the frame. Align the white tape on the wire harness with the guide.
- D. Cover the throttle position sensor coupler with the coupler cover.
- E. Insert the projection on the joint coupler into the hole in the frame.
- F. Route the clutch cable through the guide.
- G. Insert the projection on the right handlebar switch lead holder into the hole in the cable guide.
- H. Insert the projection on the wire harness holder into the hole in the cable guide.
- I. Route the wire harness through the guide.
- J. Insert the projection on the left handlebar switch lead holder into the hole in the cable guide.
- K. Route the throttle cables through the guide.
- L. Route the left handlebar switch lead to the inside of the wire harness and main switch.
- M. Insert the projections on the wire harness holders into the holes in the frame.
- N. Fasten the front cylinder spark plug lead with the holder. Point the open ends of the holder rearward.
- O. Install the ignition coil connectors so that the front cylinder ignition coil leads are routed downward.
- P. Install the ignition coil connectors so that the rear cylinder ignition coil leads are routed upward.
- Q. Align the paint mark on the throttle cable with the throttle cable holder.
- R. Make sure that the rear cylinder spark plug lead is not pinched between the rear cylinder head and the rear right cylinder head cover.
- S. Secure the plastic band by inserting the projection on the band into the hole in the frame, and then fasten the clutch cable and wire harness with the band, making sure to point the end of the band downward.
- T. Fasten the wire harness and clutch cable with the plastic band. Position the buckle of the plastic band toward the frame so that it does not protrude to the outside of the wire harness, and place the end of the band between the frame and the rear cylinder ignition coil.
- U. Route the left handlebar switch lead through the guide on the meter bracket. Make sure that there is no slack in the handlebar switch lead between the steering head and the plastic band installed on the handlebar.
- V. Route the front left turn signal light lead over the guide on the meter bracket.
- W. Route the right handlebar switch lead through the guide on the meter bracket. Make sure that there is no slack in the handlebar switch lead between the steering head and the plastic band installed on the handlebar.
- X. Route the front right turn signal light lead to the front of the right handlebar switch lead, and then connect the lead to the front turn signal light.
- Y. Route the meter assembly lead to the front of the meter bracket.
- Z. Route the front turn signal light lead to the front of the left handlebar switch lead, and then connect the lead to the front turn signal light.
- AA. Install the joint coupler by sliding it onto the engine bracket from below.
- AB. Connect the wire harness to the left handlebar switch, and then install the coupler onto the tab on the engine bracket (front upper side).
- AC. Secure the holder by inserting the projection on the holder into the hole in the bracket, and then fasten the front cylinder spark plug lead with the holder.
- AD. To the left handlebar switch
- AE. Install the left handlebar switch coupler onto the tab on the intake air pressure sensor bracket.
- AF. To the wire harness
- AG. To the main portion of the wire harness
- AH. Fasten the wire harness by sliding the plastic holder on the wire harness onto the stud on the intake air pressure sensor bracket.
- AI. To the horn
- AJ. Fasten the spark plug lead with the holder.

CABLE ROUTING (except for ABS models)

Clutch cable (right side view)

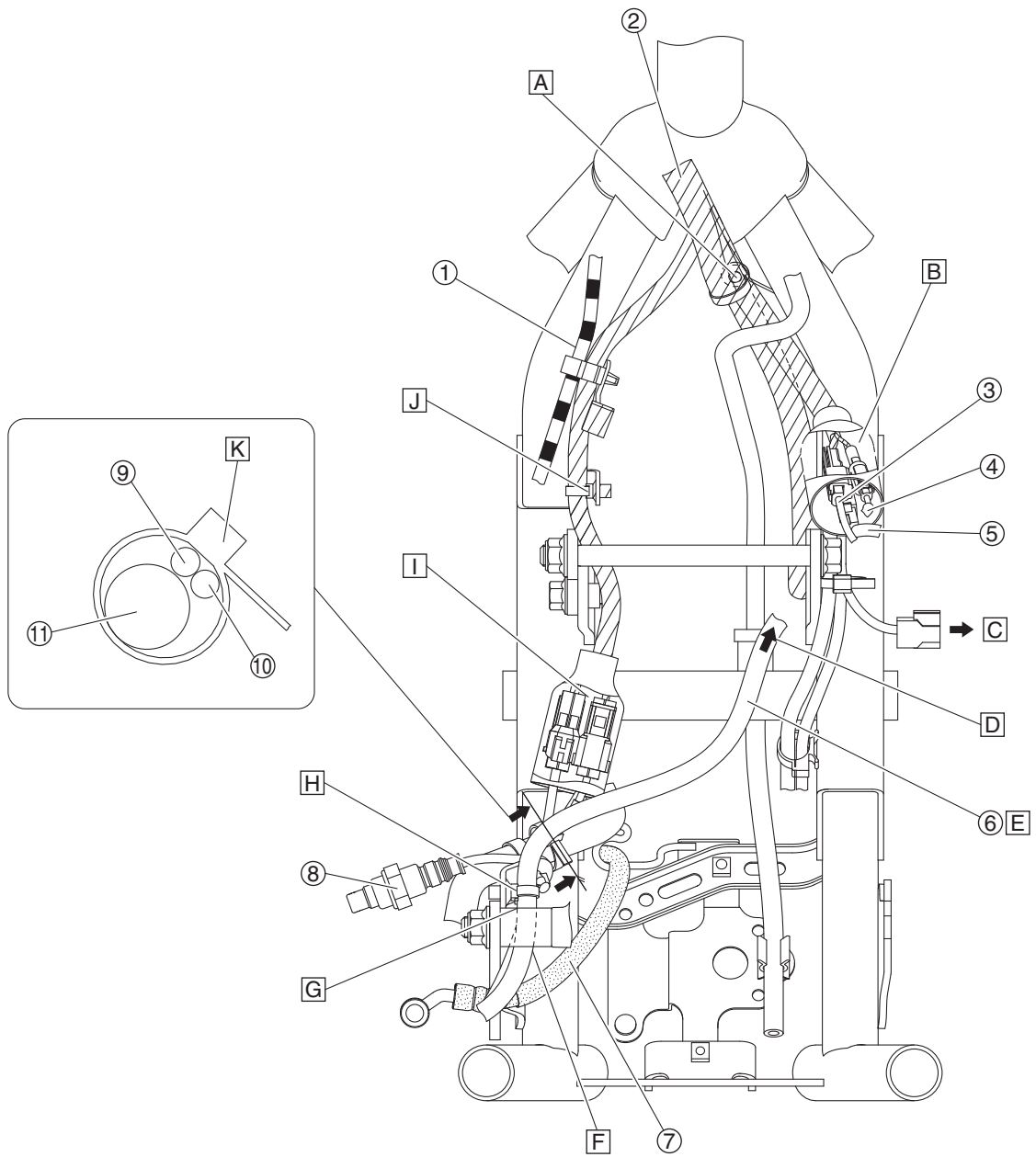


CABLE ROUTING (except for ABS models)

1. Lean angle sensor
 2. Tail sub-wire harness
 3. Wire harness
 4. Clutch cable
 5. Starter motor lead
 6. Rear brake light switch
 7. O₂ sensor
 8. Brake fluid reservoir hose
 9. Positive battery lead
 10. Frame
 11. Rear brake light switch lead
- A. Insert the projection on the tail sub-wire harness holder into the hole in the battery box.
 - B. Secure the holder by inserting the projection on the holder into the hole in the battery box bracket, and then fasten the clutch cable and wire harness with the holder.
 - C. Insert the projection on the starter motor lead holder into the hole in the engine bracket (front lower side).
 - D. Insert the projection on the starter motor lead holder into the hole in the engine bracket (rear lower side).
 - E. Fasten the brake fluid reservoir hose, rear brake light switch lead, and O₂ sensor lead with the plastic band. Face the buckle of the plastic band upward with the end pointing downward.
 - F. Insert the projection on the wire harness holder into the hole in the battery box.
 - G. Insert the projection on the positive battery lead holder into the hole in the battery box.
 - H. Face the catch of the holder forward. Route the clutch cable to the outside of the wire harness.
 - I. Fasten the wire harness with a plastic locking tie within the range shown in the illustration.
 - J. Route the rear brake light switch lead and starter motor lead through the guide, and then secure the leads by bending the guide around the leads. Route the rear brake light switch lead to the outside of the starter motor lead. Make sure that the leads do not protrude.
 - K. Fasten the wire harness to the frame with a plastic locking tie. Cut off the excess end of the plastic locking tie.
 - L. Fasten the wire harness to the frame with a plastic locking tie. Face the buckle of the plastic locking tie inward, and then cut off the excess end of the tie.

CABLE ROUTING (except for ABS models)

Frame (inner side view)

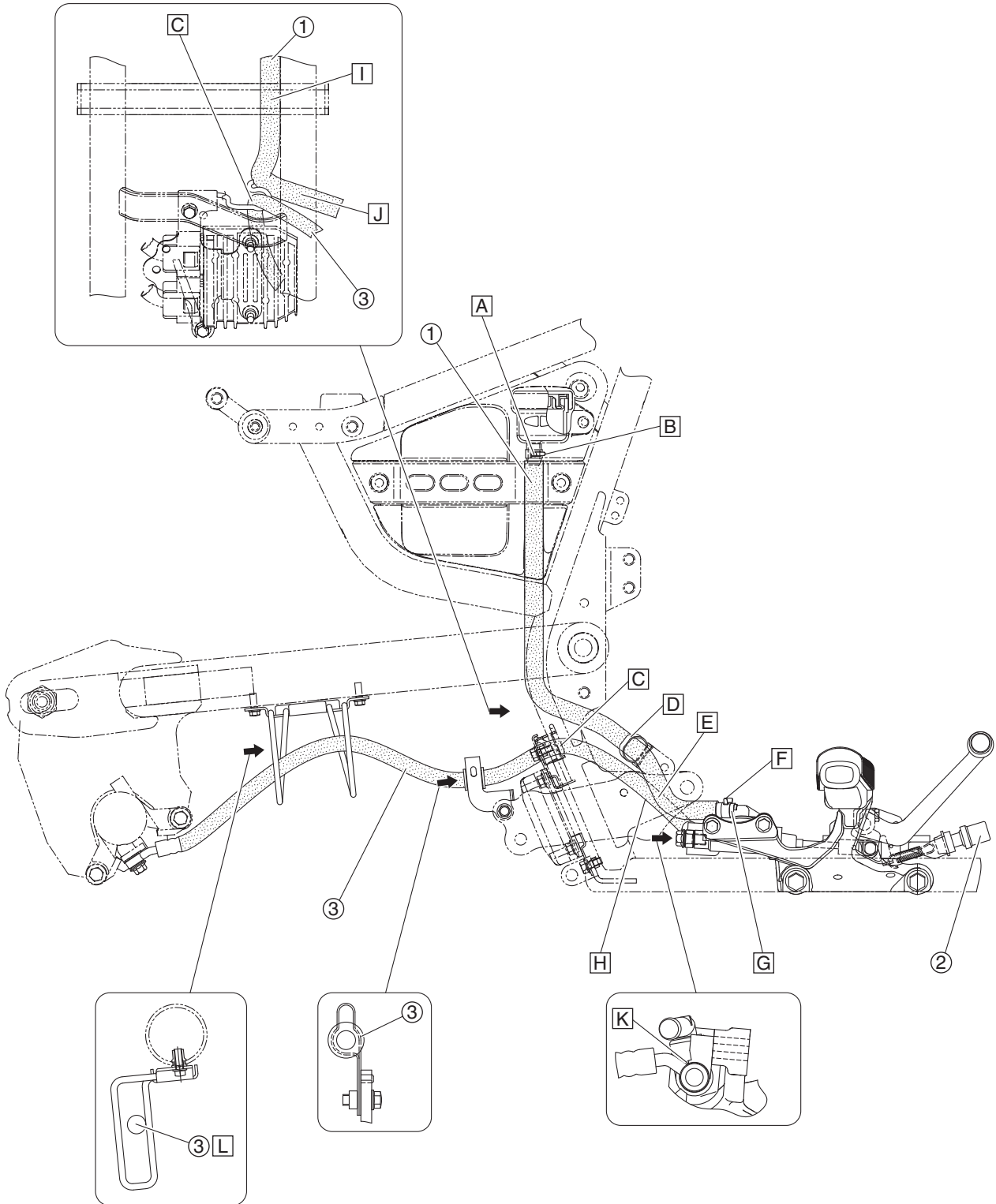


CABLE ROUTING (except for ABS models)

1. Clutch cable
2. Wire harness
3. Crankshaft position sensor lead
4. Oil level switch lead
5. Neutral switch lead
6. Starter motor lead
7. Rear brake hose
8. O₂ sensor
9. Rear brake light switch lead
10. O₂ sensor lead
11. Brake fluid reservoir hose
- A. Insert the projection on the wire harness holder into the hole in the frame.
- B. After connecting the crankshaft position sensor coupler, oil level switch coupler, and neutral switch coupler, cover the couplers with the coupler cover.
- C. To the speed sensor
- D. To the starter relay
- E. Route the starter motor lead to the front of the frame cross member.
- F. Route the starter motor lead and rear brake light switch lead under the engine bracket (rear lower side).
- G. Route the rear brake light switch lead under the mounting position for the starter motor lead on the engine bracket (rear lower side).
- H. Insert the projection on the starter motor lead holder into the hole in the engine bracket (rear lower side).
- I. After connecting the rear brake light switch coupler and O₂ sensor coupler, cover the couplers with the coupler cover.
- J. Insert the projection on the wire harness holder into the hole in the battery box bracket.
- K. Point the end of the plastic band downward.

CABLE ROUTING (except for ABS models)

Rear brake hose (right side view)

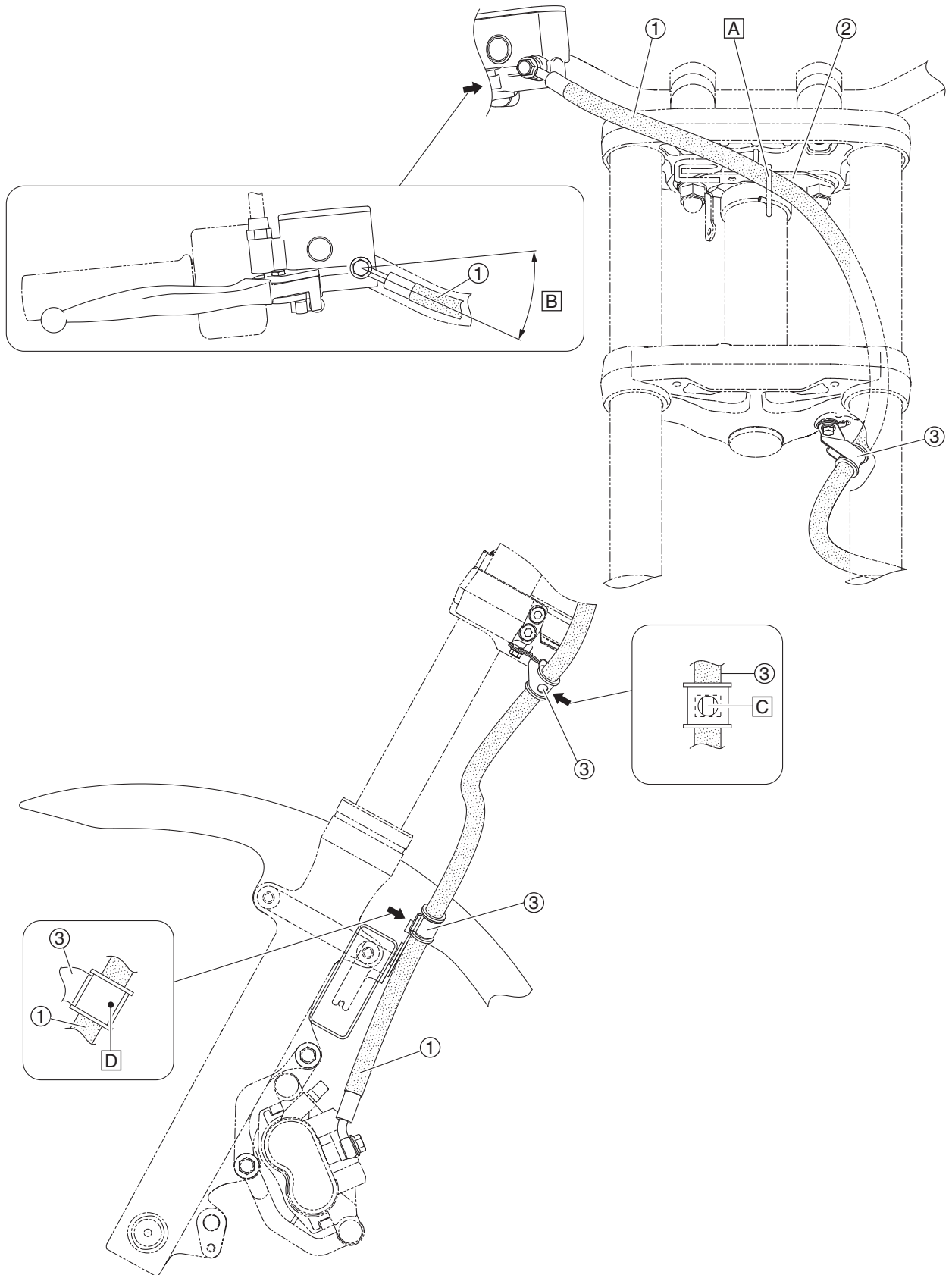


CABLE ROUTING (except for ABS models)

1. Brake fluid reservoir hose
2. Rear brake light switch
3. Rear brake hose
- A. Install the brake fluid reservoir hose with its white paint mark facing inward.
- B. Do not install the hose clamp on the flange at the end of the hose fitting. Point the ends of the hose clamp outward, making sure that the ends do not contact the battery cover holder.
- C. Route the rear brake hose, through the guide on the rectifier/regulator bracket.
- D. Fasten the brake fluid reservoir hose at the white paint mark.
- E. Route the brake fluid reservoir hose to the outside of the engine bracket (rear lower side).
- F. Point the ends of the hose clamp upward.
- G. Install the brake fluid reservoir hose with its white paint mark facing upward.
- H. Route the rear brake hose to the inside of the engine bracket (rear lower side).
- I. Route the brake fluid reservoir hose to the rear of the frame cross member.
- J. Route the brake fluid reservoir hose to the front of the frame.
- K. Face the white paint mark on the rear brake hose upward.
- L. Route the brake hose through the rear brake hose guide.

CABLE ROUTING (except for ABS models)

Front brake hose (front and left side view)

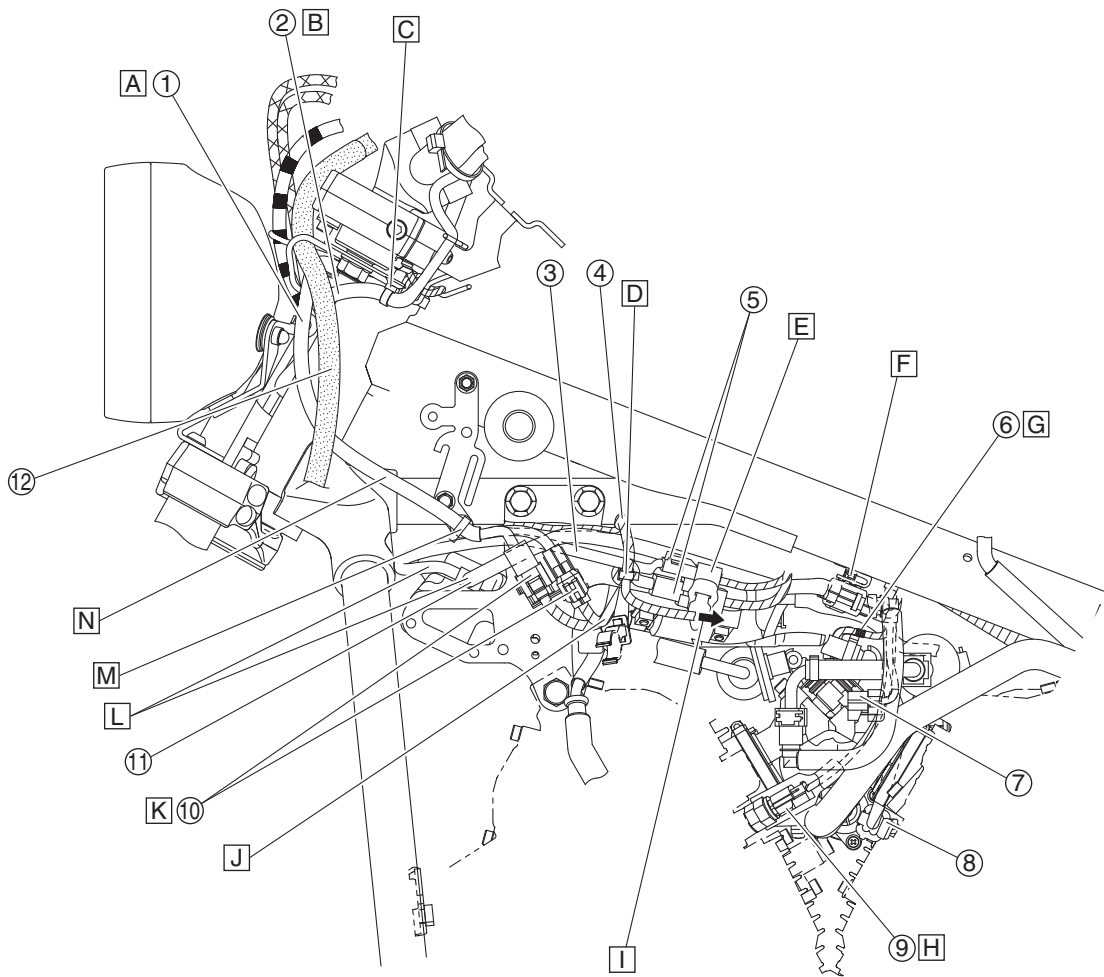


CABLE ROUTING (except for ABS models)

1. Front brake hose
2. Cable guide
3. Brake hose holder
 - A. Route the front brake hose through the cable guide.
 - B. 20–40°
 - C. Fasten the front brake hose with the holder, making sure that the paint mark on the hose is visible through the hole in the holder.
 - D. Fasten the front brake hose with the holder, making sure that the paint mark on the hose is aligned with the open ends of the holder.

CABLE ROUTING (except for ABS models)

Steering head (left side view)

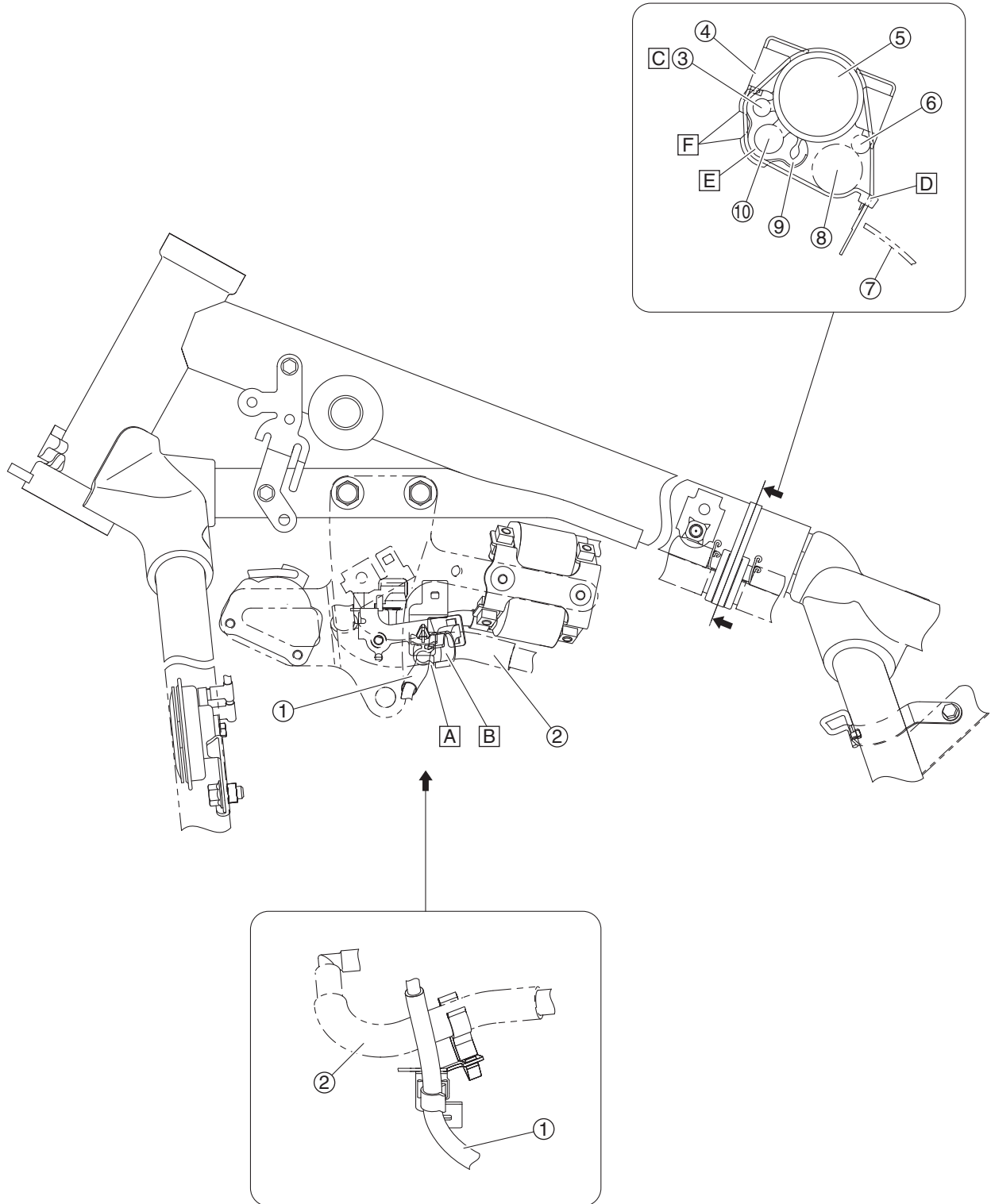


CABLE ROUTING (except for ABS models)

1. Right handlebar switch lead
 2. Left handlebar switch lead
 3. Main switch lead
 4. Fuel pump lead
 5. Main switch couplers
 6. Rear cylinder injector lead
 7. Front cylinder injector coupler
 8. ISC (idle speed control) unit coupler
 9. Engine temperature sensor coupler
 10. Right handlebar switch coupler
 11. Immobilizer unit lead
 12. Front brake hose
- A. Route the right handlebar switch lead through the cable guide.
 - B. Route the left handlebar switch lead to the outside of the cable guide.
 - C. Insert the projection on the left handlebar switch lead holder into the hole in the cable guide.
 - D. Route the fuel pump lead to the outside of the main switch leads and immobilizer unit lead, and then fasten the fuel pump lead with the holder.
 - E. Fasten the main switch couplers to the engine bracket (front upper side) with the plastic band. Be sure to position the smaller coupler above the larger coupler.
 - F. After connecting the immobilizer unit coupler, insert the projection on the coupler into the hole in the frame.
 - G. Connect the rear cylinder injector coupler, which has white tape on the lead, to rear cylinder injector.
 - H. After connecting the engine temperature sensor coupler, cover the coupler with the coupler cover.
 - I. To the fuel pump
 - J. Route the right handlebar switch lead under the engine bracket (front upper side).
 - K. Install the right handlebar switch coupler (4-pin) onto the tab on the engine bracket (front upper side) and insert the projection on the right handlebar switch coupler (8-pin) into the hole in the bracket.
 - L. Route the main switch lead and immobilizer unit lead between the right handlebar switch leads and the engine bracket (front upper side).
 - M. Insert the projection on the right handlebar switch lead holder into the hole in the cable guide.
 - N. Route the right handlebar switch lead to the inside of the front brake hose.

CABLE ROUTING (except for ABS models)

Spark plug lead

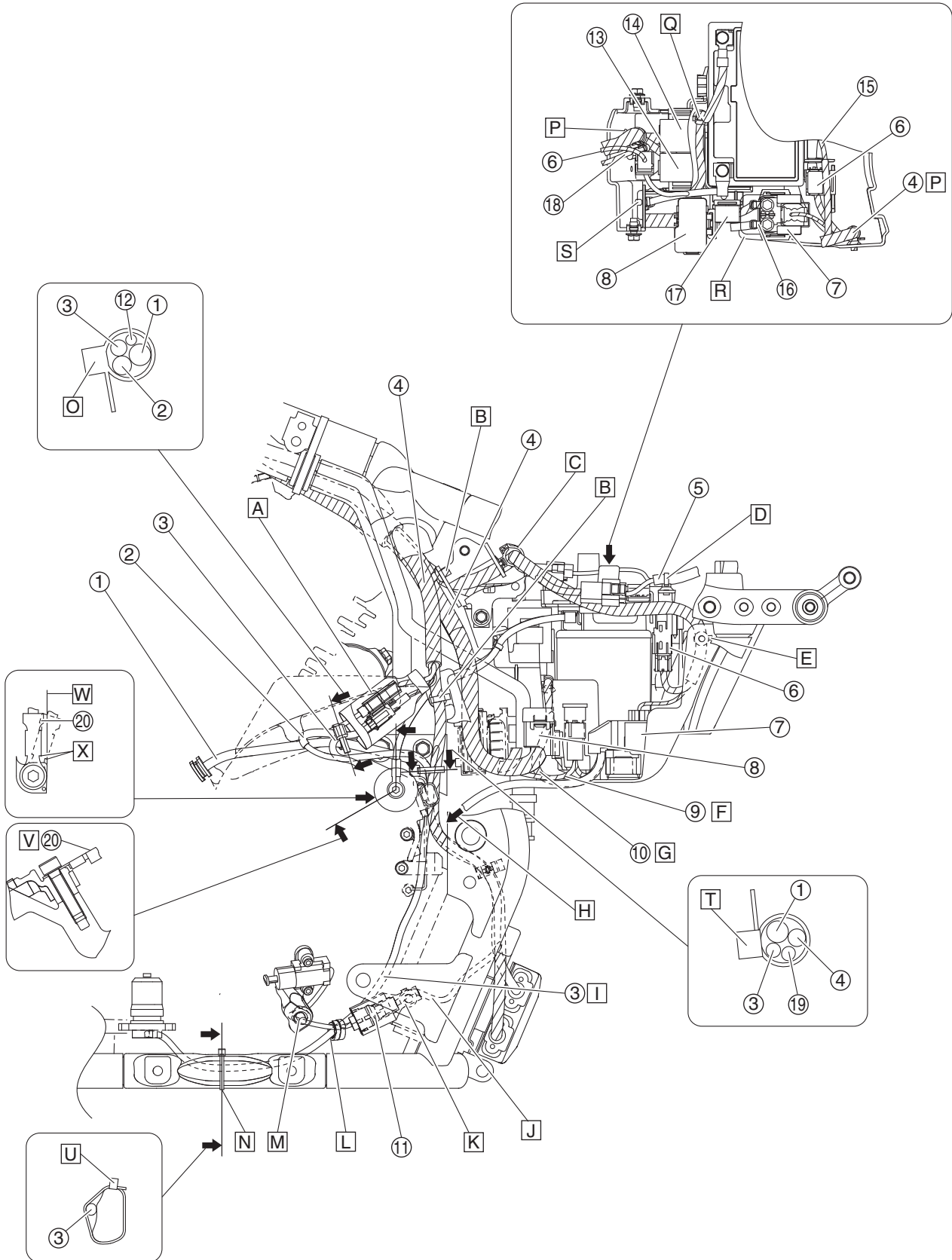


CABLE ROUTING (except for ABS models)

1. Front cylinder spark plug lead
 2. Fuel return hose
 3. Fuel tank breather hose
 4. Fuel tank bracket
 5. Frame
 6. Clutch cable
 7. Rear right cylinder head cover
 8. Wire harness
 9. Hose holder
 10. Crankcase breather hose
- A. Fasten the front cylinder spark plug lead with the holder.
 - B. Fasten the fuel return hose with the holder.
 - C. Fasten the hose protector of the fuel tank breather hose with the hose holder. Make sure that the fuel tank breather hose contacts the fuel tank bracket.
 - D. Position the buckle of the plastic band below the frame, and place the end of the band to the inside of the rear right cylinder head cover.
 - E. Be sure to fit the plastic band into the slots in the hose holder.
 - F. Slots in the hose holder

CABLE ROUTING (except for ABS models)

Electrical components tray (left side view)

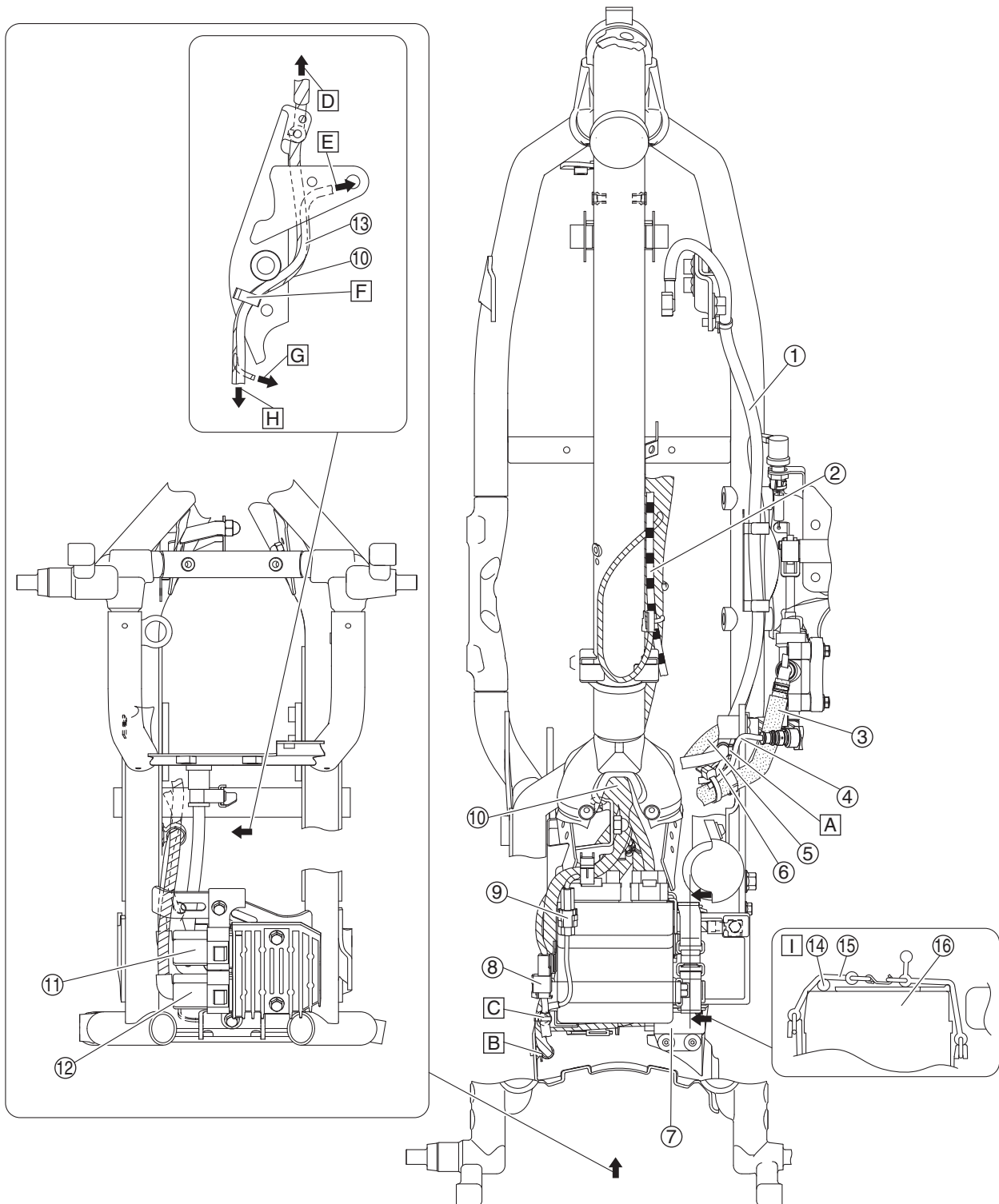


CABLE ROUTING (except for ABS models)

1. Stator coil lead
2. Neutral switch lead
3. Oil level switch lead
4. Wire harness
5. Tail sub-wire harness
6. Headlight relay
7. Starter relay
8. Fuse box
9. Main fuse lead
10. Positive battery lead
11. Sidestand switch coupler
12. Crankshaft position sensor lead
13. Turn signal/hazard relay
14. Relay unit
15. Lean angle sensor lead
16. Starter motor lead
17. Main fuse
18. Yamaha diagnostic tool coupler
19. Speed sensor lead
20. Ground lead
 - A. After connecting the couplers, cover the couplers with the coupler cover, and then place the couplers in the air duct.
 - B. Insert the projections on the wire harness holders into the holes in the frame.
 - C. Do not face the catch of the holder downward.
 - D. Insert the projection on the tail sub-wire harness holder into the hole in the battery box.
 - E. Insert the projection on the wire harness holder into the hole in the battery box.
 - F. Route the main fuse lead under the fuse box.
 - G. Route the positive battery lead under the fuse box.
 - H. To the starter motor
 - I. Route the oil level switch lead to the inside of the frame.
 - J. Route the sidestand switch lead to the inside of the frame.
 - K. After connecting the sidestand switch coupler, insert the projection on the coupler cover into the hole in the frame.
 - L. Fasten the oil level switch lead and sidestand switch lead with the holder. Position the holder between the sidestand switch coupler and the sidestand switch lead holder.
 - M. Install the sidestand switch lead holder at the location shown.
 - N. Fasten the oil level switch lead to the frame with a plastic locking tie.
 - O. Point the end of the plastic locking tie downward.
 - P. Insert the projection on the wire harness holder into the hole in the battery box.
 - Q. Insert the projection on the positive battery lead holder into the hole in the battery box.
 - R. After connecting the positive battery lead and starter motor lead, install the starter relay cover.
 - S. Insert the projection on the ground lead holder into the hole in the battery box.
 - T. Point the end of the plastic locking tie inward.
 - U. Position the buckle of the plastic locking tie on top of the frame, with the end pointing outward, and then cut off the excess end of the tie to 1–5 mm (0.04–0.20 in).
- V. Install the ground lead terminal so that the crimped section of the terminal that secures the lead is facing inward. Install the ground lead terminal and the drive pulley housing using the same bolt.
- W. Side of the drive pulley housing
- X. Install the ground lead terminal so that the indicated section of the terminal is positioned to the front of the side of the drive pulley housing.

CABLE ROUTING (except for ABS models)

Rectifier/regulator (rear view)

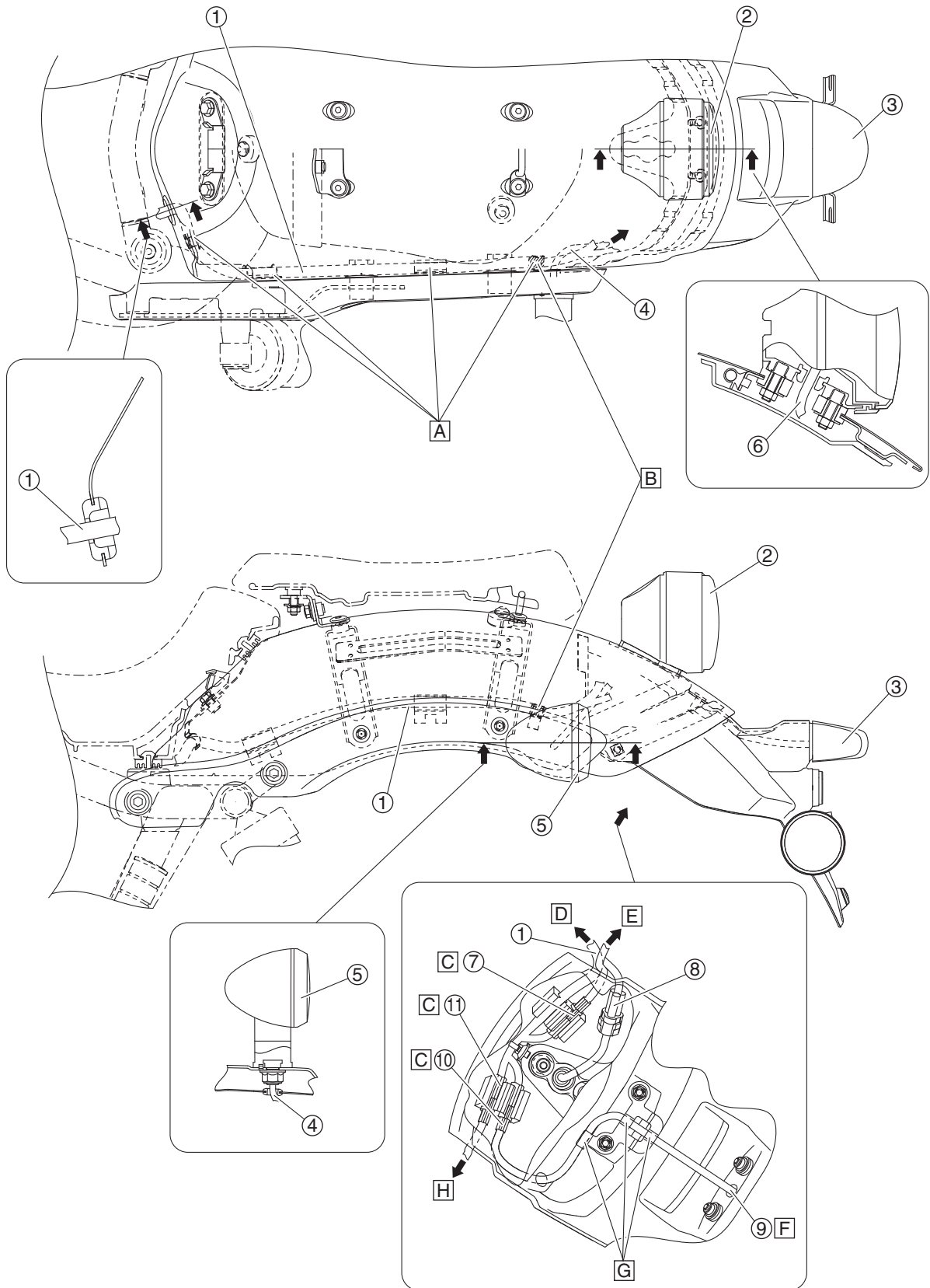


CABLE ROUTING (except for ABS models)

1. Starter motor lead
2. Clutch cable
3. Brake fluid reservoir hose
4. O₂ sensor lead
5. Rear brake hose
6. Rear brake light switch lead
7. Lean angle sensor
8. Rear turn signal light and license plate light sub-wire harness coupler
9. Tail/brake light sub-wire harness coupler
10. Wire harness
11. Stator coil coupler
12. Rectifier/regulator coupler
13. Stator coil lead
14. Positive battery lead
15. Battery band
16. Battery
 - A. Insert the projection the stator motor lead holder into the hole in the engine bracket (rear lower bracket).
 - B. Insert the projection on the wire harness holder into the hole in the battery box.
 - C. Insert the projection on the tail sub-wire harness holder into the hole in the battery box.
 - D. To the wire harness
 - E. To the stator coil
 - F. Secure the holder by inserting the projection on the holder into the hole in the frame, and then fasten the wire harness and stator coil lead with the holder.
 - G. To the sidestand switch
 - H. To the rectifier/regulator
 - I. Route the positive battery lead on top of the battery, and then fasten the lead with the battery band.

CABLE ROUTING (except for ABS models)

Rear fender (top and left view)



CABLE ROUTING (except for ABS models)

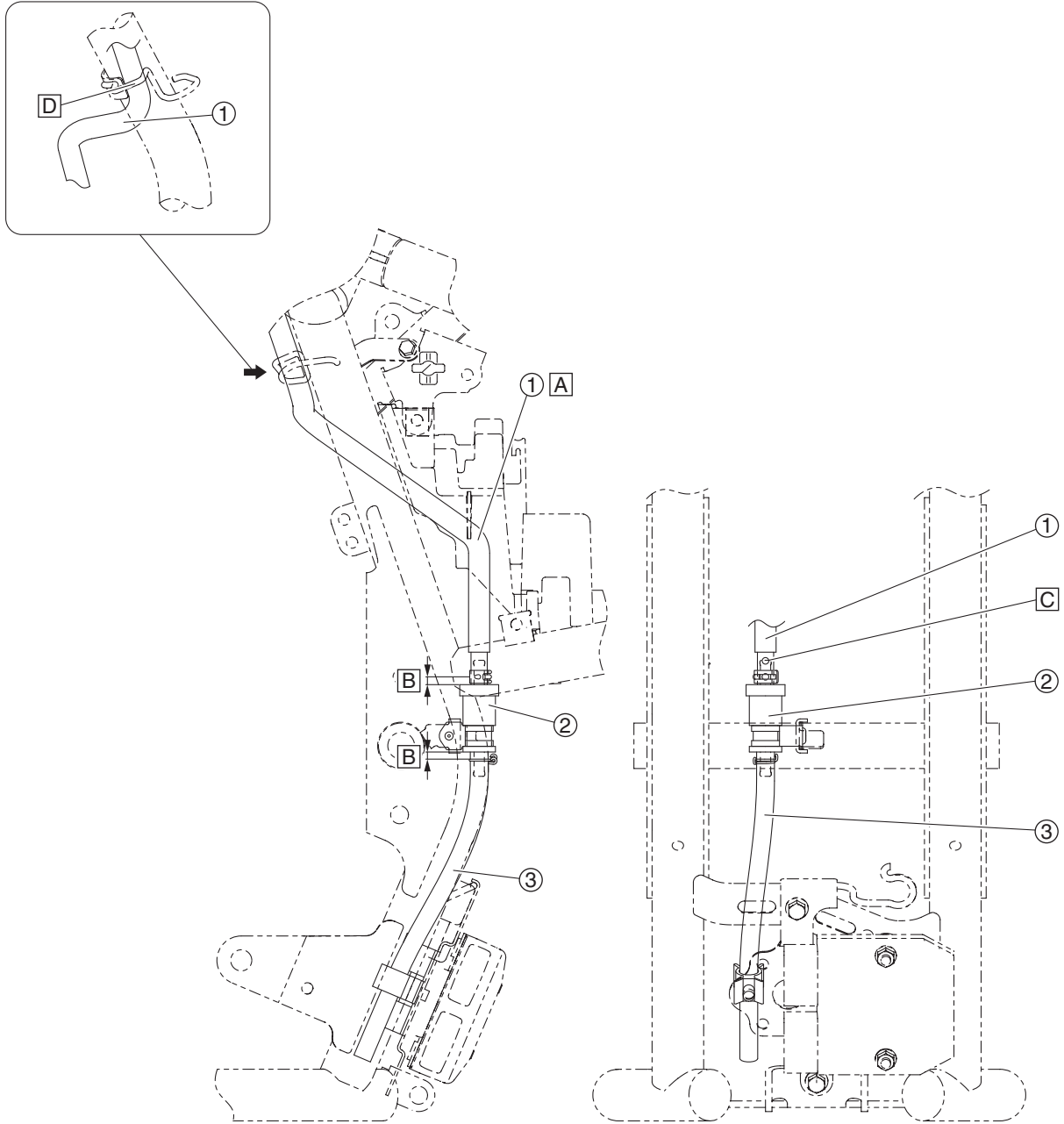
1. Tail sub-wire harness
 2. Tail/brake light
 3. License plate light
 4. Rear left turn signal light lead
 5. Rear left turn signal light
 6. Tail/brake light lead
 7. Rear left turn signal light coupler
 8. Tail/brake light coupler
 9. License plate light lead
 10. License plate light coupler
 11. Rear right turn signal light coupler (black)
- A. Route the tail sub-wire harness through the guides, and then secure the lead by bending the guides around the lead.
 - B. Align the white tape on the tail sub-wire harness with the guide.
 - C. Install each coupler so that both ends of the female section of the coupler are protruding past the edges of the holder.
 - D. To the holder on the rear fender
 - E. To the rear left turn signal light
 - F. To the license plate light
 - G. Route the license plate light lead between the bracket and the rear fender, making sure that the lead is secured by the bracket.
 - H. To the rear right turn signal light

CABLE ROUTING (except for ABS models)

1. Fuel tank breather/overflow hose (fuel tank to hose joint)
2. Fuel tank breather/overflow hose (hose joint to rollover valve)
3. Hose joint
4. Fuel filter
5. Fuel hose (fuel pump to fuel filter)
6. Fuel pump
7. Fuel return hose
8. Fuel sender lead
9. Fuel sender
10. Frame
11. Fuel hose (hose joint to fuel tank)
 - A. Install the fuel tank breather/overflow hose (fuel tank to hose joint) completely onto the hose fitting.
 - B. Install the fuel tank breather/overflow hose (fuel tank to hose joint) with its white paint mark facing rearward.
 - C. Align the hose clamp with the white paint mark on the fuel tank breather/overflow hose (fuel tank to hose joint) and point the ends of the clamp rearward.
 - D. 18 mm (0.71 in) or more
 - E. 8 mm (0.31 in) or more
 - F. Make sure not to install the hose clamps on the raised portions of the hose fittings.
 - G. Connect the orange connector of the fuel hose (fuel pump to fuel filter) to the fuel pump.
 - H. 0 mm (0 in) or more
 - I. Install the fuel return hose completely onto the hose fitting of the pressure regulator, making sure that the yellow paint mark on the hose is facing outward.
 - J. Align the ends of the hose clamp with the yellow paint mark on the fuel return hose. Make sure not to install the hose clamp on the raised portion of the hose fitting.
 - K. Install the fuel sender so that the fuel sender lead is routed inward.
 - L. Make sure that the end of the hose clamp contacts the frame.
 - M. Install the fuel return hose completely onto the hose joint, making sure that the white paint mark on the hose is positioned on the same side of the hose joint as the arrow mark.
 - N. Arrow mark
 - O. Align the hose clamp with the edge of the white paint mark on the fuel hose (hose joint to fuel tank), making sure to align the crimped section of the clamp with the paint mark.
 - P. Install the fuel hose (hose joint to fuel tank) completely onto the hose fitting, making sure that the white paint mark on the hose is facing downward.
 - Q. Fasten the fuel return hose with the holder.
 - R. Route the fuel sender lead through the guide, and then secure the lead by bending the guide around the lead.

CABLE ROUTING (except for ABS models)

Fuel tank breather hose (left and rear view)

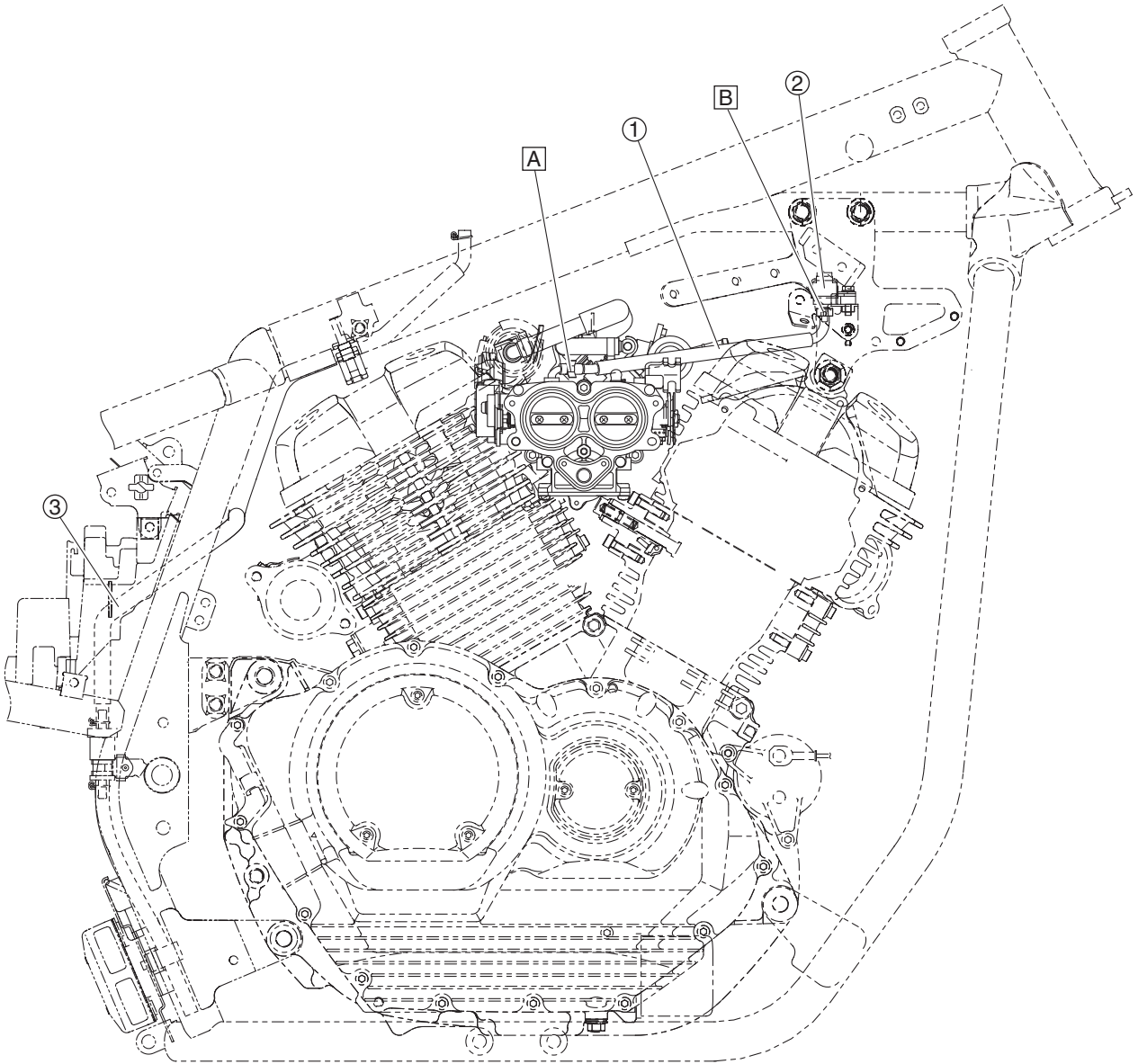


CABLE ROUTING (except for ABS models)

1. Fuel tank breather/overflow hose (hose joint to rollover valve)
2. Rollover valve
3. Fuel tank breather/overflow hose (from rollover valve)
- A. Route the fuel tank breather hose (hose joint to rollover valve) to the left of the battery box.
- B. 2–8 mm (0.08–0.31 in)
- C. Install the fuel tank breather hose (hose joint to rollover valve) with its white paint mark facing rearward.
- D. Route the fuel tank breather hose (hose joint to rollover valve) through the guide.

CABLE ROUTING (except for ABS models)

Fuel tank breather hose (right side view)

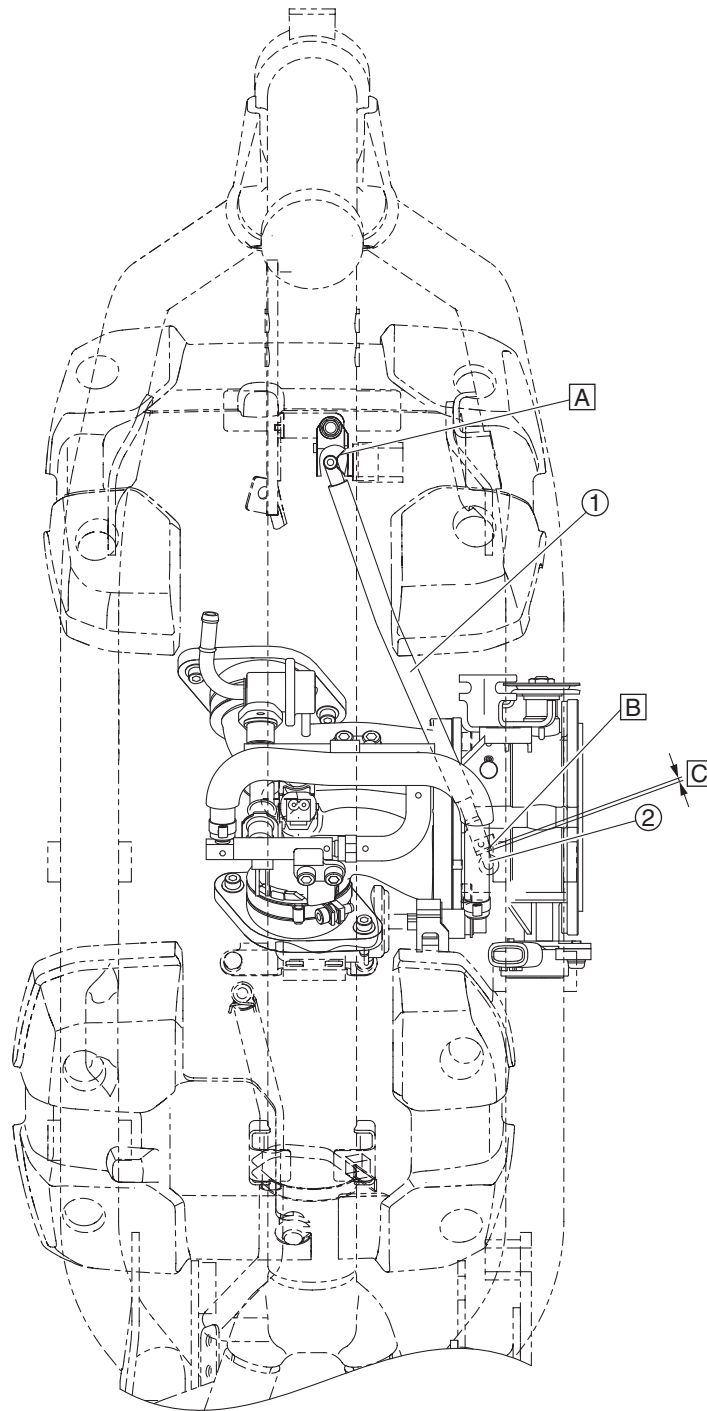


CABLE ROUTING (except for ABS models)

1. Intake air pressure hose
2. Intake air pressure sensor
3. Fuel tank breather hose (hose joint to rollover valve)
 - A. Point the ends of the hose clamp to the right.
 - B. Install the intake air pressure hose with its white paint mark facing to the right.

CABLE ROUTING (except for ABS models)

Intake air pressure sensor hose (top view)

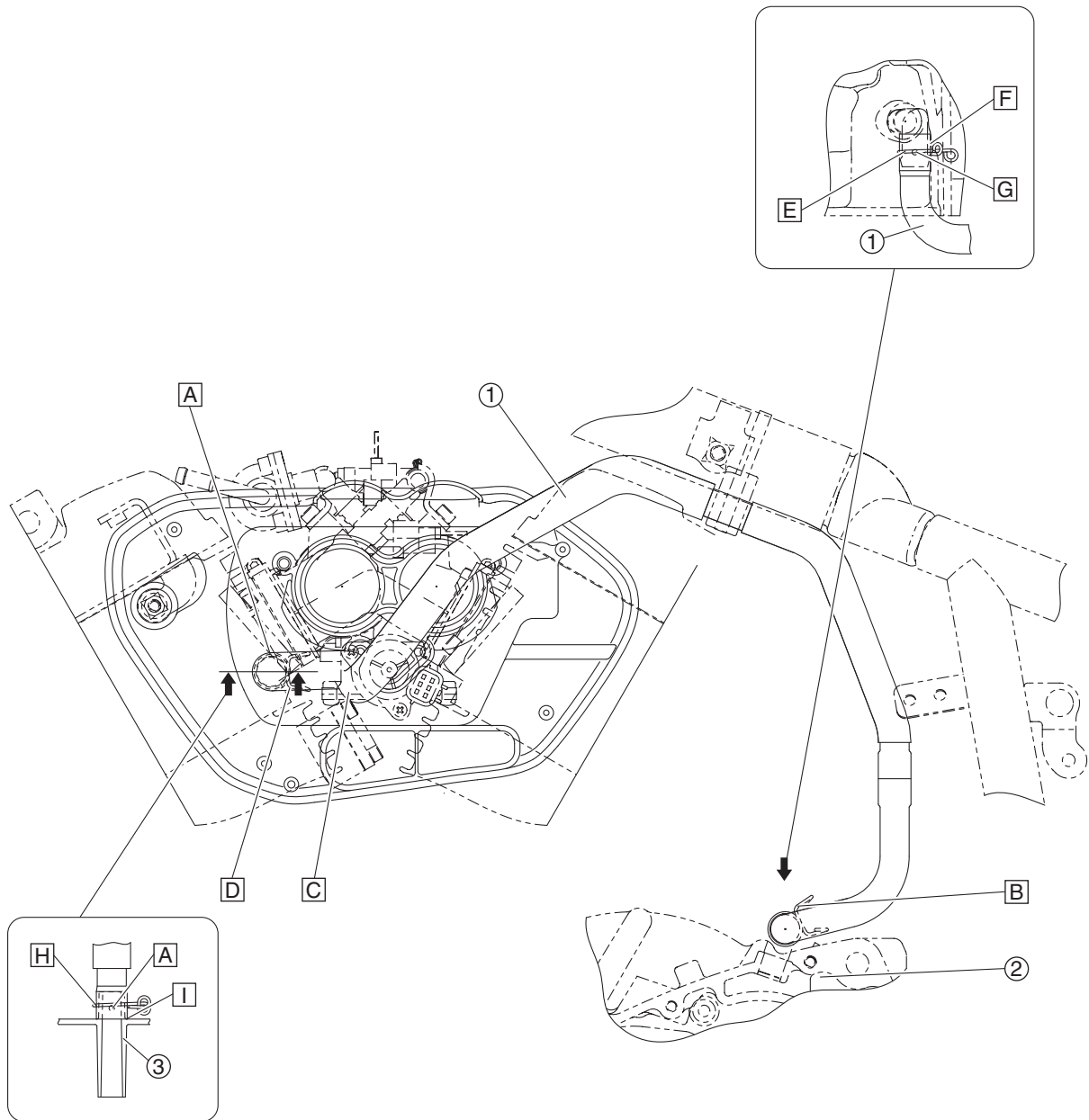


CABLE ROUTING (except for ABS models)

1. Intake air pressure sensor hose
2. Hose fitting
 - A. Point the ends of the hose clamp to the right.
 - B. Install the intake air pressure sensor hose completely onto the hose fitting, making sure that the yellow paint mark on the hose is facing upward.
 - C. 1–2 mm (0.04–0.08 in)

CABLE ROUTING (except for ABS models)

Crankcase breather hose (left side view)



CABLE ROUTING (except for ABS models)

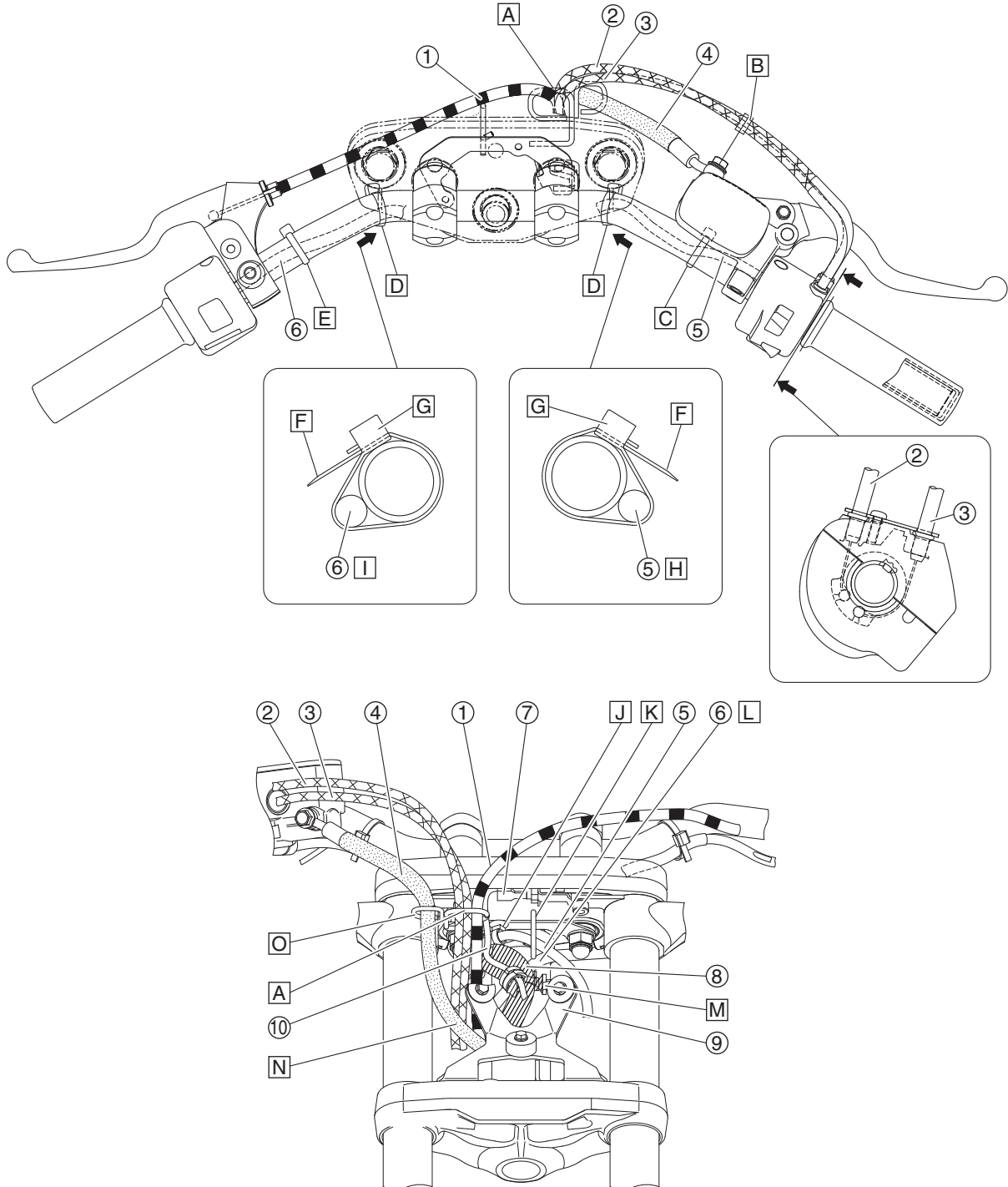
1. Crankcase breather hose
2. Crankcase
3. Air filter case
- A. Install the crankcase breather hose with its white paint mark facing upward.
- B. Point the ends of the hose clamp rearward, angled upward.
- C. Route the crankcase breather hose over the timing chain tensioner.
- D. Point the ends of the hose clamp rearward.
- E. Align the hose clamp with the yellow paint mark on the crankcase breather hose.
- F. Install the crankcase breather hose completely onto the hose joint, making sure that the yellow paint mark on the hose is facing upward.
- G. Yellow paint mark
- H. Align the hose clamp with the white paint mark on the crankcase breather hose.
- I. Install the crankcase breather hose onto the hose fitting of the air filter case, making sure that the hose contacts the case.

CABLE ROUTING (for ABS models)

EAS1XC1004

CABLE ROUTING (for ABS models)

Handlebar (top and front view)

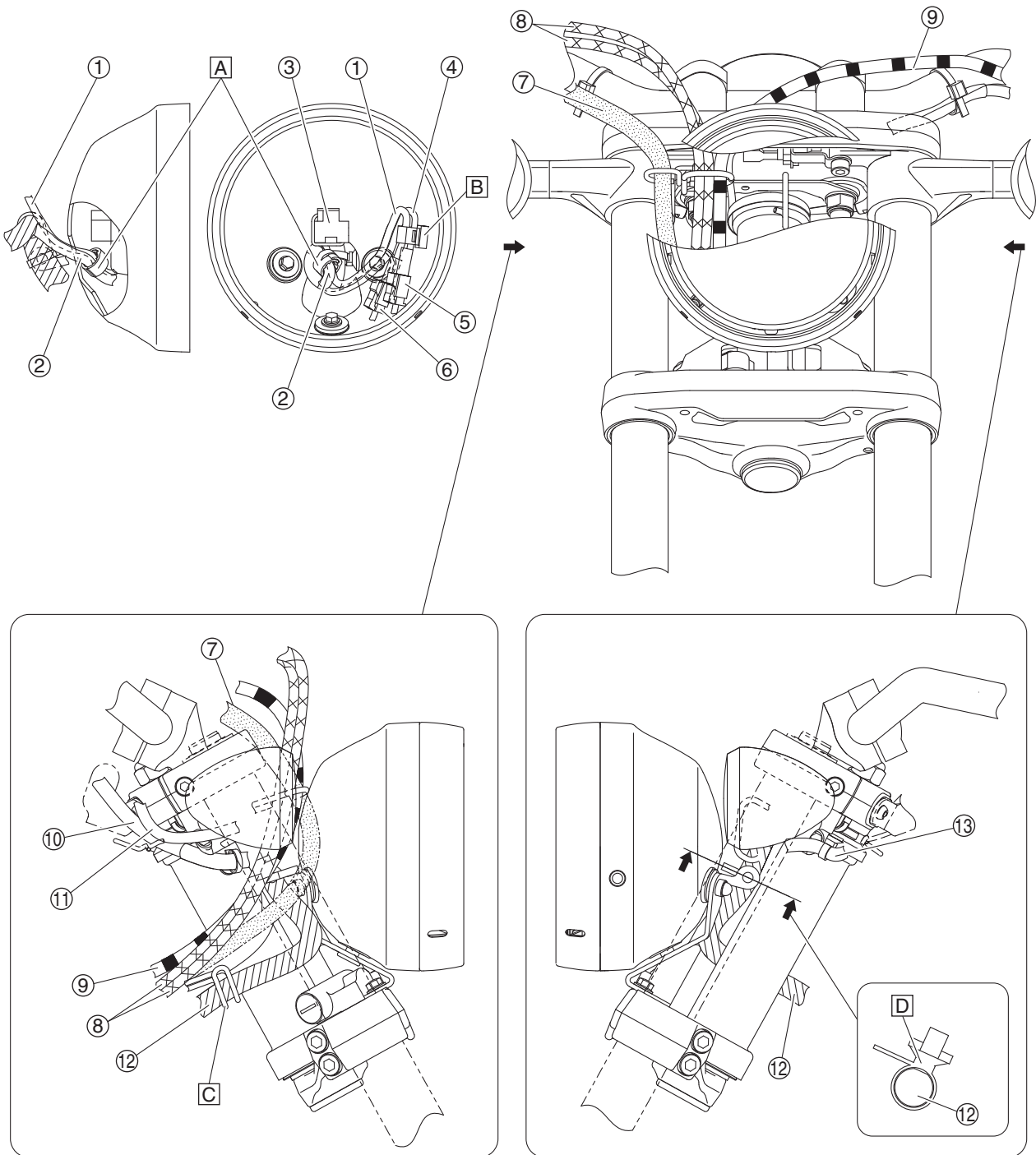


CABLE ROUTING (for ABS models)

1. Clutch cable
2. Throttle cable (accelerator cable)
3. Throttle cable (decelerator cable)
4. Brake pipe/hose assembly (front brake master cylinder to hydraulic unit)
5. Right handlebar switch lead
6. Left handlebar switch lead
7. Intake air temperature sensor
8. Wire harness
9. Headlight stay
10. Intake air temperature sensor sub-wire harness
- A. Route the clutch cable, throttle cable (accelerator cable), and throttle cable (decelerator cable) through the cable guide.
- B. Align the holder with the brake hose union bolt and face the catch of the holder rearward.
- C. Fasten the right handlebar switch lead with the plastic band. Align the plastic band with the middle of the front brake master cylinder.
- D. Fasten the handlebar switch lead with the plastic band at the bend in the handlebar.
- E. Fasten the left handlebar switch lead with the plastic band. Align the plastic band with the locknut.
- F. Point the end of the plastic band downward.
- G. Face the buckle of the plastic band forward.
- H. Route the right handlebar switch lead under the handlebar.
- I. Route the left handlebar switch lead under the handlebar.
- J. Insert the projection on the right handlebar switch lead holder into the hole in the cable guide.
- K. Route the right handlebar switch lead through the cable guide.
- L. Route the left handlebar switch lead to the rear of the right handlebar switch lead and wire harness.
- M. Insert the projection on the wire harness holder into the hole in the headlight stay.
- N. Route the brake pipe/hose assembly (front brake master cylinder to hydraulic unit) to the front of the clutch cable, throttle cable (accelerator cable), and throttle cable (decelerator cable).
- O. Route the brake pipe/hose assembly (front brake master cylinder to hydraulic unit) through the cable guide.

CABLE ROUTING (for ABS models)

Headlight

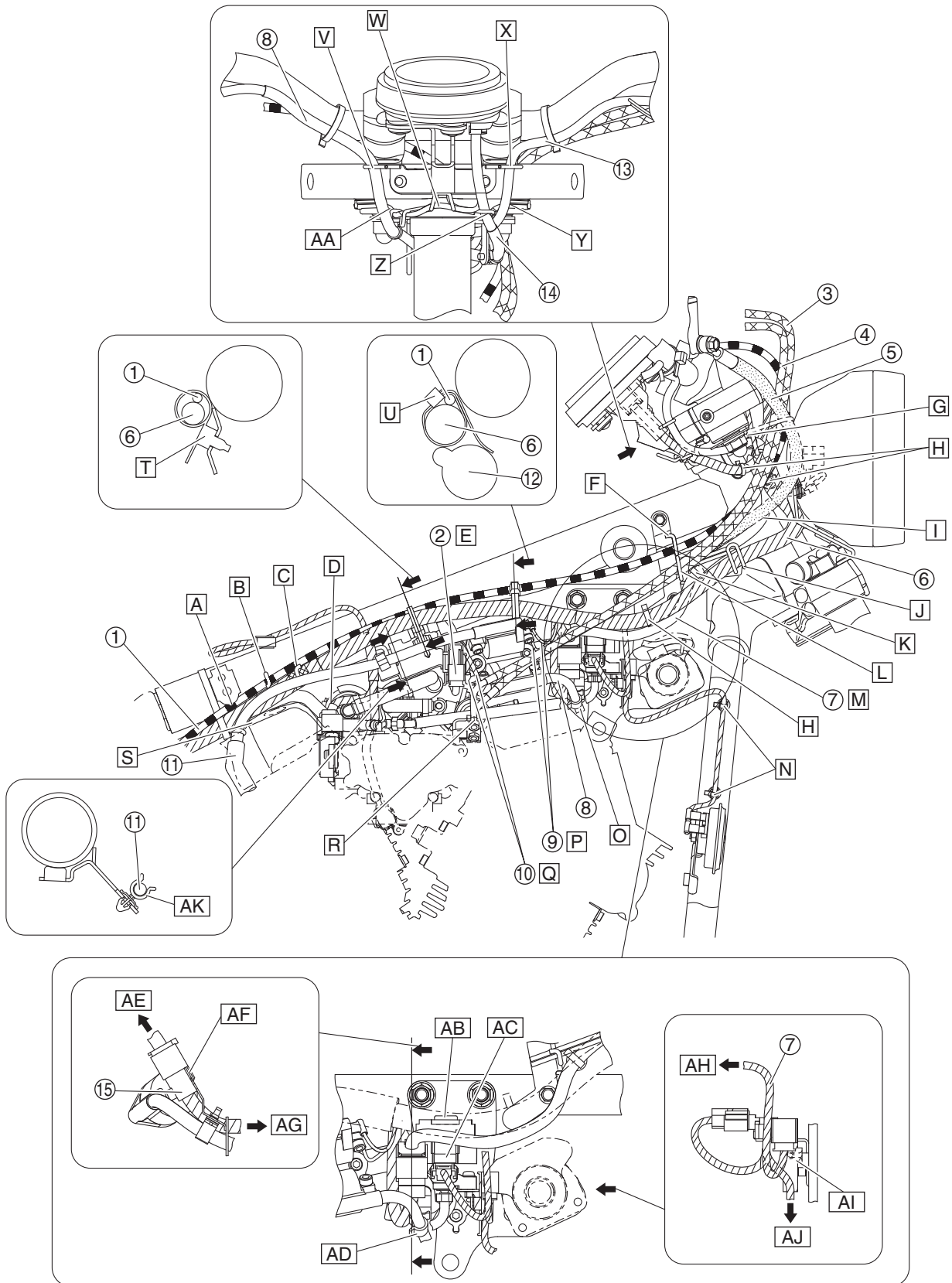


CABLE ROUTING (for ABS models)

1. Intake air temperature sensor sub-wire harness
 2. Headlight lead
 3. Headlight coupler
 4. Auxiliary light lead
 5. Auxiliary light coupler
 6. Intake air temperature sensor coupler
 7. Brake pipe/hose assembly (front brake master cylinder to hydraulic unit)
 8. Throttle cables
 9. Clutch cable
 10. Meter assembly lead
 11. Right handlebar switch lead
 12. Wire harness
 13. Left handlebar switch lead
- A. Fasten the headlight lead and intake air temperature sensor sub-wire harness with the holder. Be sure to position the holder inside the headlight assembly.
 - B. Fasten the intake air temperature sensor sub-wire harness and auxiliary light lead with the holder.
 - C. Route the wire harness through the guide.
 - D. Insert the projection on the wire harness holder into the hole in the headlight stay.

CABLE ROUTING (for ABS models)

Steering head cable (right side view)

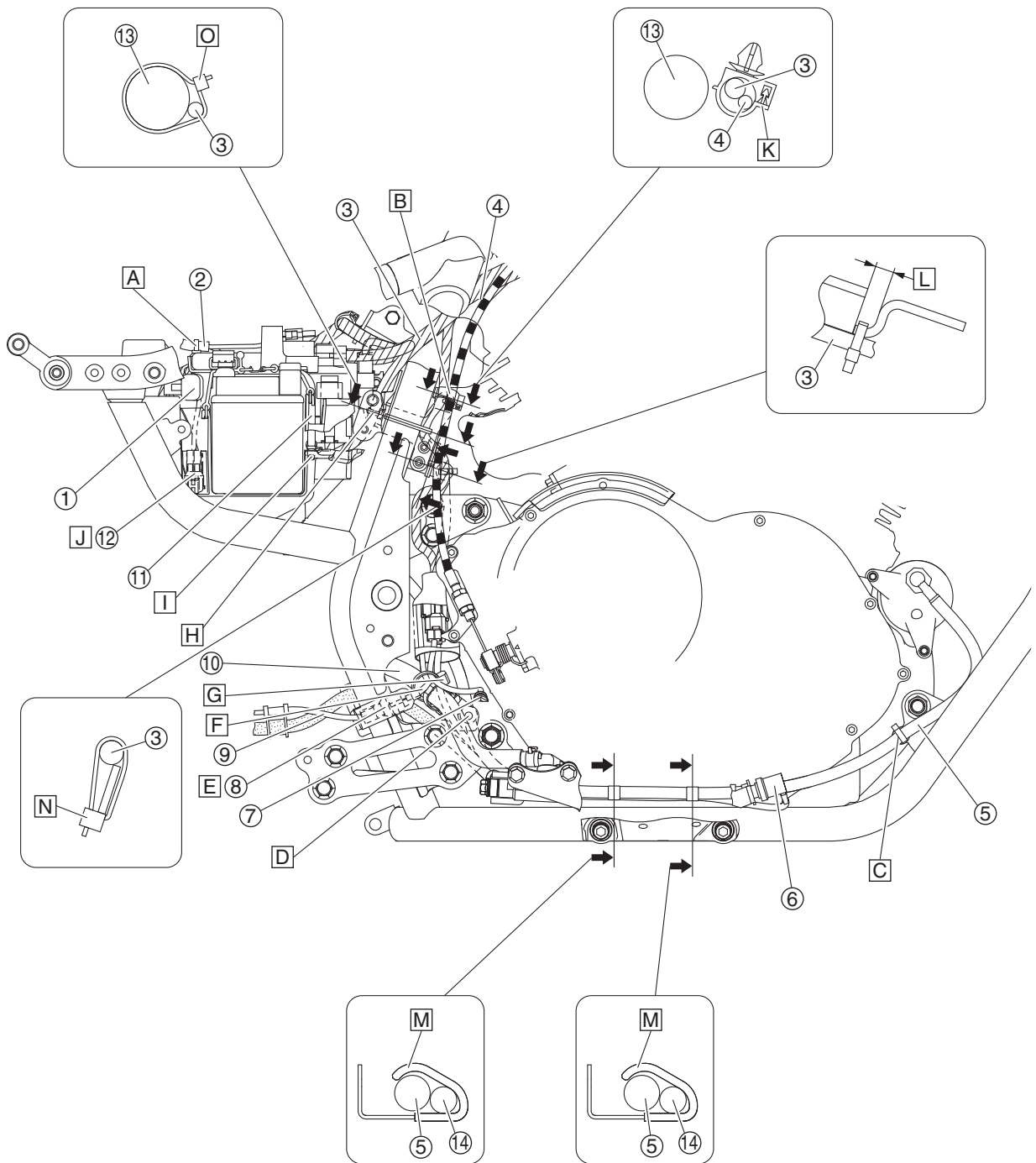


CABLE ROUTING (for ABS models)

1. Clutch cable
 2. Joint coupler
 3. Throttle cable (accelerator cable)
 4. Throttle cable (decelerator cable)
 5. Brake pipe/hose assembly (front brake master cylinder to hydraulic unit)
 6. Wire harness
 7. Left handlebar switch lead
 8. Front cylinder spark plug lead
 9. Front cylinder ignition coil lead
 10. Rear cylinder ignition coil lead
 11. Rear cylinder spark plug lead
 12. Rear cylinder ignition coil
 13. Right handlebar switch lead
 14. Meter assembly lead
 15. Left handlebar switch coupler
- A. Route the clutch cable to the inside of the fuel tank bracket.
- B. Route the clutch cable through the guide on the frame.
- C. Route the wire harness through the guide on the frame. Align the white tape on the wire harness with the guide.
- D. Cover the throttle position sensor coupler with the coupler cover.
- E. Insert the projection on the joint coupler into the hole in the frame.
- F. Route the clutch cable through the guide.
- G. Insert the projection on the right handlebar switch lead holder into the hole in the cable guide.
- H. Insert the projection on the wire harness holder into the hole in the cable guide.
- I. Route the left handlebar switch lead to the inside of the brake pipe/hose assembly (front brake master cylinder to hydraulic unit).
- J. Route the wire harness through the guide.
- K. Insert the projection on the left handlebar switch lead holder into the hole in the cable guide.
- L. Route the throttle cables through the guide.
- M. Route the left handlebar switch lead to the inside of the wire harness and main switch.
- N. Insert the projections on the wire harness holders into the holes in the frame.
- O. Fasten the front cylinder spark plug lead with the holder. Point the open ends of the holder rearward.
- P. Install the ignition coil connectors so that the front cylinder ignition coil leads are routed downward.
- Q. Install the ignition coil connectors so that the rear cylinder ignition coil leads are routed upward.
- R. Align the paint mark on the throttle cable with the throttle cable holder.
- S. Make sure that the rear cylinder spark plug lead is not pinched between the rear cylinder head and the rear right cylinder head cover.
- T. Secure the plastic band by inserting the projection on the band into the hole in the frame, and then fasten the clutch cable and wire harness with the band, making sure to point the end of the band downward.
- U. Fasten the wire harness and clutch cable with the plastic band. Position the buckle of the plastic band toward the frame so that it does not protrude to the outside of the wire harness, and place the end of the band between the frame and the rear cylinder ignition coil.
- V. Route the left handlebar switch lead through the guide on the meter bracket. Make sure that there is no slack in the handlebar switch lead between the steering head and the plastic band installed on the handlebar.
- W. Route the front left turn signal light lead over the guide on the meter bracket.
- X. Route the right handlebar switch lead through the guide on the meter bracket. Make sure that there is no slack in the handlebar switch lead between the steering head and the plastic band installed on the handlebar.
- Y. Route the front right turn signal light lead to the front of the right handlebar switch lead, and then connect the lead to the front turn signal light.
- Z. Route the meter assembly lead to the front of the meter bracket.
- AA. Route the front turn signal light lead to the front of the left handlebar switch lead, and then connect the lead to the front turn signal light.
- AB. Install the joint coupler by sliding it onto the engine bracket from below.
- AC. Connect the wire harness to the left handlebar switch, and then install the coupler onto the tab on the engine bracket (front upper side).
- AD. Secure the holder by inserting the projection on the holder into the hole in the bracket, and then fasten the front cylinder spark plug lead with the holder.
- AE. To the left handlebar switch
- AF. Install the left handlebar switch coupler onto the tab on the intake air pressure sensor bracket.
- AG. To the wire harness
- AH. To the main portion of the wire harness
- AI. Fasten the wire harness by sliding the plastic holder on the wire harness onto the stud on the intake air pressure sensor bracket.
- AJ. To the horn
- AK. Fasten the spark plug lead with the holder.

CABLE ROUTING (for ABS models)

Clutch cable (right side view)

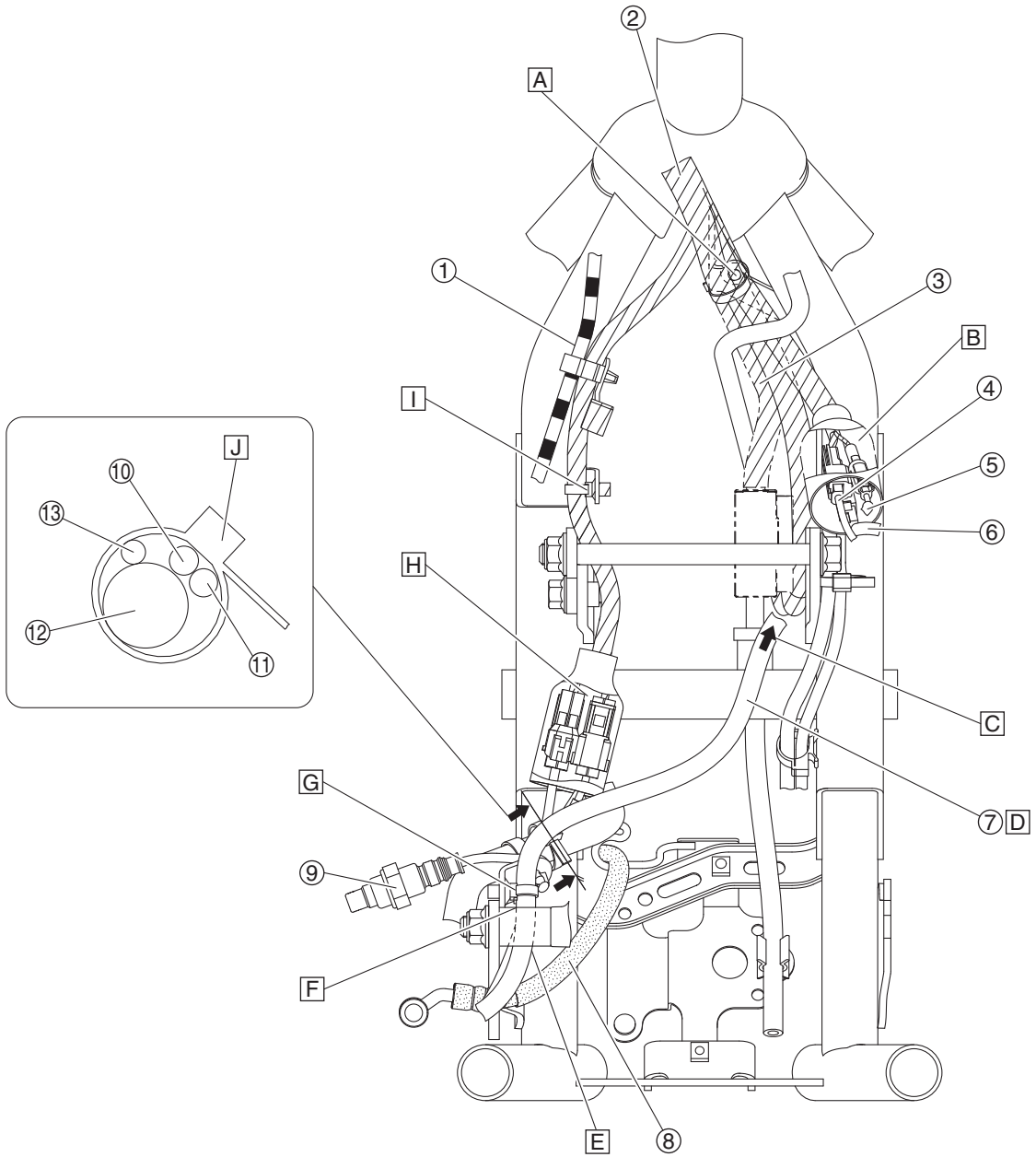


CABLE ROUTING (for ABS models)

1. Lean angle sensor
 2. Tail sub-wire harness
 3. Wire harness
 4. Clutch cable
 5. Starter motor lead
 6. Rear brake light switch
 7. O₂ sensor
 8. Rear wheel sensor coupler
 9. Rear wheel sensor lead
 10. Brake fluid reservoir hose
 11. Positive battery lead
 12. ABS test coupler
 13. Frame
 14. Rear brake light switch lead
- A. Insert the projection on the tail sub-wire harness holder into the hole in the battery box.
 - B. Secure the holder by inserting the projection on the holder into the hole in the battery box bracket, and then fasten the clutch cable and wire harness with the holder.
 - C. Insert the projection on the starter motor lead holder into the hole in the engine bracket (front lower side).
 - D. Insert the projection on the starter motor lead holder into the hole in the engine bracket (rear lower side).
 - E. After connecting the rear wheel sensor coupler, cover the coupler with the coupler cover.
 - F. Fasten the rear wheel sensor lead, brake fluid reservoir hose, rear brake light switch lead, and O₂ sensor lead with the plastic band. Make sure to route the rear wheel sensor lead to the outside of the frame.
 - G. Fasten the brake fluid reservoir hose, rear brake light switch lead, and O₂ sensor lead with the plastic band. Face the buckle of the plastic band upward with the end pointing downward.
 - H. Insert the projection on the wire harness holder into the hole in the battery box.
 - I. Insert the projection on the positive battery lead holder into the hole in the battery box.
 - J. Position the ABS test coupler to the rear of the battery and under the lean angle sensor.
 - K. Face the catch of the holder forward. Route the clutch cable to the outside of the wire harness.
 - L. Fasten the wire harness with a plastic locking tie within the range shown in the illustration.
 - M. Route the rear brake light switch lead and starter motor lead through the guide, and then secure the leads by bending the guide around the leads. Route the rear brake light switch lead to the outside of the starter motor lead. Make sure that the leads do not protrude.
 - N. Fasten the wire harness to the frame with a plastic locking tie. Cut off the excess end of the plastic locking tie.
 - O. Fasten the wire harness to the frame with a plastic locking tie. Face the buckle of the plastic locking tie inward, and then cut off the excess end of the tie.

CABLE ROUTING (for ABS models)

Frame (inner side view)

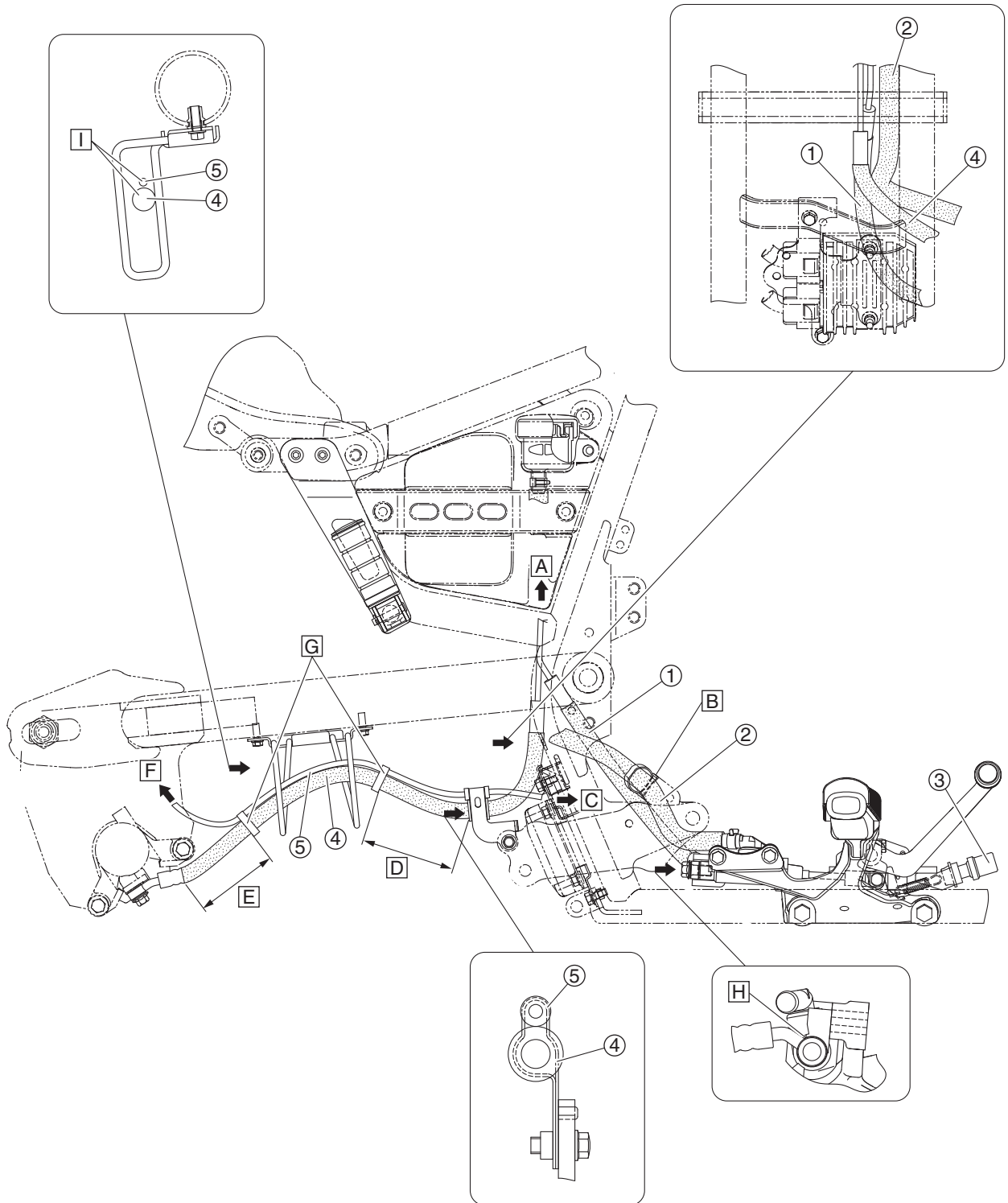


CABLE ROUTING (for ABS models)

1. Clutch cable
2. Wire harness
3. ABS ECU lead
4. Crankshaft position sensor lead
5. Oil level switch lead
6. Neutral switch lead
7. Starter motor lead
8. Brake hose (rear brake master cylinder to hydraulic unit)
9. O₂ sensor
10. Rear brake light switch lead
11. O₂ sensor lead
12. Brake fluid reservoir hose
13. Rear wheel sensor lead
- A. Insert the projection on the wire harness holder into the hole in the frame.
- B. After connecting the crankshaft position sensor coupler, oil level switch coupler, and neutral switch coupler, cover the couplers with the coupler cover.
- C. To the starter relay
- D. Route the starter motor lead to the front of the frame cross member.
- E. Route the starter motor lead and rear brake light switch lead under the engine bracket (rear lower side).
- F. Route the rear brake light switch lead under the mounting position for the starter motor lead on the engine bracket (rear lower side).
- G. Insert the projection on the starter motor lead holder into the hole in the engine bracket (rear lower side).
- H. After connecting the rear brake light switch coupler and O₂ sensor coupler, cover the couplers with the coupler cover.
- I. Insert the projection on the wire harness holder into the hole in the battery box bracket.
- J. Point the end of the plastic band downward.

CABLE ROUTING (for ABS models)

Rear brake hose (right side view)

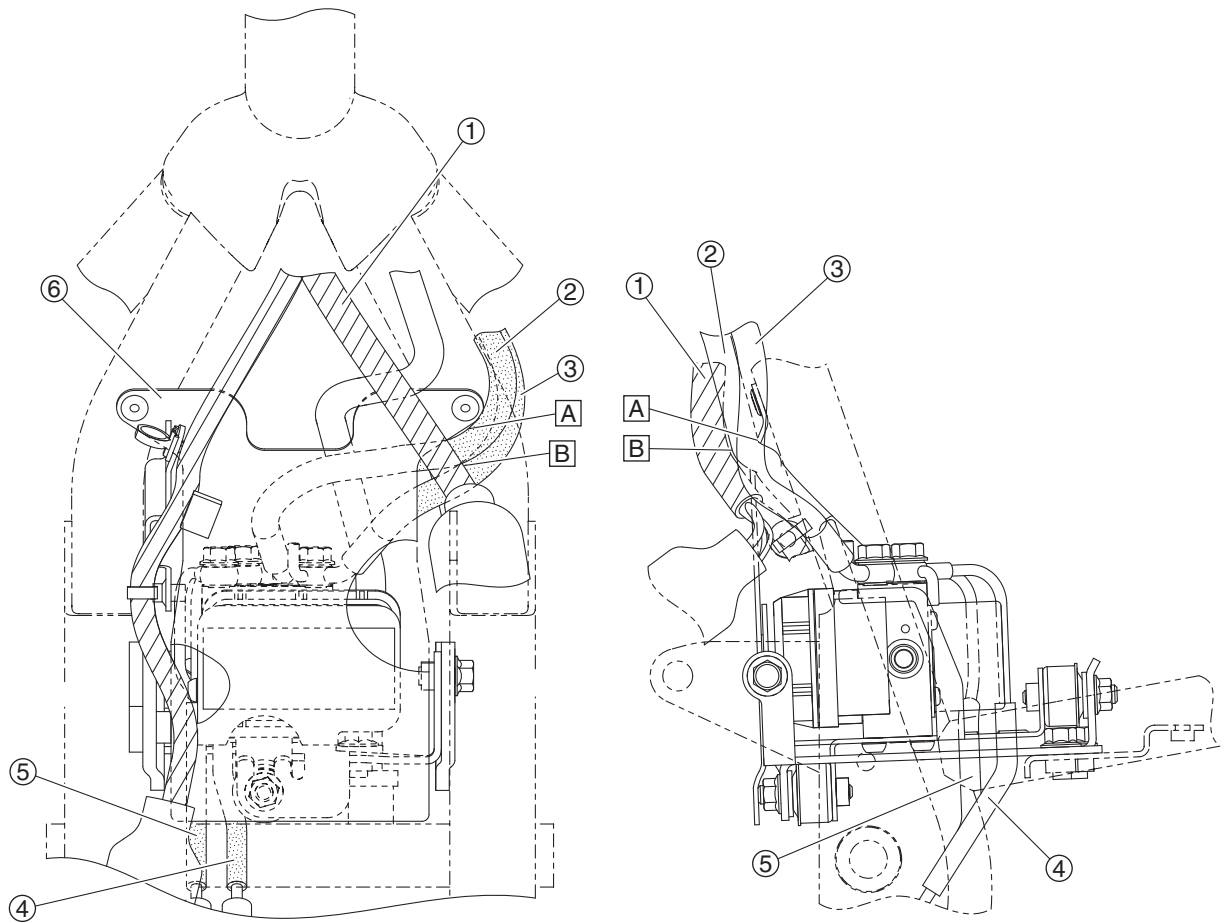


CABLE ROUTING (for ABS models)

1. Brake hose (rear brake master cylinder to hydraulic unit)
2. Rear brake fluid reservoir hose
3. Rear brake light switch
4. Brake hose (hydraulic unit to rear brake caliper)
5. Rear wheel sensor lead
 - A. To the hydraulic unit
 - B. Fasten the rear brake fluid reservoir hose at the white paint mark with the holder.
 - C. To the rear wheel sensor coupler
 - D. 85–95 mm (3.35–3.74 in)
 - E. 75–85 mm (2.95–3.35 in)
 - F. To the rear wheel sensor coupler
 - G. Route the rear wheel sensor lead over the brake hose (hydraulic unit to rear brake caliper).
 - H. Face the white paint mark on the brake hose (rear brake master cylinder to hydraulic unit) upward.
- I. Route the brake hose (hydraulic unit to rear brake caliper) and rear wheel sensor lead through the rear brake hose guide.

CABLE ROUTING (for ABS models)

Hydraulic unit (inner and left side view)

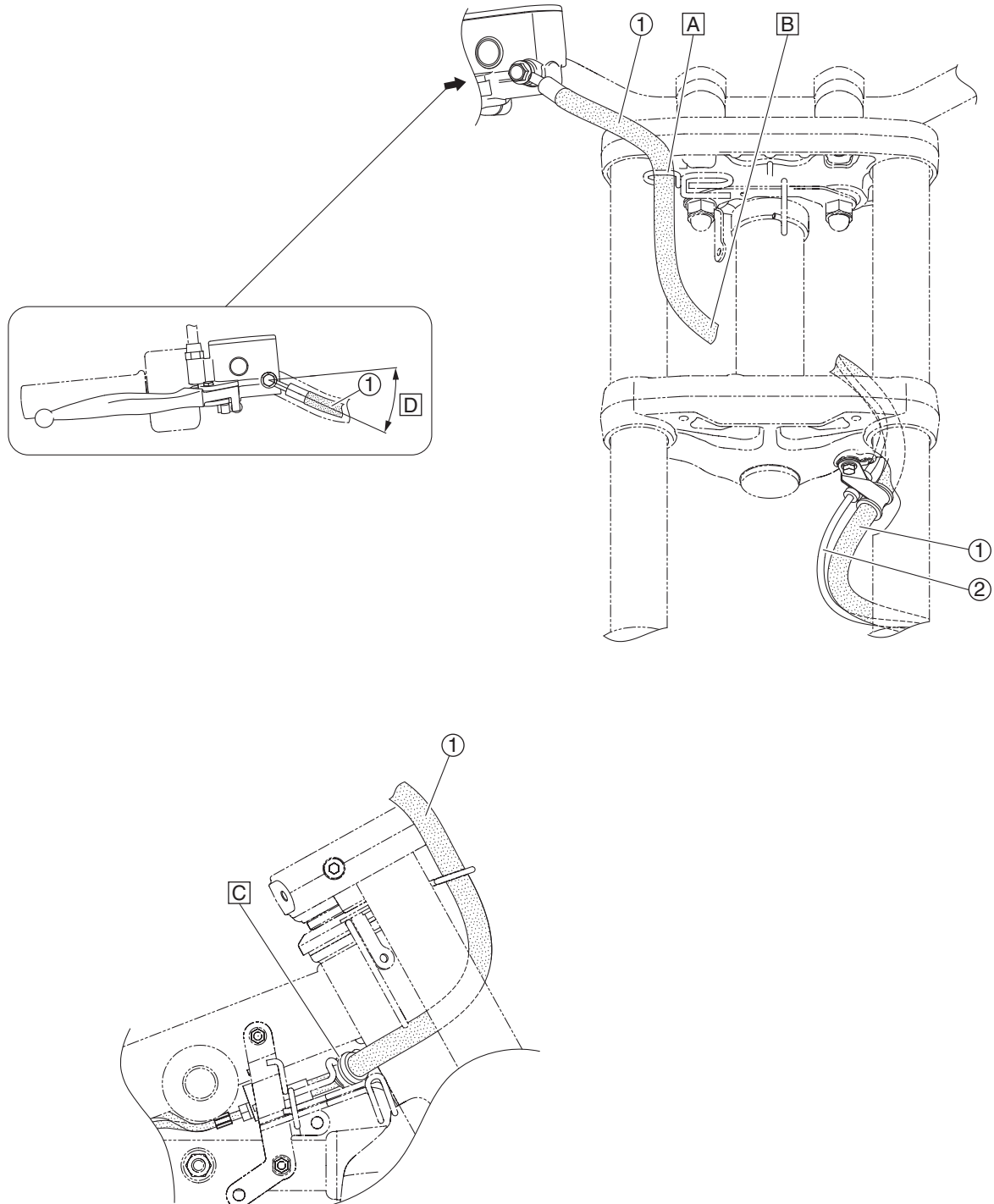


CABLE ROUTING (for ABS models)

1. Wire harness
2. Brake hose (front brake master cylinder to hydraulic unit)
3. Brake hose (hydraulic unit to front brake caliper)
4. Brake hose (rear brake master cylinder to hydraulic unit)
5. Brake hose (hydraulic unit to rear brake caliper)
6. Rubber cover
 - A. Route the brake hose (front brake master cylinder to hydraulic unit) and brake hose (hydraulic unit to front brake caliper) between the frame and the rubber cover.
 - B. Route the brake hose (front brake master cylinder to hydraulic unit) and brake hose (hydraulic unit to front brake caliper) to the rear of the wire harness.

CABLE ROUTING (for ABS models)

Front brake hose (front and right side view)

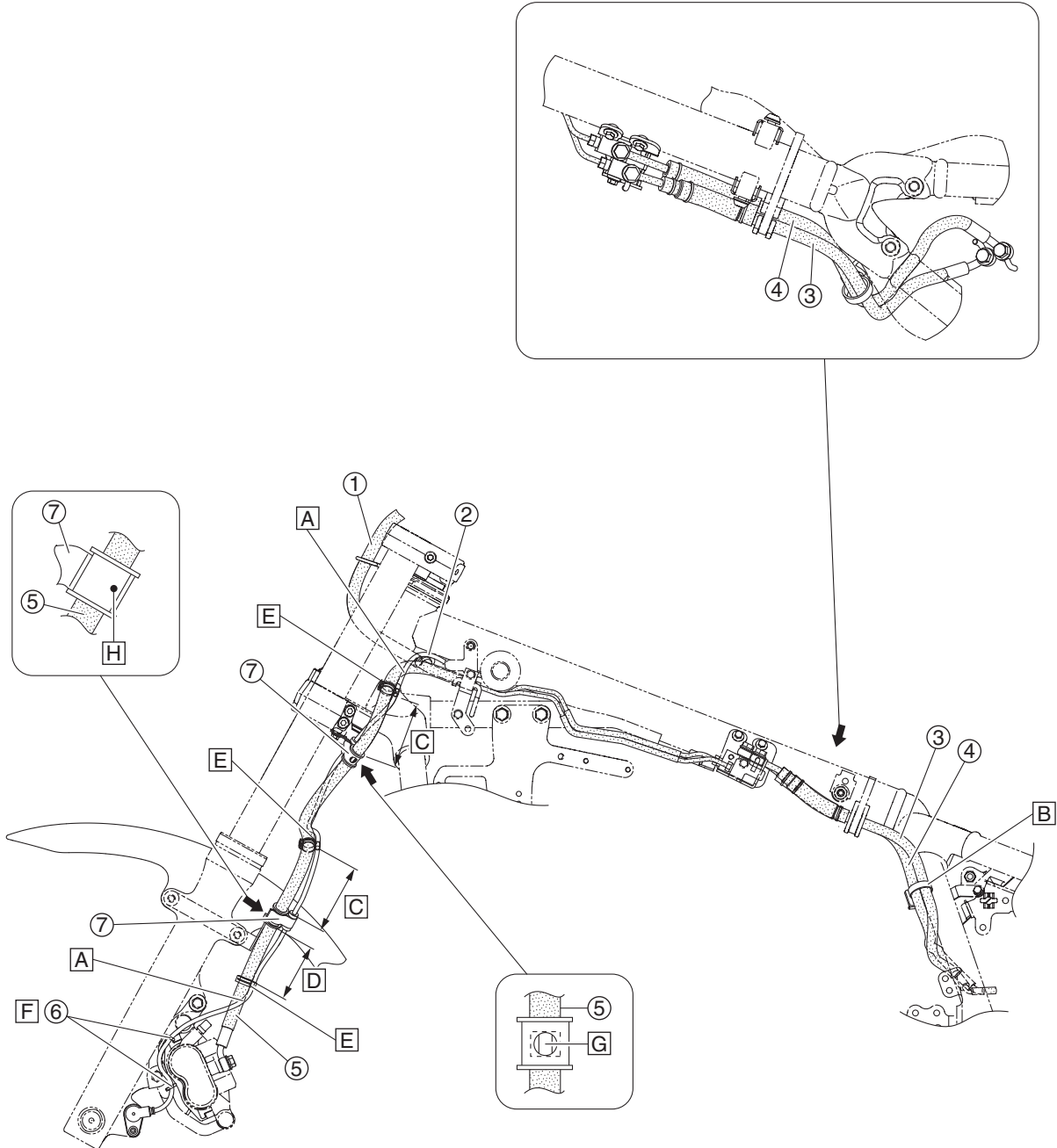


CABLE ROUTING (for ABS models)

1. Brake pipe/hose assembly (front brake master cylinder to hydraulic unit)
2. Front wheel sensor lead
- A. Route the brake pipe/hose assembly (front brake master cylinder to hydraulic unit) through the cable guide.
- B. Route the brake pipe/hose assembly (front brake master cylinder to hydraulic unit) between the front fork and the pipe section of the lower bracket.
- C. Fasten the grommet on the brake pipe/hose assembly (front brake master cylinder to hydraulic unit) with the front brake hose holder.
- D. 20–40°

CABLE ROUTING (for ABS models)

Front brake hose (left side view)

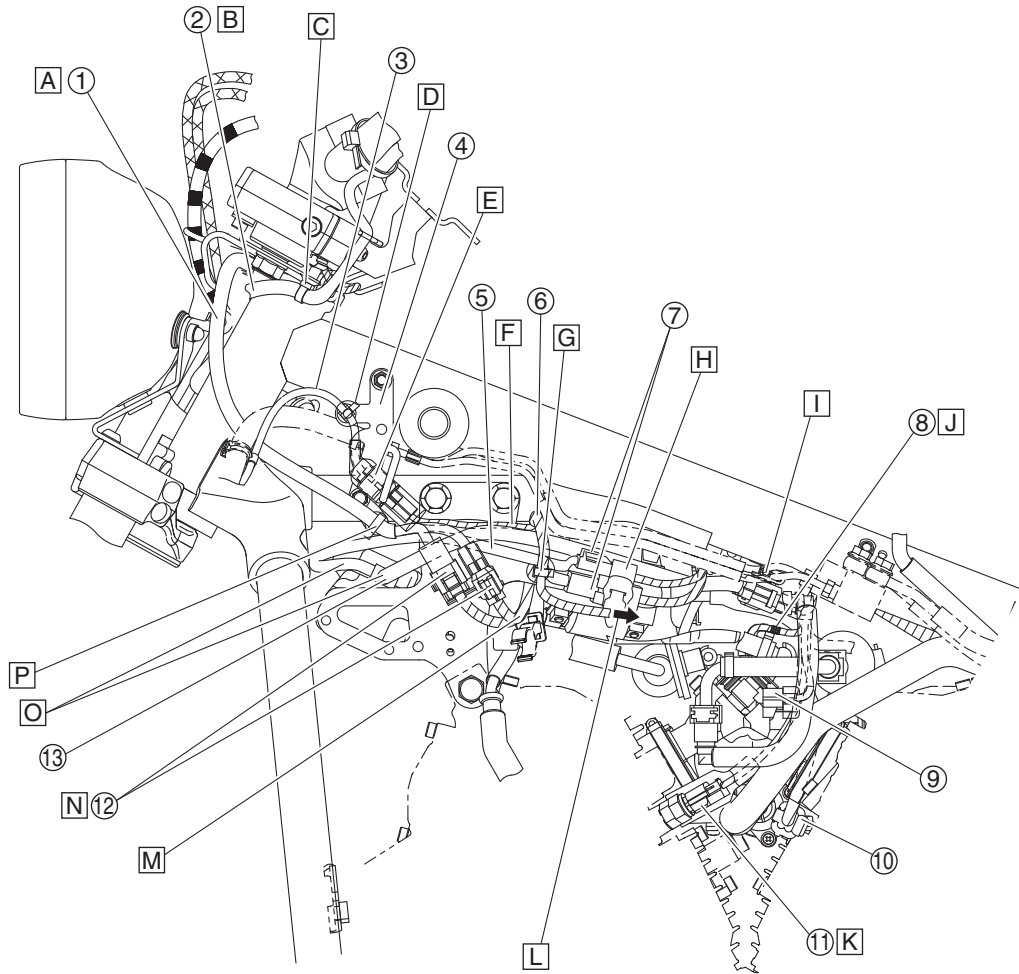


CABLE ROUTING (for ABS models)

1. Brake pipe/hose assembly (front brake master cylinder to hydraulic unit)
2. Front wheel sensor lead
3. Brake hose (hydraulic unit to front brake caliper)
4. Brake hose (front brake master cylinder to hydraulic unit)
5. Brake pipe/hose assembly (hydraulic unit to front brake caliper)
6. Front wheel sensor lead holder
7. Front brake hose holder
- A. Route the front wheel sensor lead to the outside of the brake pipe/hose assembly (front brake master cylinder to hydraulic unit).
- B. Secure the holder by inserting the projection on the holder into the hole in the brake hose bracket, and then fasten the brake hose (hydraulic unit to front brake caliper) and brake hose (front brake master cylinder to hydraulic unit) with the holder.
- C. 85–95 mm (3.35–3.74 in)
- D. 75–85 mm (2.95–3.35 in)
- E. Route the front wheel sensor lead to the rear of the brake pipe/hose assembly (hydraulic unit to front brake caliper).
- F. Fasten the front wheel sensor lead with the front wheel sensor lead holder.
- G. Fasten the brake pipe/hose assembly (hydraulic unit to front brake caliper) with the holder, making sure that the paint mark on the hose is visible through the hole in the holder.
- H. Fasten the brake pipe/hose assembly (hydraulic unit to front brake caliper) with the holder, making sure that the paint mark on the hose is aligned with the open ends of the holder.

CABLE ROUTING (for ABS models)

Steering head (left side view)

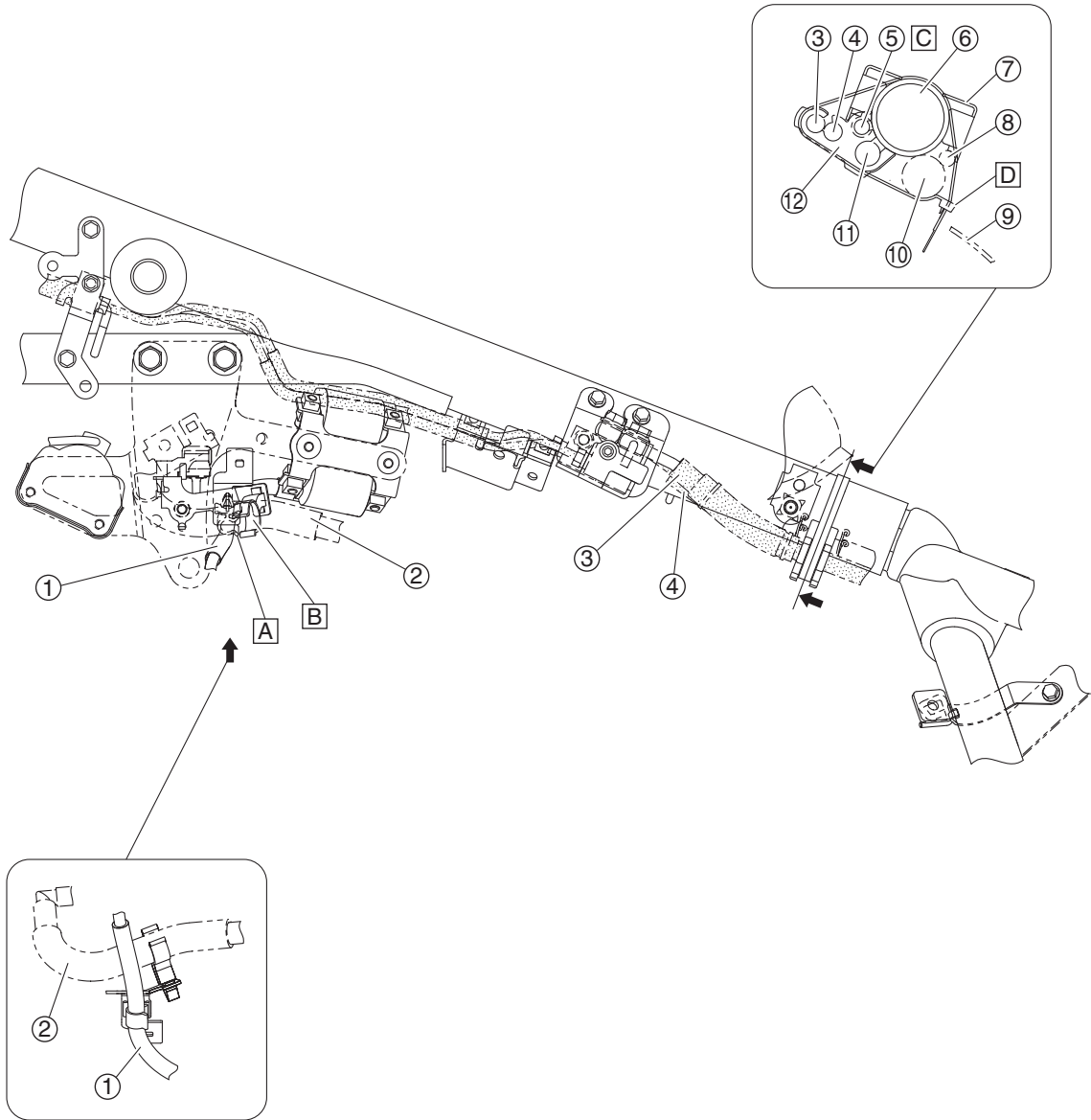


CABLE ROUTING (for ABS models)

1. Right handlebar switch lead
 2. Left handlebar switch lead
 3. Front wheel sensor lead
 4. Front wheel sensor coupler holder
 5. Main switch lead
 6. Fuel pump lead
 7. Main switch coupler
 8. Rear cylinder injector lead
 9. Front cylinder injector coupler
 10. ISC (idle speed control) unit coupler
 11. Engine temperature sensor coupler
 12. Right handlebar switch coupler
 13. Immobilizer unit lead
- A. Route the right handlebar switch lead through the cable guide.
 - B. Route the left handlebar switch lead to the outside of the cable guide.
 - C. Insert the projection on the left handlebar switch lead holder into the hole in the cable guide.
 - D. Secure the plastic locking tie by inserting the projection on the tie into the hole in the front wheel sensor coupler holder, and then fasten the front wheel sensor lead at the white tape with the tie. Cut off the excess end of the plastic locking tie.
 - E. After connecting the front wheel sensor coupler, fit the coupler into the slot in the front wheel sensor coupler holder.
 - F. Route the front wheel sensor lead to the outside of the engine bracket (front upper side).
 - G. Route the fuel pump lead to the outside of the main switch leads and immobilizer unit lead, and then fasten the fuel pump lead with the holder.
 - H. Fasten the main switch couplers to the engine bracket (front upper side) with the plastic band. Be sure to position the smaller coupler above the larger coupler.
 - I. After connecting the immobilizer unit coupler, insert the projection on the coupler into the hole in the frame.
 - J. Connect the rear cylinder injector coupler, which has white tape on the lead, to rear cylinder injector.
 - K. After connecting the engine temperature sensor coupler, cover the coupler with the coupler cover.
 - L. To the fuel pump
 - M. Route the right handlebar switch lead under the engine bracket (front upper side).
 - N. Install the right handlebar switch coupler (4-pin) onto the tab on the engine bracket (front upper side) and insert the projection on the right handlebar switch coupler (8-pin) into the hole in the bracket.
 - O. Route the main switch lead and immobilizer unit lead between the right handlebar switch leads and the engine bracket (front upper side).
 - P. Insert the projection on the right handlebar switch lead holder into the hole in the cable guide.

CABLE ROUTING (for ABS models)

Spark plug lead

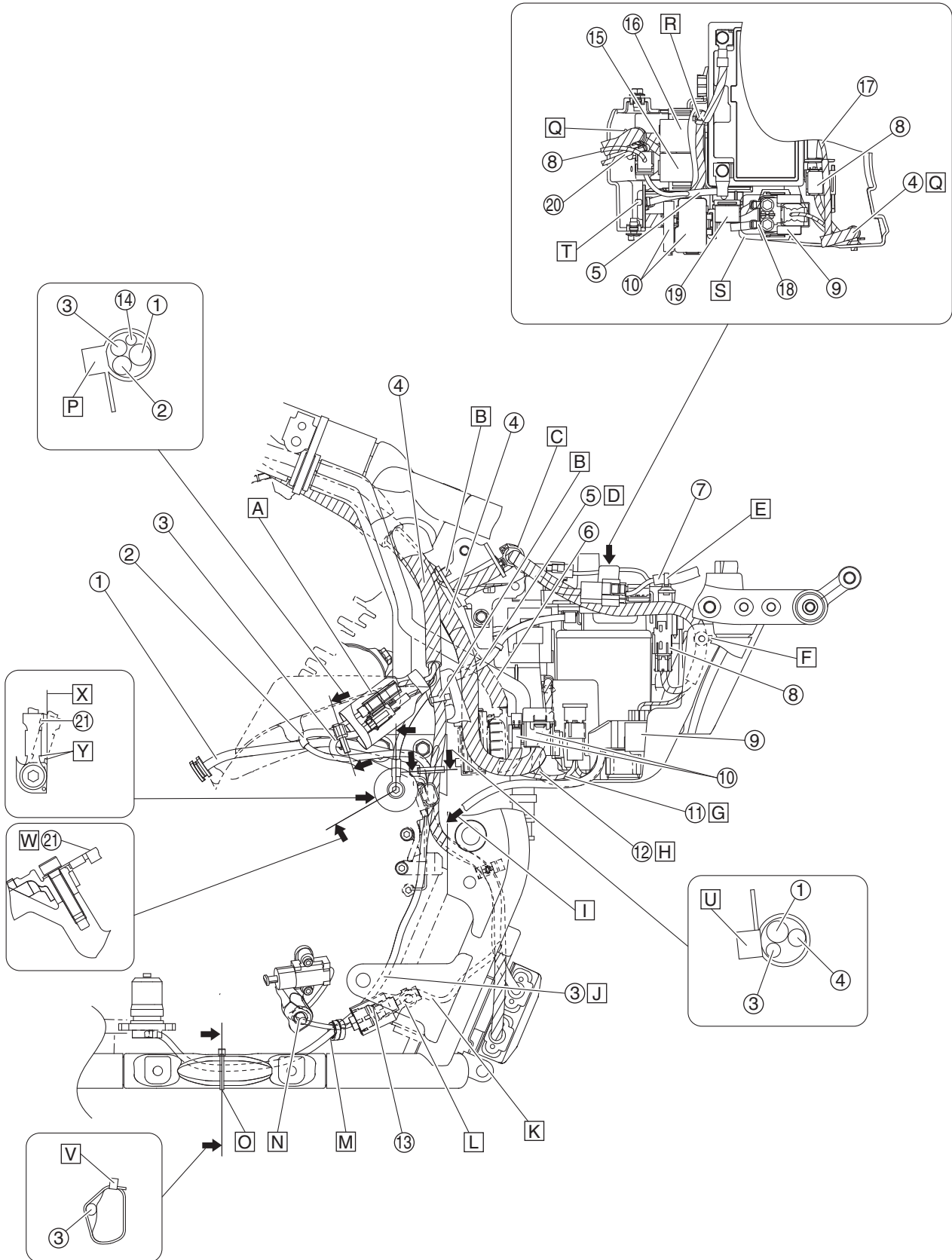


CABLE ROUTING (for ABS models)

1. Front cylinder spark plug lead
 2. Fuel return hose
 3. Brake hose (hydraulic unit to front brake caliper)
 4. Brake hose (front brake master cylinder to hydraulic unit)
 5. Fuel tank breather hose
 6. Frame
 7. Fuel tank bracket
 8. Clutch cable
 9. Rear right cylinder head cover
 10. Wire harness
 11. Crankcase breather hose
 12. Hose holder
- A. Fasten the front cylinder spark plug lead with the holder.
 - B. Fasten the fuel return hose with the holder.
 - C. Fasten the hose protector of the fuel tank breather hose with the hose holder. Make sure that the fuel tank breather hose contacts the fuel tank bracket.
 - D. Position the buckle of the plastic band below the frame, and place the end of the band to the inside of the rear right cylinder head cover.

CABLE ROUTING (for ABS models)

Electrical components tray (left side view)

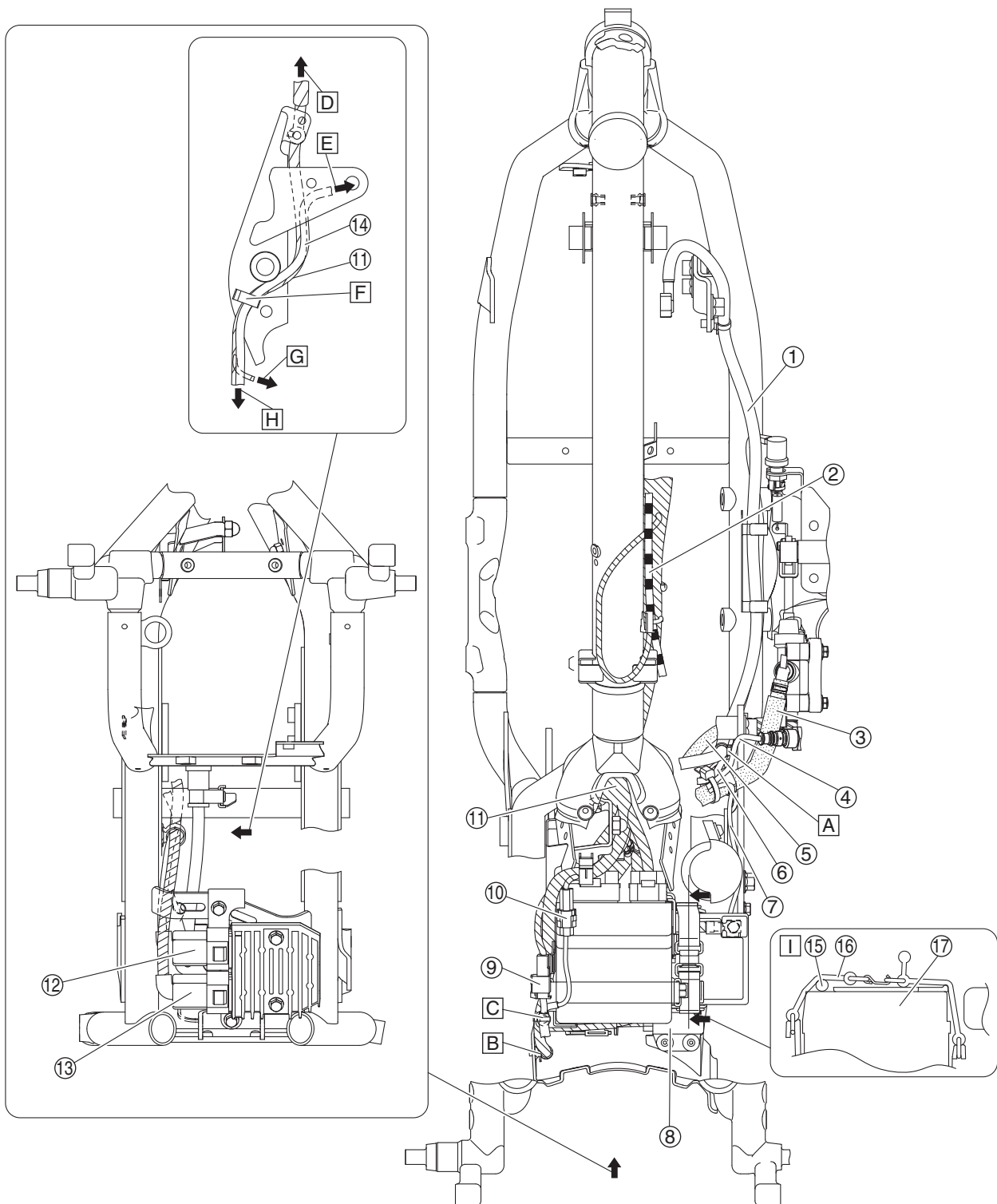


CABLE ROUTING (for ABS models)

1. Stator coil lead
 2. Neutral switch lead
 3. Oil level switch lead
 4. Wire harness
 5. Negative battery lead
 6. ABS ECU lead
 7. Tail sub-wire harness
 8. Headlight relay
 9. Starter relay
 10. Fuse box
 11. Main fuse lead
 12. Positive battery lead
 13. Sidestand switch coupler
 14. Crankshaft position sensor lead
 15. Turn signal/hazard relay
 16. Relay unit
 17. Lean angle sensor lead
 18. Starter motor lead
 19. Main fuse
 20. Yamaha diagnostic tool coupler
 21. Ground lead
- A. After connecting the couplers, cover the couplers with the coupler cover, and then place the couplers in the air duct.
 - B. Insert the projections on the wire harness holders into the holes in the frame.
 - C. Do not face the catch of the holder downward.
 - D. Route the negative battery lead to the outside of the ABS ECU lead.
 - E. Insert the projection on the tail sub-wire harness holder into the hole in the battery box.
 - F. Insert the projection on the wire harness holder into the hole in the battery box.
 - G. Route the main fuse lead under the fuse box.
 - H. Route the positive battery lead under the fuse box.
 - I. To the starter motor
 - J. Route the oil level switch lead to the inside of the frame.
 - K. Route the sidestand switch lead to the inside of the frame.
 - L. After connecting the sidestand switch coupler, insert the projection on the coupler cover into the hole in the frame.
 - M. Fasten the oil level switch lead and sidestand switch lead with the holder. Position the holder between the sidestand switch coupler and the sidestand switch lead holder.
 - N. Install the sidestand switch lead holder at the location shown.
 - O. Fasten the oil level switch lead to the frame with a plastic locking tie.
 - P. Point the end of the plastic locking tie downward.
 - Q. Insert the projection on the wire harness holder into the hole in the battery box.
 - R. Insert the projection on the positive battery lead holder into the hole in the battery box.
 - S. After connecting the positive battery lead and starter motor lead, install the starter relay cover.
 - T. Insert the projection on the ground lead holder into the hole in the battery box.
 - U. Point the end of the plastic locking tie inward.
- V. Position the buckle of the plastic locking tie on top of the frame, with the end pointing outward, and then cut off the excess end of the tie to 1–5 mm (0.04–0.20 in).
 - W. Install the ground lead terminal so that the crimped section of the terminal that secures the lead is facing inward. Install the ground lead terminal and the drive pulley housing using the same bolt.
 - X. Side of the drive pulley housing
 - Y. Install the ground lead terminal so that the indicated section of the terminal is positioned to the front of the side of the drive pulley housing.

CABLE ROUTING (for ABS models)

Rectifier/regulator (rear view)

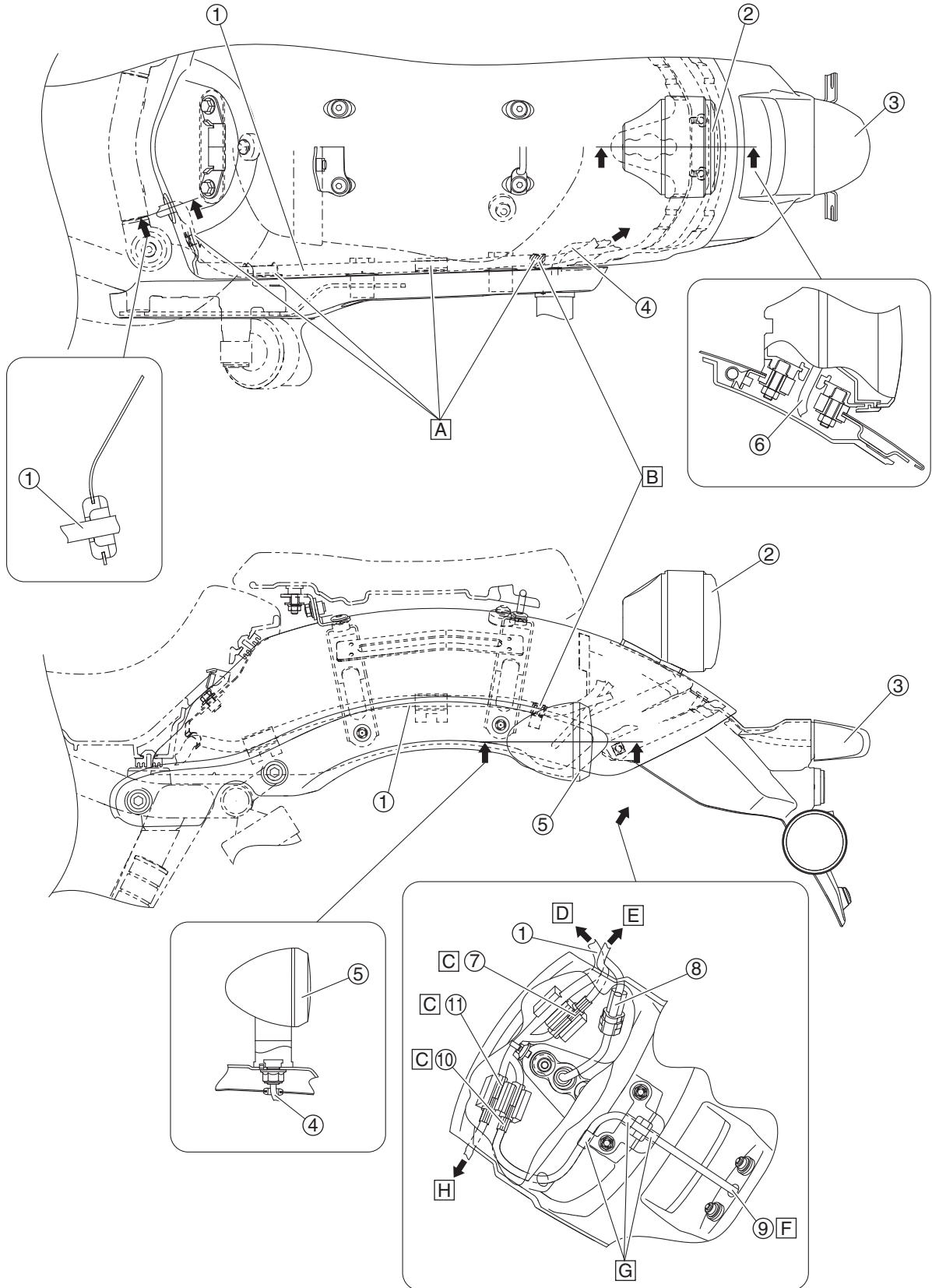


CABLE ROUTING (for ABS models)

1. Starter motor lead
2. Clutch cable
3. Brake fluid reservoir hose
4. O₂ sensor lead
5. Rear brake hose
6. Rear brake light switch lead
7. Rear wheel sensor lead
8. Lean angle sensor
9. Rear turn signal light and license plate light sub-wire harness coupler
10. Tail/brake light sub-wire harness coupler
11. Wire harness
12. Stator coil coupler
13. Rectifier/regulator coupler
14. Stator coil lead
15. Positive battery lead
16. Battery band
17. Battery
 - A. Insert the projection the stator motor lead holder into the hole in the engine bracket (rear lower bracket).
 - B. Insert the projection on the wire harness holder into the hole in the battery box.
 - C. Insert the projection on the tail sub-wire harness holder into the hole in the battery box.
 - D. To the wire harness
 - E. To the stator coil
 - F. Secure the holder by inserting the projection on the holder into the hole in the frame, and then fasten the wire harness and stator coil lead with the holder.
 - G. To the sidestand switch
 - H. To the rectifier/regulator
 - I. Route the positive battery lead on top of the battery, and then fasten the lead with the battery band.

CABLE ROUTING (for ABS models)

Rear fender (top and left view)

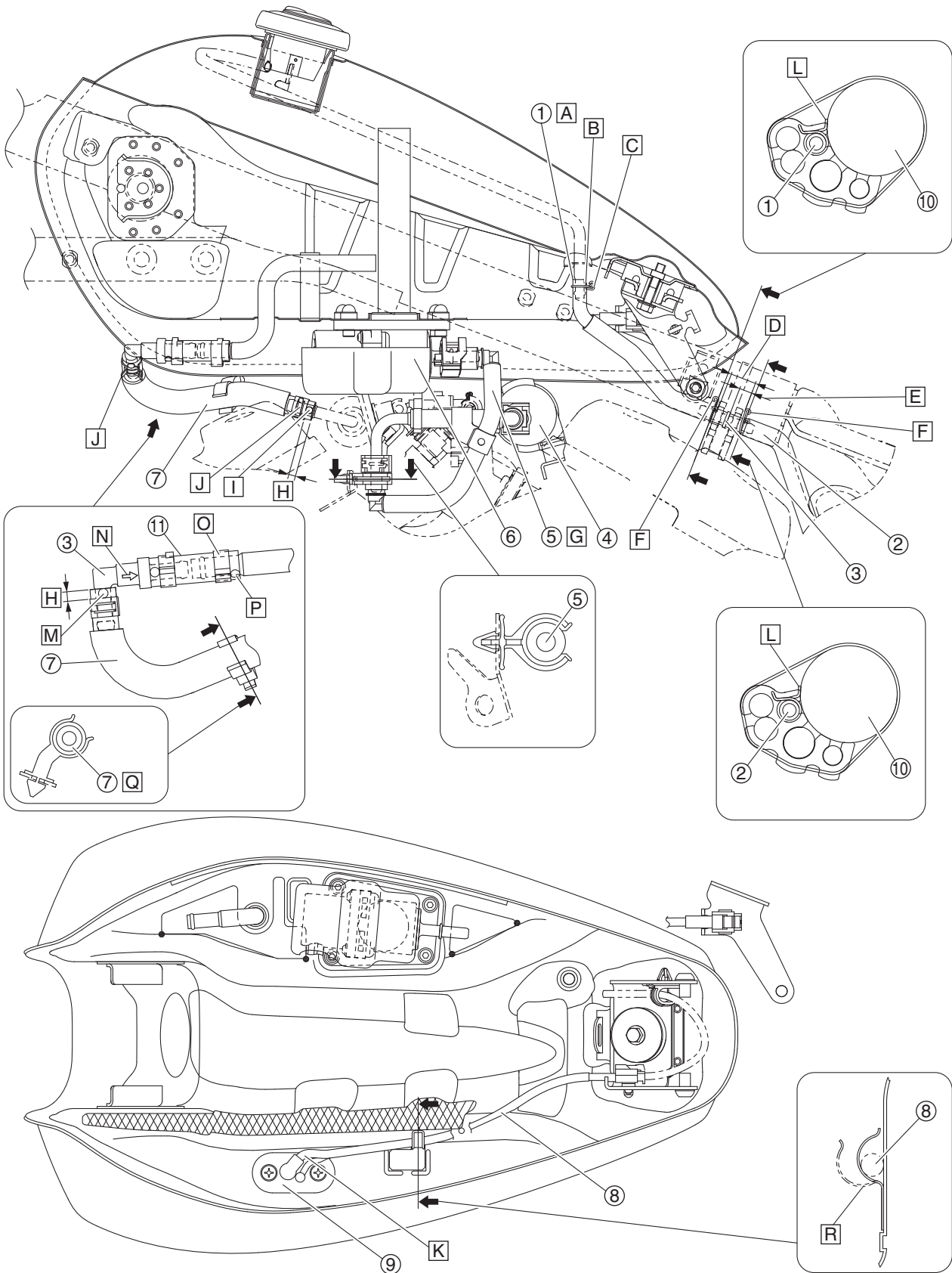


CABLE ROUTING (for ABS models)

1. Tail sub-wire harness
 2. Tail/brake light
 3. License plate light
 4. Rear left turn signal light lead
 5. Rear left turn signal light
 6. Tail/brake light lead
 7. Rear left turn signal light coupler
 8. Tail/brake light coupler
 9. License plate light lead
 10. License plate light coupler
 11. Rear right turn signal light coupler (black)
- A. Route the tail sub-wire harness through the guides, and then secure the lead by bending the guides around the lead.
 - B. Align the white tape on the tail sub-wire harness with the guide.
 - C. Install each coupler so that both ends of the female section of the coupler are protruding past the edges of the holder.
 - D. To the holder on the rear fender
 - E. To the rear left turn signal light
 - F. To the license plate light
 - G. Route the license plate light lead between the bracket and the rear fender, making sure that the lead is secured by the bracket.
 - H. To the rear right turn signal light

CABLE ROUTING (for ABS models)

Fuel tank

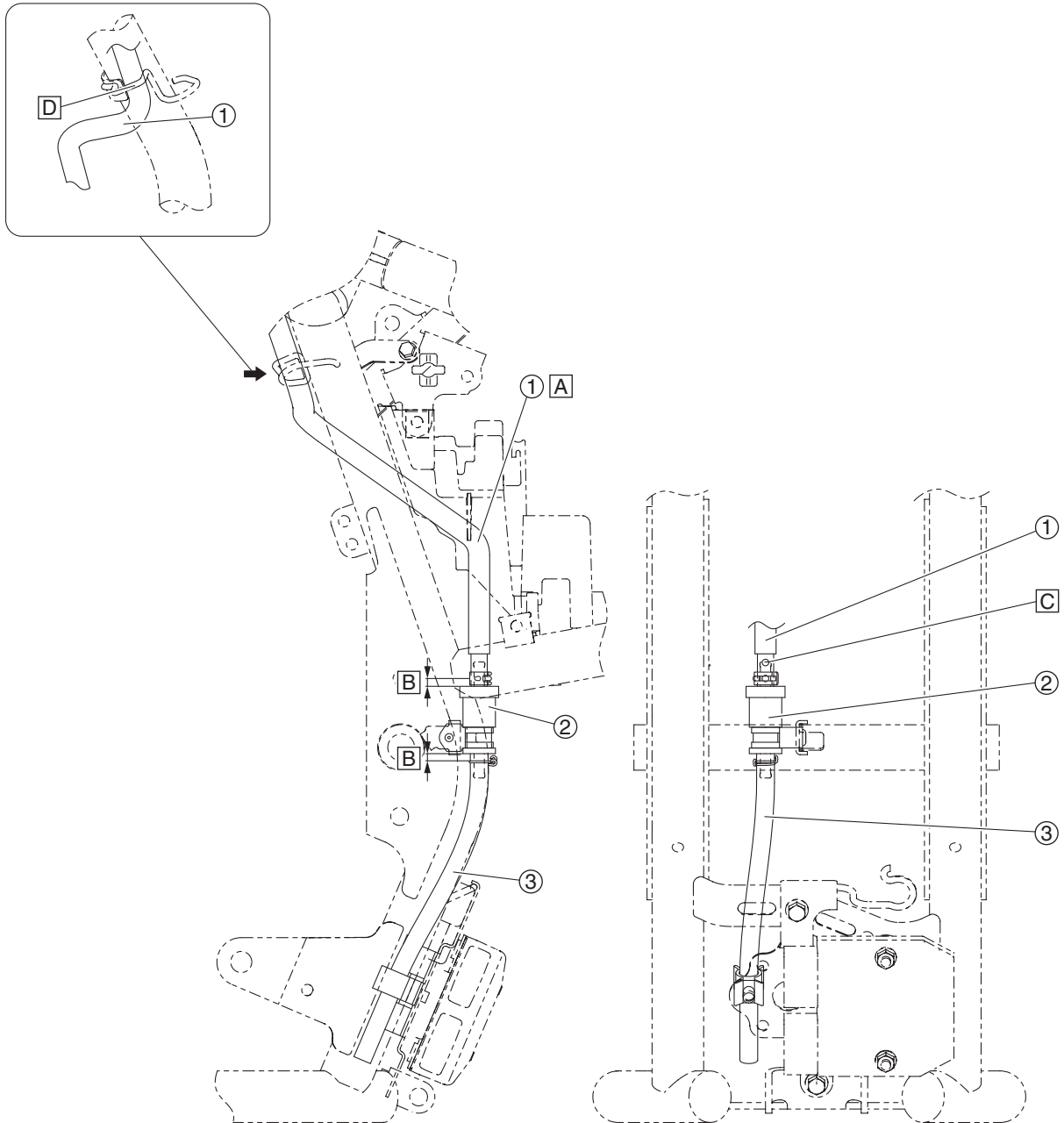


CABLE ROUTING (for ABS models)

1. Fuel tank breather/overflow hose (fuel tank to hose joint)
2. Fuel tank breather/overflow hose (hose joint to rollover valve)
3. Hose joint
4. Fuel filter
5. Fuel hose (fuel pump to fuel filter)
6. Fuel pump
7. Fuel return hose
8. Fuel sender lead
9. Fuel sender
10. Frame
11. Fuel hose (hose joint to fuel tank)
 - A. Install the fuel tank breather/overflow hose (fuel tank to hose joint) completely onto the hose fitting.
 - B. Install the fuel tank breather/overflow hose (fuel tank to hose joint) with its white paint mark facing rearward.
 - C. Align the hose clamp with the white paint mark on the fuel tank breather/overflow hose (fuel tank to hose joint) and point the ends of the clamp rearward.
 - D. 18 mm (0.71 in) or more
 - E. 8 mm (0.31 in) or more
 - F. Make sure not to install the hose clamps on the raised portions of the hose fittings.
 - G. Connect the orange connector of the fuel hose (fuel pump to fuel filter) to the fuel pump.
 - H. 0 mm (0 in) or more
 - I. Install the fuel return hose completely onto the hose fitting of the pressure regulator, making sure that the yellow paint mark on the hose is facing outward.
 - J. Align the ends of the hose clamp with the yellow paint mark on the fuel return hose. Make sure not to install the hose clamp on the raised portion of the hose fitting.
 - K. Install the fuel sender so that the fuel sender lead is routed inward.
 - L. Make sure that the end of the hose clamp contacts the frame.
 - M. Install the fuel return hose completely onto the hose joint, making sure that the white paint mark on the hose is positioned on the same side of the hose joint as the arrow mark.
 - N. Arrow mark
 - O. Align the hose clamp with the edge of the white paint mark on the fuel hose (hose joint to fuel tank), making sure to align the crimped section of the clamp with the paint mark.
 - P. Install the fuel hose (hose joint to fuel tank) completely onto the hose fitting, making sure that the white paint mark on the hose is facing downward.
 - Q. Fasten the fuel return hose with the holder.
 - R. Route the fuel sender lead through the guide, and then secure the lead by bending the guide around the lead.

CABLE ROUTING (for ABS models)

Fuel tank breather hose (left and rear view)

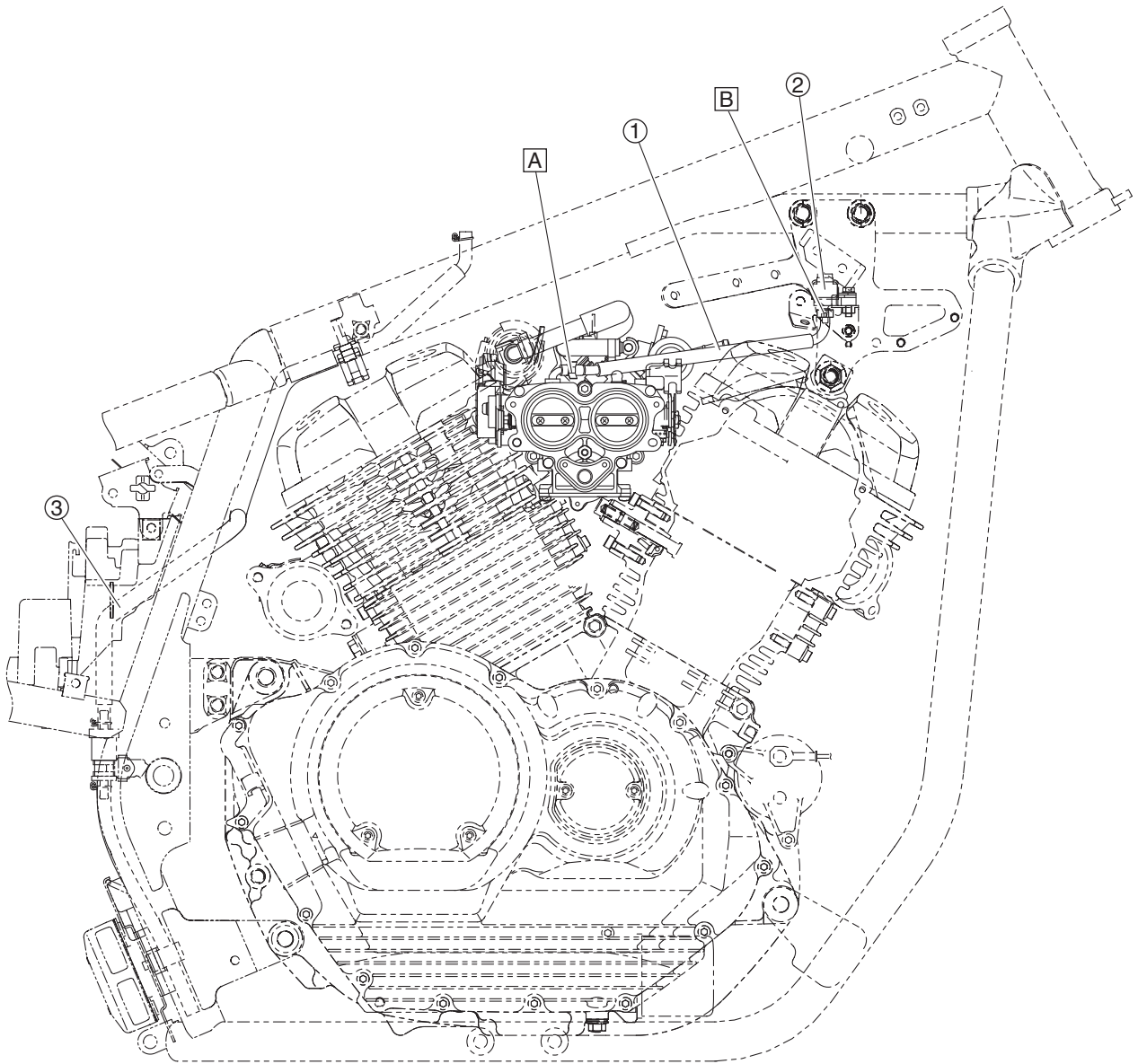


CABLE ROUTING (for ABS models)

1. Fuel tank breather/overflow hose (hose joint to rollover valve)
2. Rollover valve
3. Fuel tank breather/overflow hose (from rollover valve)
- A. Route the fuel tank breather hose (hose joint to rollover valve) to the left of the battery box.
- B. 2–8 mm (0.08–0.31 in)
- C. Install the fuel tank breather hose (hose joint to rollover valve) with its white paint mark facing rearward.
- D. Route the fuel tank breather hose (hose joint to rollover valve) through the guide.

CABLE ROUTING (for ABS models)

Fuel tank breather hose (right side view)

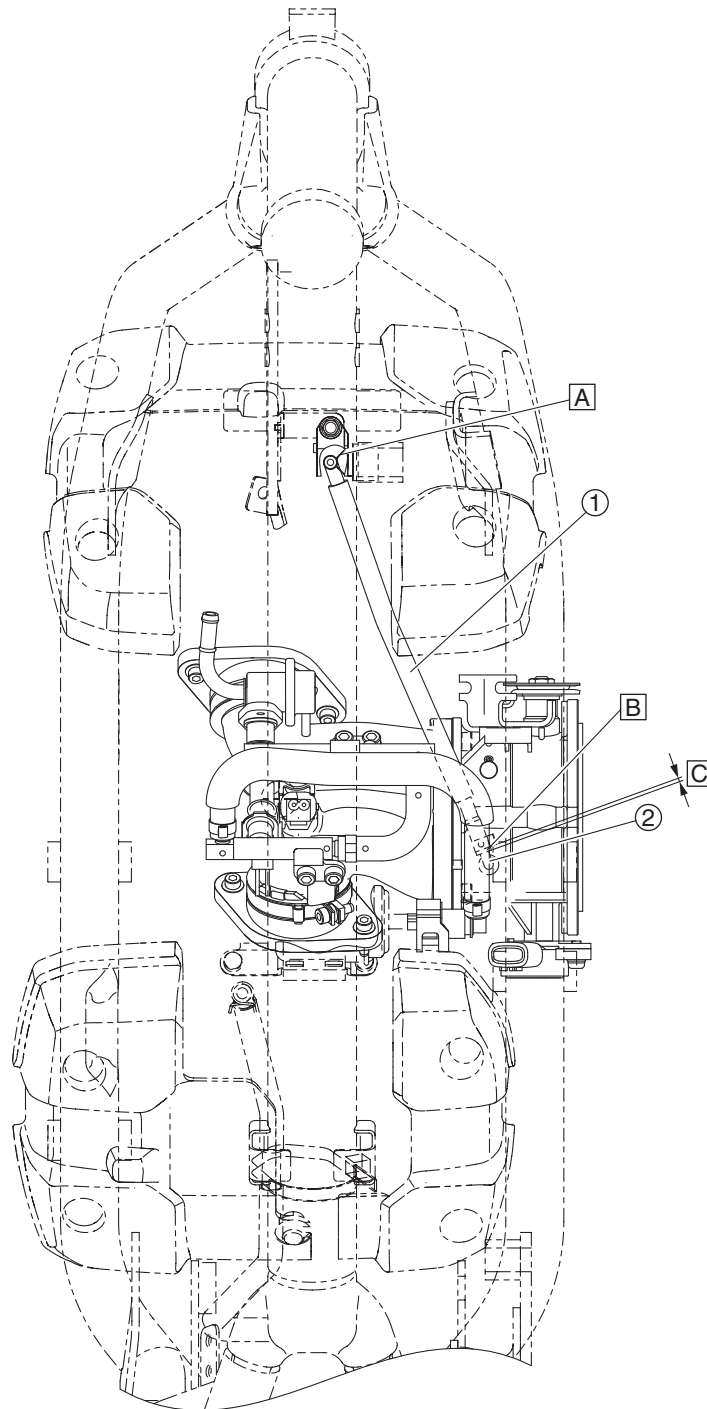


CABLE ROUTING (for ABS models)

1. Intake air pressure hose
2. Intake air pressure sensor
3. Fuel tank breather hose (hose joint to rollover valve)
 - A. Point the ends of the hose clamp to the right.
 - B. Install the intake air pressure hose with its white paint mark facing to the right.

CABLE ROUTING (for ABS models)

Intake air pressure sensor hose (top view)

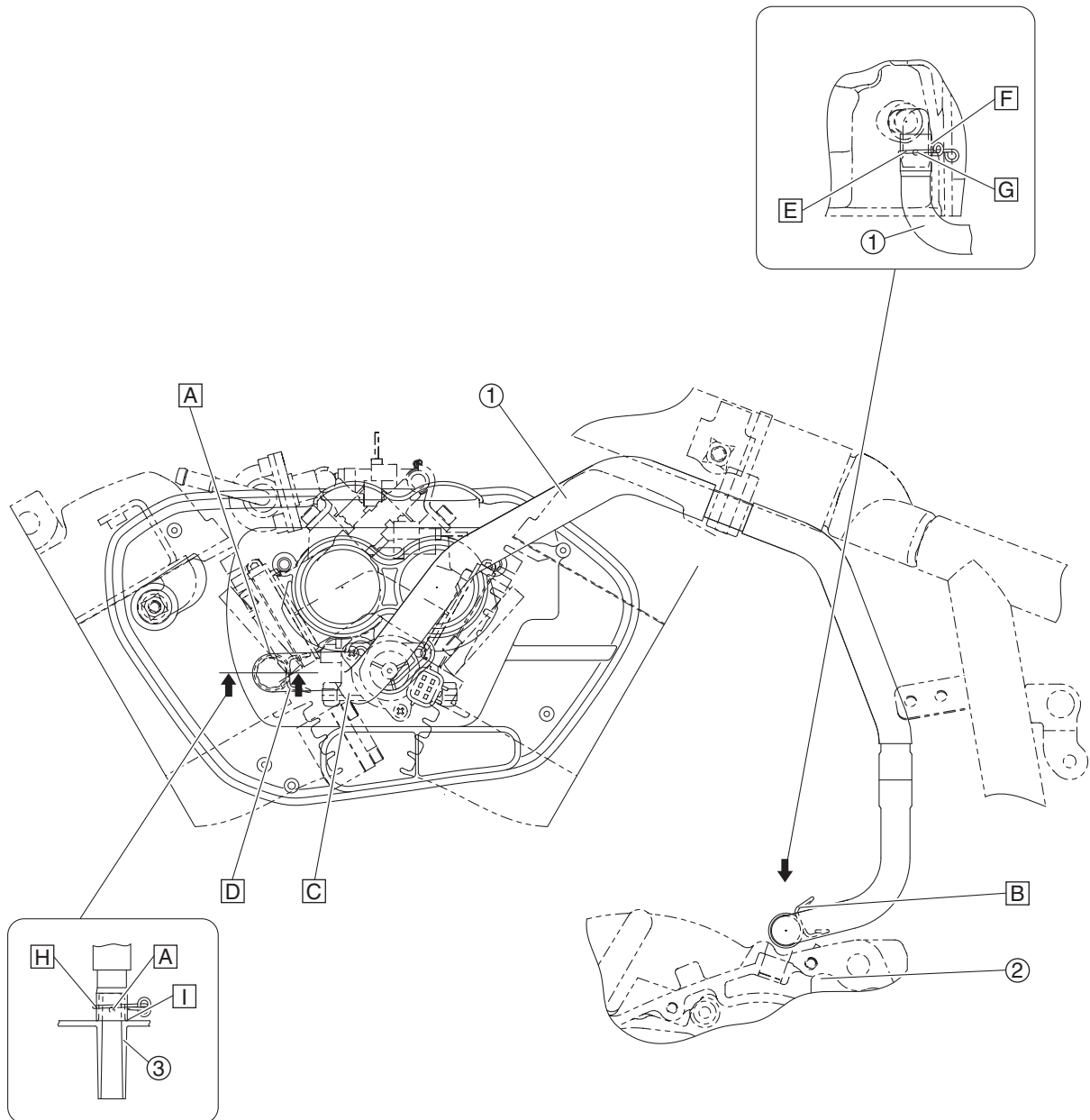


CABLE ROUTING (for ABS models)

1. Intake air pressure sensor hose
2. Hose fitting
 - A. Point the ends of the hose clamp to the right.
 - B. Install the intake air pressure sensor hose completely onto the hose fitting, making sure that the yellow paint mark on the hose is facing upward.
 - C. 1–2 mm (0.04–0.08 in)

CABLE ROUTING (for ABS models)

Crankcase breather hose (left side view)



CABLE ROUTING (for ABS models)

1. Crankcase breather hose
2. Crankcase
3. Air filter case
- A. Install the crankcase breather hose with its white paint mark facing upward.
- B. Point the ends of the hose clamp rearward, angled upward.
- C. Route the crankcase breather hose over the timing chain tensioner.
- D. Point the ends of the hose clamp rearward.
- E. Align the hose clamp with the yellow paint mark on the crankcase breather hose.
- F. Install the crankcase breather hose completely onto the hose joint, making sure that the yellow paint mark on the hose is facing upward.
- G. Yellow paint mark
- H. Align the hose clamp with the white paint mark on the crankcase breather hose.
- I. Install the crankcase breather hose onto the hose fitting of the air filter case, making sure that the hose contacts the case.

CABLE ROUTING (for ABS models)

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PERIODIC MAINTENANCE

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.

EAU46911

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

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.

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.			√		√	
4	* Fuel injection system	• Adjust synchronization.	√	√	√	√	√	√
5	* Muffler and exhaust pipe	• Check the screw clamp(s) for looseness.	√	√	√	√	√	

EAU1770G

GENERAL MAINTENANCE AND LUBRICATION CHART

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.

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					

PERIODIC MAINTENANCE

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)	
5 *	Brake hoses	<ul style="list-style-type: none"> • Check for cracks or damage. • Check for correct routing and clamping. 		√	√	√	√	√
		<ul style="list-style-type: none"> • Replace. 	Every 4 years					
6 *	Brake fluid	<ul style="list-style-type: none"> • Replace. 	Every 2 years					
7 *	Wheels	<ul style="list-style-type: none"> • Check runout and for damage. 		√	√	√	√	
8 *	Tires	<ul style="list-style-type: none"> • Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary. 		√	√	√	√	√
9 *	Wheel bearings	<ul style="list-style-type: none"> • Check bearing for looseness or damage. 		√	√	√	√	
10 *	Swingarm	<ul style="list-style-type: none"> • Check operation and for excessive play. 		√	√	√	√	
		<ul style="list-style-type: none"> • Lubricate with lithium-soap-based grease. 	Every 50000 km (30000 mi)					
11 *	Drive belt	<ul style="list-style-type: none"> • Check belt condition. • Replace if damaged. • Check belt tension. • Make sure that the rear wheel is properly aligned. 	Every 4000 km (2500 mi)					
12 *	Steering bearings	<ul style="list-style-type: none"> • Check bearing play and steering for roughness. 	√	√	√	√	√	
		<ul style="list-style-type: none"> • Lubricate with lithium-soap-based grease. 	Every 20000 km (12000 mi)					
13 *	Chassis fasteners	<ul style="list-style-type: none"> • Make sure that all nuts, bolts and screws are properly tightened. 		√	√	√	√	√
14	Brake lever pivot shaft	<ul style="list-style-type: none"> • Lubricate with silicone grease. 		√	√	√	√	√
15	Brake pedal pivot shaft	<ul style="list-style-type: none"> • Lubricate with lithium-soap-based grease. 		√	√	√	√	√
16	Clutch lever pivot shaft	<ul style="list-style-type: none"> • Lubricate with lithium-soap-based grease. 		√	√	√	√	√
17	Shift pedal pivot shaft	<ul style="list-style-type: none"> • Lubricate with lithium-soap-based grease. 		√	√	√	√	√
18	Sidestand	<ul style="list-style-type: none"> • Check operation. • Lubricate with lithium-soap-based grease. 		√	√	√	√	√
19 *	Sidestand switch	<ul style="list-style-type: none"> • Check operation. 	√	√	√	√	√	√
20 *	Front fork	<ul style="list-style-type: none"> • Check operation and for oil leakage. 		√	√	√	√	
21 *	Shock absorber assemblies	<ul style="list-style-type: none"> • Check operation and shock absorbers for oil leakage. 		√	√	√	√	
22	Engine oil	<ul style="list-style-type: none"> • Change. • Check oil level and vehicle for oil leakage. 	√	√	√	√	√	√
23	Engine oil filter cartridge	<ul style="list-style-type: none"> • Replace. 	√		√		√	
24 *	Front and rear brake switches	<ul style="list-style-type: none"> • Check operation. 	√	√	√	√	√	√
25	Moving parts and cables	<ul style="list-style-type: none"> • Lubricate. 		√	√	√	√	√
26 *	Throttle grip	<ul style="list-style-type: none"> • Check operation. • Check throttle grip free play, and adjust if necessary. • Lubricate cable and grip housing. 		√	√	√	√	√
27 *	Lights, signals and switches	<ul style="list-style-type: none"> • Check operation. • Adjust headlight beam. 	√	√	√	√	√	√

PERIODIC MAINTENANCE

EAU18681

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.
-

PERIODIC MAINTENANCE

EAS21030

CHECKING THE FUEL LINE

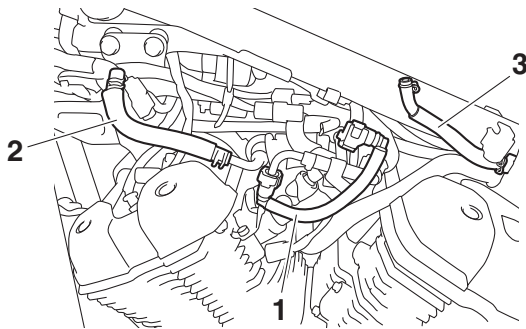
The following procedure applies to all of the fuel and breather hoses.

1. Remove:
 - Fuel tank
Refer to "FUEL TANK" on page 6-1.
2. Check:
 - Fuel hoses "1"
 - Fuel return hose "2"
 - Fuel tank breather/overflow hose "3"
Cracks/damage → Replace.
Loose connection → Connect properly.

ECA1TP1012

NOTICE

Make sure the fuel tank breather hose are routed correctly.



3. Install:
 - Fuel tank
Refer to "FUEL TANK" on page 6-1.

EAS20680

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Remove:
 - Rear cylinder right cover
Refer to "ENGINE REMOVAL" on page 5-3.
2. Disconnect:
 - Spark plug cap
3. Remove:
 - Spark plug

ECA13320

NOTICE

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

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

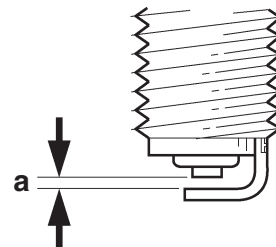


Manufacturer/model
NGK/CPR7EA-9

5. Check:
 - Electrode
Damage/wear → Replace the spark plug.
 - Insulator
Abnormal color → Replace the spark plug.
Normal color is medium-to-light tan.
6. Clean:
 - Spark plug
(with a spark plug cleaner or wire brush)
7. Measure:
 - Spark plug gap "a"
(with a wire thickness gauge)
Out of specification → Regap.



Spark plug gap
0.8–0.9 mm (0.031–0.035 in)



8. Install:
 - Spark plug



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

TIP

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

9. Connect:
 - Spark plug cap
10. Install:
 - Rear cylinder right cover
Refer to "ENGINE REMOVAL" on page 5-3.

EAS20530

ADJUSTING THE VALVE CLEARANCE

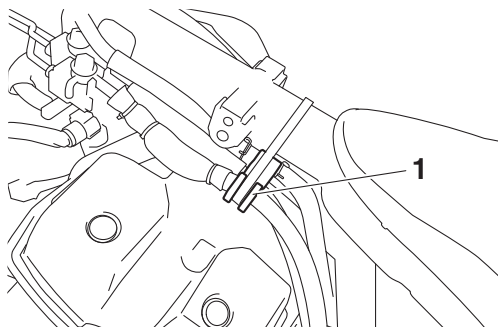
The following procedure applies to all of the valves.

TIP

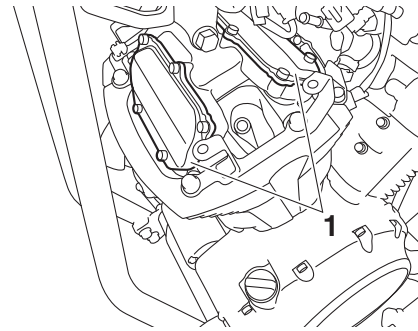
- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

PERIODIC MAINTENANCE

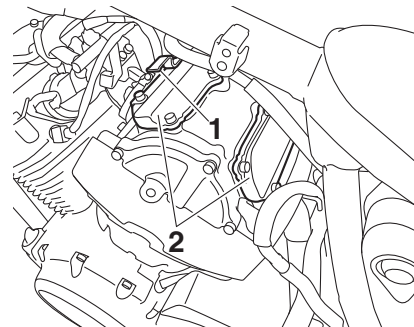
1. Remove:
 - Fuel tank
Refer to “FUEL TANK” on page 6-1.
 - Front cylinder left cover
 - Front cylinder right cover
 - Rear cylinder left cover
 - Rear cylinder right cover
Refer to “ENGINE REMOVAL” on page 5-3.
2. Disconnect:
 - Throttle position sensor coupler
 - Fuel hose (fuel filter to inlet pipe assembly)
Refer to “THROTTLE BODIES” on page 6-6.
3. Remove:
 - Fuel filter
Refer to “THROTTLE BODIES” on page 6-6.
 - Rear cylinder head guard
 - Rear cylinder left cover bracket
Refer to “ENGINE REMOVAL” on page 5-3.
4. Disconnect:
 - Crankcase breather hose
Refer to “GENERAL CHASSIS” on page 4-1.
5. Disconnect:
 - Spark plug caps
Refer to “ENGINE REMOVAL” on page 5-3.
6. Remove:
 - Spark plugs
Refer to “CAMSHAFTS” on page 5-16.
7. Remove:
 - Damper cover
 - Generator cover damper
 - Timing mark accessing screw
 - Crankshaft end accessing screw
Refer to “GENERATOR AND STARTER CLUTCH” on page 5-42.
8. Remove:
 - Hose holder “1”



9. Remove:
 - Front cylinder tappet covers “1”



10. Remove:
 - Fuel filter bracket “1”
 - Rear cylinder tappet covers “2”

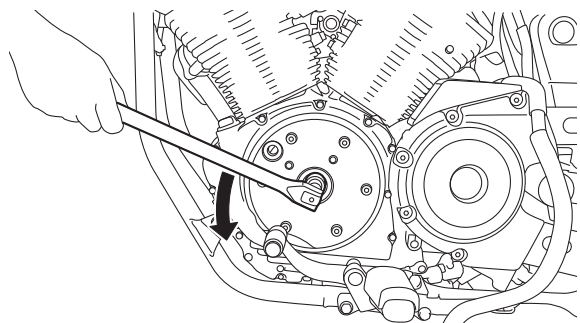


11. Measure:
 - Valve clearance
Out of specification → Adjust.

	Valve clearance (cold)
	Intake 0.08–0.12 mm (0.0031–0.0047 in)
	Exhaust 0.22–0.26 mm (0.0087–0.0102 in)

Front cylinder

- a. Turn the crankshaft counterclockwise.



- b. When the front cylinder piston is at TDC on the compression stroke, align the TDC mark “a” on the generator rotor with the slot “b” in the generator cover.

PERIODIC MAINTENANCE



Locknut (rocker arm adjusting screw)
27 Nm (2.7 m·kgf, 20 ft·lbf)

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



13. Install:

- Rear cylinder tappet covers
- Fuel filter bracket
- Front cylinder tappet covers



Rear cylinder tappet cover bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
Front cylinder tappet cover bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

14. Install:

- Crankshaft end accessing screw
(along with the O-ring **New**)
- Timing mark accessing screw
(along with the O-ring **New**)
- Generator cover damper
- Damper cover
Refer to "GENERATOR AND STARTER CLUTCH" on page 5-42.



Damper cover bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

15. Install:

- All removed parts

TIP

For installation, reverse the removal procedure.

EAS21070

CHECKING THE CRANKCASE BREATHER HOSE

1. Remove:

- Air filter case
Refer to "GENERAL CHASSIS" on page 4-1.
- Air duct
Refer to "BELT DRIVE" on page 4-94.
- Fuel tank
Refer to "FUEL TANK" on page 6-1.

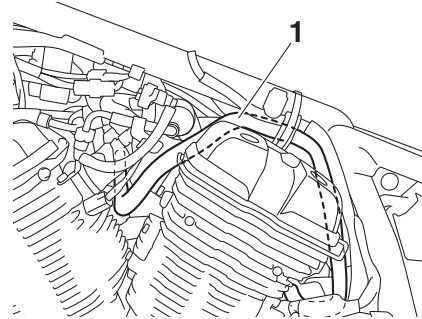
2. Check:

- 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 6-1.
- Air duct
Refer to "BELT DRIVE" on page 4-94.
- Air filter case
Refer to "GENERAL CHASSIS" on page 4-1.

EAS20570

SYNCHRONIZING THE THROTTLE BODIES

TIP

Before synchronizing the throttle bodies, check the following items:

- Valve clearance
- Spark plugs
- Air filter element
- Throttle body joints
- Fuel hoses
- Exhaust system
- Breather hoses

1. Stand the vehicle on a level surface.

TIP

Place the vehicle on a suitable stand.

2. Check:

- Engine idling speed

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



Engine idling speed
950–1050 r/min

Out of specification → Clean or replace.



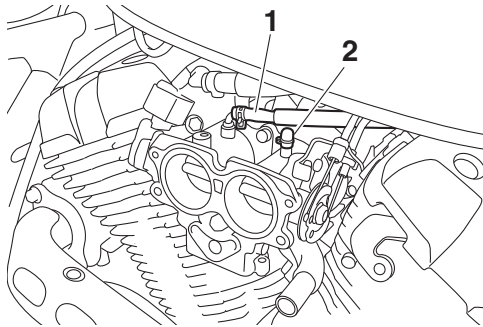
3. Remove:

- Air filter case
Refer to "GENERAL CHASSIS" on page 4-1.

PERIODIC MAINTENANCE

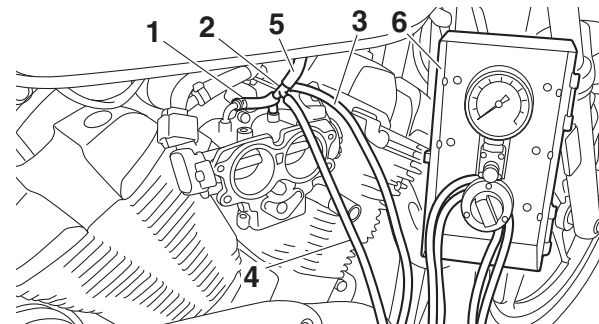
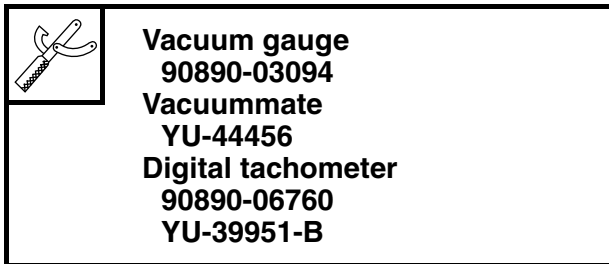
4. Disconnect:

- Intake air pressure sensor hose "1"
- Cap "2"



5. Install:

- Hose "1" (Parts No.: 5JW-24311-00)
- 3-way joint "2" (Parts No.: 90413-05014)
- Vacuum gauge hose #1 "3"
- Vacuum gauge hose #2 "4"
- Intake air pressure sensor hose "5"
- Vacuum gauge "6"
- Digital tachometer



6. Install:

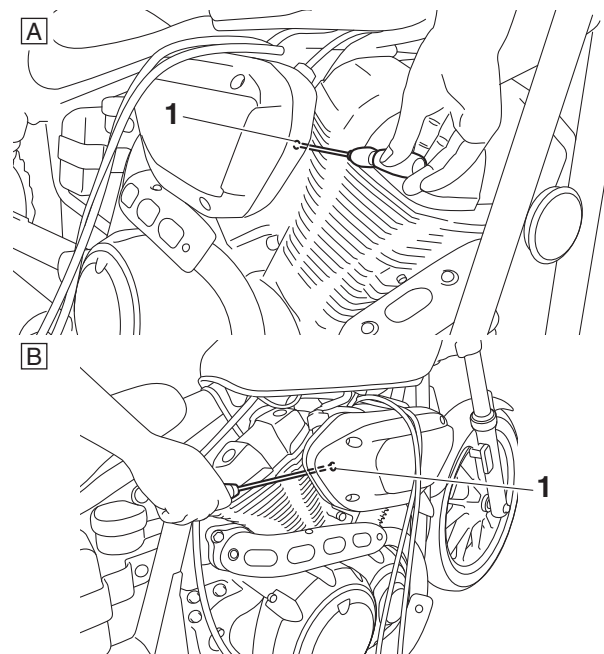
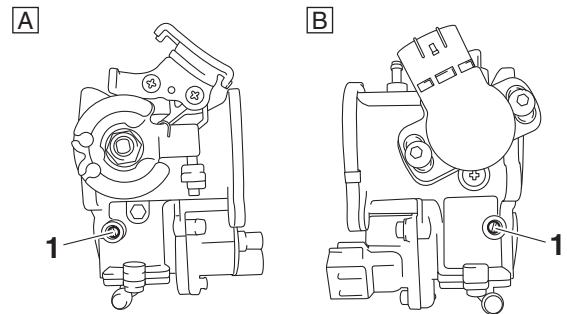
- Air filter case
Refer to "GENERAL CHASSIS" on page 4-1.

7. Adjust:

- Throttle body synchronization

- Measure the vacuum pressure of the front cylinder throttle body and rear cylinder throttle body.
- Using the throttle body with the lowest vacuum pressure as the standard, turn the air screw "1" of the other throttle body to adjust its vacuum pressure.

- If the vacuum pressure of the throttle body with the lower pressure is out of specification, adjust it to specification first, and then synchronize the throttle bodies.



- Front cylinder throttle body
- Rear cylinder throttle body

TIP

- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If the air screw was removed, turn the screw in fully, and then turn it out 1 1/4 turns. Then, synchronize the throttle bodies.

ECA14900

NOTICE

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



Intake vacuum
34.7–40.0 kPa (260–300 mmHg,
10.2–11.8 inHg)

TIP

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



8. Measure:
 - Engine idling speed
Out of specification → Adjust.
Make sure that the vacuum pressure is within specification.
9. Stop the engine and remove the measuring equipment.
10. Connect:
 - Intake air pressure sensor hose
 - Cap
11. Install:
 - Air filter case
Refer to “GENERAL CHASSIS” on page 4-1.
12. Adjust:
 - Throttle grip free play
Refer to “CHECKING THE THROTTLE GRIP OPERATION” on page 3-26.



Throttle grip free play
4.0–6.0 mm (0.16–0.24 in)

EAS21080

CHECKING THE EXHAUST SYSTEM

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

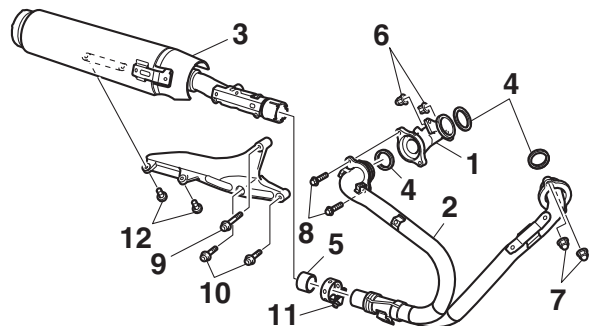
1. Check:
 - Exhaust pipe joint “1”
 - Exhaust pipe “2”
 - Muffler “3”
 - Gaskets “4”, “5”
Exhaust gas leaks → Replace.
2. Check:

Tightening torque

 - Exhaust pipe joint nuts “6”
 - Exhaust pipe nuts “7”
 - Exhaust pipe bolts “8”
 - Muffler bracket and frame bolt “9”
 - Muffler bracket and engine bracket (rear lower side) bolts “10”
 - Muffler and exhaust bolt “11”
 - Muffler bracket and muffler bolts “12”



Exhaust pipe joint nut
15 Nm (1.5 m·kgf, 11 ft·lbf)
Exhaust pipe nut
20 Nm (2.0 m·kgf, 14 ft·lbf)
Exhaust pipe bolt
20 Nm (2.0 m·kgf, 14 ft·lbf)
Muffler bracket and frame bolt
53 Nm (5.3 m·kgf, 38 ft·lbf)
Muffler bracket and engine bracket (rear lower side) bolt
53 Nm (5.3 m·kgf, 38 ft·lbf)
Muffler and exhaust bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)
Muffler bracket and muffler bolt
35 Nm (3.5 m·kgf, 25 ft·lbf)



EAS1XC1027

ADJUSTING THE EXHAUST GAS VOLUME

TIP

- Be sure to set the CO density level to standard, and then adjust the exhaust gas volume.
- To adjust the exhaust gas volume, use the CO adjustment mode of the Yamaha diagnostic tool. For more information, refer to the operation manual of the Yamaha diagnostic tool.

1. Connect the Yamaha diagnostic tool to the coupler. For information about connecting the Yamaha diagnostic tool, refer to “YAMAHA DIAGNOSTIC TOOL” on page 7-45.

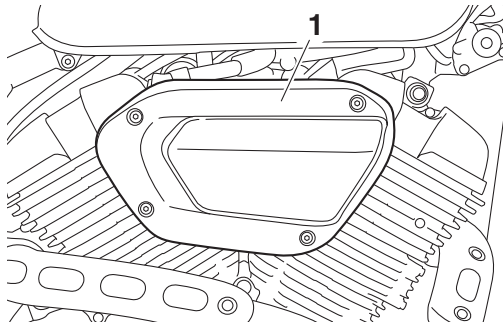


Yamaha diagnostic tool
90890-03215

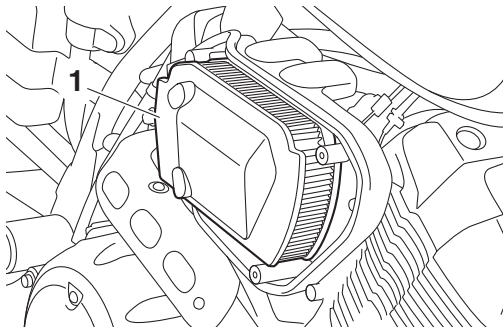
EAS20960

REPLACING THE AIR FILTER ELEMENT

1. Remove:
 - Air filter case cover “1”



2. Remove:
- Air filter element “1”



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

TIP

- Replace the air filter element every 37000 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



Air filter case cover bolt
2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)

ECA1TP1013

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 body synchronization, leading to poor engine performance and possible overheating.

TIP

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

EAS1TP1017

CHECKING THE CLUTCH OPERATION

1. Check:
- Clutch operation
Dysfunctional → Check the clutch system.
Refer to “CLUTCH” on page 5-48.

EWA1TP1010

WARNING

Before checking the clutch operation, check the brake system and make sure that the brake is operating at all times during the check-up. While checking the clutch operation, do not rev up the engine.

- Place the vehicle on a level surface, and start the engine.
- Grab the clutch lever and make sure that you can shift the gear smoothly.
- Grab the clutch lever and shift to first gear.
- Operate both the front and rear brakes, release the clutch lever slowly and make sure that the engine stops.

EAS1TP1018

ADJUSTING THE CLUTCH LEVER FREE PLAY

1. Measure:
- Clutch lever free play “a”
Out of specification → Adjust.



Clutch lever free play
5.0–10.0 mm (0.20–0.39 in)

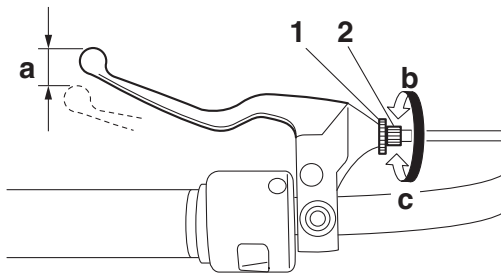
2. Adjust:
- Clutch lever free play

Clutch lever side

- Loosen the locknut “1”
- Turn the adjusting bolt “2” in direction “b” or “c” until the specified clutch lever free play is obtained.

Direction “b”
Clutch lever free play is increased.
Direction “c”
Clutch lever free play is decreased

PERIODIC MAINTENANCE



c. Tighten the locknut.

TIP

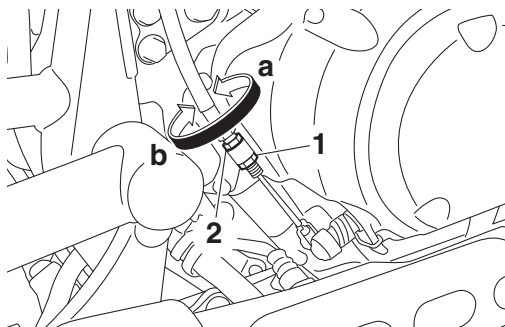
If the specified clutch lever free play cannot be obtained on the clutch lever side of the cable, use the adjusting nut on the crankcase side.



Crankcase side

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

Direction "a"
Clutch lever free play is increased.
Direction "b"
Clutch lever free play is decreased.



c. Tighten the locknut to specification.



Clutch cable locknut
7 Nm (0.7 m·kgf, 5.1 ft·lbf)



EAS1TP1019

CHECKING THE BRAKE OPERATION

- Check:
 - Brake operation
Brake not working properly → Check the brake system.
Refer to "FRONT BRAKE" on page 4-30 and "REAR BRAKE" on page 4-47.

TIP

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

EAS21240

CHECKING THE BRAKE FLUID LEVEL

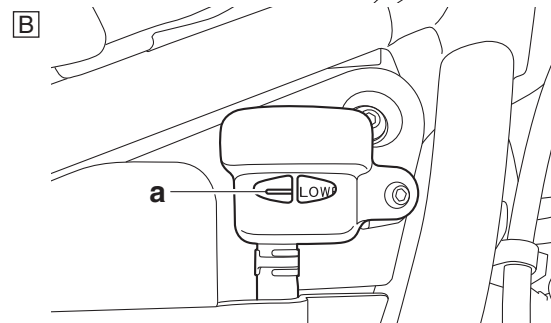
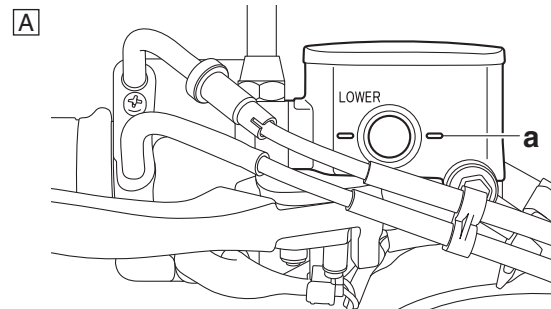
- Stand the vehicle on a level surface.

TIP

- Place the vehicle on a suitable stand.
 - Make sure the vehicle is upright.
- Check:
 - Brake fluid level
Below the minimum level mark "a" → Add the specified brake fluid to the proper level.



Specified brake fluid
DOT 4



- Front brake
- Rear brake

EWA1TP1021

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 and 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 spilled brake fluid immediately.

TIP

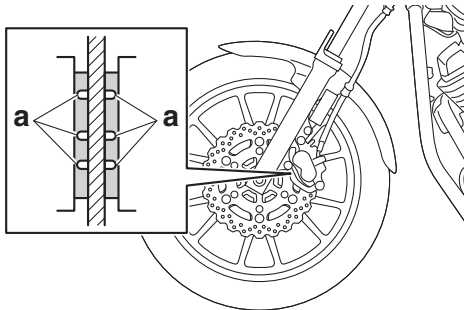
In order to ensure a correct reading of the brake fluid level, make sure the top of the brake master cylinder reservoir or brake fluid reservoir is horizontal.

EAS21250

CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
 - Front brake pad
Wear indicator grooves “a” almost disappeared → Replace the brake pads as a set. Refer to “FRONT BRAKE” on page 4-30.

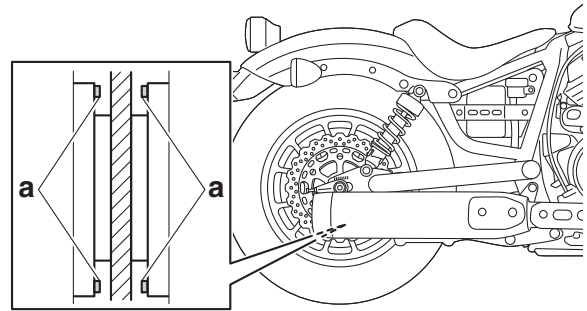


EAS21260

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 “a” almost touch the brake disc → Replace the brake pads as a set. Refer to “REAR BRAKE” on page 4-47.



EAS1XC1029

BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)

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

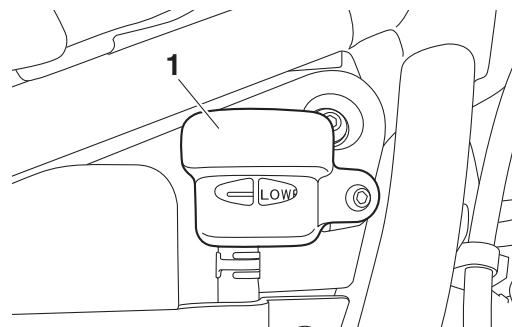
- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the hydraulic brake system, make sure there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic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

- Brake fluid reservoir cover “1”

TIP

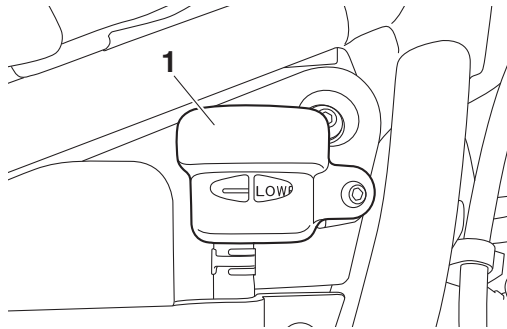
After removing the brake fluid reservoir cover, install the brake fluid reservoir temporarily.



PERIODIC MAINTENANCE

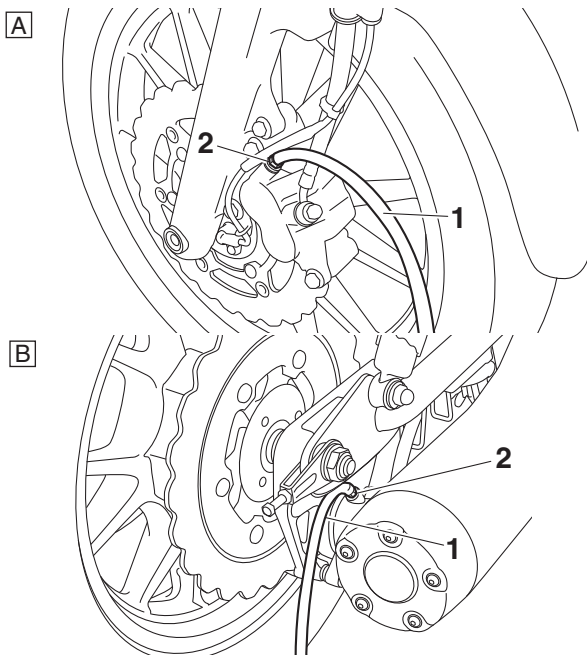
1. Remove:
 - Brake fluid reservoir cover “1”

TIP
After removing the brake fluid reservoir cover, install the brake fluid reservoir temporarily.



2. Bleed:
 - ABS

- a. Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the specified 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 brake caliper
B. Rear brake caliper

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

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

- h. Tighten the bleed screw and then release the brake lever or brake pedal.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- j. Check the operation of the hydraulic unit. Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-67.

ECA1XC1004

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 brake master cylinder reservoir or brake fluid reservoir to the proper level with the specified brake fluid.
- l. Tighten the bleed screw to specification.



**Brake caliper bleed screw
6 Nm (0.6 m·kgf, 4.3 ft·lbf)**

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

EWA1XC1008

WARNING

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

3. Install:
 - Brake fluid reservoir cover



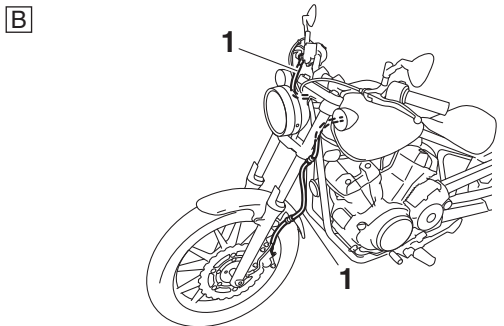
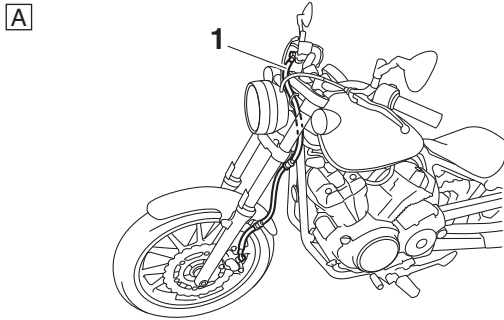
**Brake fluid reservoir cover bolt
2.8 Nm (0.28 m·kgf, 2.0 ft·lbf)
LOCTITE®**

EAS21280

CHECKING THE FRONT BRAKE HOSE

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

PERIODIC MAINTENANCE



- A. Except for ABS models
- B. For ABS models

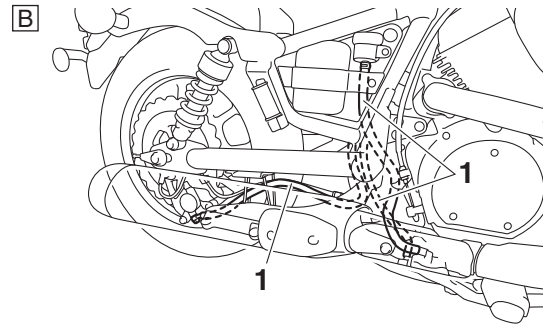
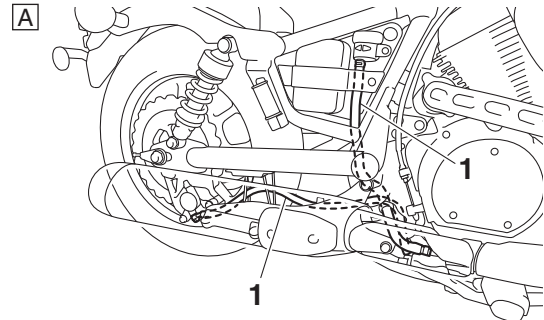
2. Check:
 - Brake hose holders
Loose → Tighten the holder bolt.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
 - Brake hose(s)
Brake fluid leakage → Replace the brake hose.
Refer to “FRONT BRAKE” on page 4-30.

EAS21290

CHECKING THE REAR BRAKE HOSES

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

1. Check:
 - Brake hoses “1”
Cracks/damage/wear → Replace.



- A. Except for ABS models
- B. For ABS models

2. Check:
 - Brake hose holder
Loose → Tighten the holder bolt.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
 - Brake hoses
Brake fluid leakage → Replace the damaged hose.
Refer to “REAR BRAKE” on page 4-47.

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

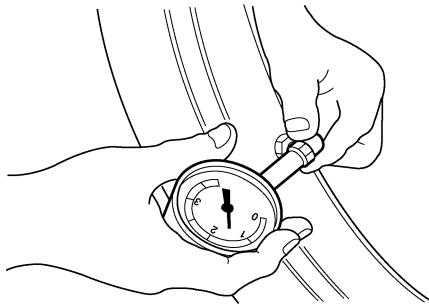
CHECKING THE TIRES

The following procedure applies to both of the tires.

PERIODIC MAINTENANCE

1. Check:

- Tire pressure
Out of specification → Regulate.



EWA13180

WARNING

- The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.
- The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
- Operation of an overloaded vehicle could cause tire damage, an accident or an injury. **NEVER OVERLOAD THE VEHICLE.**



Tire air pressure (measured on cold tires)

Loading condition

0–90 kg (0–198 lb)

Front

225 kPa (2.25 kgf/cm², 33 psi)

Rear

250 kPa (2.50 kgf/cm², 36 psi)

Loading condition

90–206 kg (198–454 lb) (except for ABS models)

90–202 kg (198–445 lb) (for ABS models)

Front

250 kPa (2.50 kgf/cm², 36 psi)

Rear

280 kPa (2.80 kgf/cm², 41 psi)

Maximum load

206 kg (454 lb) (except for ABS models)

202 kg (445 lb) (for ABS models)

* Total weight of rider, passenger, cargo and accessories

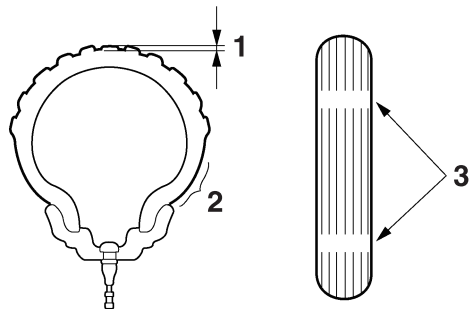
EWA13190

WARNING

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

2. Check:

- Tire surfaces
Damage/wear → Replace the tire.



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



Wear limit (front)

XVS950CU 1.6 mm (0.06 in)

XVS950CUE 1.0 mm (0.04 in)

Wear limit (rear)

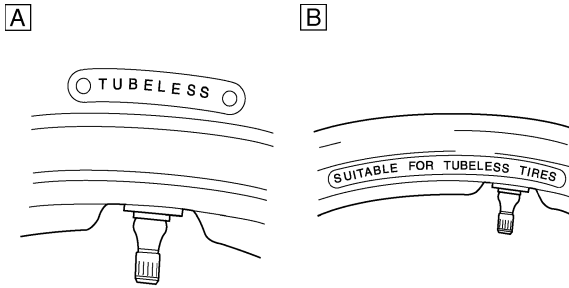
XVS950CU 1.6 mm (0.06 in)

XVS950CUE 1.0 mm (0.04 in)

EWA14080

WARNING

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



- A. Tire
B. Wheel

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

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 100/90-19M/C 57H Manufacturer/model BRIDGESTONE/EXEDRA G721
--	--

	Rear tire Size 150/80B16M/C 71H Manufacturer/model BRIDGESTONE/EXEDRA G722
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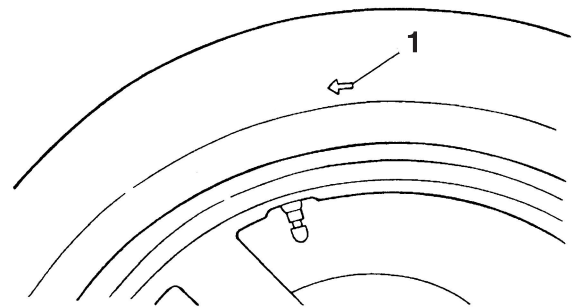
EWA1TP1012

WARNING

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km (60 mi) 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.



EAS1TP1020

CHECKING THE WHEEL BEARINGS

The following procedure applies to all of the wheel bearings.

- Check:
 - Wheel bearings
Refer to "CHECKING THE FRONT WHEEL" on page 4-13 and "CHECKING THE REAR WHEEL" on page 4-25.

EAS1TP1021

CHECKING THE SWINGARM PIVOT SHAFT BEARINGS

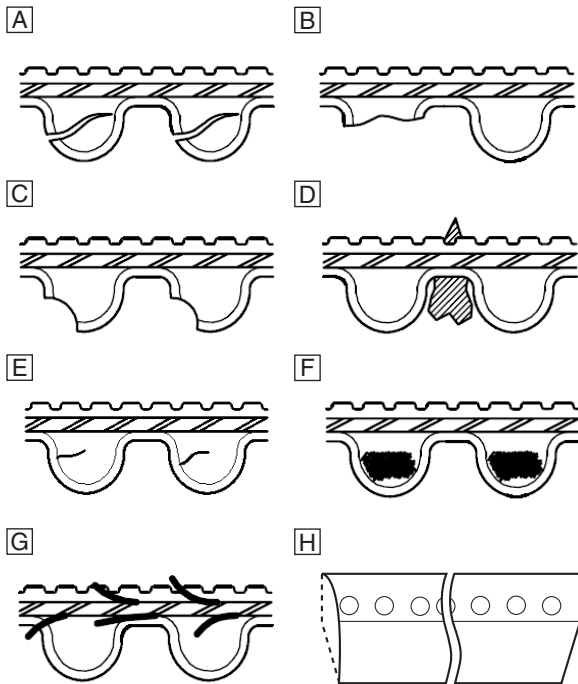
- Check:
 - Swingarm pivot shaft bearings
Refer to "SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES" on page 4-89.

EAS1TP1022

CHECKING THE DRIVE BELT

- Remove:
 - Drive belt upper guard and lower guard
Refer to "REAR WHEEL" on page 4-19.
 - Check:
 - Drive belt
 - External tooth cracks "A" → Replace.
 - Missing teeth "B" → Replace.
 - Hook wear "C" → Replace.
 - Stone damage "D" → Replace if damage is on the edge.
 - Internal tooth cracks (hairline) "E" → OK to run, but monitor condition.
 - Chipping (not serious) "F" → OK to run, but monitor condition.
 - Fuzzy edge cord "G" → OK to run, but monitor condition
 - Bevel wear (outboard edge only) "H" → OK to run, but monitor condition.
- Refer to "BELT DRIVE" on page 4-94

PERIODIC MAINTENANCE



3. Install:
- Drive belt upper guard and lower guard
Refer to "REAR WHEEL" on page 4-19.

EAS21430

ADJUSTING THE DRIVE BELT SLACK

TIP

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

ECA14950

NOTICE

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

TIP

Measure the drive belt slack when the engine is cold, and when the drive belt is dry.

1. Stand the vehicle on a level surface.

EWA13120

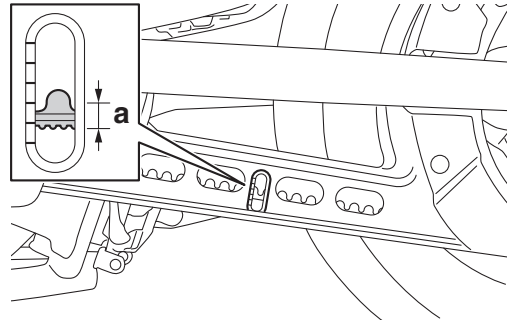
WARNING

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

TIP

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

2. Rotate the rear wheel several times and check the drive belt to locate its tightest point.
3. Check:
 - Drive belt slack "a"
Out of specification → Adjust.



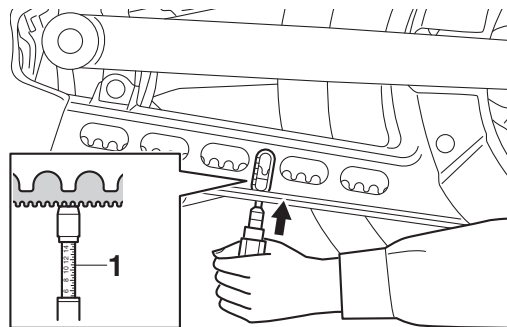
Drive belt slack (on a suitable stand)
7.0–9.0 mm (0.28–0.35 in)



Belt tension gauge
90890-03170
Rear drive belt tension gauge
YM-03170

TIP

Measure the drive belt slack when the drive belt has been pushed with 45 N (4.5 kgf, 10 lbf) of pressure using the belt tension gauge "1".



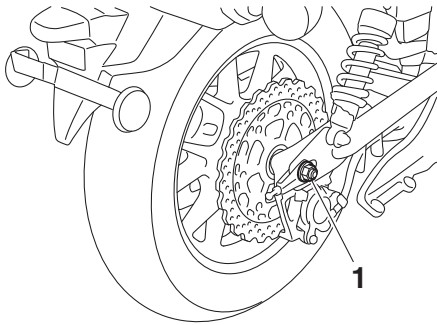
4. Remove:
 - Muffler
Refer to "ENGINE REMOVAL" on page 5-3.
5. Adjust:
 - Drive belt slack

TIP

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

- a. Loosen the rear wheel axle nut "1".

PERIODIC MAINTENANCE

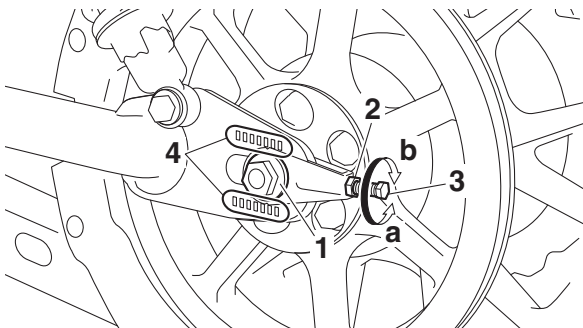


- b. Loosen both drive belt adjusting bolt locknuts "2".
- c. Turn both drive belt adjusting bolts "3" in direction "a" or "b" until the specified drive belt slack is obtained.

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

TIP

Using the alignment marks "4" on each side of the swingarm, make sure that both belt pullers are in the same position for proper wheel alignment.



- d. Tighten the drive belt adjusting bolt locknuts to specification.



Drive belt adjusting bolt locknut
16 Nm (1.6 m·kgf, 12 ft·lbf)

- e. Tighten the rear wheel axle nut to specification.



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

6. Install:

- Muffler
Refer to "ENGINE REMOVAL" on page 5-3.

EAS21510

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120

WARNING

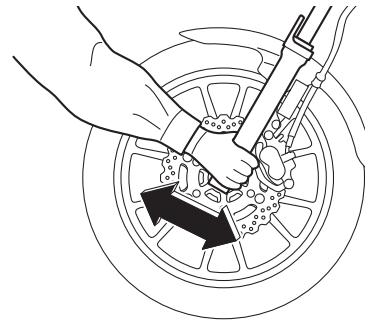
Securely support the vehicle so that there is no danger of it falling over.

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.



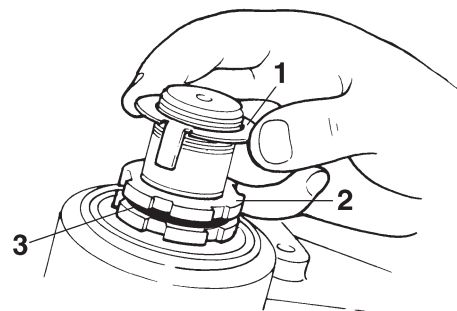
3. Remove:

- Upper bracket
Refer to "STEERING HEAD" on page 4-85.

4. Adjust:

- Steering head

- a. Remove the lock washer "1", the upper ring nut "2", and the rubber washer "3".



- b. Tighten the lower ring nut "4" to specification with a steering nut wrench "5".



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

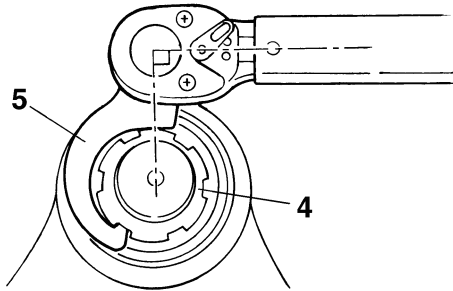
PERIODIC MAINTENANCE



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

TIP

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



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

EWA13140



WARNING

Do not overtighten the lower ring nut.



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

- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings. Refer to “STEERING HEAD” on page 4-85.
- e. Install the rubber washer “3”.
- f. Install the upper ring nut “2”.

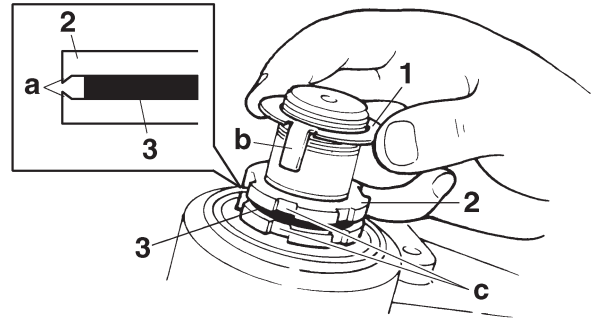
TIP

Install the upper ring nut and lower ring nut with their sharp-edged sides “a” facing each other.

- g. Finger tighten the upper ring nut “2”, and then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- h. Install the lock washer “1”.

TIP

Make sure the lock washer tabs “b” sit correctly in the ring nut slots “c”.



- 5. Install:
 - Upper bracket
 Refer to “STEERING HEAD” on page 4-85.

EAS1TP1023

LUBRICATING THE STEERING BEARINGS

Lubricate the steering bearings.



Recommended lubricant
Lithium-soap-based grease

EAS1TP1024

CHECKING THE CHASSIS FASTENERS

Make sure that all nuts, bolts, and screws are properly tightened.

Refer to “CHASSIS TIGHTENING TORQUES” on page 2-21.

EAS21700

LUBRICATING THE BRAKE LEVER

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



Recommended lubricant
Silicone grease

EAS21710

LUBRICATING THE BRAKE PEDAL

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



Recommended lubricant
Lithium-soap-based grease

EAS1TP1025

LUBRICATING THE CLUTCH LEVER

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



Recommended lubricant
Lithium-soap-based grease

EAS1TP1026

LUBRICATING THE SHIFT PEDAL

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

	<p>Recommended lubricant Lithium-soap-based grease</p>
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EAS1TP1027

CHECKING THE SIDESTAND

1. Stand the vehicle on a level surface.

EWA13120



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 sidestand is elevated.

2. Check:

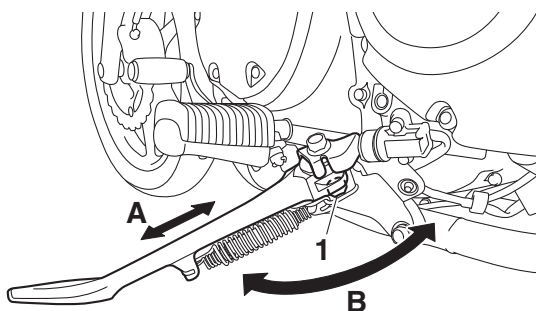
- Sidestand vertical movement "A"
Free play is noticeable → Replace the defective part(s).
- Sidestand axial movement "B"
Unsmooth operation → Replace the defective part(s).

a. Tighten the sidestand nut "1" to specification.



Sidestand nut
64 Nm (6.4 m-kgf, 46 ft-lbf)

- b. Check the sidestand vertical movement "A" by moving the sidestand up and down.
- c. Check the sidestand axial movement "B" by moving the sidestand up and down.



EAS21720

LUBRICATING THE SIDESTAND

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



Recommended lubricant
Lithium-soap-based grease

EAS1TP1028

CHECKING THE SIDESTAND SWITCH

Refer to "ELECTRICAL COMPONENTS" on page 7-147.

EAS21530

CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

EWA13120



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

2. Check:

- Inner tube
Damage/scratches → Replace.
- Oil seal
Oil leakage → Replace.

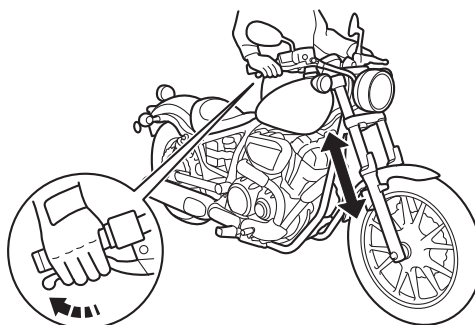
3. Hold the vehicle upright and apply the front brake.

4. Check:

- Front fork operation
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.

Rough movement → Repair.

Refer to "FRONT FORK" on page 4-76.



EAS1TP1029

CHECKING THE REAR SHOCK ABSORBER ASSEMBLIES

1. Check:

- Damper rod
- Oil leakage
- Gas leakage (for models equipped with gas cylinders)
- Spring

Refer to "CHECKING THE REAR SHOCK ABSORBER ASSEMBLIES" on page 4-92.

2. Check:

- Operation
Pump the rear shock absorber assemblies up and down several times.
Unsmooth operation → Replace rear shock absorber assembly.

Refer to "SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES" on page 4-89.

EAS1XC1031

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLIES (for models not equipped with gas cylinders)

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

EWA1TP1013

WARNING

- Securely support the vehicle so that there is no danger of it falling over.
- Always adjust both rear shock absorber assemblies evenly. Uneven adjustment can result in poor handling and loss of stability.

Spring preload

ECA1TP1014

NOTICE

Never go beyond the maximum or minimum adjustment positions.


1. Adjust:
 - Spring preload

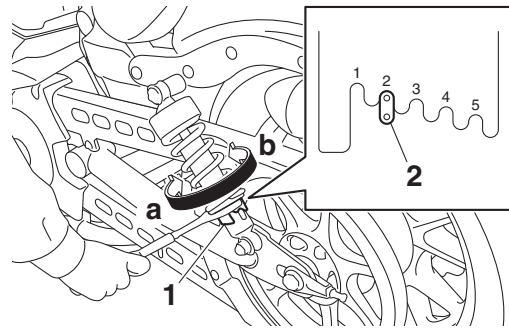
TIP

Adjust the spring preload with the special wrench and extension bar included in the owner's tool kit 2.

- a. Turn the adjusting ring "1" in direction "a" or "b".
- b. Align the desired position on the adjusting ring with the stopper "2".

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

	Adjusting positions
	Standard
	2
	Minimum (soft)
	1
	Maximum (hard)
	5



EAS1XC1032

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLIES (for models equipped with gas cylinders)

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

EWA1XC1009

WARNING

- Securely support the vehicle so that there is no danger of it falling over.
- Always adjust both rear shock absorber assemblies evenly. Uneven adjustment can result in poor handling and loss of stability.

Spring preload

ECA1XC1005

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - Spring preload


TIP

Adjust the spring preload with the special wrench and extension bar included in the owner's tool kit 2.

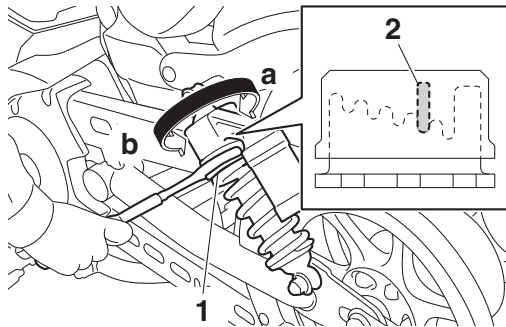
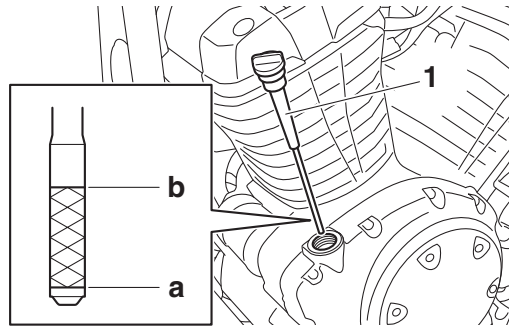

- a. Turn the adjusting ring "1" in direction "a" or "b".
- b. Align the desired position on the adjusting ring with the stopper "2".

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

PERIODIC MAINTENANCE



Adjusting positions
Standard
 1 notch out*
Minimum (soft)
 0 notches out*
Maximum (hard)
 4 notches out*
 *: from the fully turned-in position

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



EAS20750

CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on the suitable stand.
- Make sure that the vehicle is upright.

2. Let the engine idle for a few minutes, and then turn it off.

3. Remove:

- Dipstick "1"

4. Check:

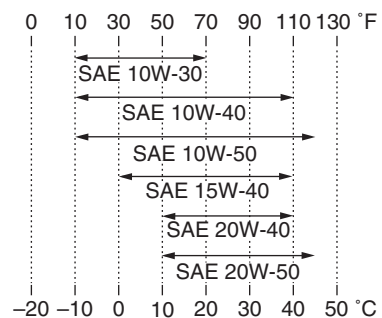
- Engine oil level

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.

TIP

- Before checking the engine oil level, wait a few minutes until the oil has settled.
- Do not screw the dipstick in when inspecting the oil level.



ECA1TP1015

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.

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

6. Check the engine oil level again.

TIP

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

7. Install:

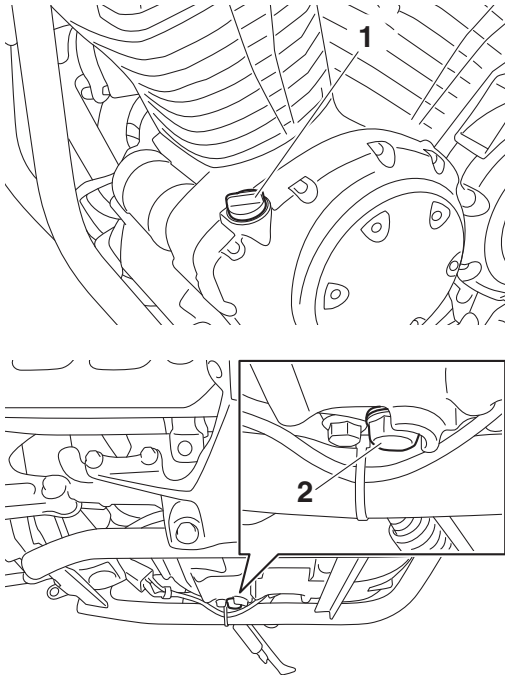
- Dipstick

PERIODIC MAINTENANCE

EAS20780

CHANGING THE ENGINE OIL

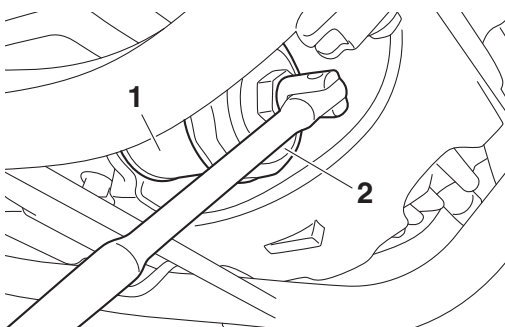
1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.
3. Remove:
 - Dipstick "1" (along with the O-ring)
 - Engine oil drain bolt "2" (along with the gasket)



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

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

	Oil filter wrench 90890-01426 YU-38411
---	---

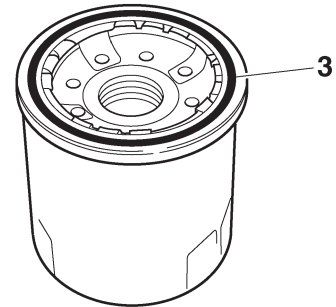


- b. Lubricate the O-ring "3" of the new oil filter cartridge with a thin coat of engine oil.


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)
---	--




6. Install:
 - Engine oil drain bolt (along with the gasket **New**)

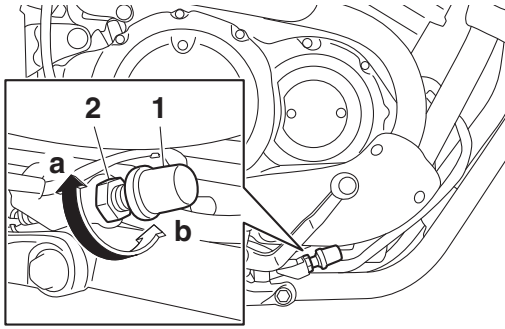
	Engine oil drain bolt 43 Nm (4.3 m·kgf, 31 ft·lbf)
---	---

7. Fill:
 - Crankcase (with the specified amount of the recommended engine oil)
8. Install:
 - Dipstick (along with the O-ring **New**)
9. Check:
 - Engine oil level

Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-23.

	Engine oil quantity Quantity (disassembled) 4.30 L (4.55 US qt, 3.78 Imp.qt) Without oil filter cartridge replacement 3.70 L (3.91 US qt, 3.26 Imp.qt) With oil filter cartridge replacement 4.00 L (4.23 US qt, 3.52 Imp.qt)
---	--

PERIODIC MAINTENANCE



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 or replace.

	Recommended lubricant 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.

EAS1TP1031

CHECKING THE THROTTLE GRIP OPERATION

1. Check:
 - Throttle cables
Damage/deterioration → Replace.
 - Throttle cable installation
Incorrect → Reinstall the throttle cables.
Refer to “HANDLEBAR” on page 4-71.
2. Check:
 - Throttle grip movement
Rough movement → Lubricate or replace the defective part(s).

	Recommended lubricant Suitable cable lubricant
--	---

TIP

With the engine stopped, turn the throttle grip slowly and release it. Make sure that the throttle grip turns smoothly and returns properly when released.

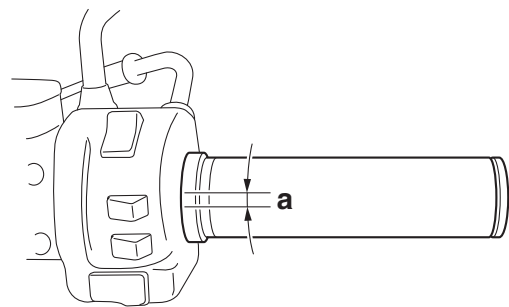
Repeat this check with the handlebar turned all the way to the left and right.

3. Measure:

- Throttle grip free play “a”
Out of specification → Adjust.



Throttle grip free play
4.0–6.0 mm (0.16–0.24 in)



4. Remove:

- Fuel tank
Refer to “FUEL TANK” on page 6-1.

5. Adjust:

- Throttle grip free play

TIP

Prior to adjusting the throttle grip free play, throttle body synchronization should be adjusted properly.

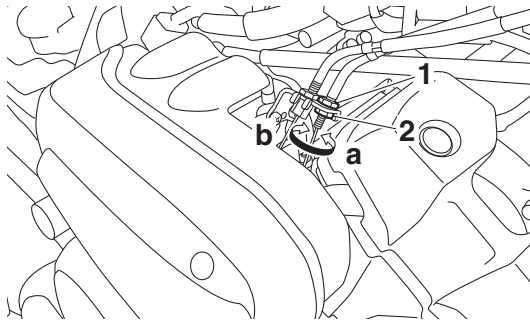
Throttle body side

- a. Loosen the locknut “1” on the accelerator cable.
- b. Turn the adjusting nut “2” in direction “a” or “b” until the specified throttle grip free play is obtained.

Direction “a”
Throttle grip free play is increased.
Direction “b”
Throttle grip free play is decreased.

- c. Tighten the locknut.

PERIODIC MAINTENANCE



TIP

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

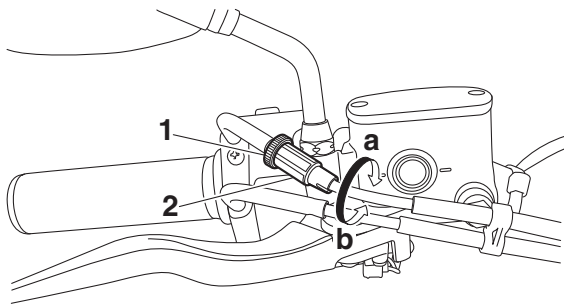


Handlebar side

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

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

- c. Tighten the locknut.



6. Install:
 - Fuel tank
 Refer to "FUEL TANK" on page 6-1.

EAS1TP1033

LUBRICATING THE THROTTLE GRIP HOUSING AND CABLE

Lubricate the throttle grip housing and cable.



Recommended lubricant
Lithium-soap-based grease

EAS1TP1034

CHECKING THE SWITCHES, LIGHTS AND SIGNALS

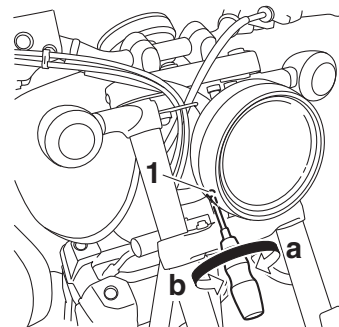
1. Check that all switches operate and that all lights come on.
Refer to "INSTRUMENT AND CONTROL FUNCTIONS" in Owner's manual.
Faulty → Refer to "CHECKING THE SWITCHES" on page 7-151 and "CHECKING THE BULBS AND BULB SOCKETS" on page 7-154.

EAS21810

ADJUSTING THE HEADLIGHT BEAM

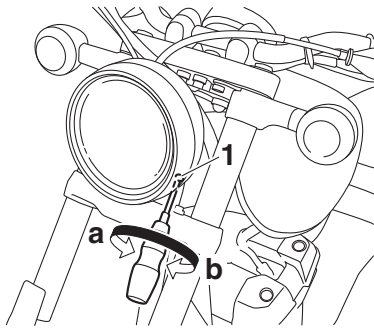
1. Adjust:
 - Headlight beam (vertically)
- a. Turn the adjusting screw "1" with a screw driver in direction "a" or "b".

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



2. Adjust:
 - Headlight beam (horizontally)
- a. Turn the adjusting screw "1" with a screw driver in direction "a" or "b".

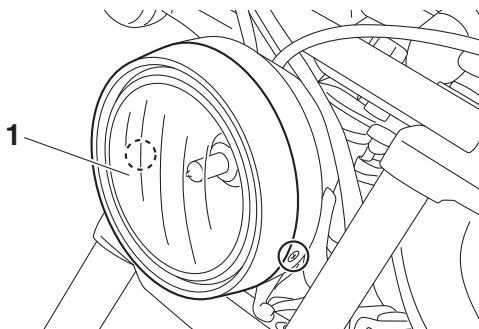
Direction "a"
Headlight beam moves to the left.
Direction "b"
Headlight beam moves to the right.



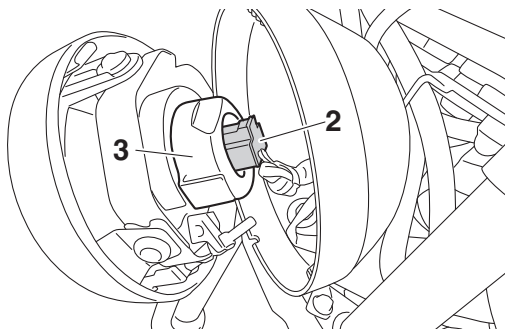
EAS21790

REPLACING THE HEADLIGHT BULB

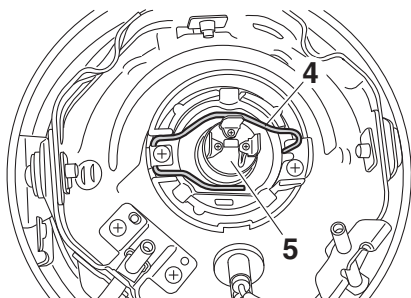
1. Remove:
 - Headlight lens unit "1"



2. Disconnect:
 - Headlight coupler "2"
3. Remove:
 - Headlight bulb cover "3"



4. Detach:
 - Headlight bulb holder "4"
5. Remove:
 - Headlight bulb "5"



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

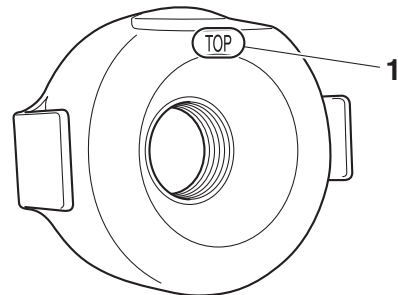
NOTICE

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. Attach:
 - Headlight bulb holder
8. Install:
 - Bulb cover

TIP

When installing the headlight bulb cover, make sure the "TOP" mark "1" faces upwards.

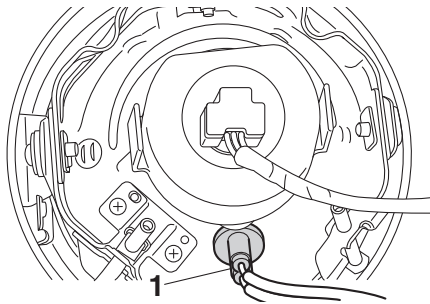


9. Connect:
 - Headlight coupler
10. Install:
 - Headlight lens unit

EAS1XC1033

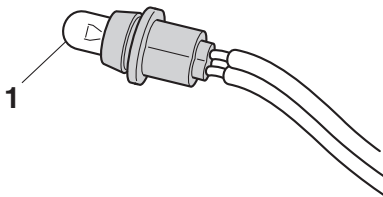
REPLACING THE AUXILIARY LIGHT BULB

1. Remove:
 - Headlight lens unit
Refer to "GENERAL CHASSIS" on page 4-1.
2. Remove:
 - Auxiliary light socket "1"



3. Remove:

- Auxiliary light bulb “1”



4. Install:

- Auxiliary light bulb **New**
- Auxiliary light socket

5. Install:

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

CHASSIS

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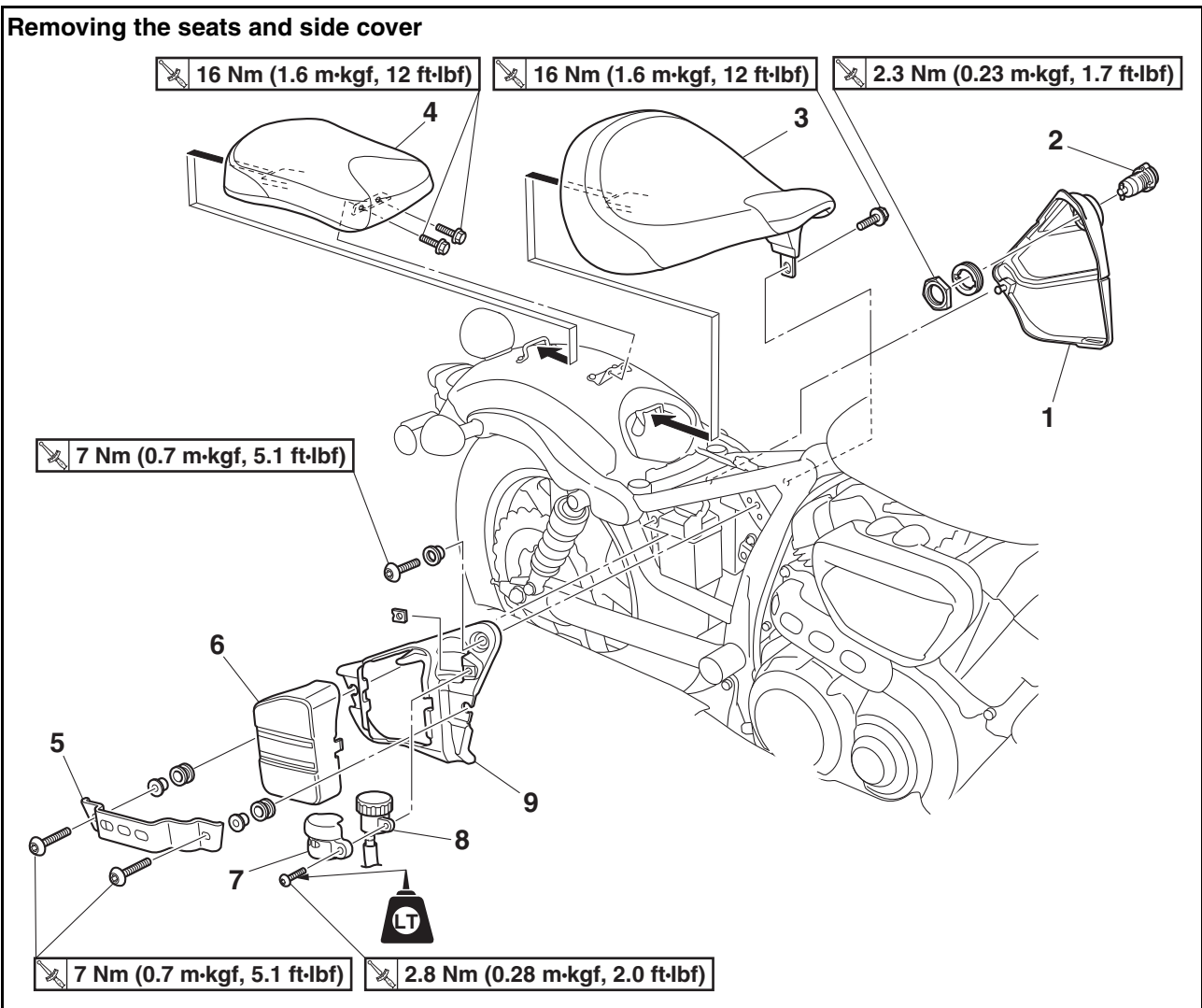
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EAS21830

GENERAL CHASSIS

Removing the seats and side cover



Order	Job/Parts to remove	Q'ty	Remarks
1	Left side cover	1	
2	Key cylinder	1	
3	Rider seat	1	
4	Passenger seat	1	
5	Battery cover holder	1	
6	Battery cover	1	
7	Brake fluid reservoir cover	1	
8	Brake fluid reservoir	1	
9	Right side cover	1	
			For installation, reverse the removal procedure.

EAS1TP1013

INSTALLING THE RIDER SEAT

1. Install:

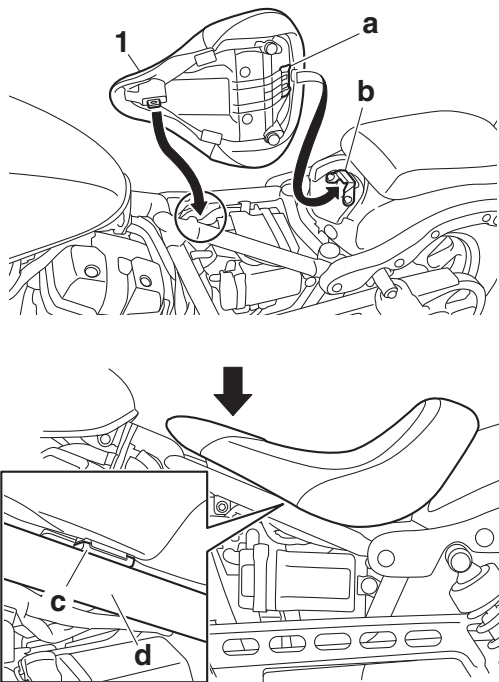
- Rider seat "1"



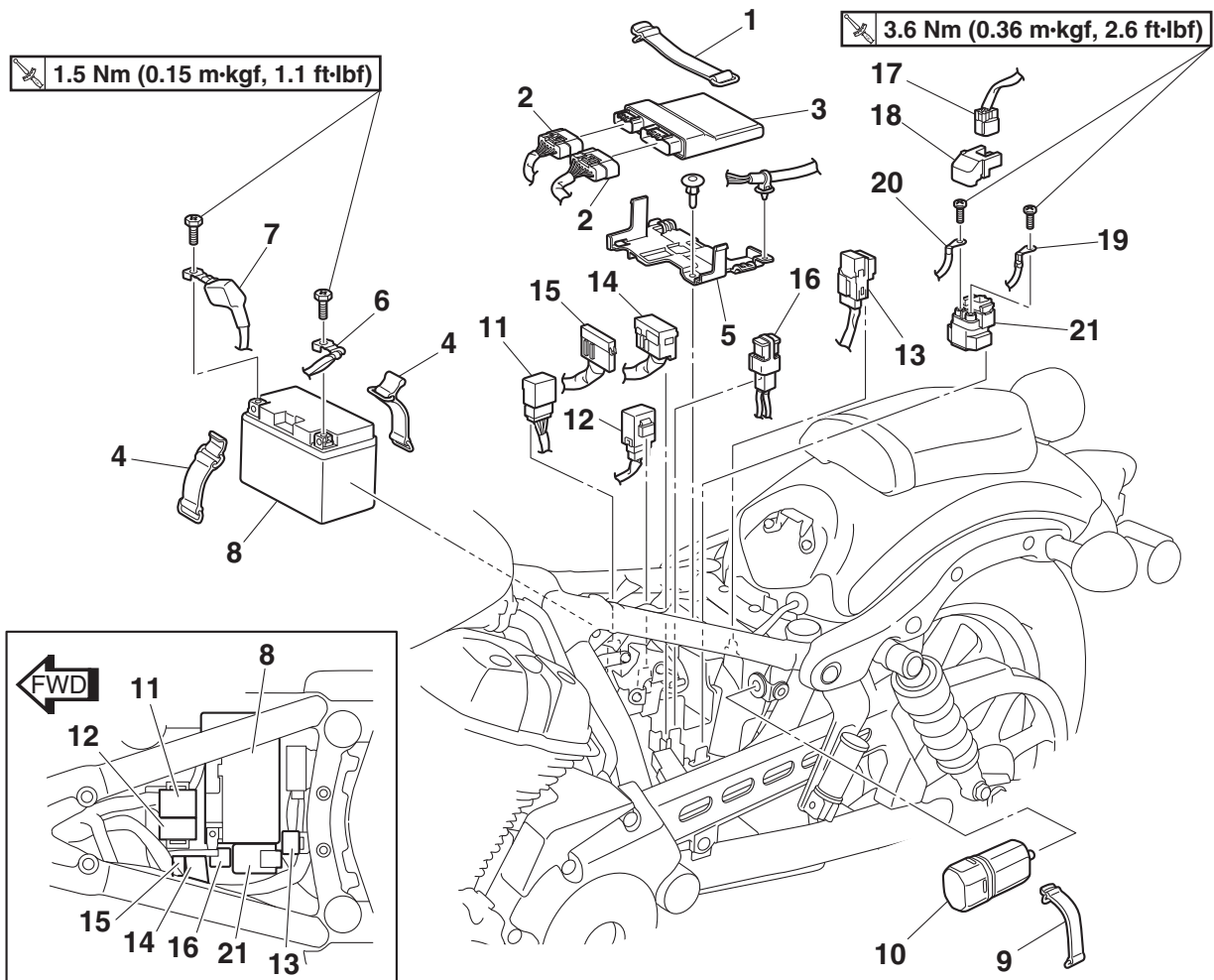
Rider seat bolt
16 Nm (1.6 m·kgf, 12 ft·lbf)

TIP

- Insert the projection "a" on the rear of the seat into the seat holder "b" as shown.
- While pushing the front of the seat down so that there is no space between the rubber dampers "c" and the frame "d", tighten the bolt.



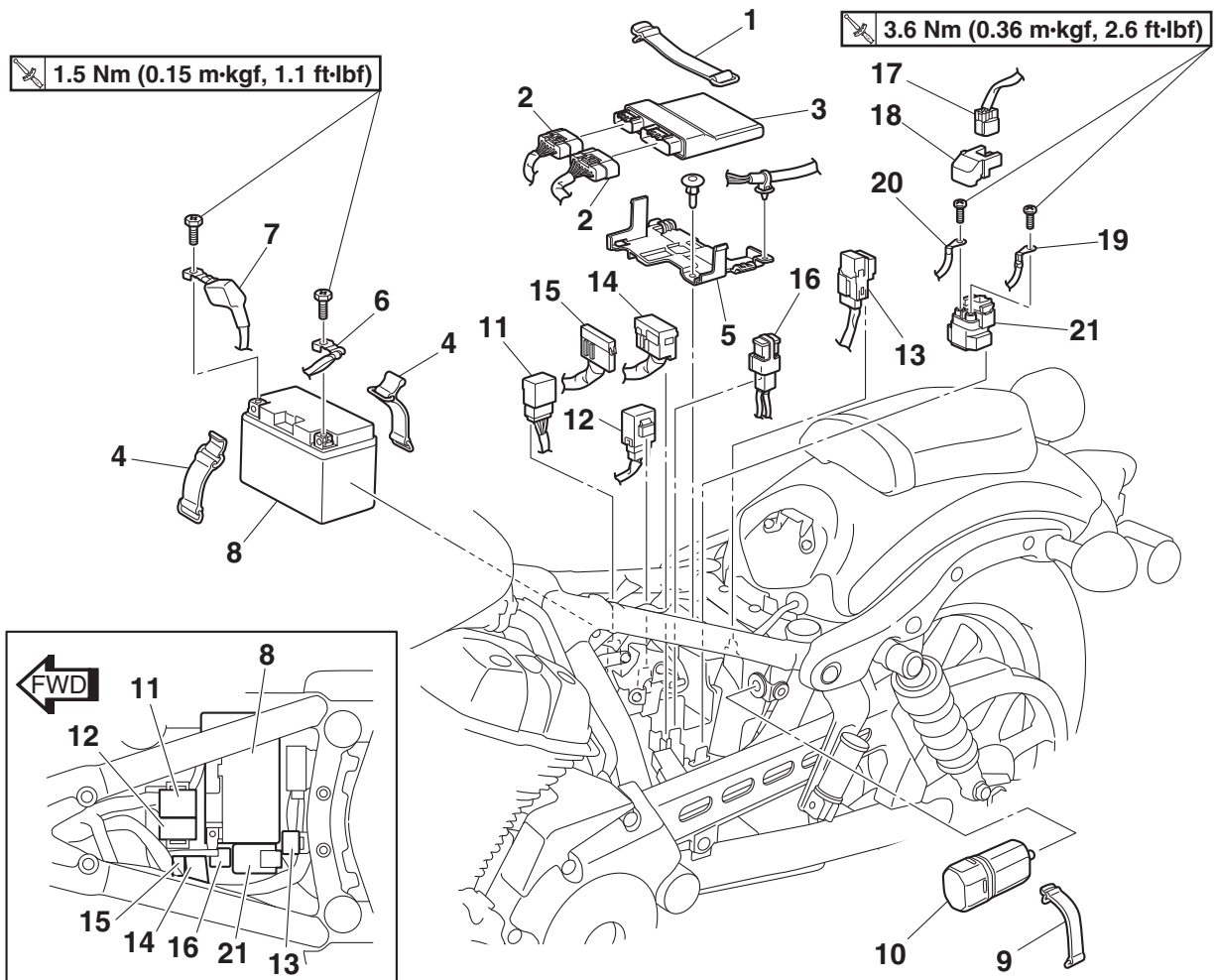
Removing the battery and relays



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/Side cover		Refer to "GENERAL CHASSIS" on page 4-1.
1	ECU band	1	
2	ECU coupler	2	Disconnect.
3	ECU (engine control unit)	1	
4	Battery band	2	
5	ECU bracket	1	
6	Negative battery lead	1	Disconnect.
7	Positive battery lead	1	Disconnect.
8	Battery	1	
9	Tool box band	1	
10	Tool box	1	
11	Relay unit	1	
12	Turn signal/hazard relay	1	
13	Head light relay	1	
14	Fuse box 1	1	
15	Fuse box 2	1	For ABS models
16	Main fuse	1	

GENERAL CHASSIS

Removing the battery and relays



Order	Job/Parts to remove	Q'ty	Remarks
17	Starter relay coupler	1	Disconnect.
18	Starter relay cover	1	
19	Starter motor lead	1	Disconnect.
20	Positive battery lead (starter relay)	1	Disconnect.
21	Starter relay	1	
			For installation, reverse the removal procedure.

EAS1TP1065

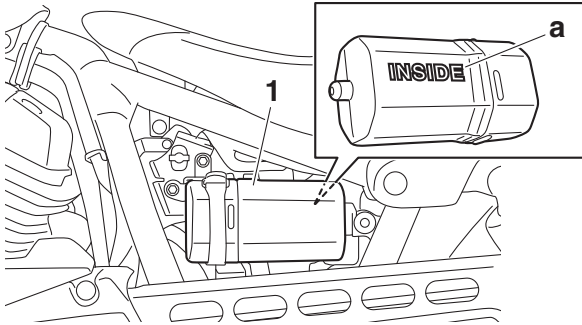
INSTALLING THE TOOL BOX

1. Install:

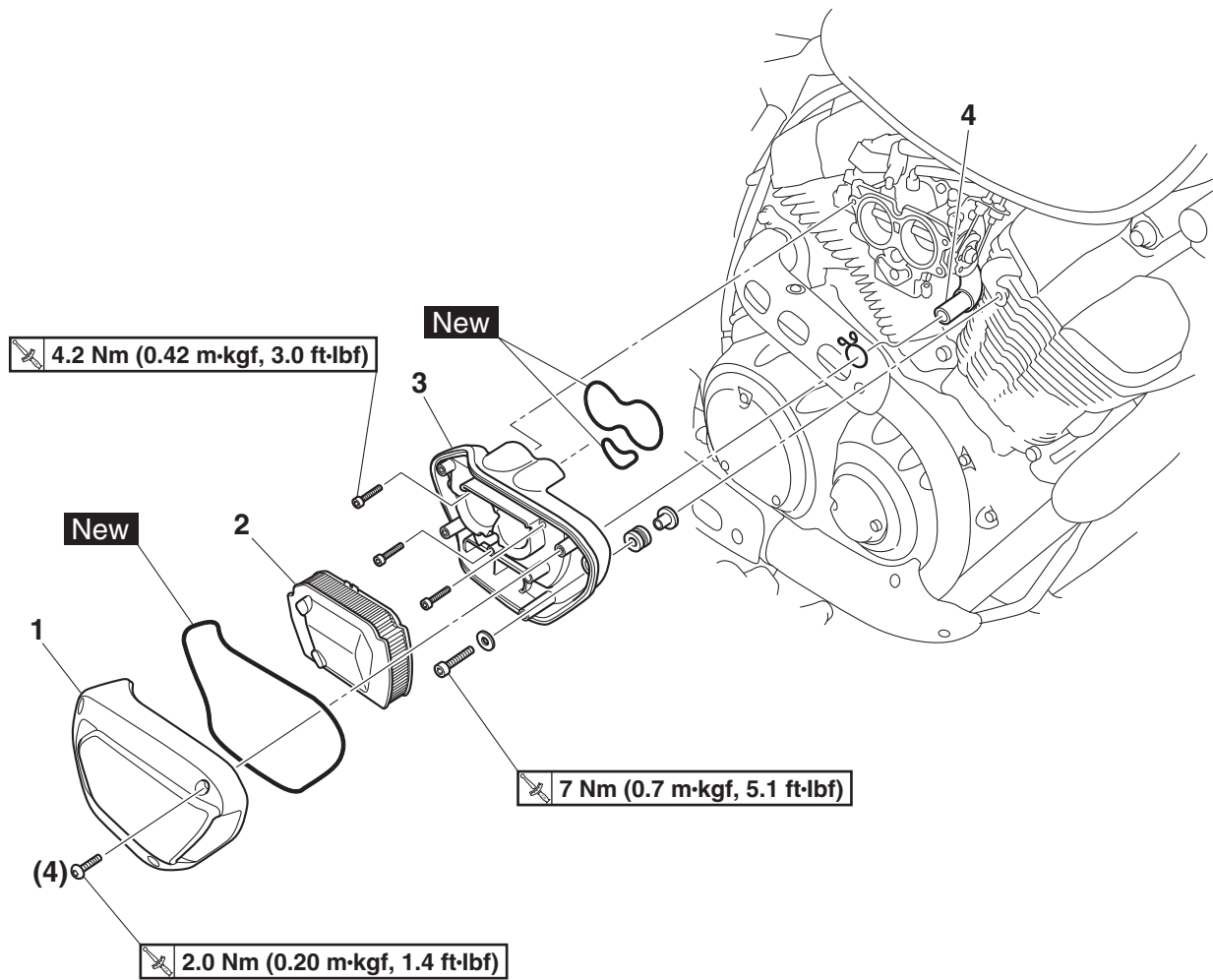
- Tool box “1”

TIP

Install the tool box with the “INSIDE” mark “a” facing inward.



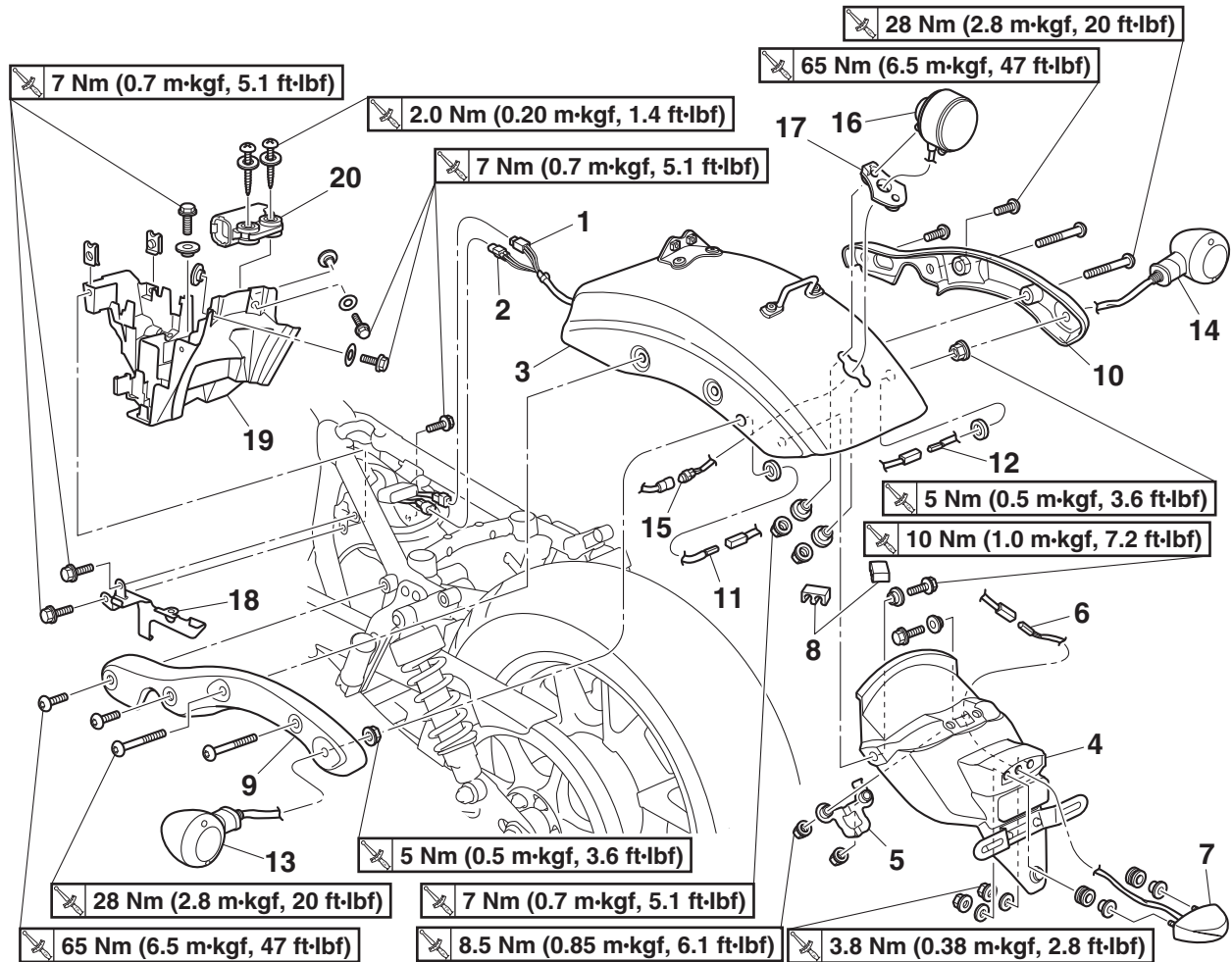
Removing the air filter case



Order	Job/Parts to remove	Q'ty	Remarks
1	Air filter case cover	1	
2	Air filter element	1	
3	Air filter case	1	
4	Crankcase breather hose	1	Disconnect.
			For installation, reverse the removal procedure.

GENERAL CHASSIS

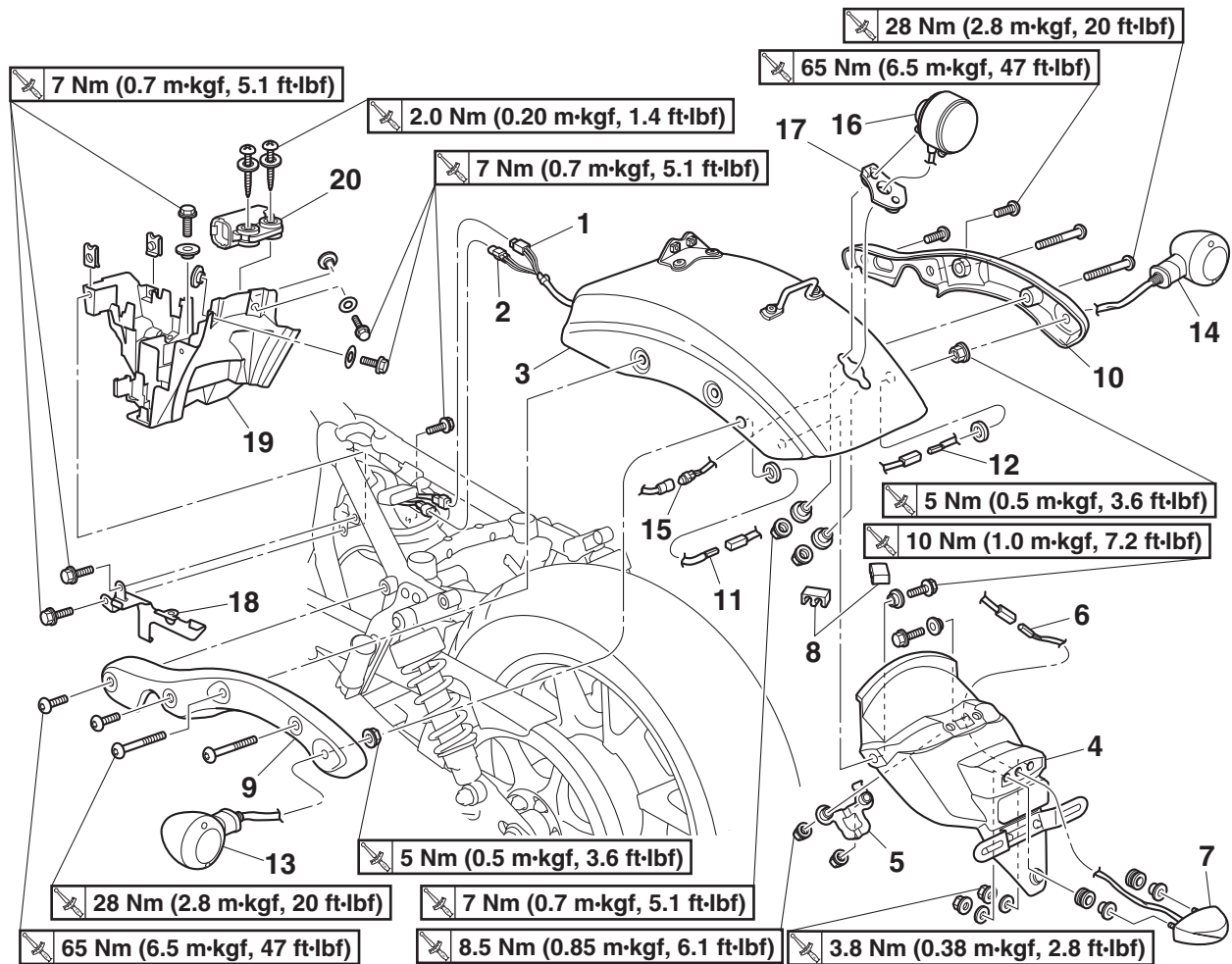
Removing the rear fender



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/Passenger seat/Side cover/Battery		Refer to "GENERAL CHASSIS" on page 4-1.
1	Rear turn signal light and license plate light sub-wire harness coupler	1	Disconnect.
2	Tail/brake light sub-wire harness coupler	1	Disconnect.
3	Rear fender	1	
4	Mudguard	1	
5	License plate light lead holder	1	
6	License plate light coupler	1	Disconnect.
7	License plate light	1	
8	Lead holder	2	
9	Rear left fender bracket	1	
10	Rear right fender bracket	1	
11	Rear left turn signal light coupler	1	Disconnect. Refer to "CABLE ROUTING (except for ABS models)" on page 2-41 and "CABLE ROUTING (for ABS models)" on page 2-75.
12	Rear right turn signal light coupler	1	Disconnect. Refer to "CABLE ROUTING (except for ABS models)" on page 2-41 and "CABLE ROUTING (for ABS models)" on page 2-75.

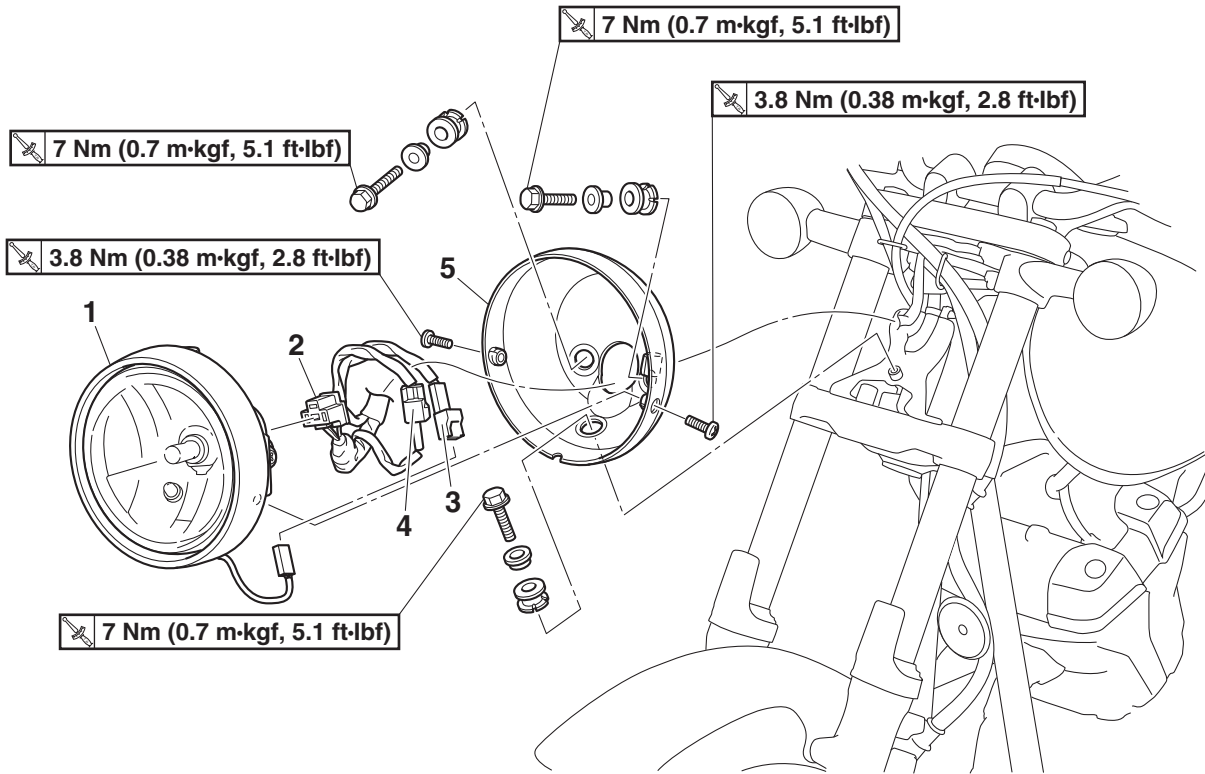
GENERAL CHASSIS

Removing the rear fender



Order	Job/Parts to remove	Q'ty	Remarks
13	Rear left turn signal light	1	
14	Rear right turn signal light	1	
15	Tail/brake light sub-wire harness coupler	1	Disconnect.
16	Tail/brake light	1	
17	Grommet	1	
18	Tool box guide	1	
19	Battery box	1	
20	Lean angle sensor	1	
			For installation, reverse the removal procedure.

Removing the headlight

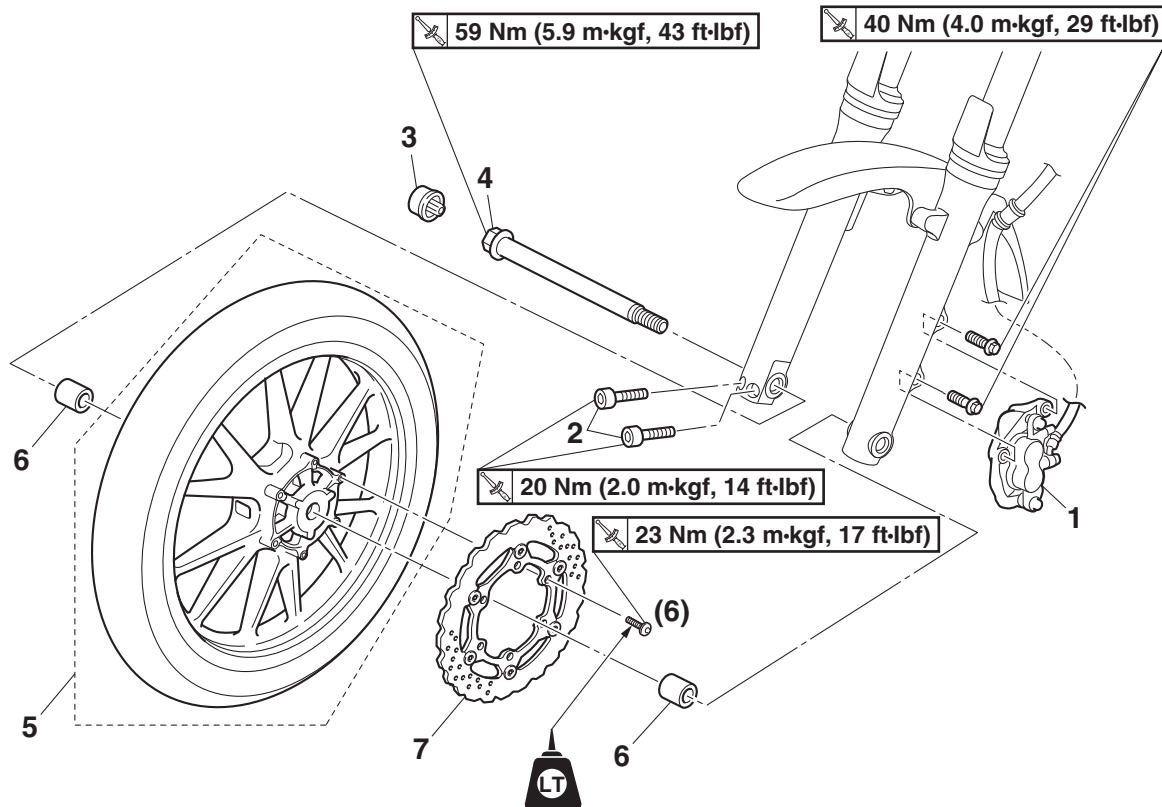


Order	Job/Parts to remove	Q'ty	Remarks
1	Headlight lens unit	1	
2	Headlight coupler	1	Disconnect.
3	Auxiliary light coupler	1	Disconnect.
4	Intake air temperature sensor coupler	1	
5	Headlight body	1	
			For installation, reverse the removal procedure.

EAS21870

FRONT WHEEL

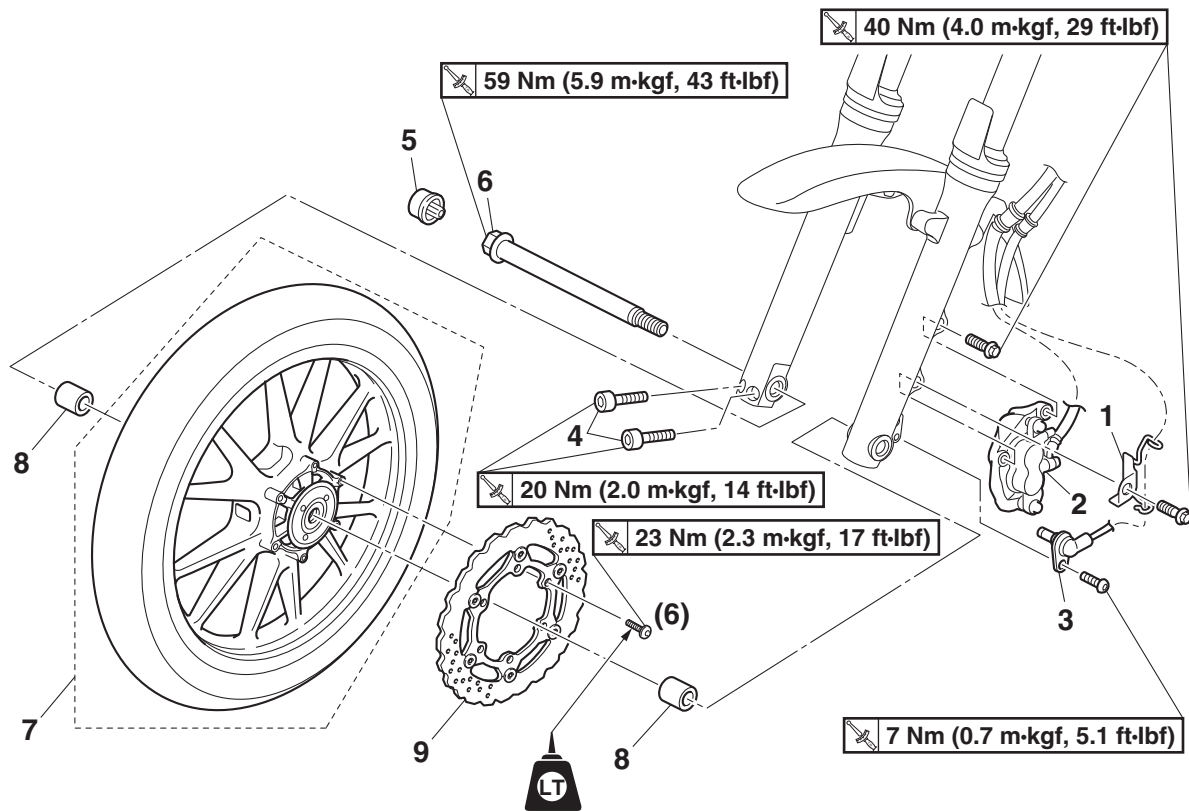
Removing the front wheel and brake disc (except for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
			TIP _____ Place the vehicle on a suitable stand so that the front wheel is elevated. _____
1	Front brake caliper	1	
2	Front wheel axle pinch bolt	2	Loosen.
3	Front wheel axle cap	1	Except for AUS
4	Front wheel axle	1	
5	Front wheel	1	
6	Collar	2	
7	Front brake disc	1	
			For installation, reverse the removal procedure.

FRONT WHEEL

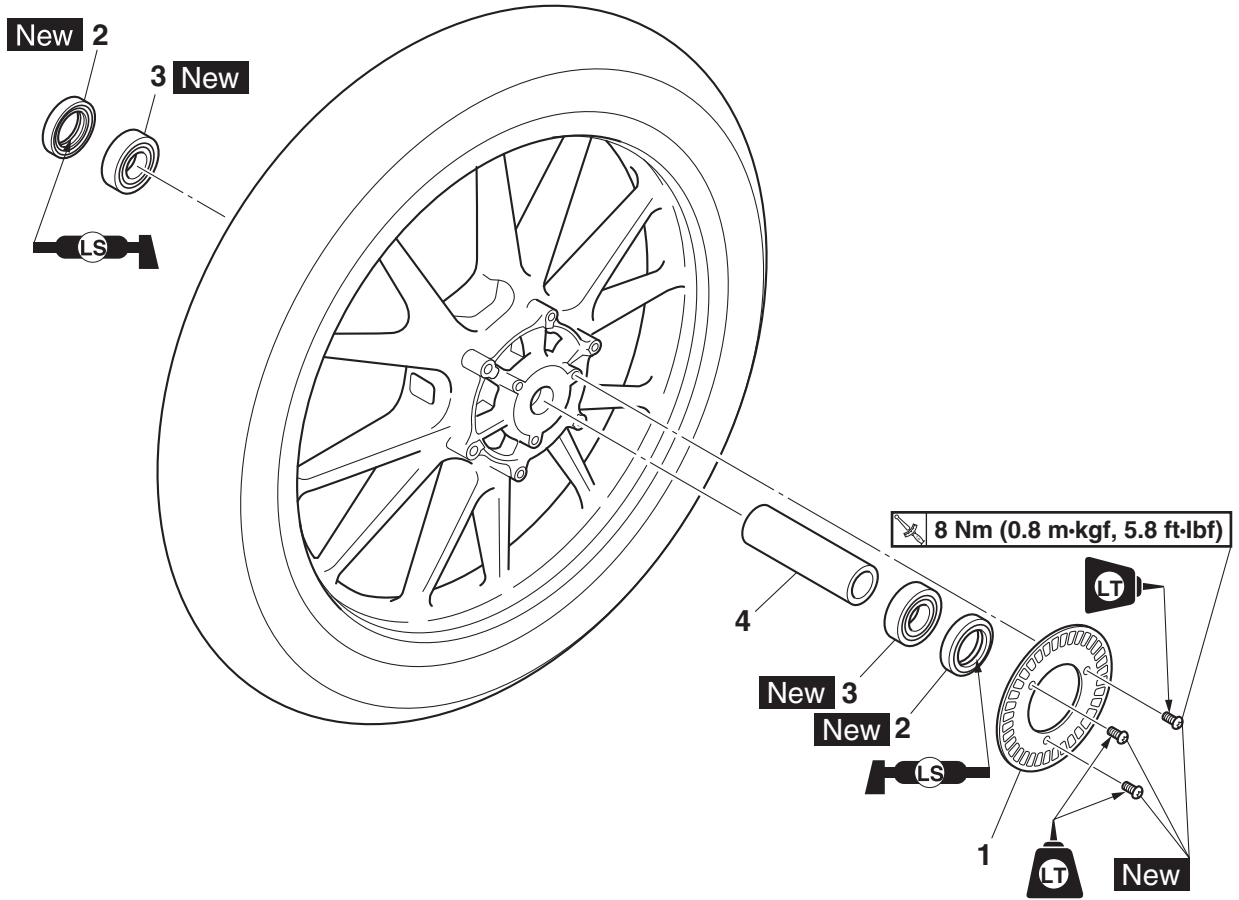
Removing the front wheel and brake disc (for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
			TIP _____ Place the vehicle on a suitable stand so that the front wheel is elevated.
1	Front wheel sensor lead holder	1	
2	Front brake caliper	1	
3	Front wheel sensor	1	
4	Front wheel axle pinch bolt	2	Loosen.
5	Front wheel axle cap	1	
6	Front wheel axle	1	
7	Front wheel	1	
8	Collar	2	
9	Front brake disc	1	
			For installation, reverse the removal procedure.

FRONT WHEEL

Disassembling the front wheel



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

FRONT WHEEL

EAS21900

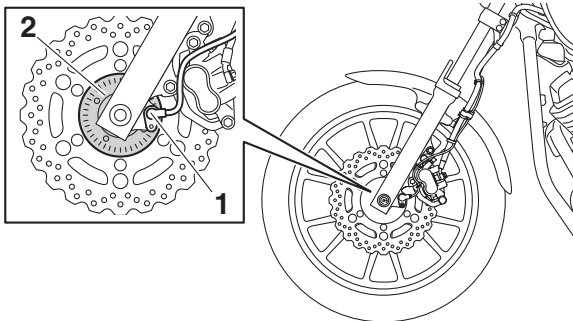
REMOVING THE FRONT WHEEL

ECA1XC1018

NOTICE

For ABS models

- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel sensor "1" or front wheel sensor rotor "2"; otherwise, the sensor or rotor may be damaged, resulting in improper performance of the ABS system.
- Do not drop the front wheel sensor rotor or subject it to shocks.
- If any solvent gets on the front wheel sensor rotor, wipe it off immediately.



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:
 - Front wheel sensor lead holder (for ABS models)
 - Front brake caliper
 - Front wheel sensor (for ABS models)

ECA1XC1019

NOTICE

- Do not apply the brake lever when removing the brake caliper.
- Be sure not to contact the sensor electrode to any metal part when removing the front wheel sensor from the outer tube. (for ABS models)

3. Elevate:
 - Front wheel

TIP

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

EAS21910

DISASSEMBLING THE FRONT WHEEL

ECA1XC1011

NOTICE

For ABS models

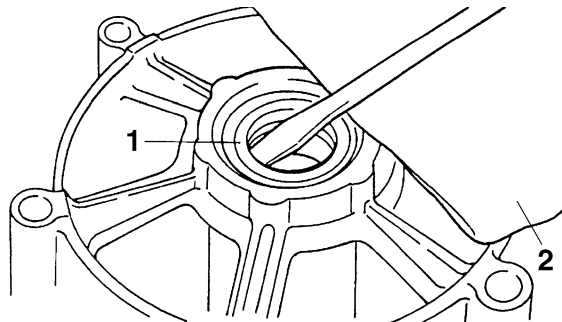
- Do not drop the wheel sensor rotor or subject it to shocks.
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.

1. Remove:
 - Front wheel sensor rotor (for ABS models)
 - Oil seals
 - Wheel bearings

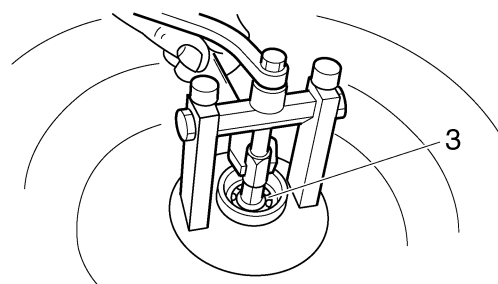
- a. Clean the outside of the front wheel hub.
- b. Remove the oil seals "1" with a flathead screwdriver.

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.



EAS21920

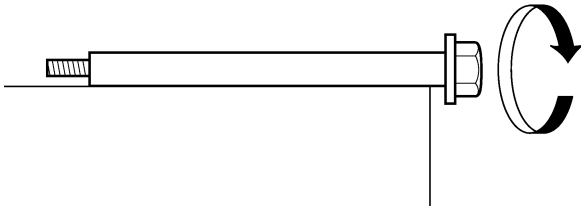
CHECKING THE FRONT WHEEL

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

EWA13460

WARNING

Do not attempt to straighten a bent wheel axle.



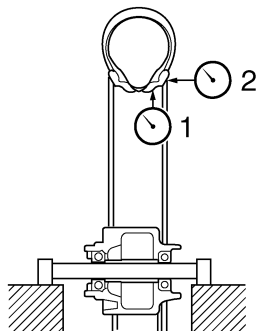
2. Check:

- Tire
- Front wheel
Damage/wear → Replace.
Refer to “CHECKING THE TIRES” on page 3-15 and “CHECKING THE WHEELS” on page 3-15.

3. Measure:

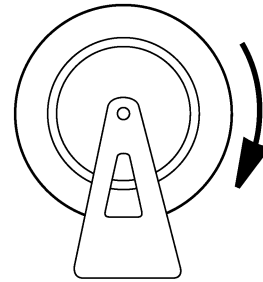
- Radial wheel runout “1”
- Lateral wheel runout “2”
Over the specified limits → Replace.

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



4. Check:

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



EAS1XC1034

MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR (for ABS models)

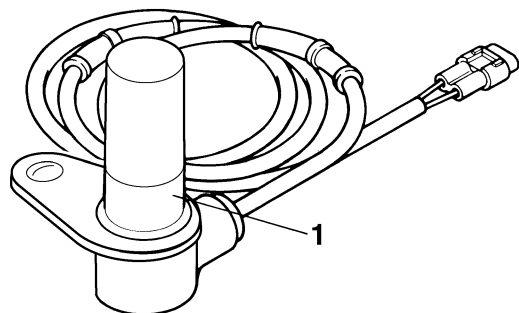
ECA1XC1006

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 front wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.
- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel sensor or front wheel sensor rotor.
- Do not drop or shock the wheel sensor or the wheel sensor rotor.

1. Check:

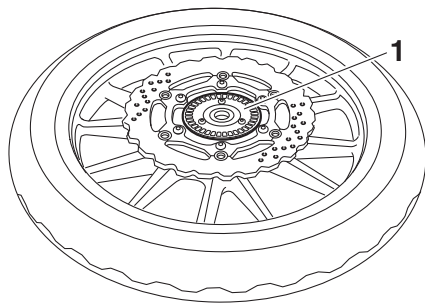
- Front wheel sensor “1”
Cracks/bends/distortion → Replace.
Iron powder/dust → Clean.



2. Check:


- Front wheel sensor rotor “1”
Cracks/damage/scratches → Replace the front wheel sensor rotor.
Iron powder/dust/solvent → Clean.

FRONT WHEEL



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.

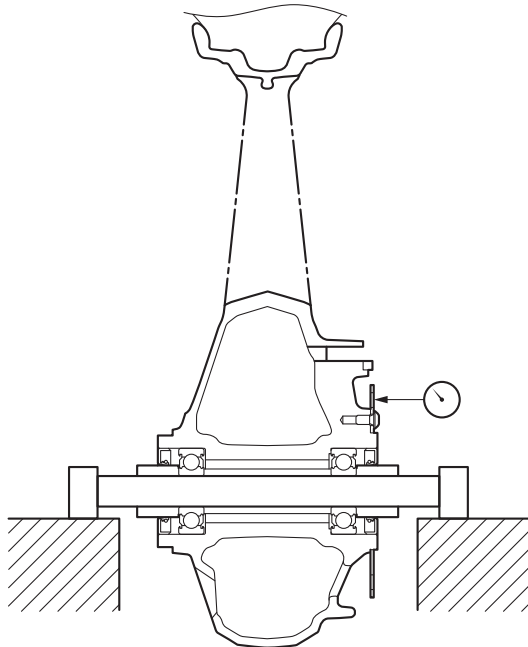


Wheel sensor rotor deflection limit
0.25 mm (0.0098 in)

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

TIP

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



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



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

ECA1XC1007

NOTICE

Replace the wheel sensor rotor bolts with new ones.

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



EAS21960

ASSEMBLING THE FRONT WHEEL

ECA1XC1011

NOTICE

For ABS models

- Do not drop the wheel sensor rotor or subject it to shocks.
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.

1. Install:

- Wheel bearings **New**



- Install the new wheel bearing (left side).

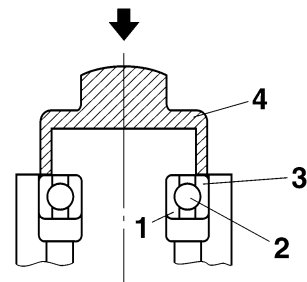
ECA1XC1027

NOTICE

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

TIP

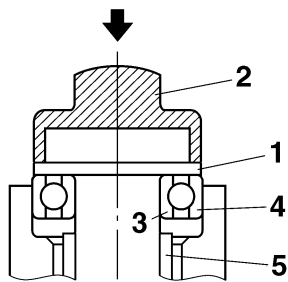
Use a socket "4" that matches the diameter of the wheel bearing outer race.



- Install the spacer.
- Install the new wheel bearing (right 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".



2. Install: (for ABS models)
- Front wheel sensor rotor



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

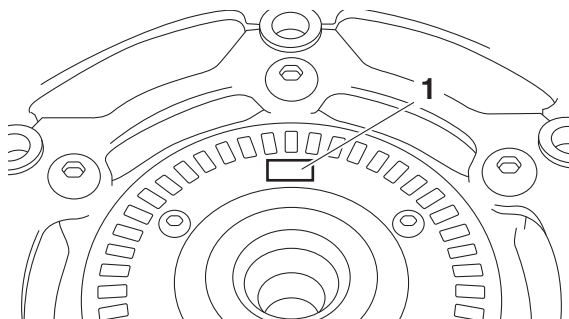
ECA1XC1007

NOTICE

Replace the wheel sensor rotor bolts with new ones.

TIP

Install the wheel sensor rotor with the stamped mark "1" facing outward.



3. Measure: (for ABS models)

- Wheel sensor rotor deflection
 Out of specification → Correct the wheel sensor rotor deflection or replace the wheel sensor rotor.
 Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR (for ABS models)" on page 4-14.



Wheel sensor rotor deflection limit
0.25 mm (0.0098 in)

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:

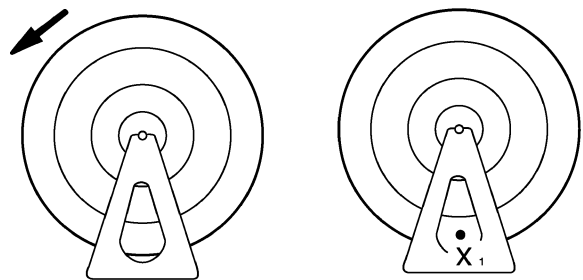
- Front wheel's heavy spot

TIP

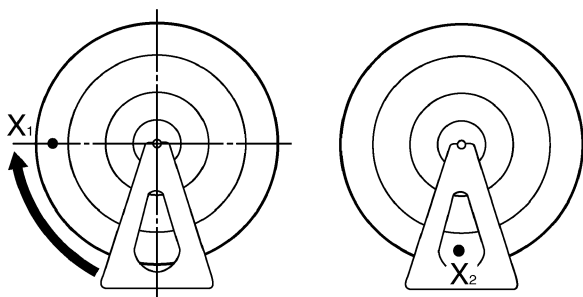
Place the front wheel on a suitable balancing stand.



- a. Spin the front wheel.
 b. When the front wheel stops, put an "X₁" mark at the bottom of the wheel.



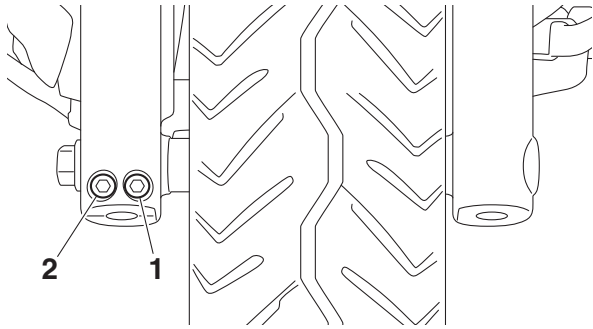
- c. Turn the front wheel 90° so that the "X₁" mark is positioned as shown.
 d. Release the front wheel.
 e. When the wheel stops, put an "X₂" mark at the bottom of the wheel.



- 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".



- a. Insert the front wheel axle from the right side and tighten it to 59 Nm (5.9 m·kgf, 43 ft·lbf).
- b. In the order pinch bolt "1" → pinch bolt "2" → pinch bolt "1", tighten each bolt to 20 Nm (2.0 m·kgf, 14 ft·lbf) without performing temporary tightening.



5. Install: (for ABS models)
- Front wheel sensor



ECA1XC1020

NOTICE

- **Make sure there are no foreign materials in the front wheel sensor rotor and front wheel sensor. Foreign materials cause damage to the front wheel sensor rotor and front wheel sensor.**
- **To route the front wheel sensor lead, refer to "CABLE ROUTING (for ABS models)" on page 2-75.**

TIP

When installing the front wheel sensor, check the wheel sensor lead for twists.

6. Measure:
- Distance "a" (between the front wheel sensor rotor "1" and front wheel sensor "2")
- Out of specification → Check the wheel bearing for looseness, and the front wheel sensor and sensor rotor installation conditions (warpage caused by overtorque, wrong installation direction, rotor decentering, LOC-TITE® on the mounting surface of the rotor, deformation caused by an impact during service and caught foreign materials). If there is any defective part, repair or replace the defective part.



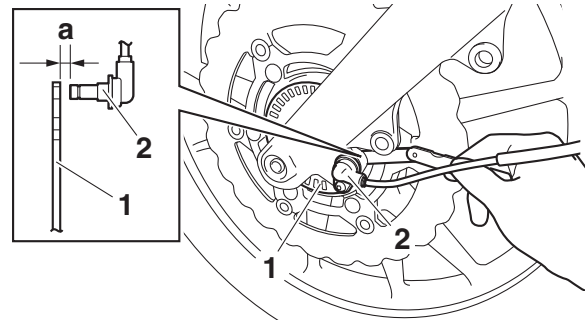
Distance "a" (between the front wheel sensor rotor and front wheel sensor)
0.5–1.3 mm (0.02–0.05 in)

TIP

Measure the distance between the front wheel sensor rotor and front wheel sensor in several places in one rotation of the front wheel. Do not turn the front wheel while the thickness gauge is installed. This may damage the front wheel sensor rotor and the front wheel sensor.



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



7. Install:
- Front brake caliper
 - Front wheel sensor lead holder (for ABS models)



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

EWA1TP1001

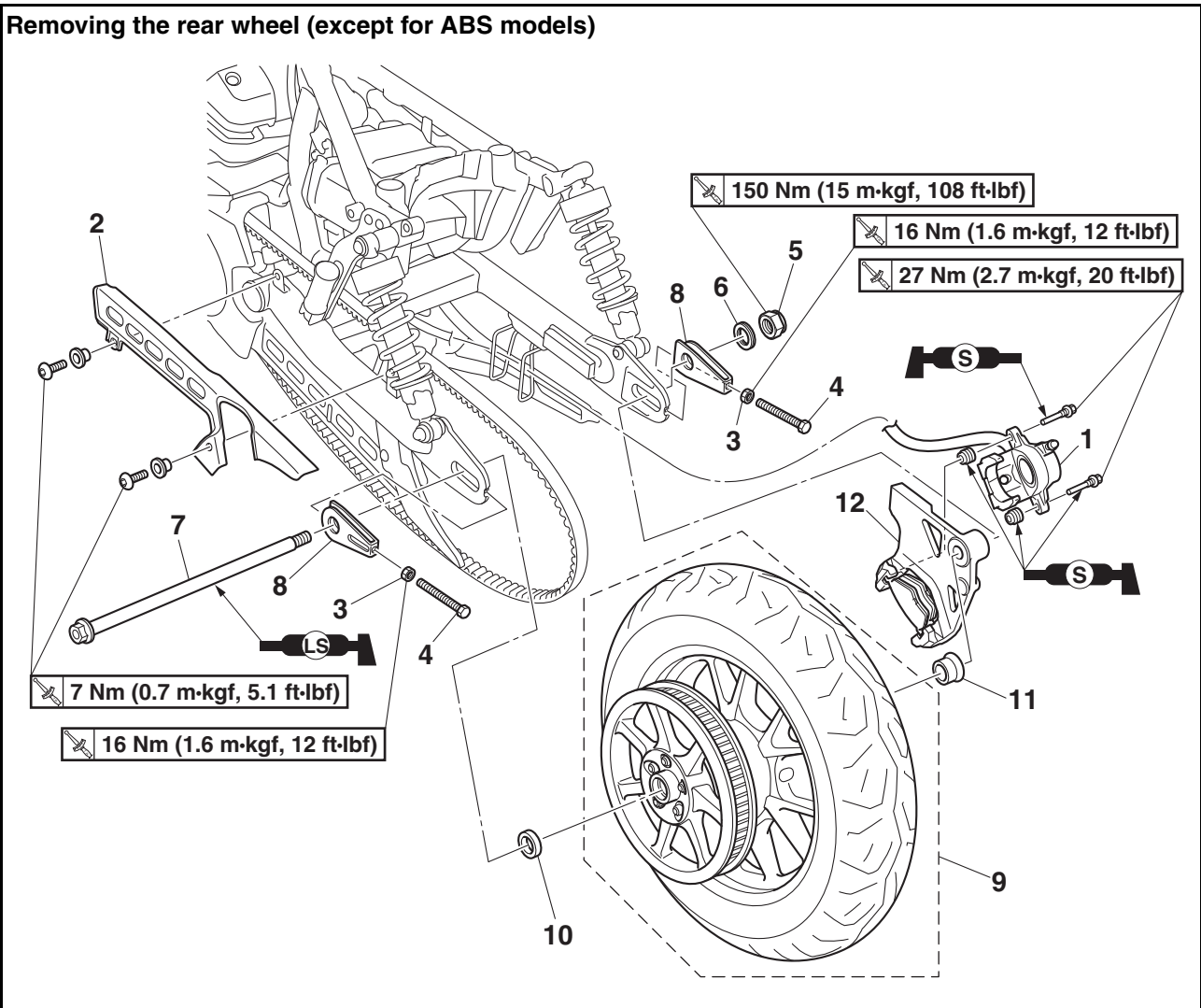
WARNING

Make sure the brake hose is routed properly.

EAS22020

REAR WHEEL

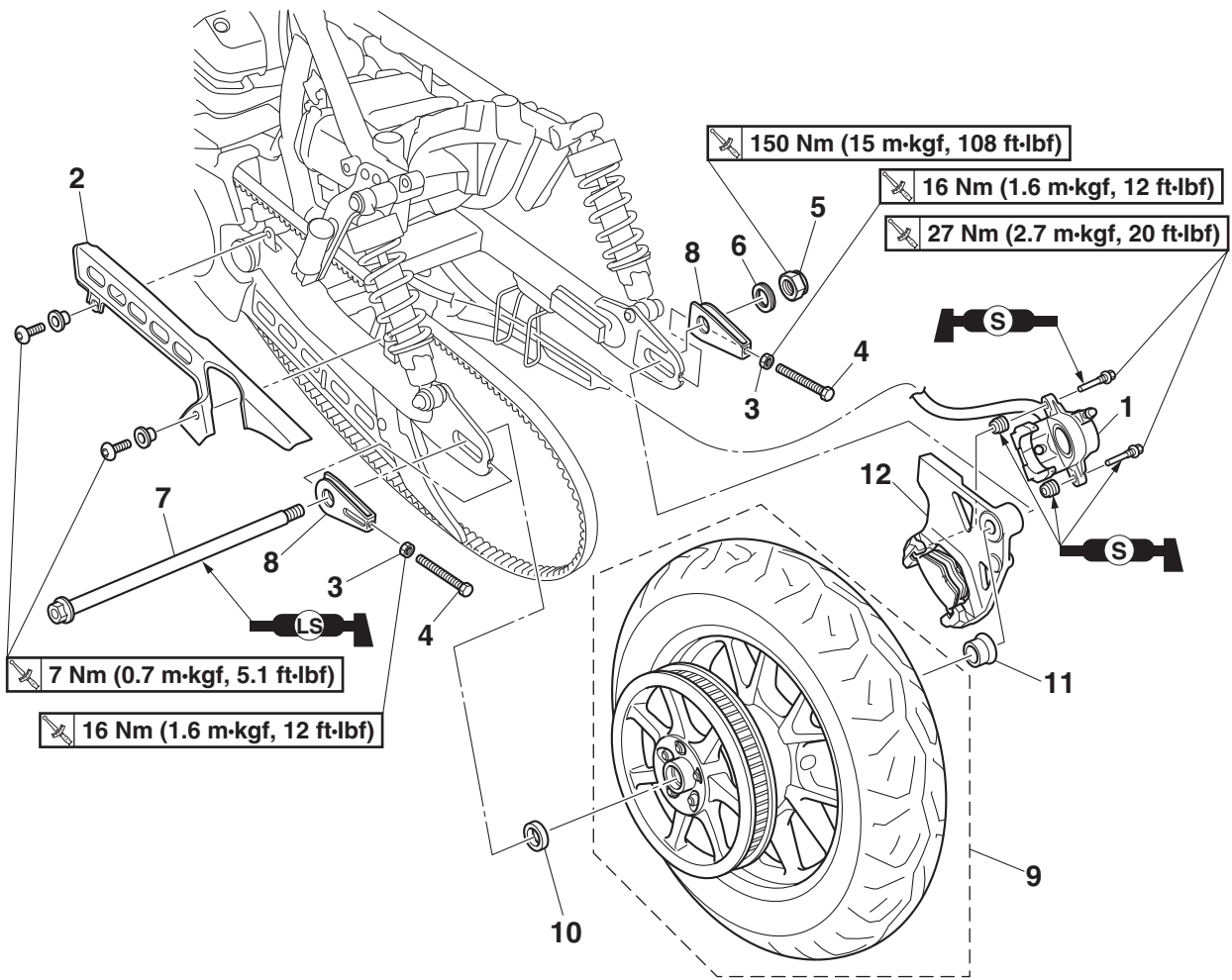
Removing the rear wheel (except for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
			TIP Place the vehicle on a suitable stand so that the rear wheel is elevated.
	Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
	Rear fender assembly		Refer to "GENERAL CHASSIS" on page 4-1.
1	Rear brake caliper	1	
2	Drive belt upper guard	1	
3	Drive belt adjusting bolt locknut	2	Loosen.
4	Drive belt adjusting bolt	2	Loosen.
5	Rear wheel axle nut	1	
6	Washer	1	
7	Rear wheel axle	1	
8	Drive belt puller	2	
9	Rear wheel	1	
10	Collar (left)	1	

REAR WHEEL

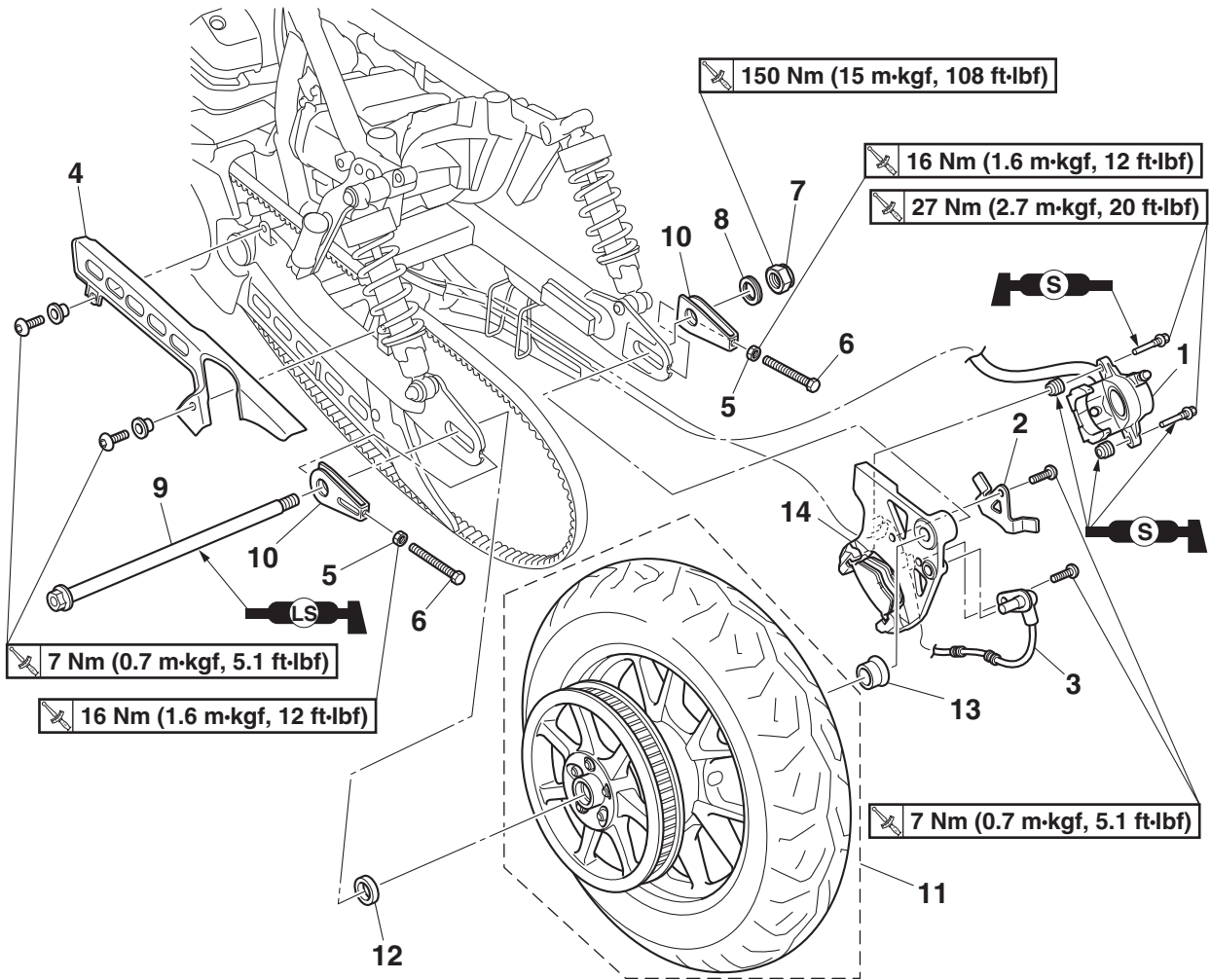
Removing the rear wheel (except for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
11	Collar (right)	1	
12	Rear brake caliper bracket	1	
			For installation, reverse the removal procedure.

REAR WHEEL

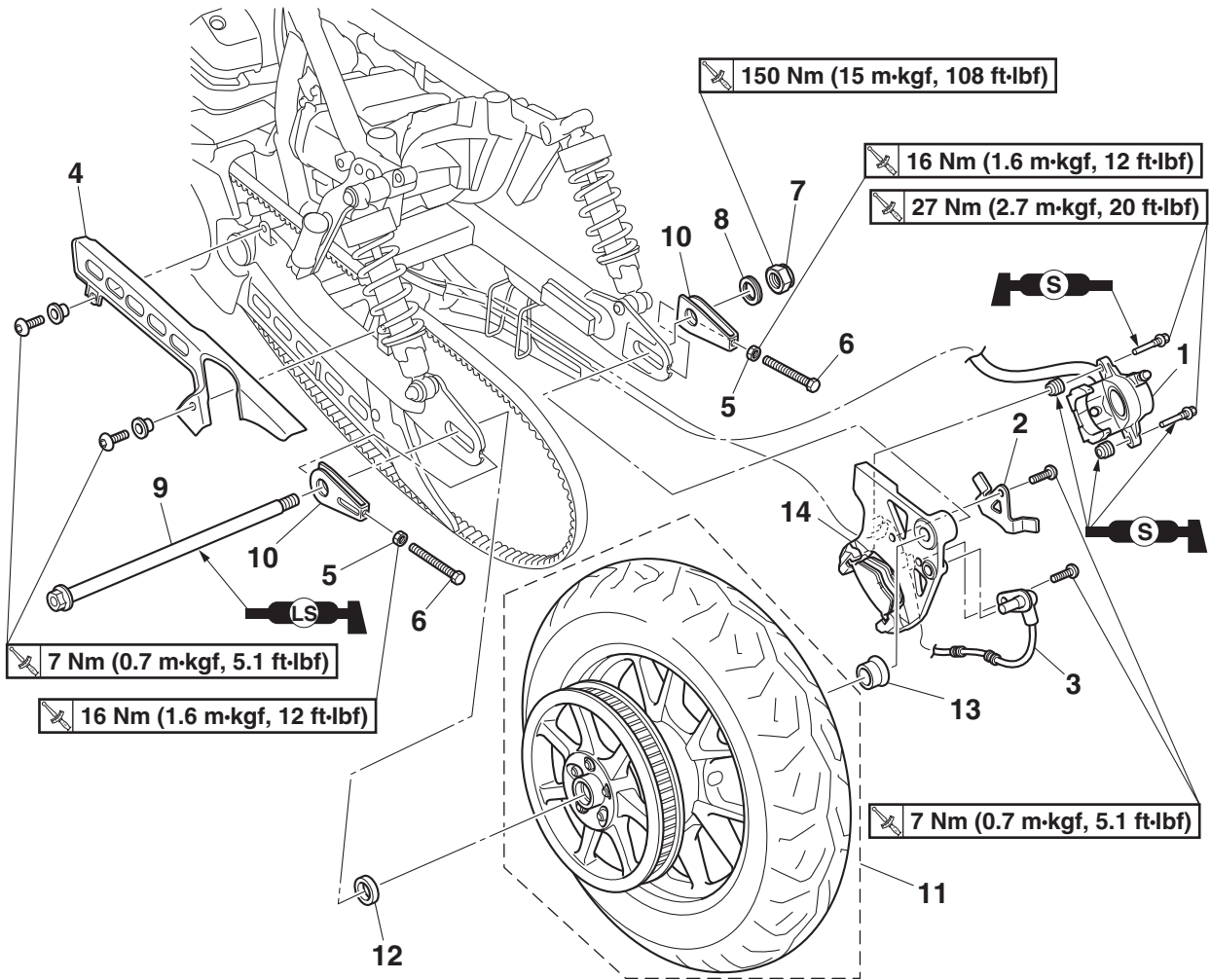
Removing the rear wheel (for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
			TIP Place the vehicle on a suitable stand so that the rear wheel is elevated.
	Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
	Rear fender assembly		Refer to "GENERAL CHASSIS" on page 4-1.
1	Rear brake caliper	1	
2	Rear wheel sensor lead holder	1	
3	Rear wheel sensor	1	
4	Drive belt upper guard	1	
5	Drive belt adjusting bolt locknut	2	Loosen.
6	Drive belt adjusting bolt	2	Loosen.
7	Rear wheel axle nut	1	
8	Washer	1	
9	Rear wheel axle	1	
10	Drive belt puller	2	
11	Rear wheel	1	
12	Collar (left)	1	

REAR WHEEL

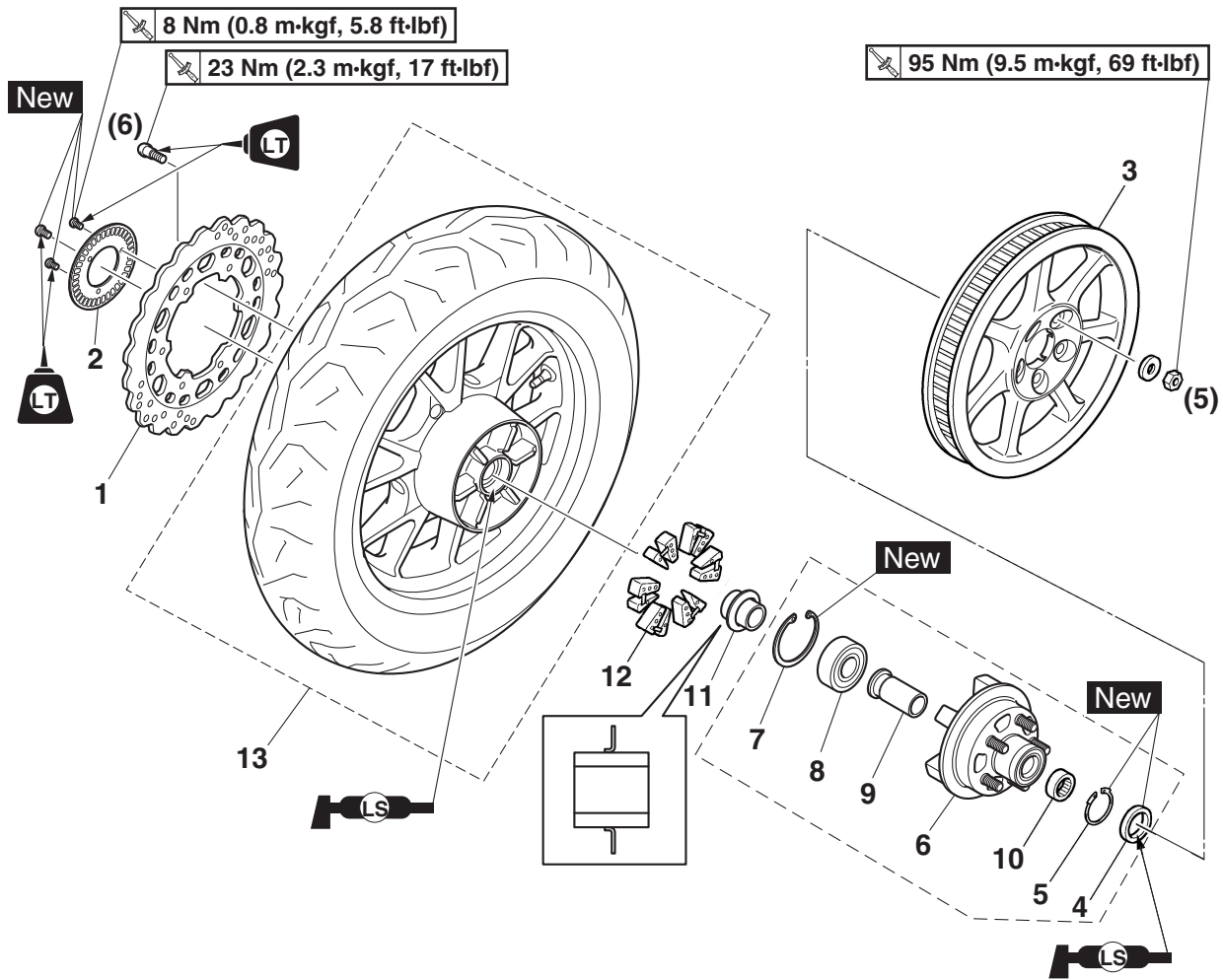
Removing the rear wheel (for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
13	Collar (right)	1	
14	Rear brake caliper bracket	1	
			For installation, reverse the removal procedure.

REAR WHEEL

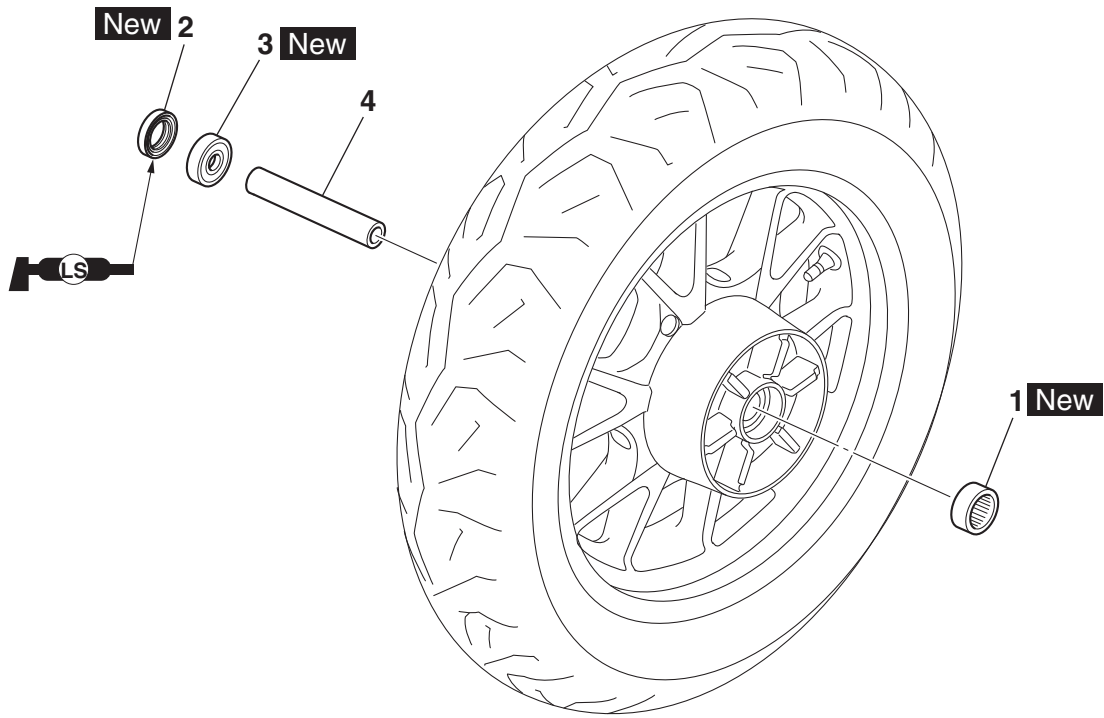
Removing the rear brake disc and rear wheel drive hub



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake disc	1	
2	Rear wheel sensor rotor	1	For ABS models
3	Rear wheel pulley	1	
4	Oil seal	1	
5	Circlip	1	
6	Rear wheel drive hub	1	
7	Circlip	1	
8	Bearing	1	
9	Collar	1	
10	Bearing	1	
11	Collar	1	
12	Rear wheel drive hub damper	6	
13	Rear wheel	1	
			For installation, reverse the removal procedure.

REAR WHEEL

Disassembling the rear wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Bearing	1	
2	Oil seal	1	
3	Bearing	1	
4	Spacer	1	
			For assembly, reverse the disassembly procedure.

EAS28760

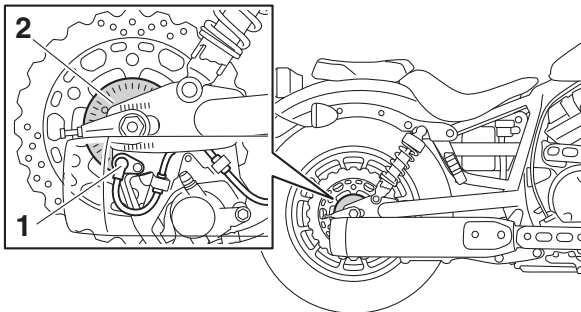
REMOVING THE REAR WHEEL (DISC)

ECA1XC1021

NOTICE

(For ABS models)

- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the rear wheel sensor “1” or rear wheel sensor rotor “2”; otherwise, the sensor or rotor may be damaged, resulting in improper performance of the ABS system.
- Do not drop the rear wheel sensor rotor or subject it to shocks.
- If any solvent gets on the rear wheel sensor rotor, wipe it off immediately.



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
- Rear wheel sensor lead holder (for ABS models)
- Rear wheel sensor (for ABS models)

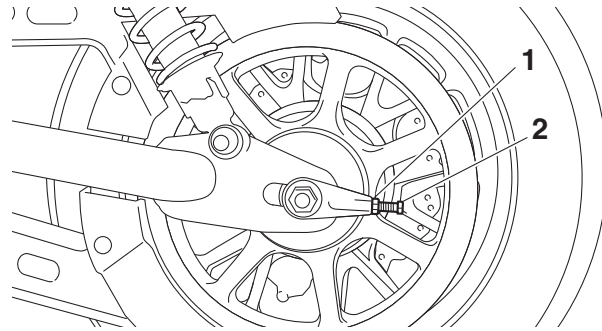
ECA1XC1022

NOTICE

- Do not depress the brake pedal when removing the brake caliper.
- Be sure not to contact the sensor electrode to any metal part when removing the rear wheel sensor from the rear brake caliper bracket. (for ABS models)

3. Loosen:

- Drive belt adjusting bolt locknuts “1”
- Drive belt adjusting bolts “2”



4. Remove:

- Rear wheel axle nut
- Rear wheel axle
- Rear wheel

TIP

Push the rear wheel forward and remove the drive belt from the rear wheel pulley.

EAS22080

DISASSEMBLING THE REAR WHEEL

ECA1XC1011

NOTICE

(For ABS models)

- Do not drop the wheel sensor rotor or subject it to shocks.
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.

1. Remove:

- Oil seals
 - Wheel bearings
- Refer to “DISASSEMBLING THE FRONT WHEEL” on page 4-13.

EAS22090

CHECKING THE REAR WHEEL

1. Check:

- Rear wheel axle
- Rear wheel
- Wheel bearings
- Oil seals

Refer to “CHECKING THE FRONT WHEEL” on page 4-13.

2. Check:

- Tire
 - Rear wheel
- Damage/wear → Replace.

Refer to “CHECKING THE TIRES” on page 3-15 and “CHECKING THE WHEELS” on page 3-15.

3. Measure:

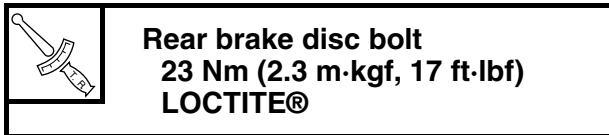
- Radial wheel runout

REAR WHEEL

3. Lubricate:
- Rear wheel axle
 - Oil seal lips

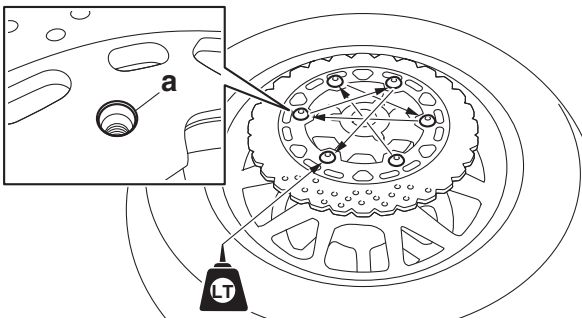


4. Install:
- Rear brake disc



TIP

- Apply locking agent (LOCTITE®) to the threads of the brake disc bolts.
- Install the brake disc so that the chamfered portions of the bolt holes “a” face away from the hub.
- Tighten the brake disc bolts in stages and in a crisscross pattern.

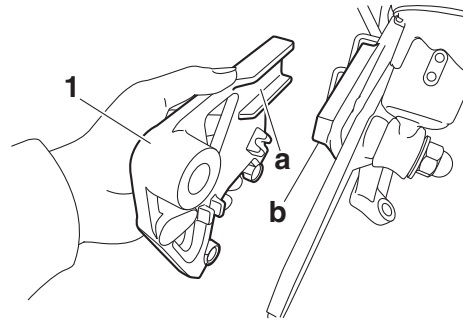


5. Check:
- Rear brake disc
Refer to “CHECKING THE REAR BRAKE DISC” on page 4-55.

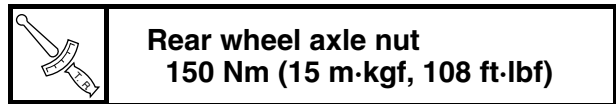
6. Install:
- Rear brake caliper bracket “1”
 - Rear wheel axle
 - Washer
 - Rear wheel axle nut

TIP

- Make sure that the slot “a” in the rear brake caliper bracket fits over the stopper “b” on the swingarm.
- Temporarily tighten the wheel axle nut.



7. Adjust:
- Drive belt slack
Refer to “ADJUSTING THE DRIVE BELT SLACK” on page 3-18.
8. Tighten:
- Rear wheel axle nut



9. Install: (for ABS models)
- Rear wheel sensor



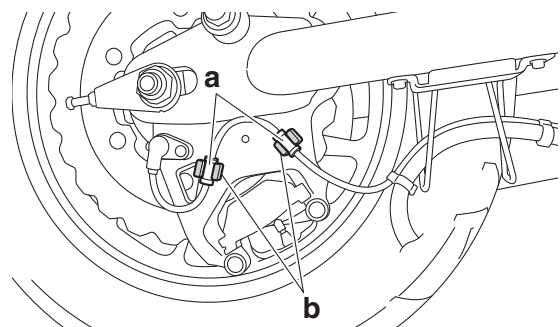
ECA1XC1023

NOTICE

- Make sure there are no foreign materials in the rear wheel sensor rotor and rear wheel sensor. Foreign materials cause damage to the rear wheel sensor rotor and rear wheel sensor.
- To route the rear wheel sensor lead, refer to “CABLE ROUTING (for ABS models)” on page 2-75.

TIP

- Fasten the grommets “a” on the rear wheel sensor lead with the holders “b” on the rear brake caliper bracket as shown in the illustration.
- When installing the rear wheel sensor, check the rear wheel sensor lead for twists.



10. Measure:

- Distance “a”
(between the rear wheel sensor rotor “1” and rear wheel sensor “2”)
Out of specification → Check the wheel bearing for looseness, and the rear wheel sensor and sensor rotor installation conditions (warping caused by overtorque, wrong installation direction, rotor decentering, LOC-TITE® on the mounting surface of the rotor, deformation caused by an impact during service and caught foreign materials). If there is any defective part, repair or replace the defective part.

EWA13500



WARNING

Make sure the brake hose is routed properly.



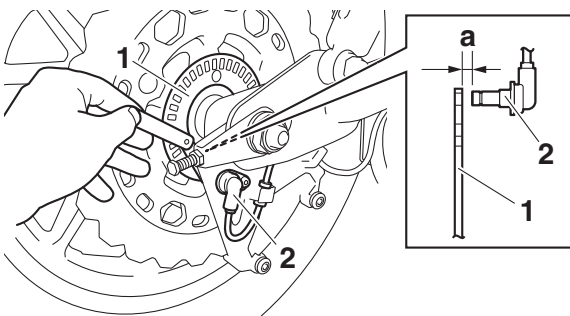
Distance “a” (between the rear wheel sensor rotor and rear wheel sensor)
0.6–1.4 mm (0.02–0.06 in)

TIP

Measure the distance between the rear wheel sensor rotor and rear wheel sensor in several places in one rotation of the rear wheel. Do not turn the rear wheel while the thickness gauge is installed. This may damage the rear wheel sensor rotor and the rear wheel sensor.



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



11. Install:

- Rear wheel sensor lead holder (for ABS models)
- Rear brake caliper

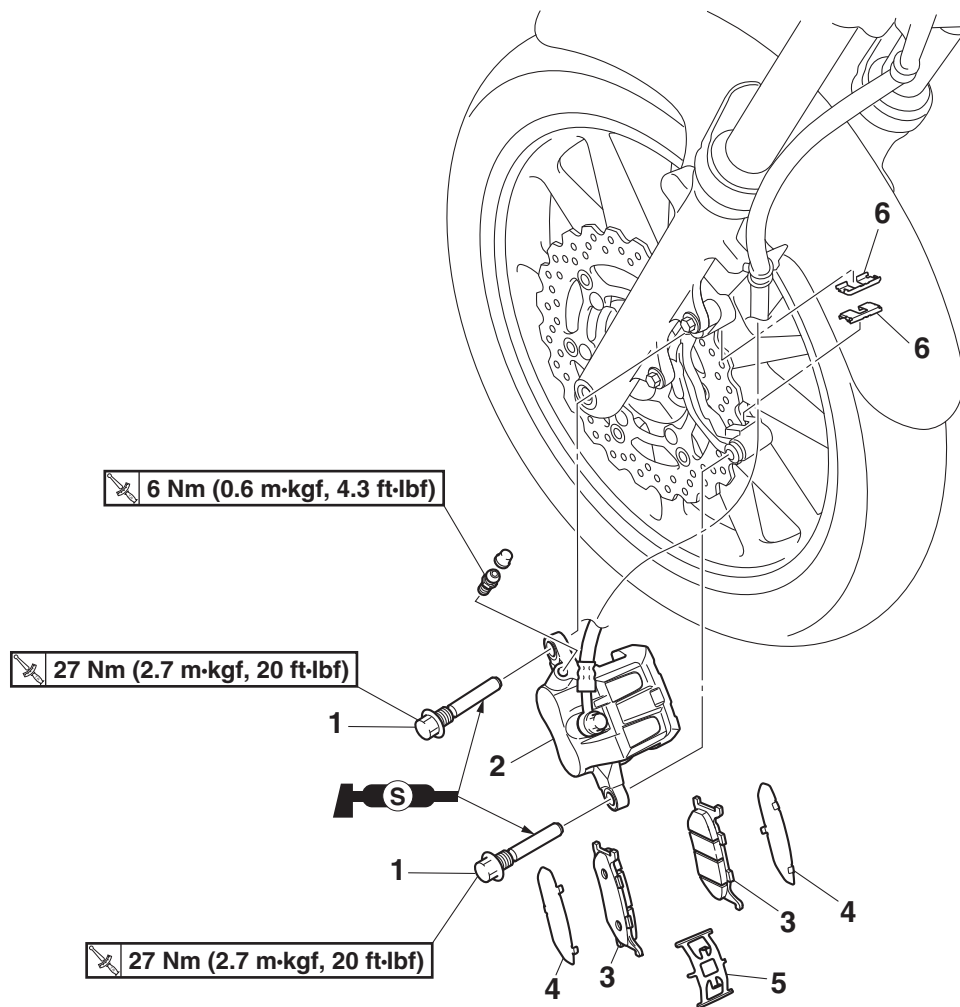


Rear wheel sensor lead holder bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)
Rear brake caliper retaining bolt
27 Nm (2.7 m·kgf, 20 ft·lbf)

EAS22210

FRONT BRAKE

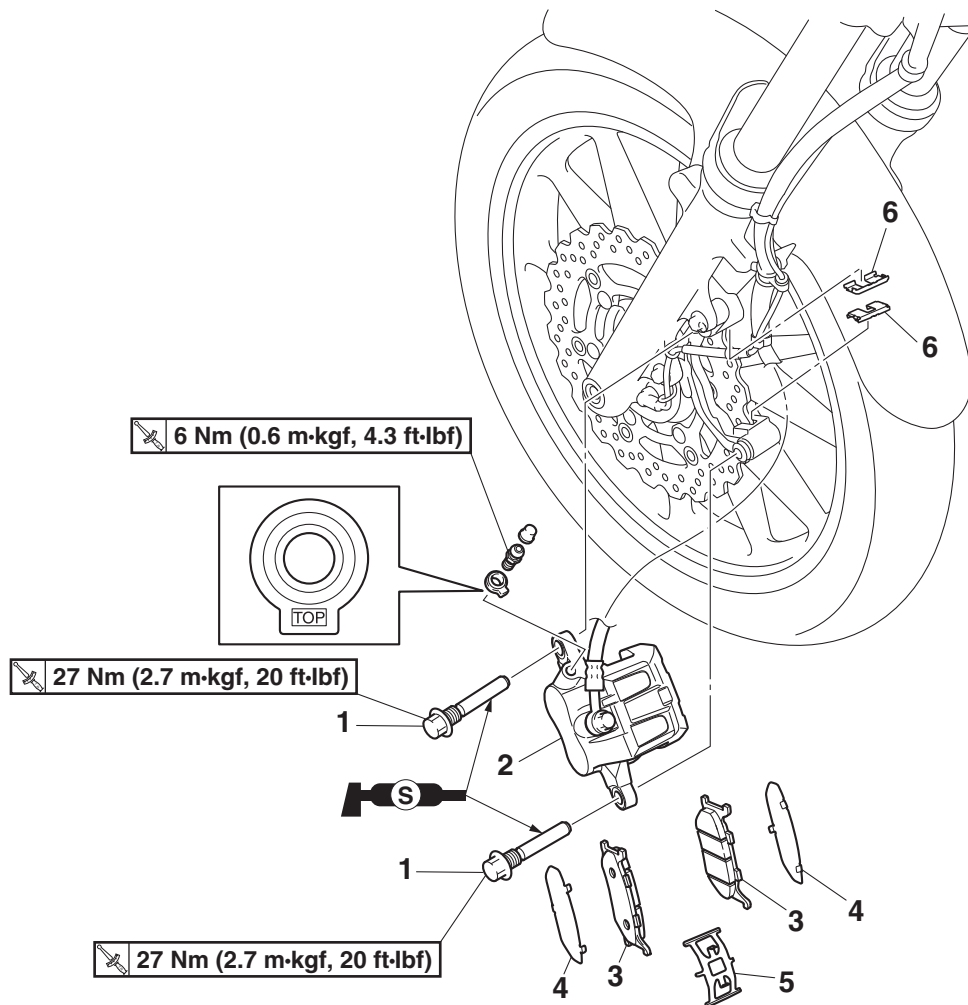
Removing the front brake pads (except for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake caliper retaining bolt	2	
2	Front brake caliper	1	
3	Front brake pad	2	
4	Brake pad shim	2	
5	Front brake pad spring	1	
6	Front brake pad support	2	
			For installation, reverse the removal procedure.

FRONT BRAKE

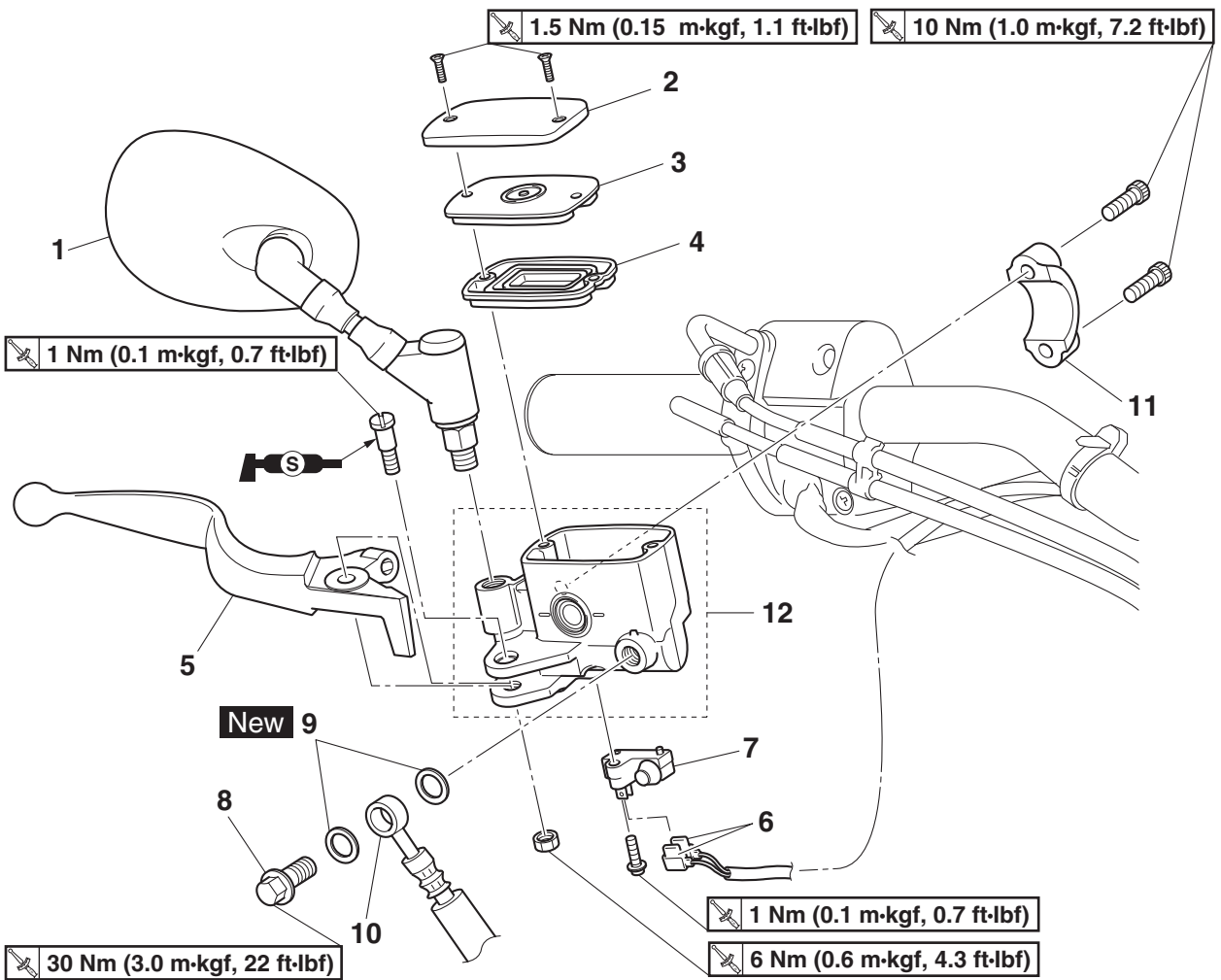
Removing the front brake pads (for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake caliper retaining bolt	2	
2	Front brake caliper	1	
3	Front brake pad	2	
4	Brake pad shim	2	
5	Front brake pad spring	1	
6	Front brake pad support	2	
			For installation, reverse the removal procedure.

FRONT BRAKE

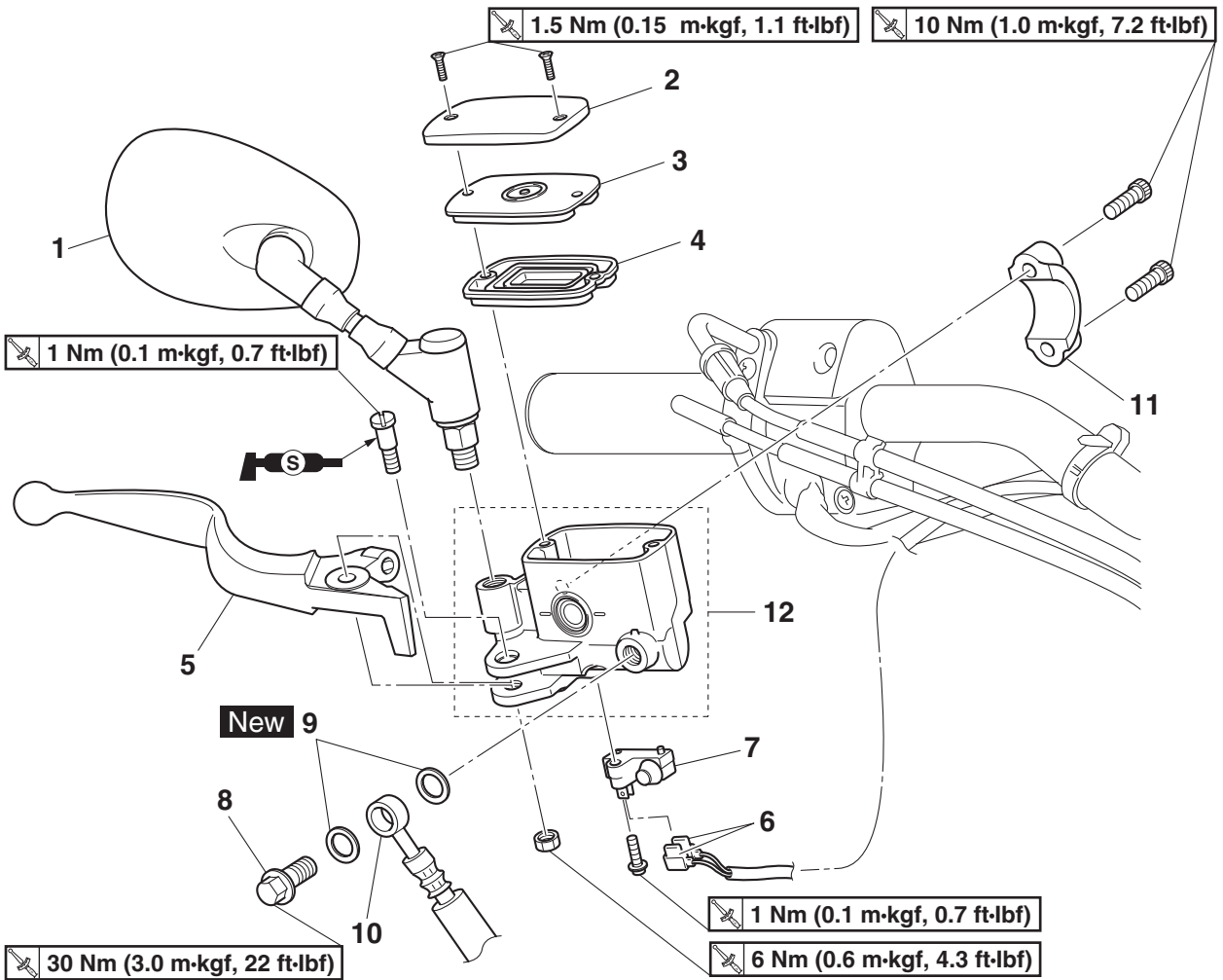
Removing the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)" on page 3-12 and "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.
1	Right rearview mirror	1	
2	Brake master cylinder reservoir cap	1	
3	Brake master cylinder reservoir diaphragm holder	1	
4	Brake master cylinder reservoir diaphragm	1	
5	Brake lever	1	
6	Front brake light switch connector	2	Disconnect.
7	Front brake light switch	1	
8	Front brake hose union bolt	1	
9	Brake hose gasket	2	
10	Front brake hose	1	
11	Front brake master cylinder holder	1	

FRONT BRAKE

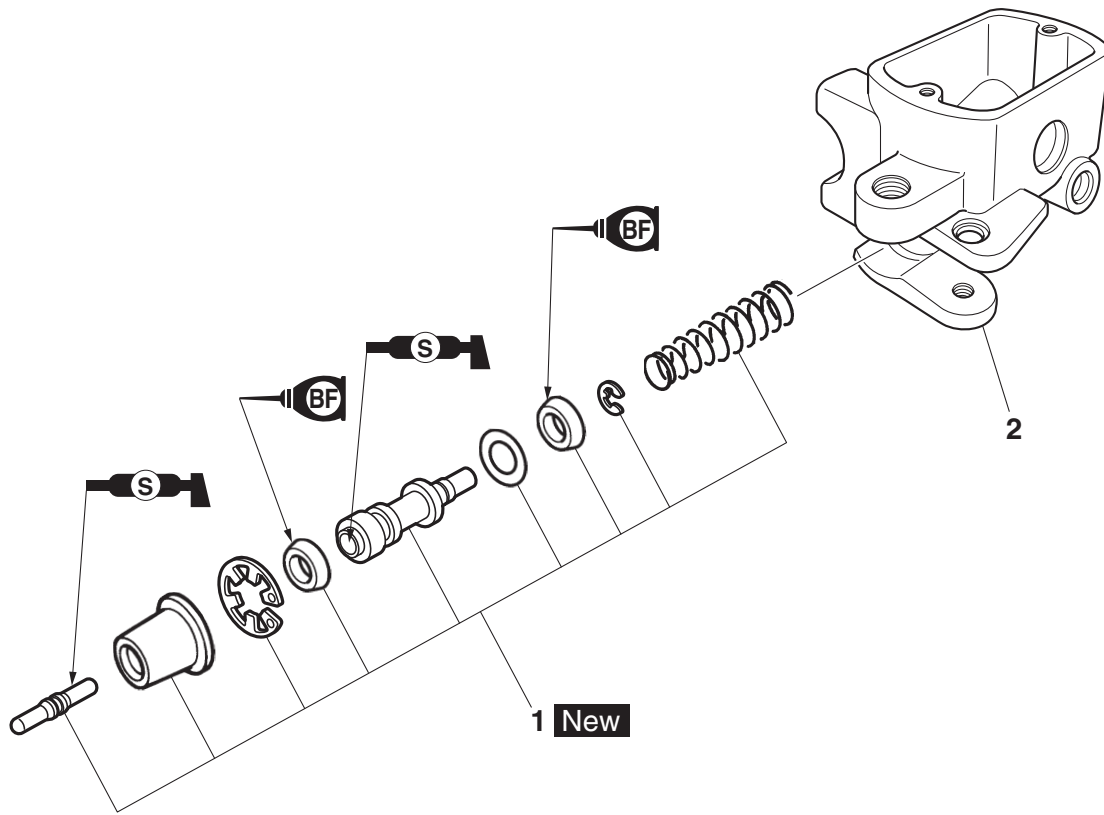
Removing the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
12	Front brake master cylinder	1	
			For installation, reverse the removal procedure.

FRONT BRAKE

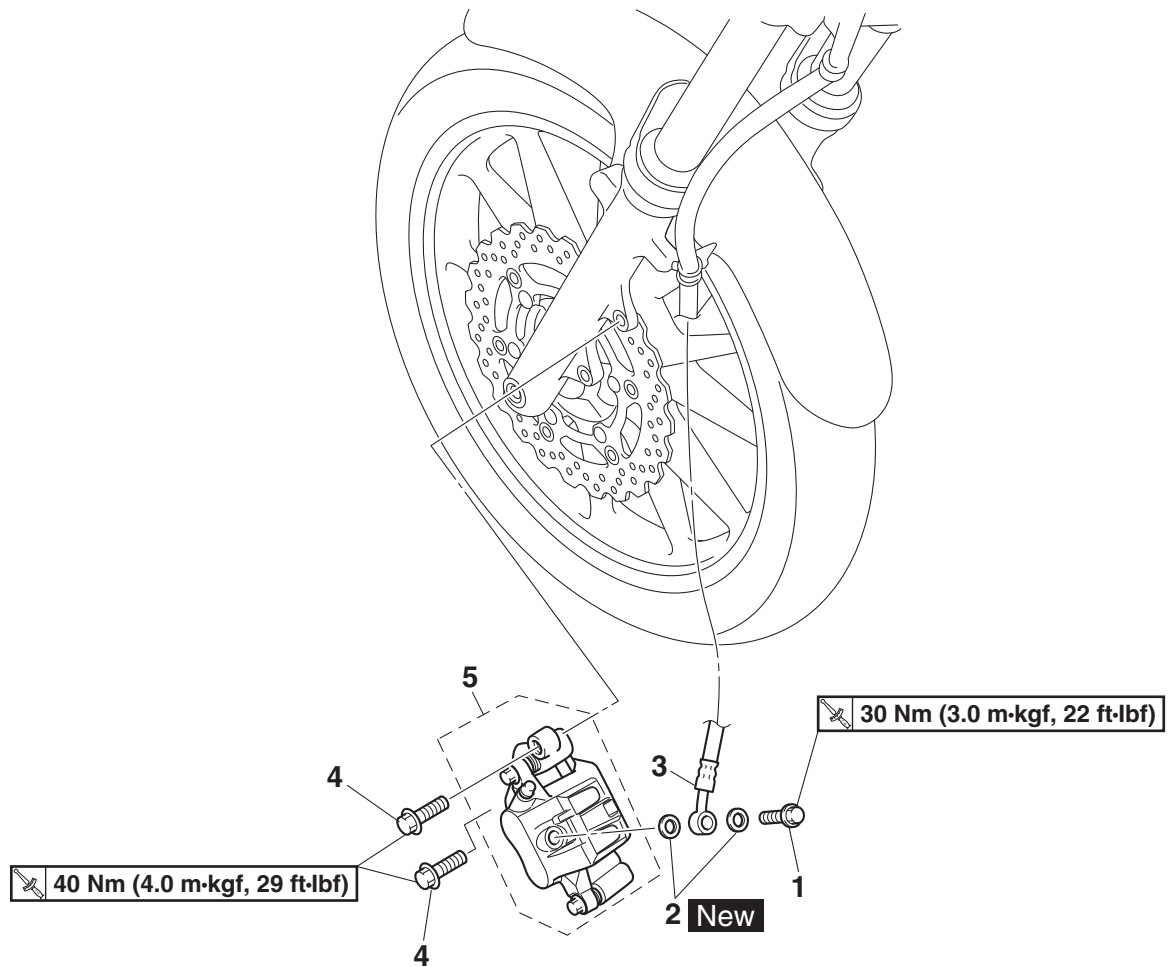
Disassembling the front brake master cylinder



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.

FRONT BRAKE

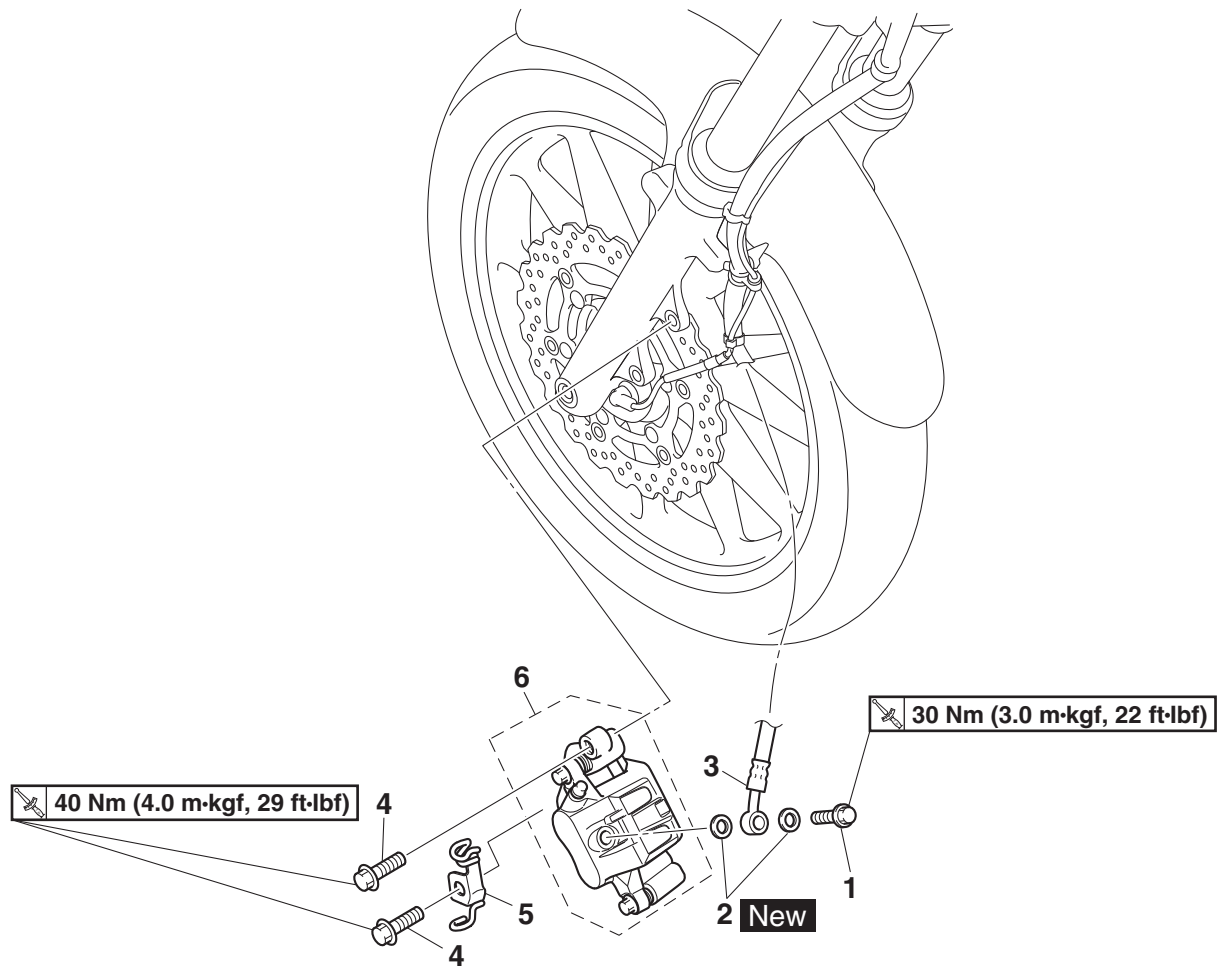
Removing the front brake caliper (except for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)" on page 3-12.
1	Front brake hose union bolt	1	
2	Brake hose gasket	2	
3	Front brake hose	1	
4	Front brake caliper bracket bolt	2	
5	Front brake caliper	1	
			For installation, reverse the removal procedure.

FRONT BRAKE

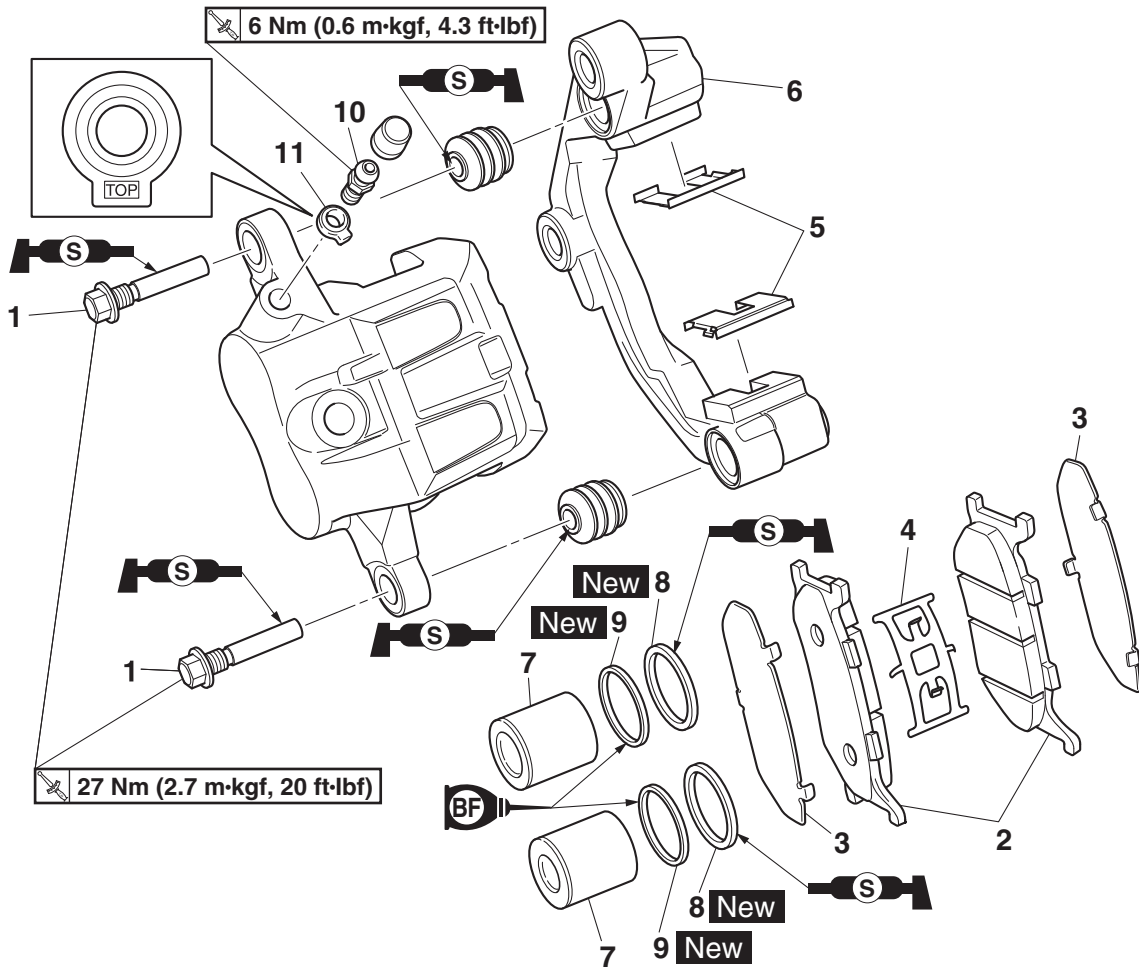
Removing the front brake caliper (for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.
1	Front brake hose union bolt	1	
2	Brake hose gasket	2	
3	Brake pipe/hose assembly (hydraulic unit to front brake caliper)	1	
4	Front brake caliper bracket bolt	2	
5	Front wheel sensor lead holder	1	
6	Front brake caliper	1	
			For installation, reverse the removal procedure.

FRONT BRAKE

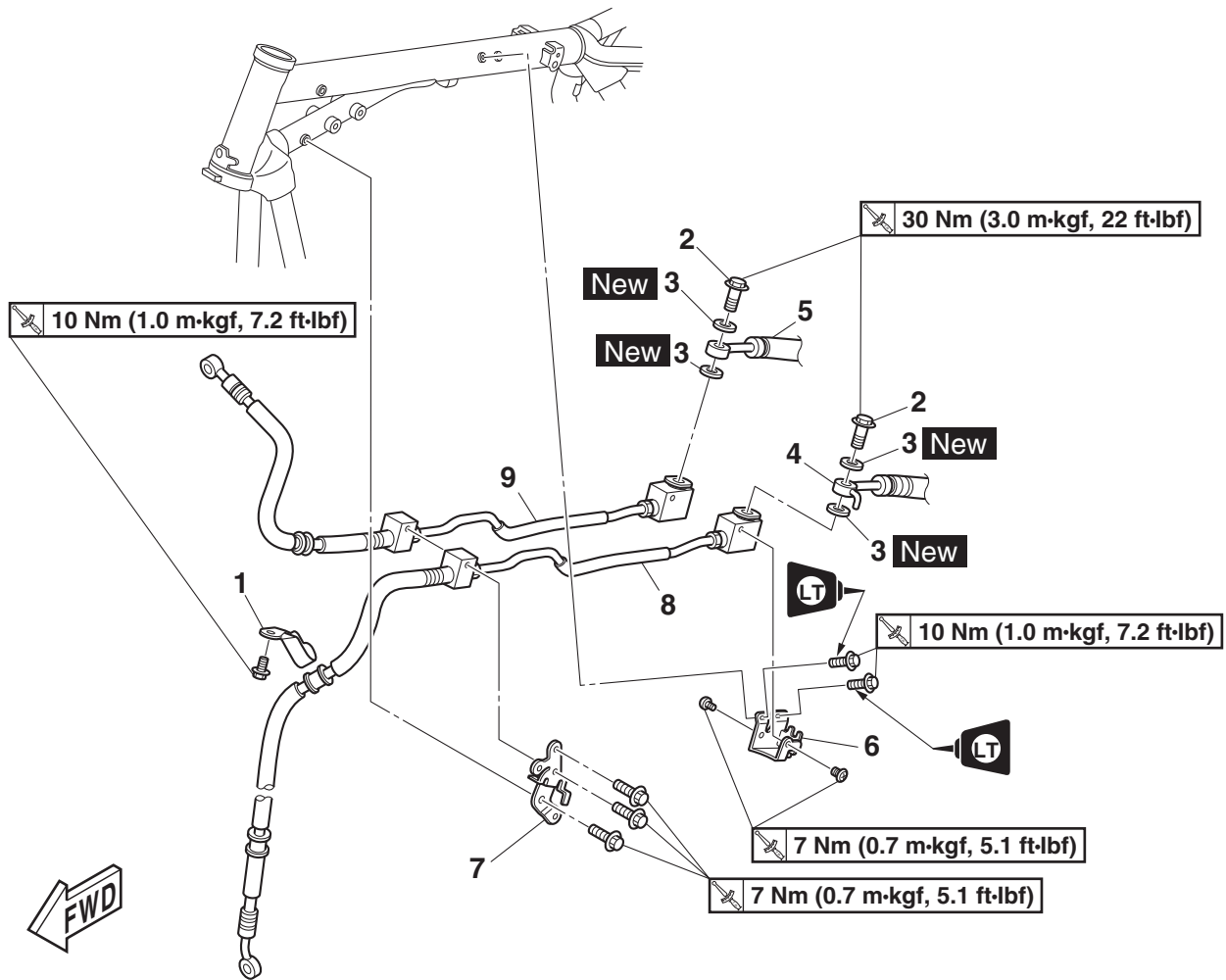
Disassembling the front brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake caliper retaining bolt	2	
2	Brake pad	2	
3	Brake pad shim	2	
4	Brake pad spring	1	
5	Brake pad support	2	
6	Brake caliper bracket	1	
7	Brake caliper piston	2	
8	Brake caliper piston dust seal	2	
9	Brake caliper piston seal	2	
10	Bleed screw	1	
11	Bush	1	For ABS models
			For assembly, reverse the disassembly procedure.

FRONT BRAKE

Removing the brake pipe/hose assemblies (for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.
1	Front brake hose/wheel sensor lead holder	1	
2	Front brake hose union bolt	2	
3	Brake hose gasket	4	
4	Brake hose (hydraulic unit to front brake caliper)	1	Disconnect.
5	Brake hose (front brake master cylinder to hydraulic unit)	1	Disconnect.
6	Brake pipe/hose assembly holder (rear side)	1	
7	Brake pipe/hose assembly holder (front side)	1	
8	Brake pipe/hose assembly (hydraulic unit to front brake caliper)	1	
9	Brake pipe/hose assembly (front brake master cylinder to hydraulic unit)	1	
			For installation, reverse the removal procedure. Refer to "INSTALLING THE BRAKE PIPE/HOSE ASSEMBLIES (for ABS models)" on page 4-45.

EAS22220

INTRODUCTION

EWA1TP1022

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.
- 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.

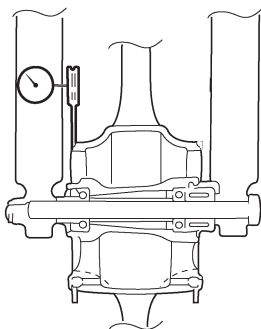
TIP

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

EAS22240

CHECKING THE FRONT BRAKE DISC

1. Remove:
 - Front wheel
Refer to "FRONT WHEEL" on page 4-10.
2. Check:
 - Brake disc
Damage/galling → Replace.
3. Measure:
 - Brake disc deflection
Out of specification → Correct the brake disc deflection or replace the brake disc.



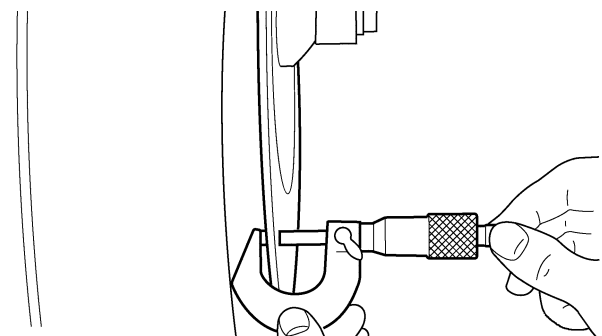
Brake disc runout limit (as measured on wheel)
0.15 mm (0.0059 in)

- a. Place the vehicle on a suitable stand so that the front wheel is elevated.
- b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
- c. Remove the brake caliper.
- d. Hold the dial gauge at a right angle against the brake disc surface.
- e. Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.

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

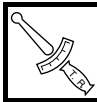


Brake disc thickness limit
4.5 mm (0.18 in)



5. Adjust:
 - Brake disc deflection

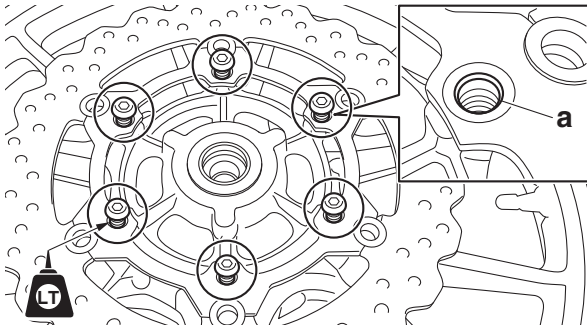
- a. Remove the brake disc.
- b. Rotate the brake disc by one bolt hole.
- c. Install the brake disc.



Brake disc bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)
LOCTITE®

TIP

- Tighten the brake disc bolts in stages and in a crisscross pattern.
- Install the brake disc so that the chamfered portions of the bolt holes "a" face away from the hub.



- 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.



6. Install:
 - Front wheel
 Refer to "FRONT WHEEL" on page 4-10.

EAS22260

REPLACING THE FRONT BRAKE PADS

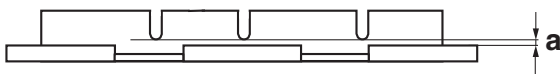
TIP

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



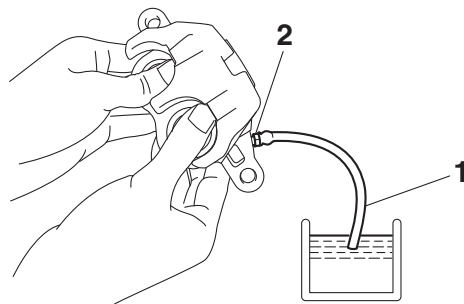
2. Install:
 - Brake pad supports
 - Brake pad spring
 - Brake pad shims (onto the brake pads)
 - Brake pads

TIP

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



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



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



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

- d. Install new brake pad shims, a new brake pad supports, new brake pads, and a new brake pad spring.



3. Lubricate:
 - Front brake caliper retaining bolts



Recommended lubricant
 Silicone grease

ECA14150

NOTICE

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

4. Install:
 - Brake caliper retaining bolts



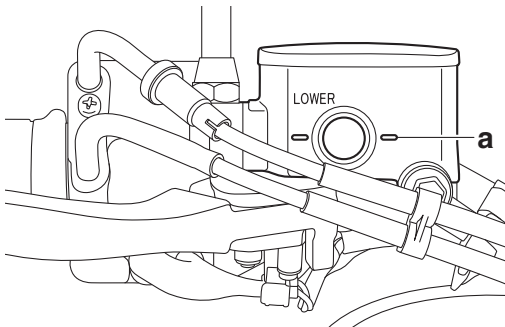
Front brake caliper retaining bolt
 27 Nm (2.7 m·kgf, 20 ft·lbf)

FRONT BRAKE

5. Check:

- Brake fluid level

Below the minimum level mark "a" → Add the specified brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-11.



6. Check:

- Brake lever operation

Soft or spongy feeling → Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)" on page 3-12 and "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.

EAS22300

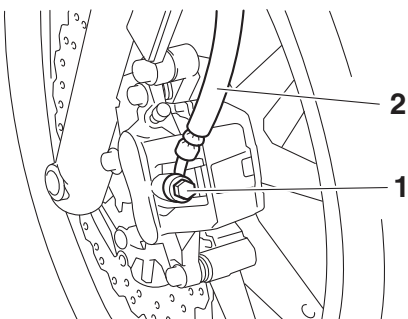
REMOVING THE FRONT BRAKE CALIPER

TIP

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

1. Remove:

- Front brake hose union bolt "1"
- Brake hose gaskets
- Front brake hose "2"
- Front wheel sensor lead holder (for ABS models)



TIP

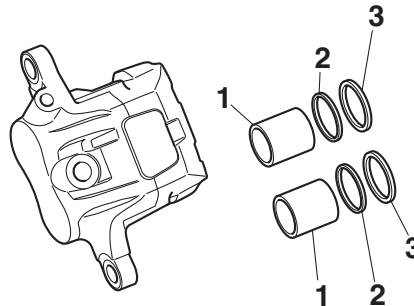
Put the end of the brake hose into a container and pump out the brake fluid carefully.

EAS22350

DISASSEMBLING THE FRONT BRAKE CALIPER

1. Remove:

- Brake caliper pistons "1"
- Brake caliper piston seals "2"
- Brake caliper piston dust seals "3"

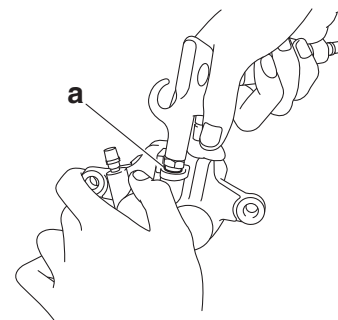


a. Blow compressed air into the brake hose joint opening "a" to force out the piston from the brake caliper.

EWA1TP1002

WARNING

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



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

EAS22390

CHECKING THE FRONT BRAKE CALIPERS

Recommended brake component replacement schedule

Brake pads	If necessary
Piston dust seals	Every two years
Piston seals	Every two years
Brake hose	Every four years

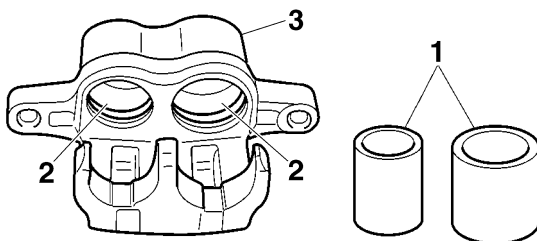
Recommended brake component replacement schedule	
Brake fluid	Every two years and whenever the brake is disassembled

- 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.

EWA1TP1003

WARNING

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



- Check:
 - Brake caliper bracket
Cracks/damage → Replace.

EAS22410

ASSEMBLING THE FRONT BRAKE CALIPER

EWA1TP1004

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.



Specified brake fluid
DOT 4

EAS22440

INSTALLING THE FRONT BRAKE CALIPER

- Install:
 - Front brake caliper "1"
(temporarily)
 - Front wheel sensor lead holder (for ABS models)
 - Brake hose gaskets **New**
 - Front brake hose "2"
 - Front brake hose union bolt "3"



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

EWA1XC1013

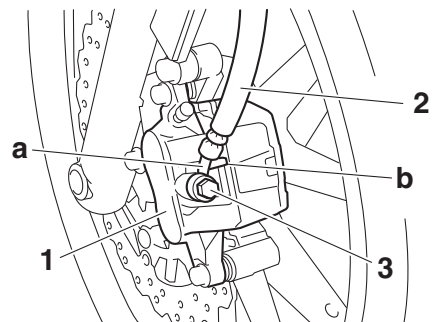
WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (except for ABS models)" on page 2-41 and "CABLE ROUTING (for ABS models)" on page 2-75.

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.



- Remove:
 - Front brake caliper
- Install:
 - Brake pad supports
 - Brake pad spring
 - Brake pad shims (onto the brake pads)
 - Brake pads
 - Front brake caliper



Front brake caliper retaining bolt
27 Nm (2.7 m·kgf, 20 ft·lbf)
Front brake caliper bracket bolt
40 Nm (4.0 m·kgf, 29 ft·lbf)

Refer to “REPLACING THE FRONT BRAKE PADS” on page 4-40.

4. Fill:

- Brake master cylinder reservoir (with the specified amount of the specified brake fluid)



Specified brake fluid
DOT 4

EWA1TP1005

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

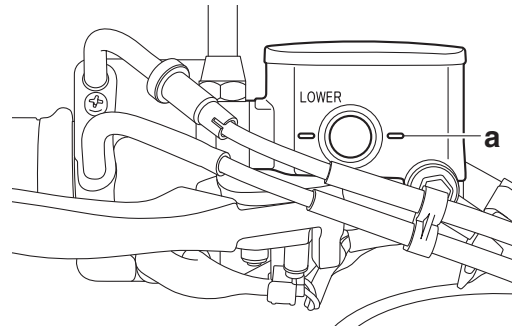
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:

- Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)” on page 3-12 and “BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)” on page 3-13.

6. Check:

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



7. Check:

- Brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)” on page 3-12 and “BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)” on page 3-13.

EAS22490

REMOVING THE FRONT BRAKE MASTER CYLINDER

TIP

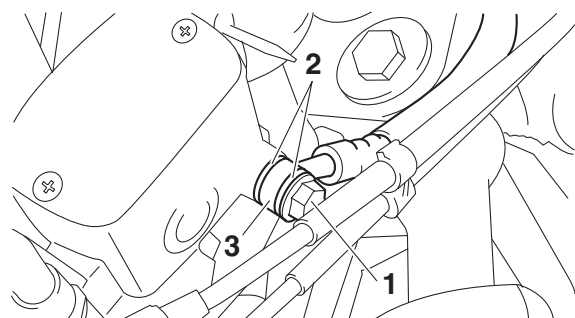
Before removing the front brake master cylinder, drain the brake fluid from the entire brake system.

1. Remove:

- Front brake hose union bolt “1”
- Brake hose gaskets “2”
- Front 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
Cracks/damage → Replace.
 - Brake master cylinder reservoir diaphragm
Damage/wear → Replace.
 4. Check:
 - Brake hose
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.



Specified brake fluid
DOT 4

EAS22530

INSTALLING THE FRONT BRAKE MASTER CYLINDER

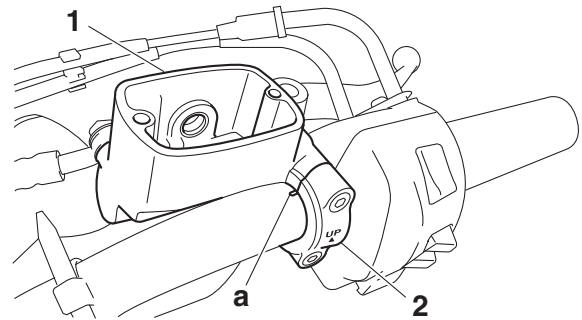
1. Install:
 - Brake master cylinder "1"
 - Front brake master cylinder holder "2"



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

TIP

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



2. Install:
 - Brake hose gaskets **New**
 - Front brake hose "1"
 - Front brake hose union bolt "2"



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

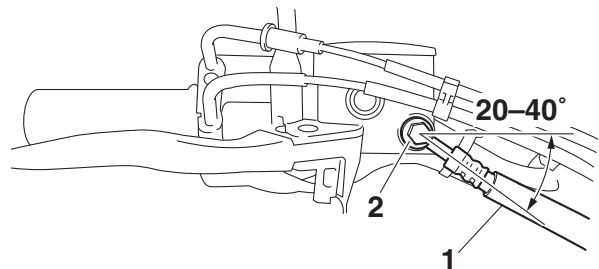
EWA1XC1013

⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (except for ABS models)" on page 2-41 and "CABLE ROUTING (for ABS models)" on page 2-75.

TIP

- Install the brake hose to the front brake master cylinder within the angle shown in the illustration.
- While holding the brake hose, tighten the union bolt.
- Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, and leads). Correct if necessary.



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



Specified brake 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 spill brake fluid immediately.

4. Bleed:

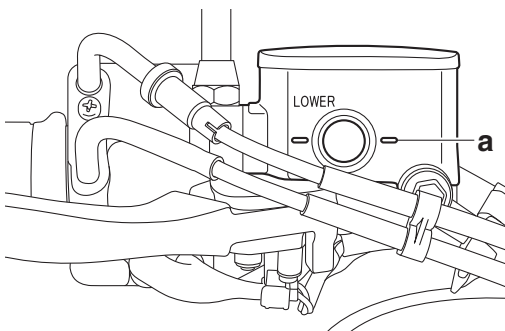
- Brake system

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)” on page 3-12 and “BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)” on page 3-13.

5. Check:

- Brake fluid level

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



6. Check:

- Brake lever operation

Soft or spongy feeling → Bleed the brake system.

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)” on page 3-12 and “BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)” on page 3-13.

EAS1XC1055

INSTALLING THE BRAKE PIPE/HOSE ASSEMBLIES (for ABS models)

1. Assemble:

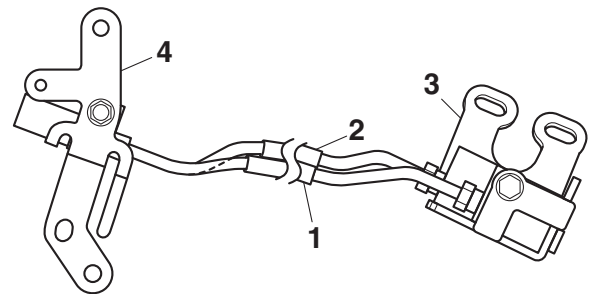
- Brake pipe/hose assembly (hydraulic unit to front brake caliper) “1” (to the brake pipe/hose assembly holders)
- Brake pipe/hose assembly (front brake master cylinder to hydraulic unit) “2” (to the brake pipe/hose assembly holders)
- Brake pipe/hose assembly holder (rear side) “3”
- Brake pipe/hose assembly holder (front side) “4”



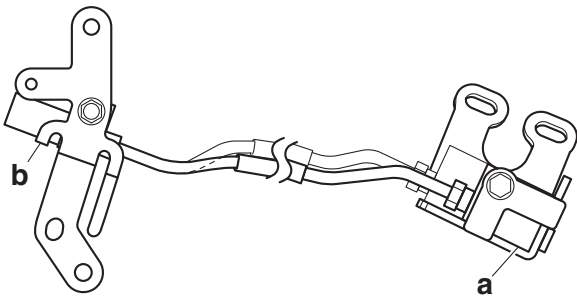
**Brake pipe/hose assembly bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

TIP

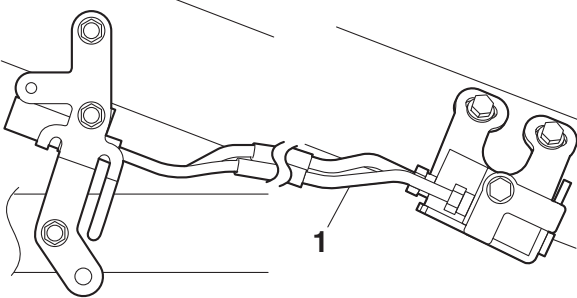
Assemble the brake pipe/hose assemblies and brake pipe/hose assembly holders before installing them to the vehicle.



- While pushing the brake pipe/hose assembly (hydraulic unit to front brake caliper) so that it contacts the portion “a” of the brake pipe/hose assembly holder (rear side), tighten the bolts to specification.
- While pushing the brake pipe/hose assembly (hydraulic unit to front brake caliper) and brake pipe/hose assembly (front brake master cylinder to hydraulic unit) so that they contact the stopper “b” on the brake pipe/hose assembly holder (front side), tighten the bolt to specification.



2. Install:
- Brake pipe/hose assemblies and holders "1" (to the frame)



- Temporarily tighten the brake pipe/hose assembly holder bolts (front side) "2".
- Temporarily tighten the brake pipe/hose assembly holder bolts (rear side) "3".
- Tighten the brake pipe/hose assembly holder bolts (front side) to specification.

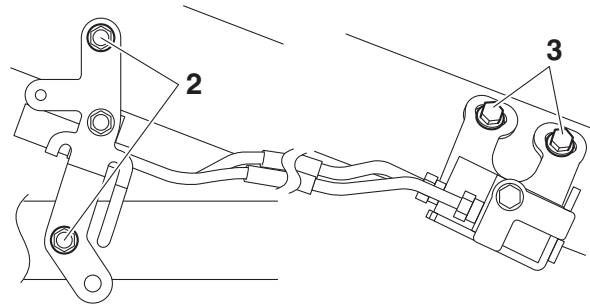


Brake pipe/hose assembly holder bolt (front side)
7 Nm (0.7 m-kgf, 5.1 ft-lbf)

- Tighten the brake pipe/hose assembly holder bolts (rear side) to specification.



Brake pipe/hose assembly holder bolt (rear side)
10 Nm (1.0 m-kgf, 7.2 ft-lbf)
LOCTITE®



3. Install:
- Brake hose gaskets **New**
 - Brake hose (hydraulic unit to front brake caliper)
 - Brake hose (front brake master cylinder to hydraulic unit)
 - Front brake hose union bolts



Front brake hose union bolt
30 Nm (3.0 m-kgf, 22 ft-lbf)

EWA1XC1013

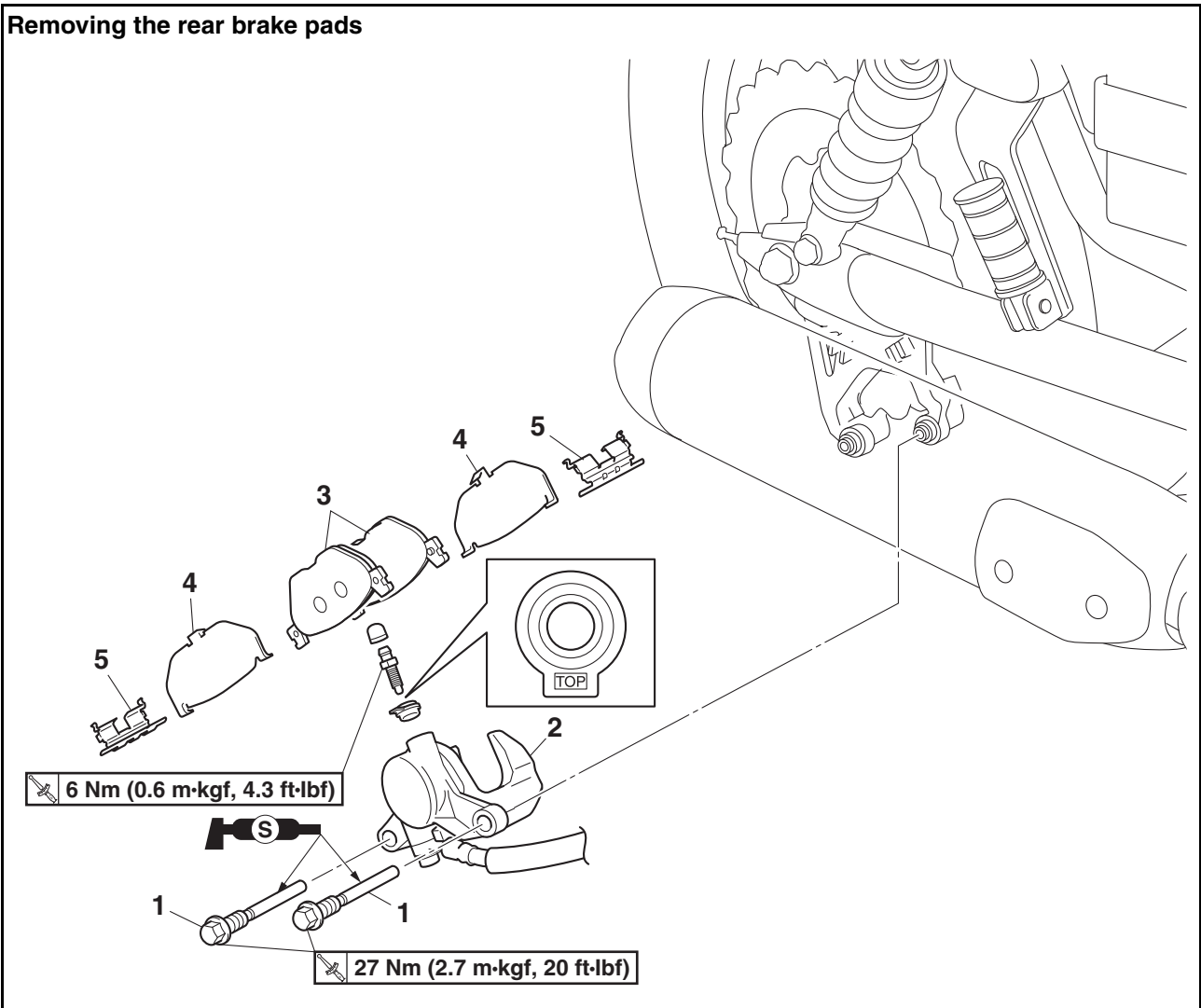


WARNING
Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (except for ABS models)" on page 2-41 and "CABLE ROUTING (for ABS models)" on page 2-75.

EAS22550

REAR BRAKE

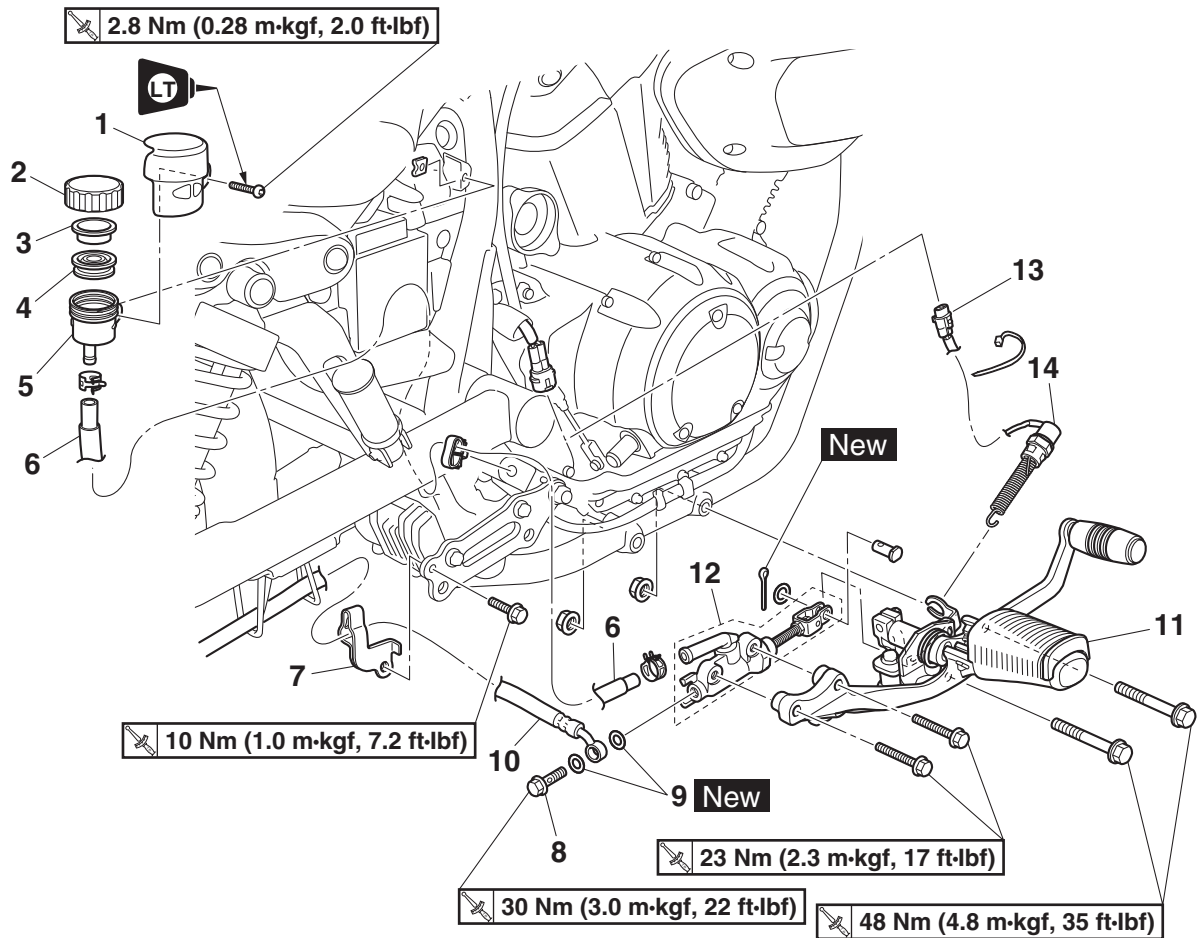
Removing the rear brake pads



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake caliper retaining bolt	2	
2	Rear brake caliper	1	
3	Rear brake pad	2	
4	Rear brake pad shim	2	
5	Rear brake pad spring	2	
			For installation, reverse the removal procedure.

REAR BRAKE

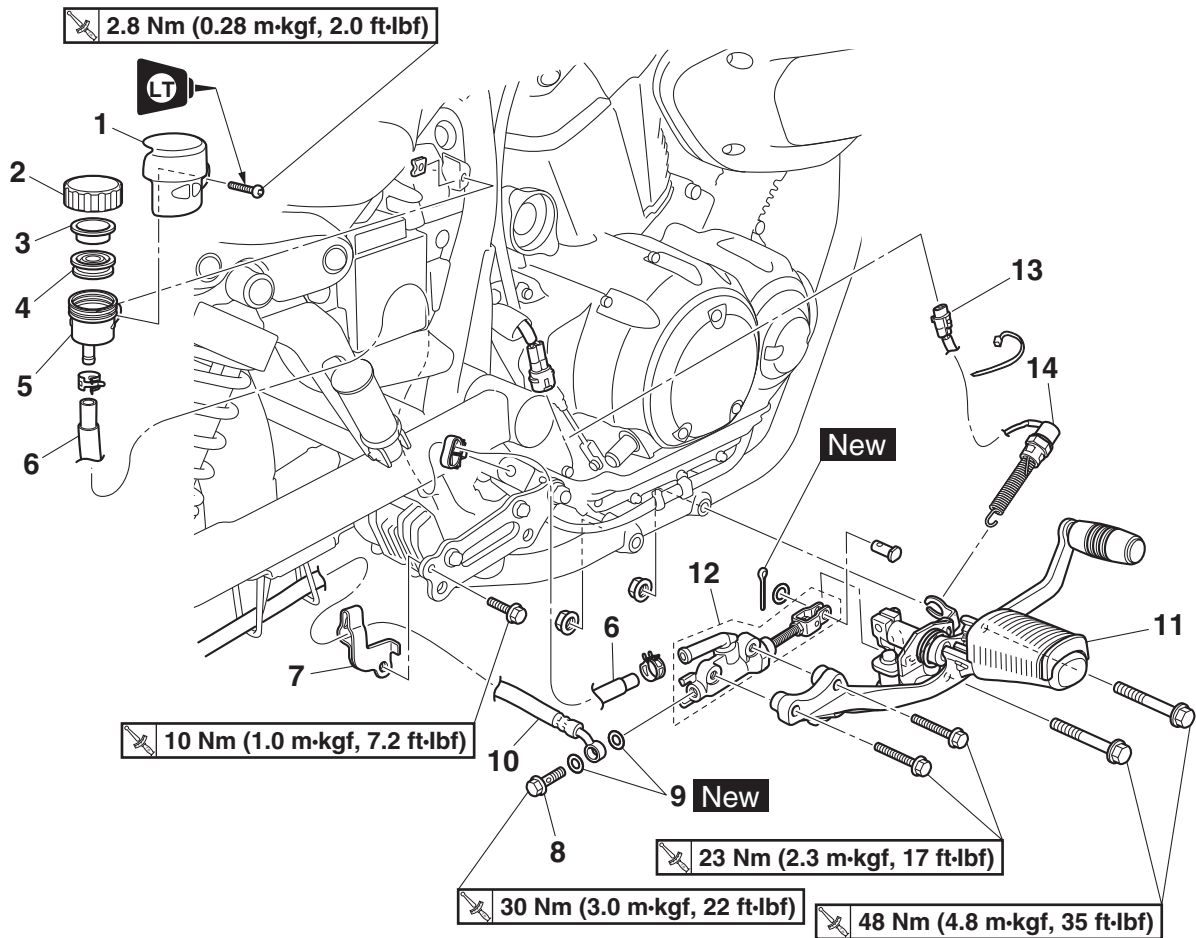
Removing the rear brake master cylinder (except for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)" on page 3-12.
	Battery cover holder		Refer to "GENERAL CHASSIS" on page 4-1.
	Exhaust pipe/Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
1	Brake fluid reservoir cover	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir	1	
6	Brake fluid reservoir hose	1	
7	Rear brake hose holder	1	
8	Rear brake hose union bolt	1	
9	Brake hose gasket	2	
10	Rear brake hose	1	
11	Right rider footrest assembly	1	
12	Rear brake master cylinder	1	

REAR BRAKE

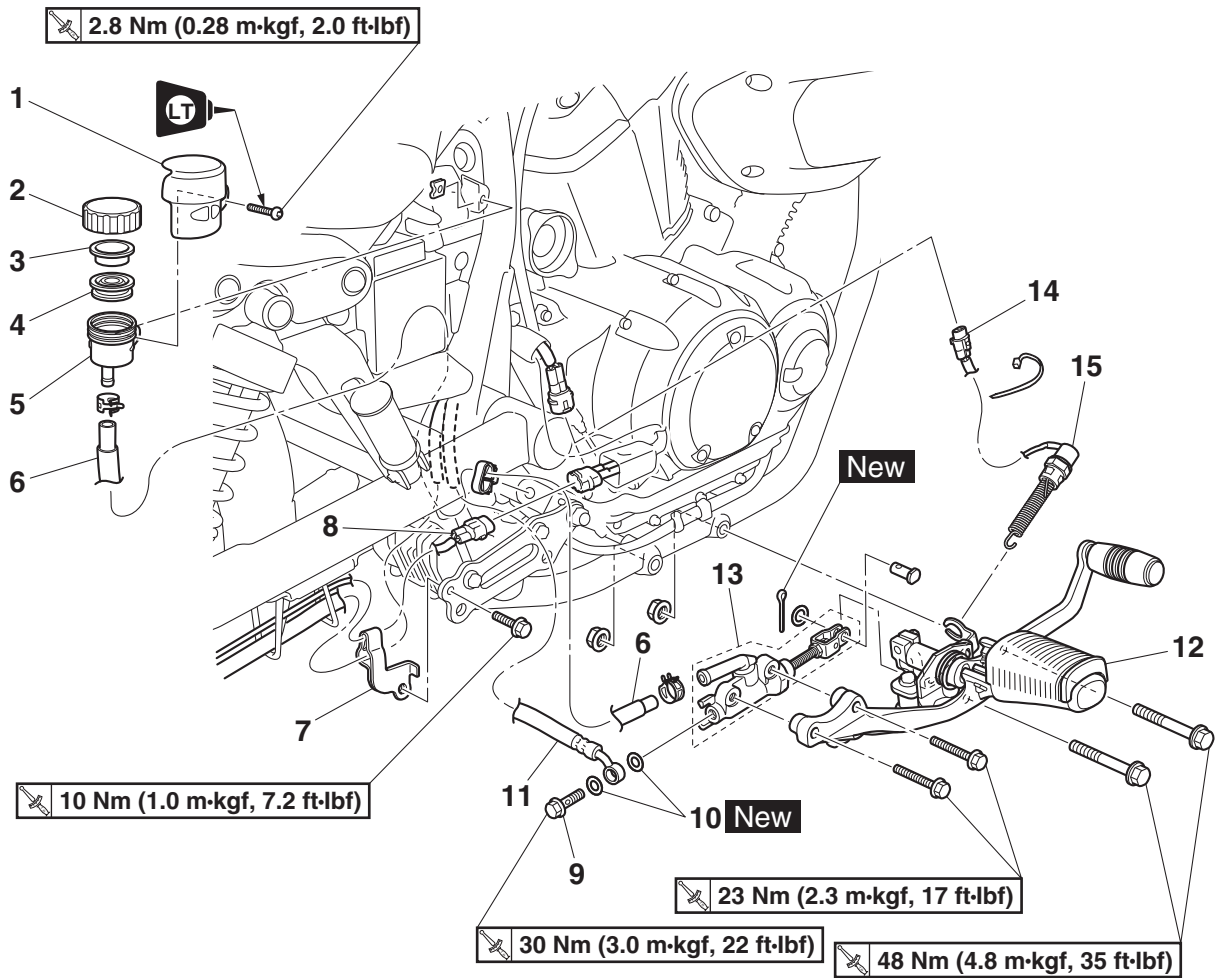
Removing the rear brake master cylinder (except for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
13	Rear brake light switch coupler	1	Disconnect.
14	Rear brake light switch	1	
			For installation, reverse the removal procedure.

REAR BRAKE

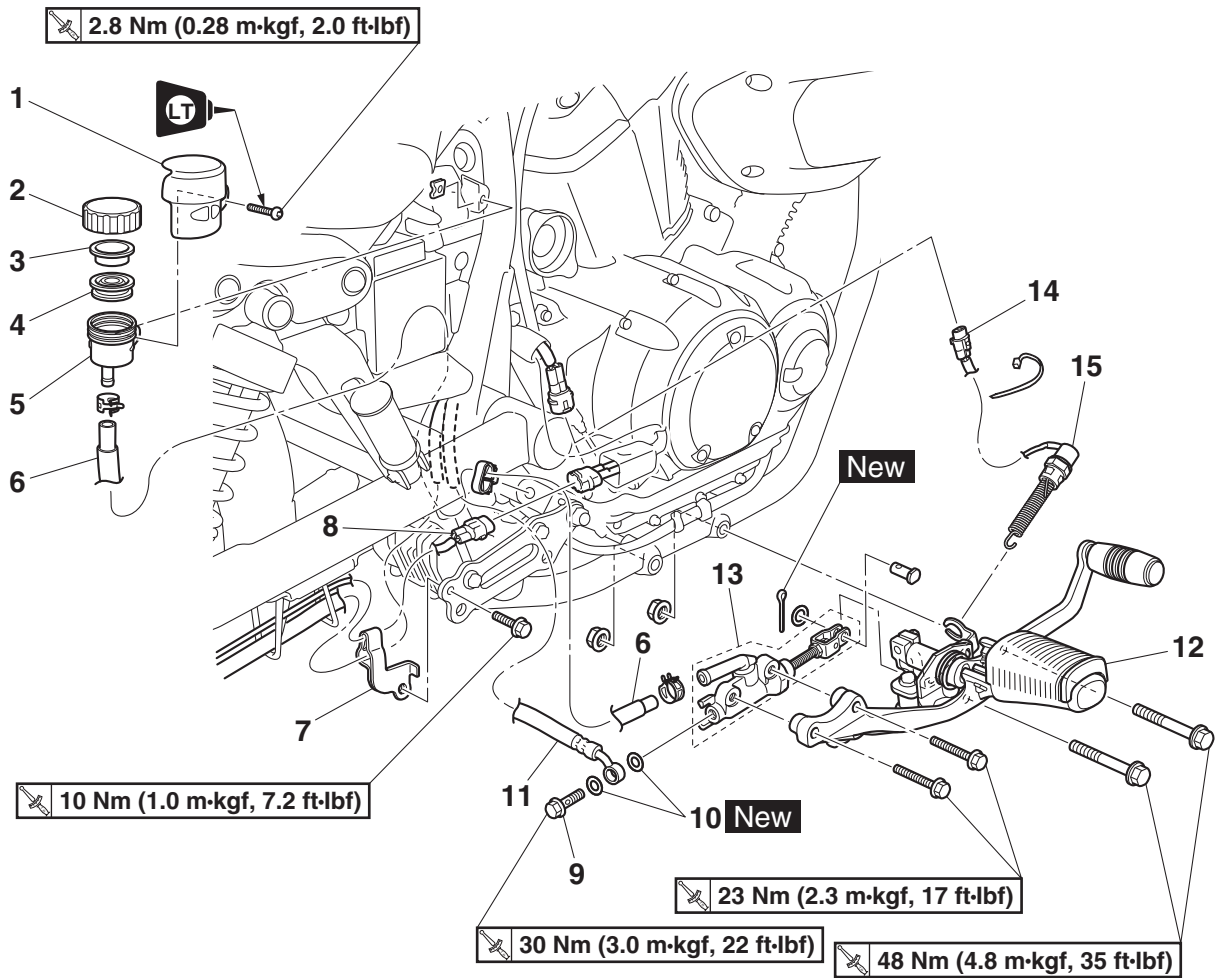
Removing the rear brake master cylinder (for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.
	Battery cover holder		Refer to "GENERAL CHASSIS" on page 4-1.
	Exhaust pipe/Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
1	Brake fluid reservoir cover	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir	1	
6	Brake fluid reservoir hose	1	
7	Rear brake hose/wheel sensor lead holder	1	
8	Rear wheel sensor coupler	1	Disconnect.
9	Rear brake hose union bolt	1	
10	Brake hose gasket	2	
11	Rear brake hose (rear brake master cylinder to hydraulic unit)	1	Disconnect.

REAR BRAKE

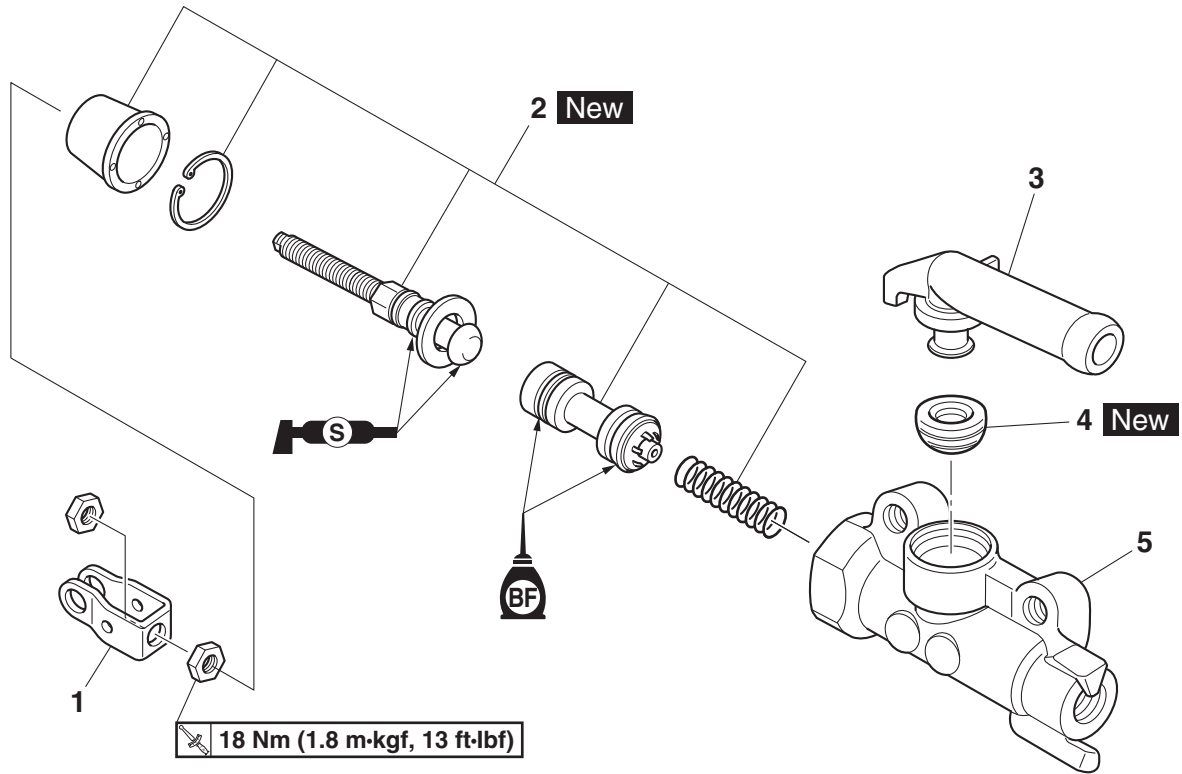
Removing the rear brake master cylinder (for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
12	Right rider footrest assembly	1	
13	Rear brake master cylinder	1	
14	Rear brake light switch coupler	1	Disconnect.
15	Rear brake light switch	1	
			For installation, reverse the removal procedure.

REAR BRAKE

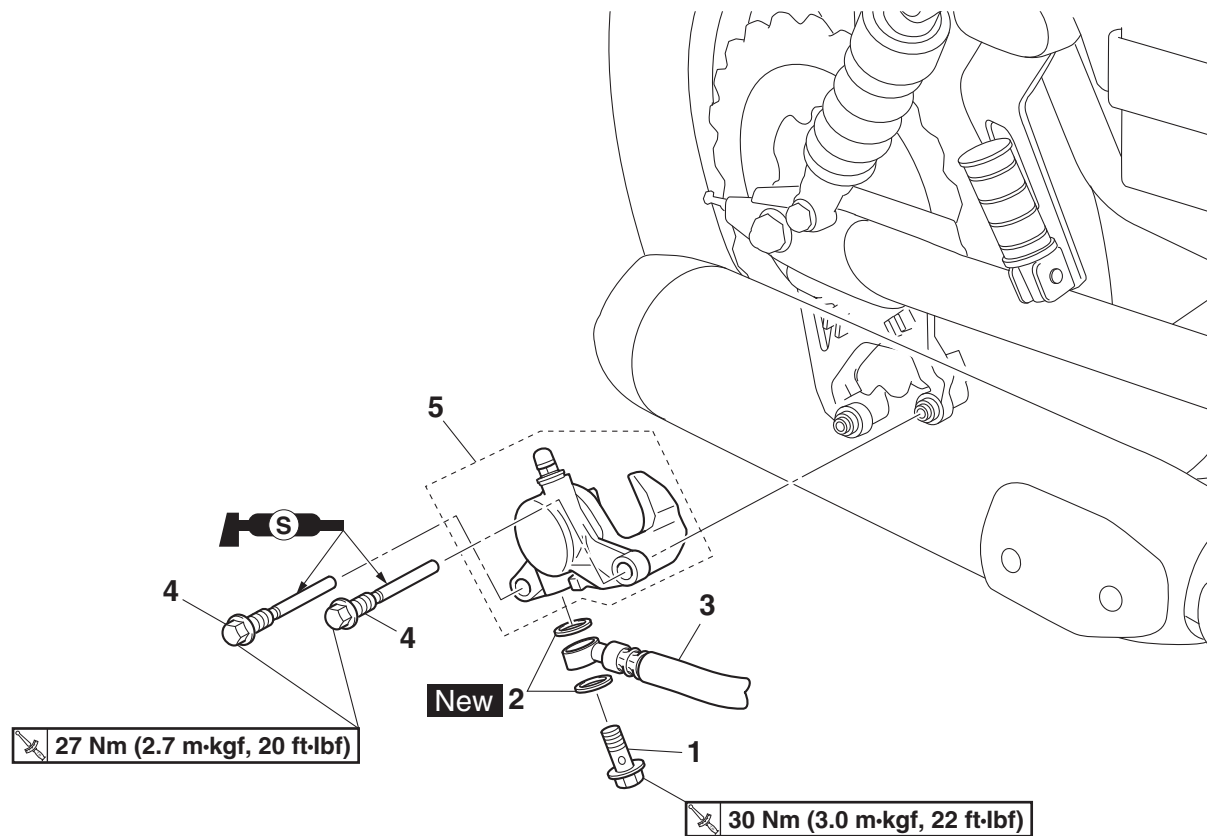
Disassembling the rear brake master cylinder



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

REAR BRAKE

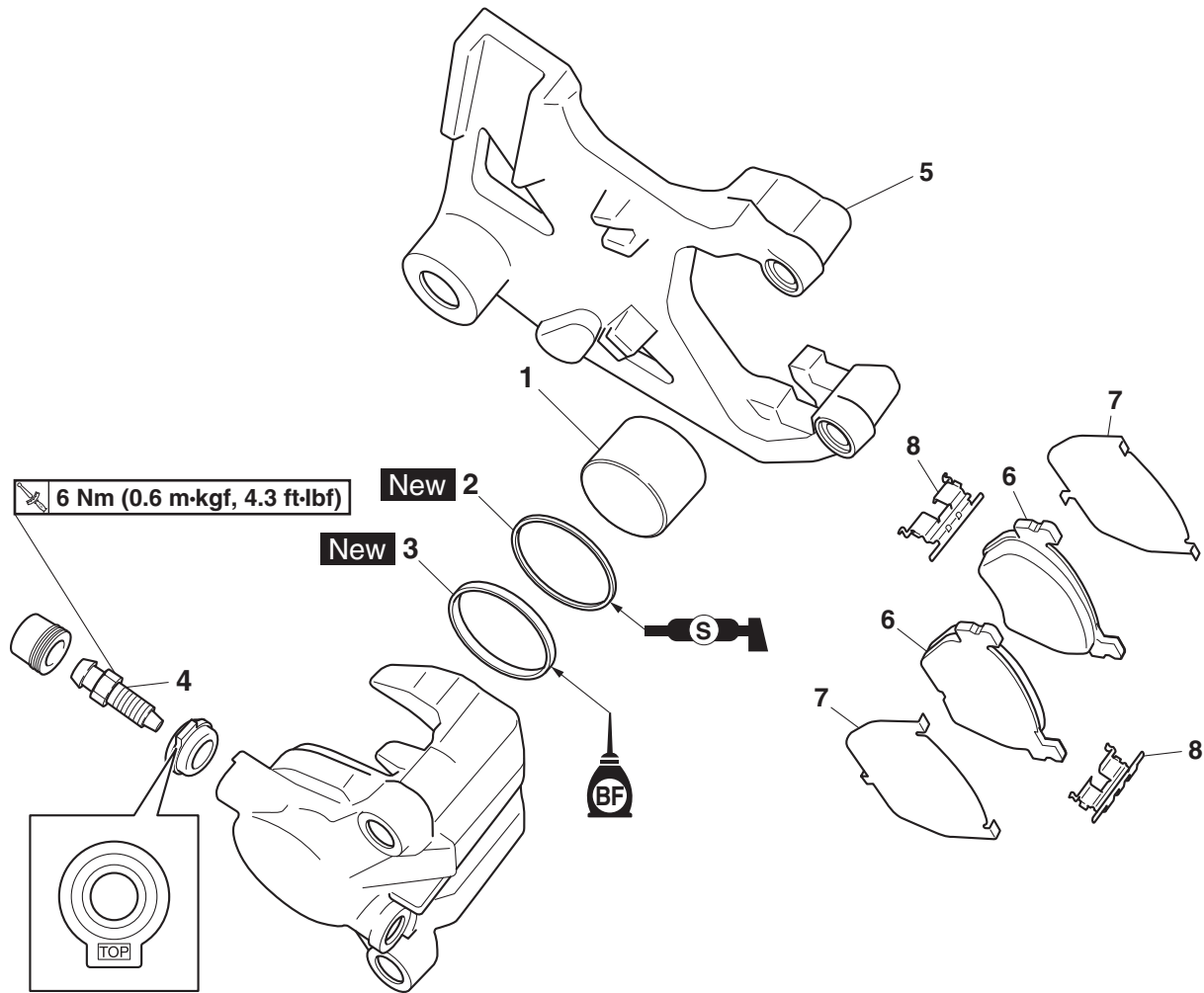
Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)" on page 3-12 and "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.
1	Rear brake hose union bolt	1	
2	Brake hose gasket	2	
3	Rear brake hose	1	
4	Rear brake caliper retaining bolt	2	
5	Rear brake caliper	1	
			For installation, reverse the removal procedure.

REAR BRAKE

Disassembling the rear brake caliper



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

EAS22560

INTRODUCTION

EWA1TP1022

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.
- 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.

TIP

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

EAS22570

CHECKING THE REAR BRAKE DISC

1. Remove:
 - Rear wheel
Refer to "REAR WHEEL" on page 4-19.
2. Check:
 - 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 DISC" on page 4-39.



Brake disc runout limit (as measured on wheel)
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 DISC" on page 4-39.



Brake disc thickness limit
5.5 mm (0.22 in)

5. Adjust:
 - Brake disc deflection
Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-39.



Brake disc bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)
LOCTITE®

6. Install:
 - Rear wheel
Refer to "REAR WHEEL" on page 4-19.

EAS22580

REPLACING THE REAR BRAKE PADS

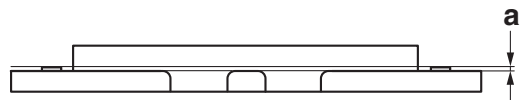
TIP

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

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



Brake pad lining thickness (inner)
5.8 mm (0.23 in)
Limit
0.8 mm (0.03 in)
Brake pad lining thickness (outer)
5.8 mm (0.23 in)
Limit
0.8 mm (0.03 in)



2. Remove:
 - Rear brake caliper retaining bolts
3. Install:
 - Brake pads

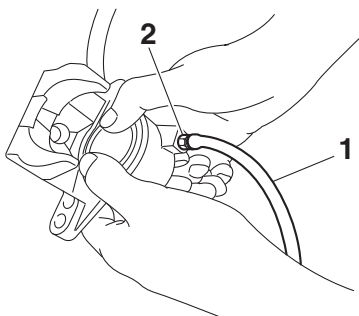
REAR BRAKE

- Brake pad shims (onto the brake pads)
- Brake pad springs

TIP

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

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



- Tighten the bleed screw to specification.



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

- Install new brake pad springs, brake pad shims, and brake pads.

4. Lubricate:

- Rear brake caliper retaining bolt



Recommended lubricant
Silicone grease

ECA14150

NOTICE

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

5. Install:

- Rear brake caliper

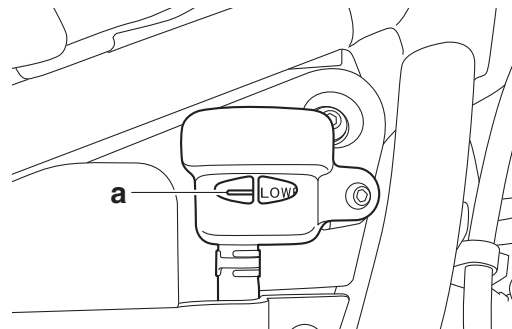


Rear brake caliper retaining bolt
27 Nm (2.7 m·kgf, 20 ft·lbf)

6. Check:

- Brake fluid level
Below the minimum level mark "a" → Add the specified brake fluid to the proper level.

Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-11.



7. Check:

- Brake pedal operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)" on page 3-12 and "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.

EAS22590

REMOVING THE REAR BRAKE CALIPER

TIP

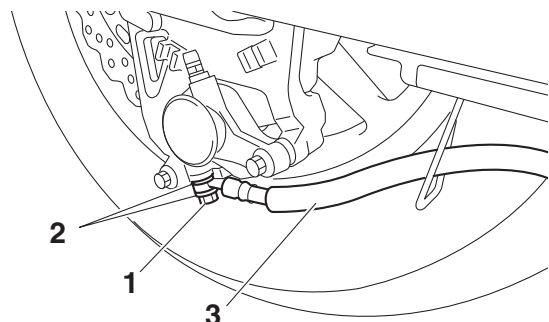
Before removing the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:

- Rear brake hose union bolt "1"
- Brake hose gaskets "2"
- Rear brake hose "3"

TIP

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



EAS22600

DISASSEMBLING THE REAR BRAKE CALIPER

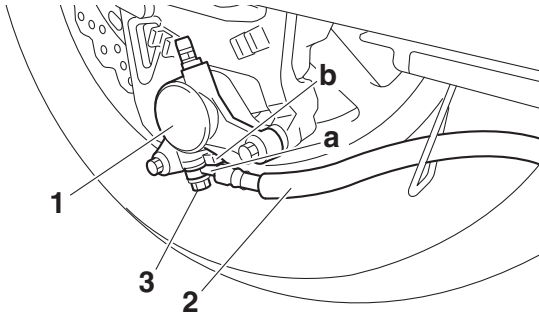
1. Remove:

- Brake caliper piston
- Brake caliper piston dust seal
- Brake caliper piston seal

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:

- Rear brake caliper

3. Install:

- Brake pad shims (onto the brake pads)
 - Brake pads
 - Brake pad springs
 - Rear brake caliper
- Refer to "REPLACING THE REAR BRAKE PADS" on page 4-55.



Rear brake caliper retaining bolt
27 Nm (2.7 m·kgf, 20 ft·lbf)

4. Fill:

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



Specified brake 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

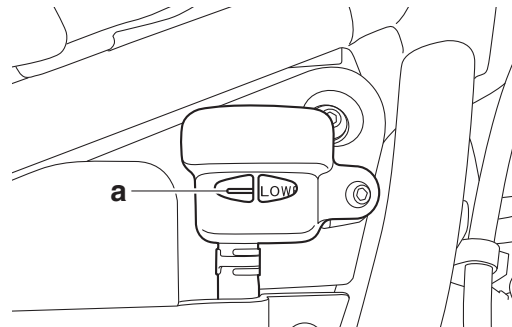
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilled brake fluid immediately.

5. Bleed:

- Brake system
- Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)" on page 3-12 and "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.

6. Check:

- Brake fluid level
- Below the minimum level mark "a" → Add the specified brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-11.



7. Check:

- Brake pedal operation
- Soft or spongy feeling → Bleed the brake system. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)" on page 3-12 and "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.

EAS22700

REMOVING THE REAR BRAKE MASTER CYLINDER

TIP

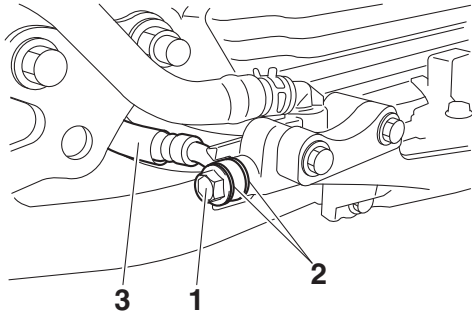
Before removing the rear brake master cylinder, drain the brake fluid from the entire brake system.

1. Remove:

- Rear brake hose union bolt "1"
- Brake hose gaskets "2"
- Rear 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
Cracks/damage → Replace.
 - Brake fluid reservoir diaphragm
Cracks/damage → Replace.
4. Check:
 - Brake hoses
Cracks/damage/wear → Replace.

EAS22730

ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA1TP1008

⚠ 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.

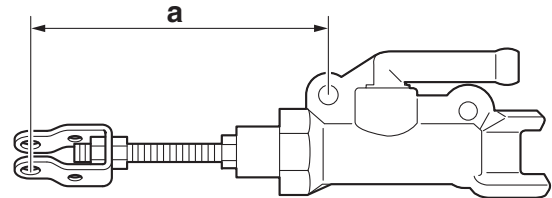


Specified brake fluid
DOT 4

1. Install:
 - Brake hose joint
 - Brake master cylinder kit **New**
 - Rear brake master cylinder joint

TIP

The rear brake master cylinder joint installation length “a” should be 101.8 mm (4.01 in).



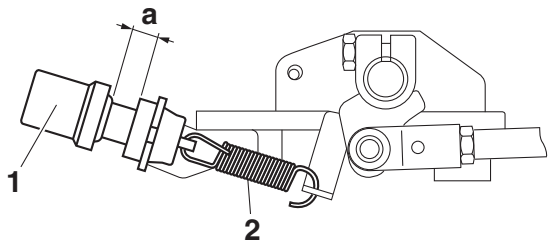
EAS22750

INSTALLING THE REAR BRAKE MASTER CYLINDER

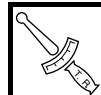
1. Install:
 - Rear brake light switch “1”

TIP

- The rear brake light switch installation length “a” should be 8.5 mm (0.33 in).
- Install the rear brake light switch spring “2” as shown in the illustration.



2. Install:
 - Brake hose gaskets “1” **New**
 - Rear brake hose “2”
 - Rear brake hose union bolt “3”



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

EWA1XC1013

⚠ WARNING

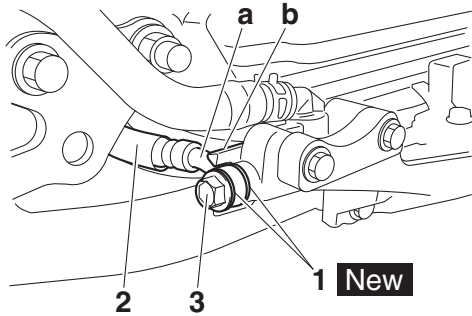
Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING (except for ABS models)” on page 2-41 and “CABLE ROUTING (for ABS models)” on page 2-75.

REAR BRAKE

ECA1TP1009

NOTICE

When installing the brake hose onto the brake master cylinder, make sure the brake pipe “a” touches the projection “b” on the brake caliper bracket as shown.



3. Install:

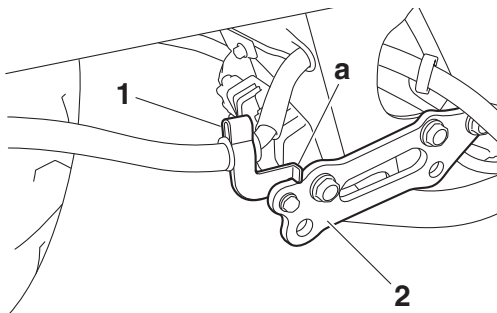
- Rear brake hose holder “1”



**Rear brake hose holder bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

Make sure that the projection “a” on the rear brake hose holder contacts the engine bracket (rear lower side) “2” as shown in the illustration.



4. Fill:

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



**Specified brake 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

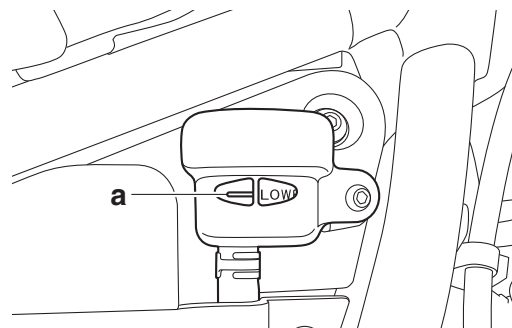
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:

- Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)” on page 3-12 and “BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)” on page 3-13.

6. Check:

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



7. Check:

- Brake pedal operation
Soft or spongy feeling → Bleed the brake system.

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (except for ABS models)” on page 3-12 and “BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)” on page 3-13.

8. Adjust:

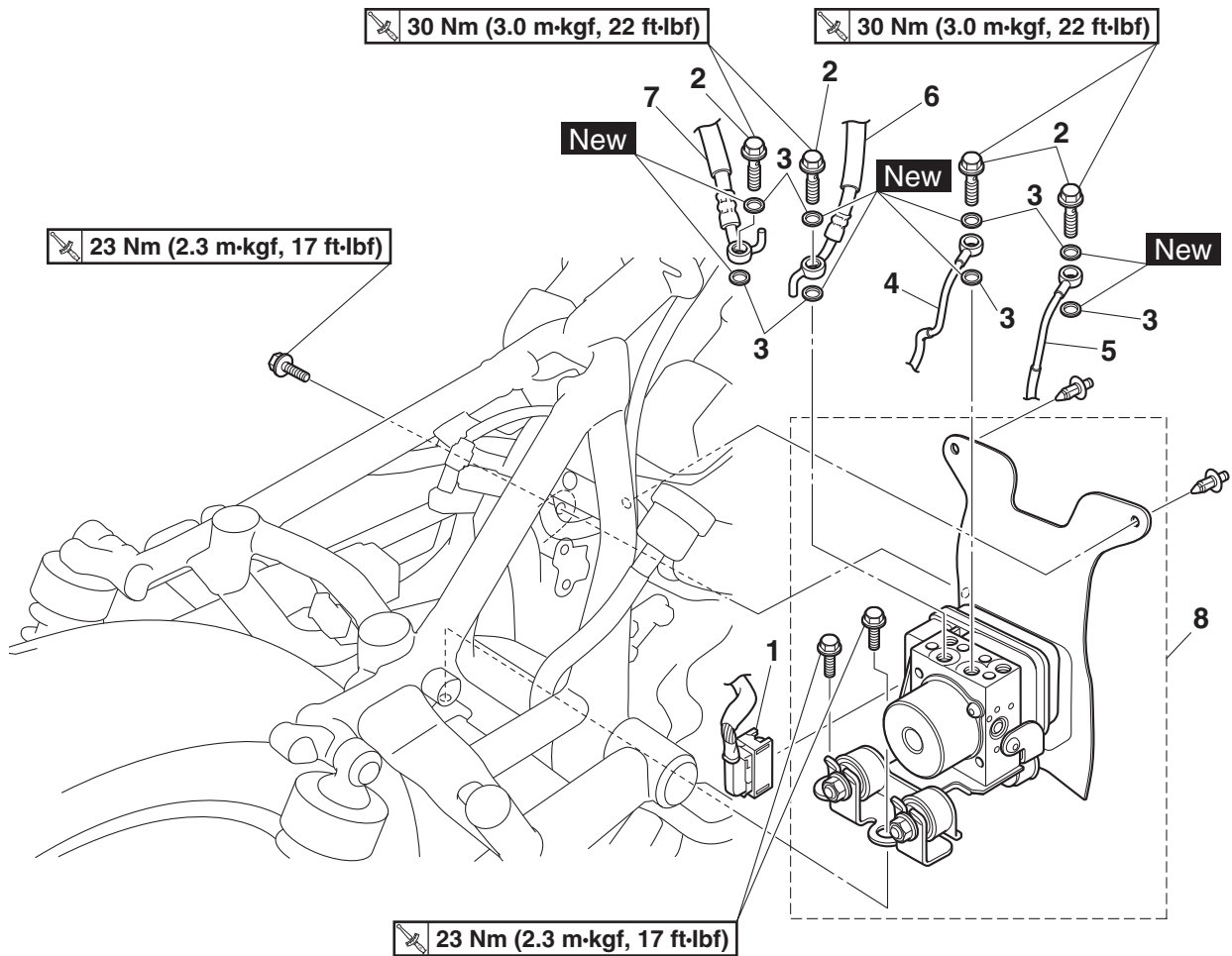
- Rear brake light operation timing
Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-25.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

EAS1XC1042

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

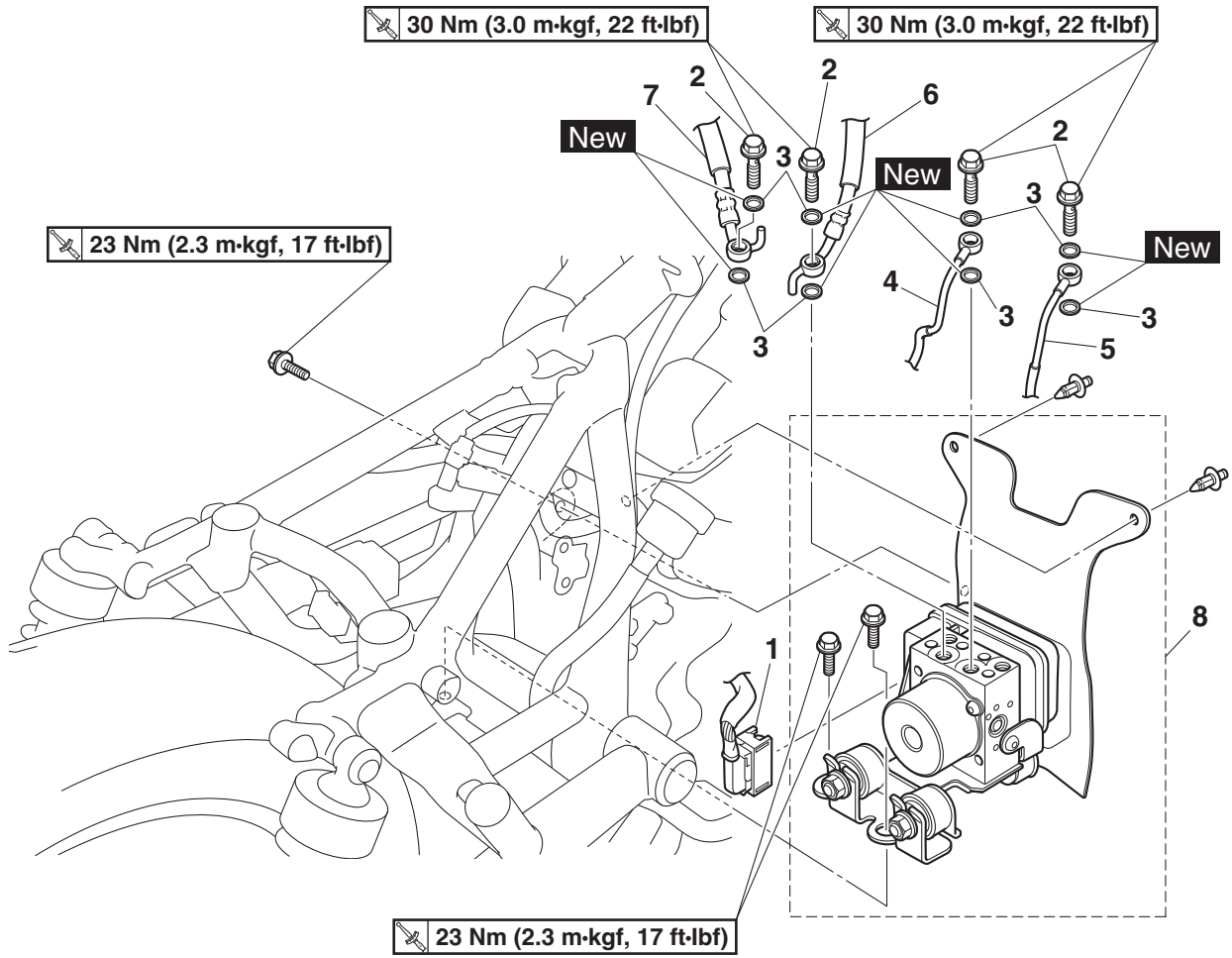
Removing the hydraulic unit assembly and brackets



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.
	Battery box		Refer to "GENERAL CHASSIS" on page 4-1.
	Drive belt/Drive pulley		Refer to "BELT DRIVE" on page 4-94.
	Drive pulley housing		Refer to "ENGINE REMOVAL" on page 5-3.
1	ABS ECU coupler	1	Disconnect.
2	Brake hose union bolt	4	
3	Brake hose gasket	8	
4	Brake hose (rear brake master cylinder to hydraulic unit)	1	Disconnect.
5	Brake hose (hydraulic unit to rear brake caliper)	1	Disconnect.
6	Brake hose (front brake master cylinder to hydraulic unit)	1	Disconnect.
7	Brake hose (hydraulic unit to front brake caliper)	1	Disconnect.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

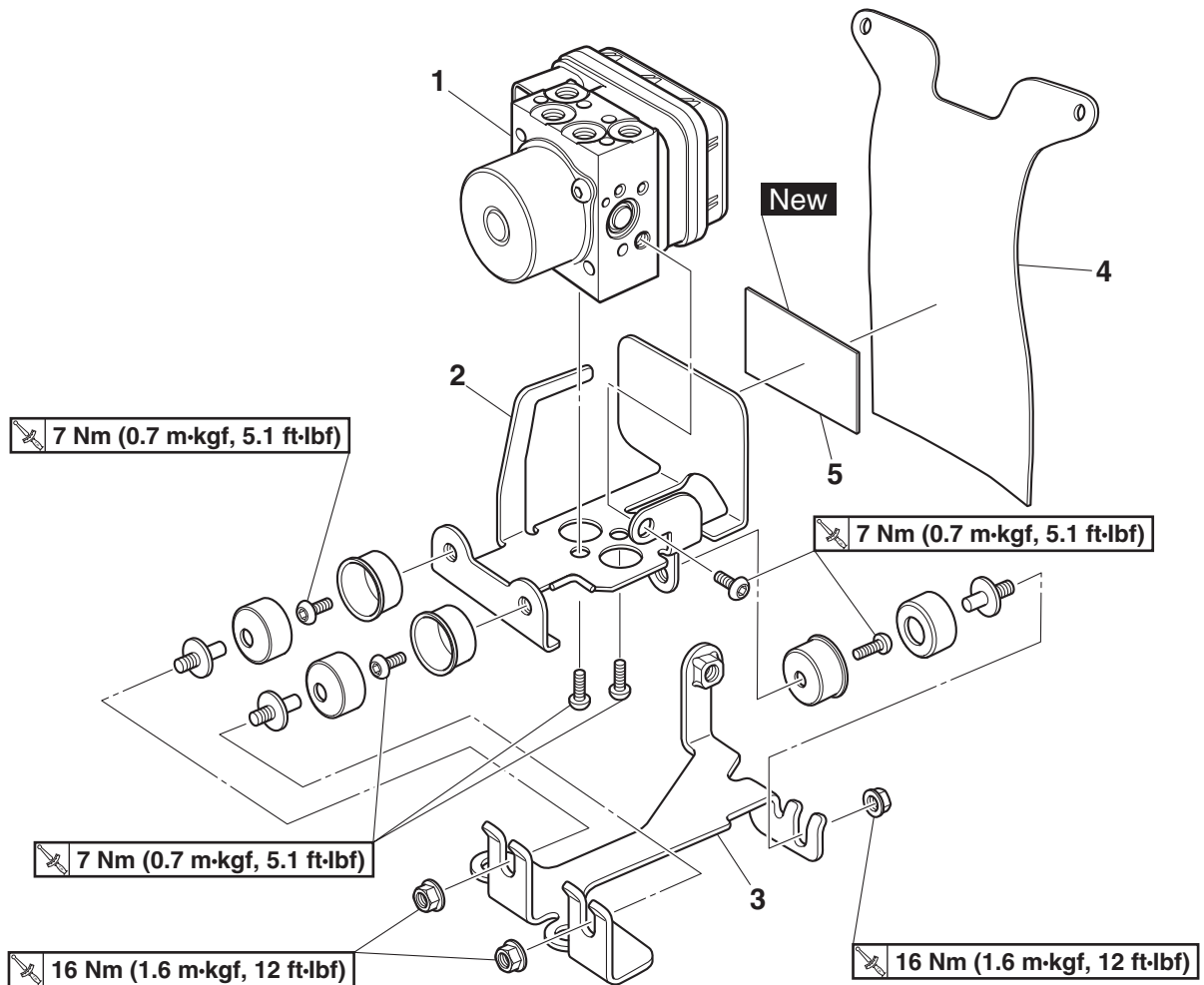
Removing the hydraulic unit assembly and brackets



Order	Job/Parts to remove	Q'ty	Remarks
8	Hydraulic unit assembly and brackets	1	
			For installation, reverse the removal procedure.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Hydraulic unit assembly and brackets		Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)" on page 4-61.
1	Hydraulic unit assembly	1	
2	Hydraulic unit assembly upper bracket	1	
3	Hydraulic unit assembly lower bracket	1	
4	Rubber cover	1	
5	Seal	1	
			For installation, reverse the removal procedure.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

EAS1XC1013

REMOVING THE HYDRAULIC UNIT ASSEMBLY

ECA1XC1024

NOTICE

Unless necessary, avoid removing and installing the brake hoses 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.

ECA1XC1015

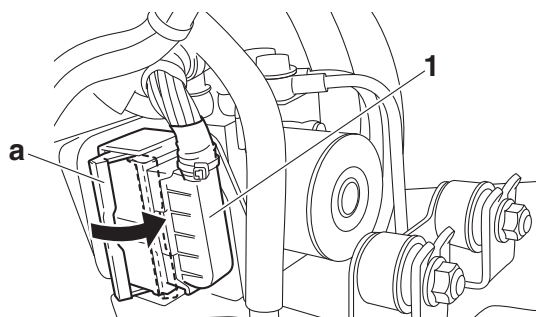
NOTICE

- 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 spilled 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. Disconnect:
 - ABS ECU coupler “1”

TIP

Pull the lock lever “a” of the ABS ECU coupler in the direction of the arrow shown, and then disconnect the coupler.



2. Remove:
 - Brake hoses

TIP

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

ECA1XC1016

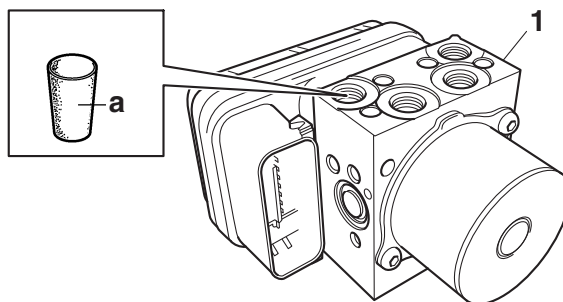
NOTICE

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

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 × 1.25) into each brake hose union bolt hole.
- When using a bolt, do not tighten the bolt until the bolt head touches the hydraulic unit. Otherwise, the brake hose union bolt seating surface could be deformed.



EAS1XC1014

CHECKING THE HYDRAULIC UNIT ASSEMBLY

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

EAS1XC1016

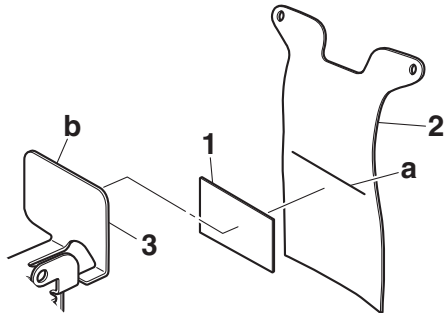
INSTALLING THE HYDRAULIC UNIT ASSEMBLY

1. Install:
 - Seal “1”
 - Rubber cover “2” (onto the hydraulic unit assembly upper bracket “3”)

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

TIP

Align the line "a" on the rubber cover with the edge "b" of the hydraulic unit assembly upper bracket.



2. Install:

- Hydraulic unit assembly "1"
(to hydraulic unit assembly upper bracket)
- Hydraulic unit assembly upper bracket "2"
- Hydraulic unit assembly lower bracket



Hydraulic unit assembly bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

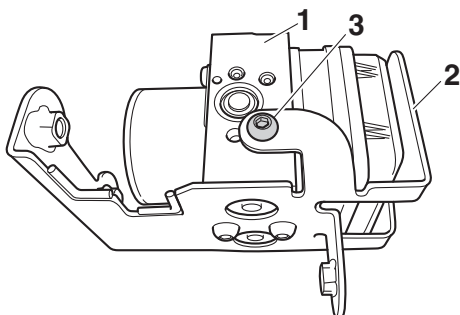
TIP

- Finger tighten the bolts, and then tighten the bolts to the specified torque starting with the bolt "3".
- Do not allow any foreign materials to enter the hydraulic unit assembly or the brake hoses when installing the hydraulic unit assembly.

ECA1XC1017

NOTICE

Do not remove the rubber plugs or bolts (M10 × 1.25) installed in the brake hose union bolt holes before installing the hydraulic unit assembly.



3. Remove:

- Rubber plugs or bolts (M10 × 1.25)

4. Install:

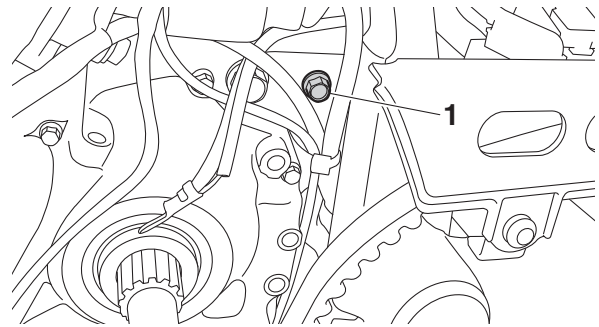
- Hydraulic unit assembly and brackets



Hydraulic unit assembly and brackets bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)

TIP

Finger tighten the bolts, and then tighten the bolts to the specified torque starting with the bolt "1".



5. Install:

- Brake hose (hydraulic unit to front brake caliper) "1"
- Brake hose (front brake master cylinder to hydraulic unit) "2"
- Brake hose (hydraulic unit to rear brake caliper) "3"
- Brake hose (rear brake master cylinder to hydraulic unit) "4"



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

ECA1XC1025

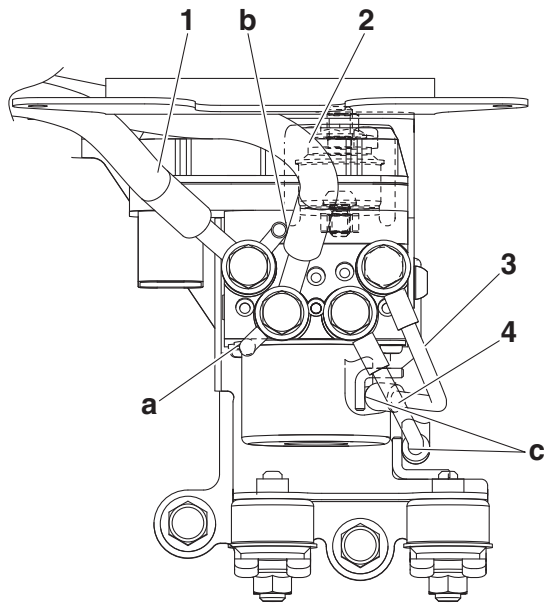
NOTICE

If the brake hose union bolt does not turn easily, replace the hydraulic unit assembly, brake hoses, and related parts as a set.

TIP

- Make sure that the stopper "a" on the brake hose (front brake master cylinder to hydraulic unit) contacts the side of the hydraulic unit assembly.
- When installing the brake hose (hydraulic unit to front brake caliper), make sure that the stopper "b" on the hose contacts the brake hose (front brake master cylinder to hydraulic unit).
- Make sure that the portion "c" of each brake hose contacts the hydraulic unit assembly upper bracket.

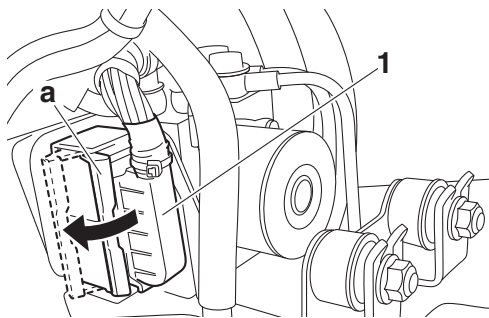
ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)



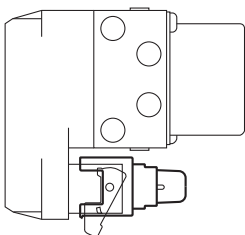
6. Connect:
- ABS ECU coupler "1"

TIP

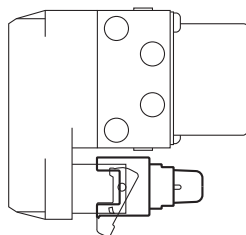
- Connect the ABS ECU coupler, and then push the lock lever "a" of the coupler in the direction of the arrow shown.
- Make sure that the ABS ECU coupler is connected in the correct position as shown in illustration "A".



A



B



A. The ABS ECU coupler is connected correctly.

B. The ABS ECU coupler is not connected.

7. Fill:

- Brake master cylinder reservoir
- Brake fluid reservoir (with the specified amount of the specified brake fluid)



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.

8. Bleed:

- Brake system
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (for ABS models)" on page 3-13.

9. 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 4-67.)

ECA14770

NOTICE

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

10. Delete the fault codes. (Refer to "[B-3] DELETING THE FAULT CODES" on page 7-145.)

11. Perform a trial run. (Refer to "CHECKING THE ABS WARNING LIGHT" on page 4-70.)

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

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.

- Brake line routing confirmation: this test checks the function of the ABS after the system was disassembled, adjusted, or serviced.
- ABS reaction-force confirmation: this test generates the same reaction-force pulsating action that is generated in the brake lever and brake pedal when the ABS is activated.

Brake line routing confirmation

EWA13120



WARNING

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

TIP

- For the brake line routing confirmation, use the diagnosis mode of the Yamaha diagnostic tool.
- Before performing the brake line routing confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.

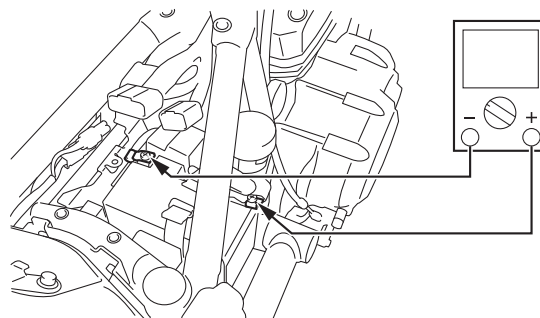
1. Place the vehicle on a suitable stand.
2. Turn the main switch to "OFF".
3. Remove:
 - Left side cover
 - Rider seat
 - ECU bracket
 - Battery coverRefer to "GENERAL CHASSIS" on page 4-1.
4. Check:
 - Battery voltage
Lower than 12.8 V → Charge or replace the battery.



**Battery voltage
Higher than 12.8 V**

TIP

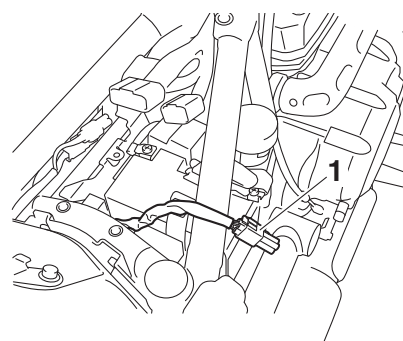
If the battery voltage is lower than 12.8 V, charge the battery, and then perform brake line routing confirmation.



5. Removing the protective cap "1", and then connect the Yamaha diagnostic tool to the ABS test coupler (4P).



**Yamaha diagnostic tool
90890-03215**

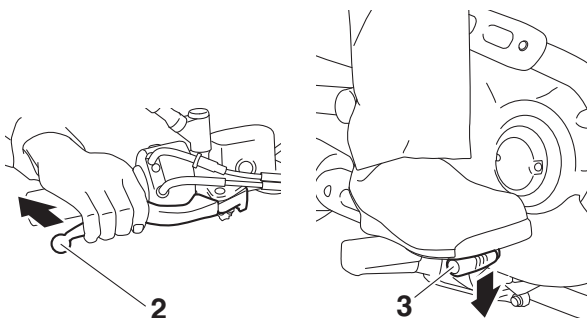
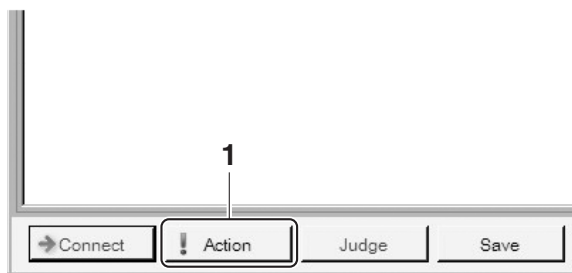


6. Start the Yamaha diagnostic tool and display the diagnosis mode screen.
7. Select code No. 2, "Brake line routing confirmation".
8. Click "Action" "1", and then operate the brake lever "2" and brake pedal "3" simultaneously.

TIP

- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.
On: The hydraulic unit is operating.
Flashing: The conditions for operating the hydraulic unit have not been met.
Off: The brake lever and brake pedal are not being operated.

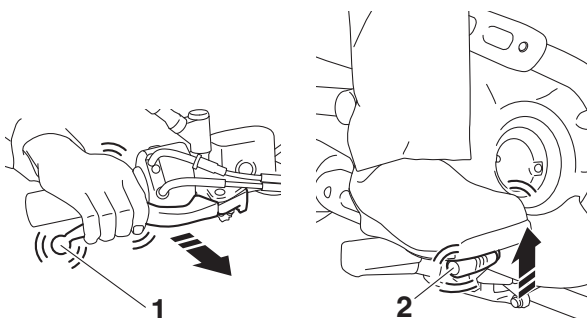
ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)



9. Check:

- Hydraulic unit operation

Click “Action”, a single pulse will be generated in the brake lever “1”, brake pedal “2”, and again in the brake lever “1”, in this order.



TIP

“ON” and “OFF” on the tool screen indicate when the brakes are being applied and released respectively.

ECA1XC1026

NOTICE

- Check that the pulse is felt in the brake lever, brake pedal, and again in the brake lever, in this order.
- If the pulse is felt in the brake pedal before it is felt in the 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.

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

ABS reaction-force confirmation

EWA13120

WARNING

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

TIP

- For the ABS reaction-force confirmation, use the diagnosis mode of the Yamaha diagnostic tool. For more information, refer to the operation manual of the Yamaha diagnostic tool.
- Before performing the ABS reaction-force confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.

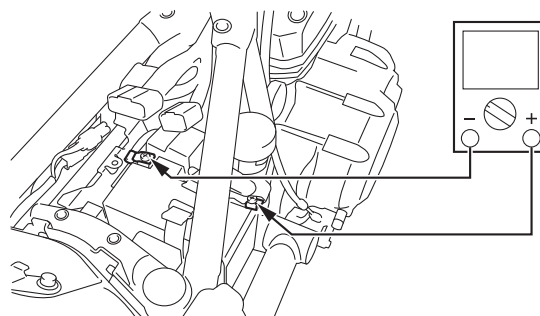
- Place the vehicle on a suitable stand.
- Turn the main switch to “OFF”.
- Remove:
 - Left side cover
 - Rider seat
 - ECU bracket
 - Battery cover
 Refer to “GENERAL CHASSIS” on page 4-1.
- Check:
 - Battery voltage
 Lower than 12.8 V → Charge or replace the battery.



**Battery voltage
Higher than 12.8 V**

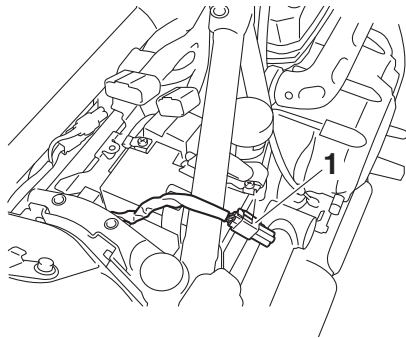
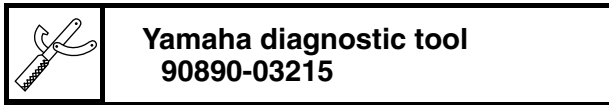
TIP

If the battery voltage is lower than 12.8 V, charge the battery, and then perform ABS reaction-force confirmation.



ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

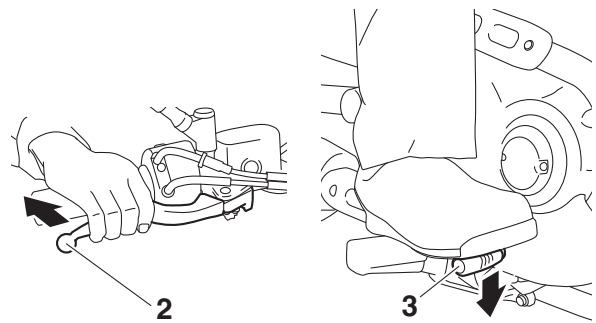
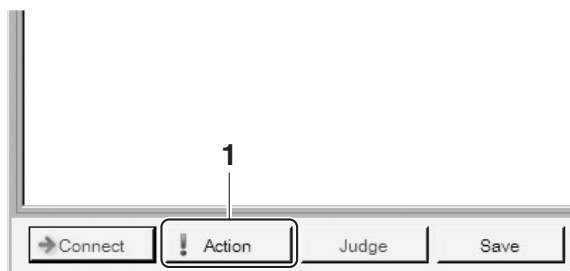
5. Removing the protective cap "1", and then connect the Yamaha diagnostic tool to the ABS test coupler (4P).



6. Start the Yamaha diagnostic tool and display the diagnosis mode screen.
 7. Select code No. 1, "ABS reaction-force confirmation".
 8. Click "Action" "1", and then operate the brake lever "2" and brake pedal "3" simultaneously.

TIP

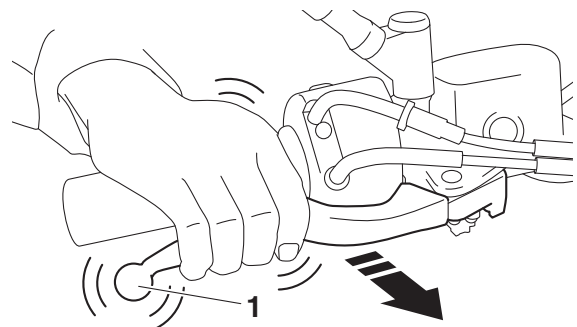
- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.
 On: The hydraulic unit is operating.
 Flashing: The conditions for operating the hydraulic unit have not been met.
 Off: The brake lever and brake pedal are not being operated.



9. A reaction-force pulsating action is generated in the brake lever "1" and continues for a few 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.
- "ON" and "OFF" on the tool screen indicate when the brakes are being applied and released respectively.

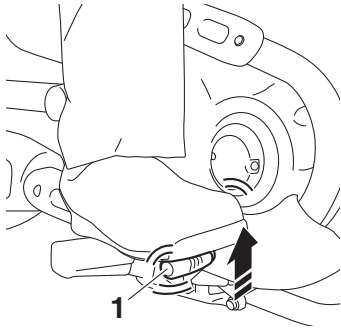


10. After the pulsating action has stopped in the brake lever, it is generated in the brake pedal "1" and continues for a few seconds.

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.
- "ON" and "OFF" on the tool screen indicate when the brakes are being applied and released respectively.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)



11. After the pulsating action has stopped in the brake pedal, it is generated in the brake lever and continues for a few seconds.

TIP

- The reaction-force pulsating action consists of quick pulses.
- “ON” and “OFF” on the tool screen indicate when the brakes are being applied and released respectively.

ECA1XC1026

NOTICE

- **Check that the pulse is felt in the brake lever, brake pedal, and again in the brake lever, in this order.**
- **If the pulse is felt in the brake pedal before it is felt in the 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.**

12. Turn the main switch to “OFF”.

13. Remove the Yamaha diagnostic tool coupler from the ABS test coupler, and then install the protective cap.

14. Turn the main switch to “ON”.

15. Set the engine stop switch to “○”.

16. Check for brake fluid leakage around the hydraulic unit.

Brake fluid leakage → Replace the hydraulic unit, brake hoses, and related parts as a set.

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

EAS1XC1026

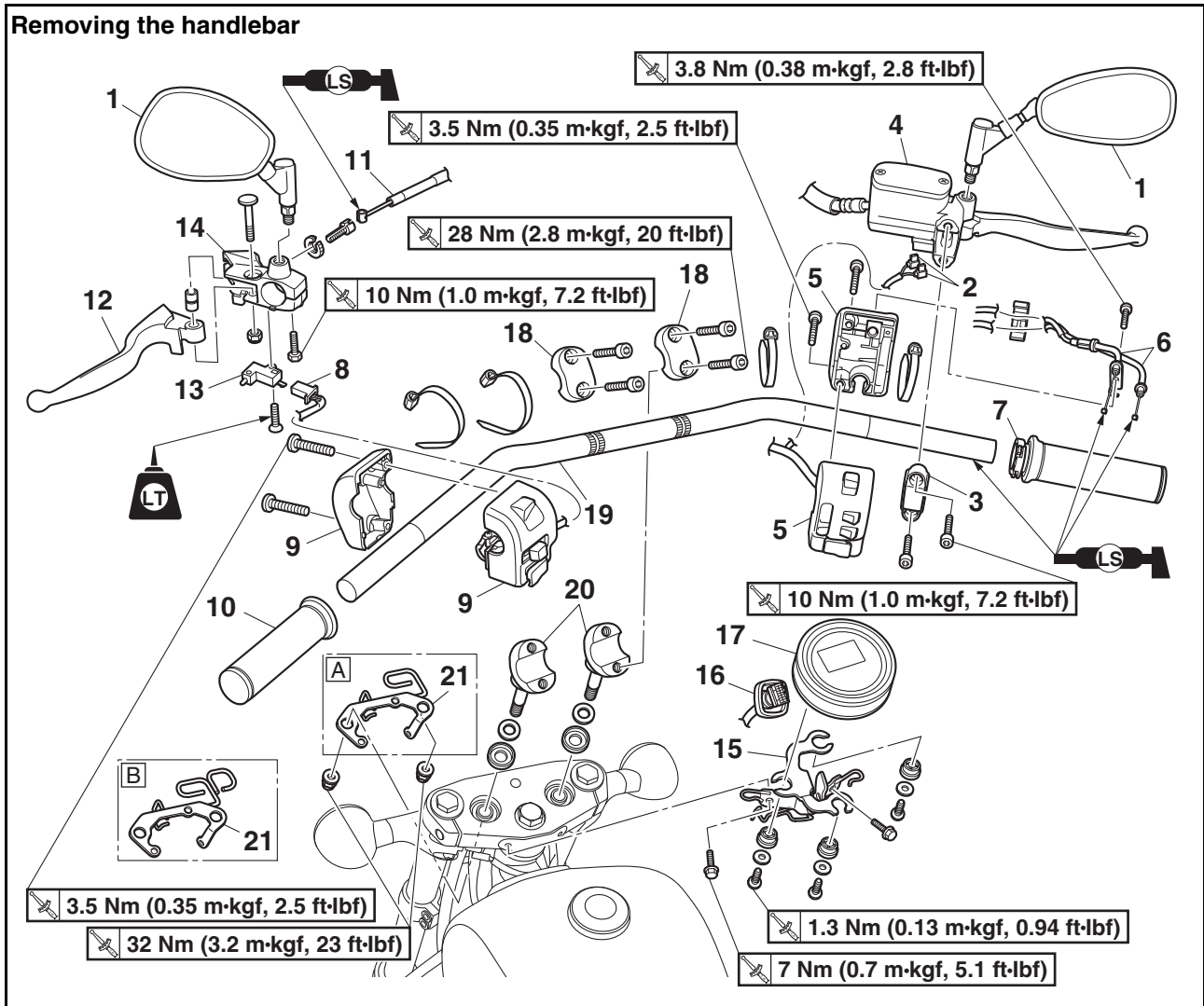
CHECKING THE ABS WARNING LIGHT

After all checks and servicing are completed, ensure that the ABS warning light goes off by walking the vehicle at a speed of faster than 7 km/h (4.4 mph) or performing a trial run.

EAS22840

HANDLEBAR

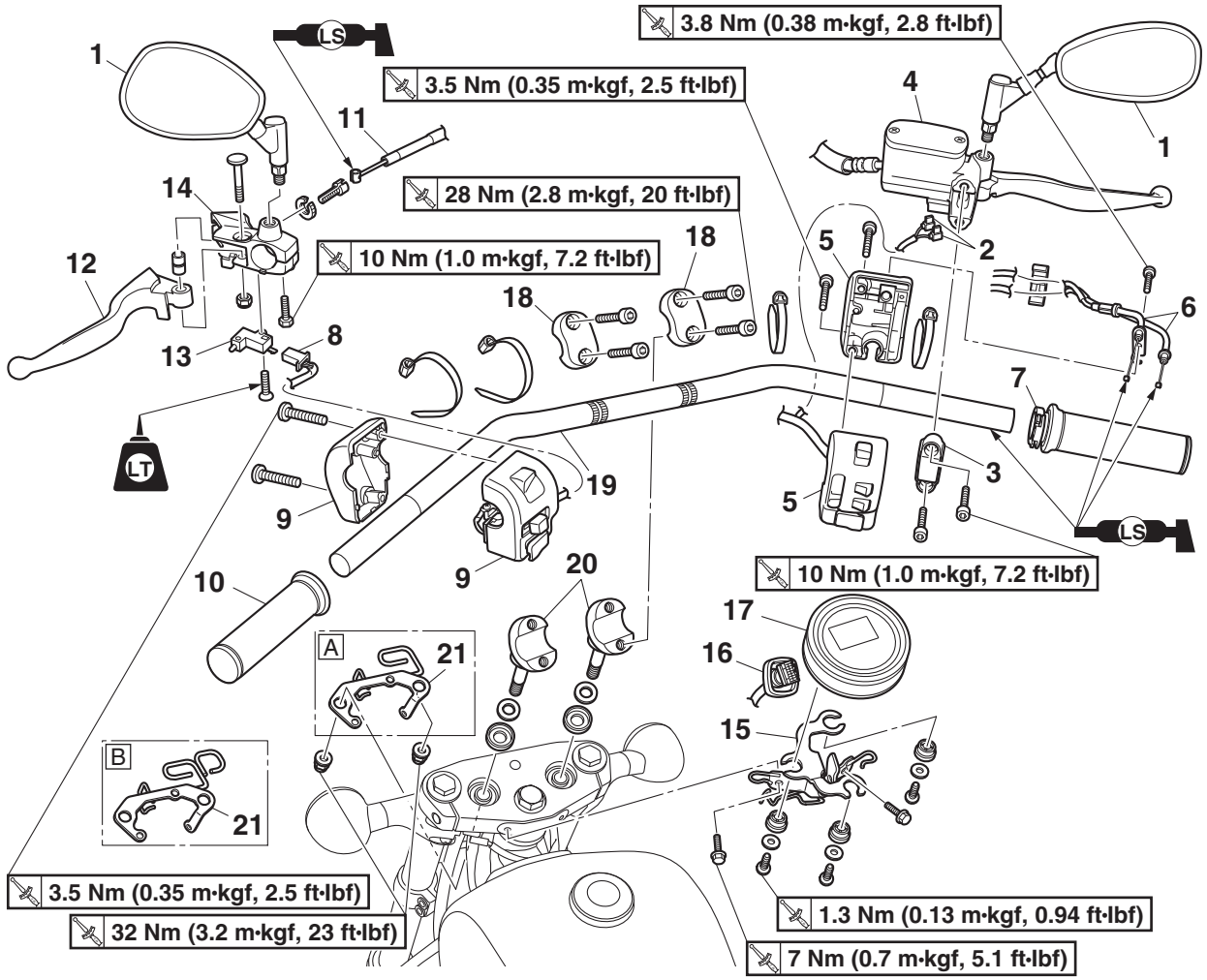
Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
	Headlight unit		Refer to "GENERAL CHASSIS" on page 4-1.
	Front turn signal light coupler		Refer to "FRONT FORK" on page 4-76.
1	Rearview mirror	2	
2	Front brake light switch connector	2	Disconnect.
3	Front brake master cylinder holder	1	
4	Front brake master cylinder assembly	1	
5	Right handlebar switch	1	
6	Throttle cable	2	Disconnect.
7	Throttle grip	1	
8	Clutch switch coupler	1	Disconnect.
9	Left handlebar switch	1	
10	Handlebar grip	1	
11	Clutch cable	1	Disconnect.
12	Clutch lever	1	
13	Clutch switch	1	

HANDLEBAR

Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
14	Clutch lever holder	1	
15	Meter assembly bracket	1	
16	Meter assembly coupler	1	Disconnect.
17	Meter assembly	1	
18	Upper handlebar holder	2	
19	Handlebar	1	
20	Lower handlebar holder	2	
21	Cable guide	1	
			For installation, reverse the removal procedure.

A: Except for ABS models
 B: For ABS models

EAS22860

REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

WARNING

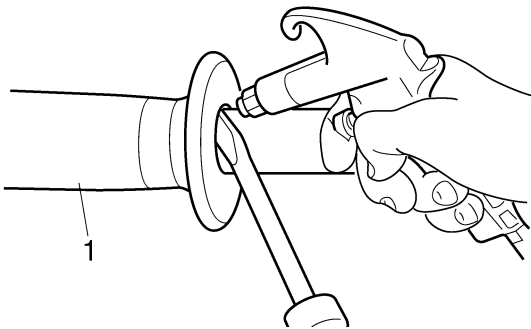
Securely support the vehicle so that there is no danger of it falling over.

2. Remove:

- Handlebar grip "1"

TIP

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



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.

EAS22930

INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

2. Install:

- Handlebar "1"
- Upper handlebar holders "2"



Upper handlebar holder bolt
28 Nm (2.8 m·kgf, 20 ft·lbf)

ECA1TP1010

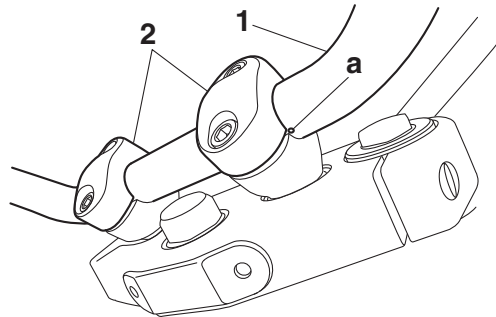
NOTICE

- First, tighten the bolts on the upper side of the upper handlebar holder, and then on the lower 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 end of the upper handlebar holder with the punch mark "a" on the handlebar.



3. Install:

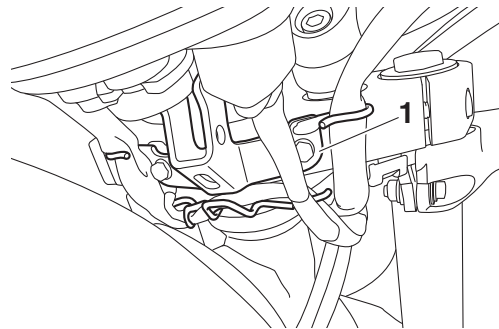
- Meter assembly bracket "1"



Meter assembly bracket bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

TIP

Make sure that the leads are routed properly through the guide. Refer to "CABLE ROUTING (except for ABS models)" on page 2-41 and "CABLE ROUTING (for ABS models)" on page 2-75.



4. Install:

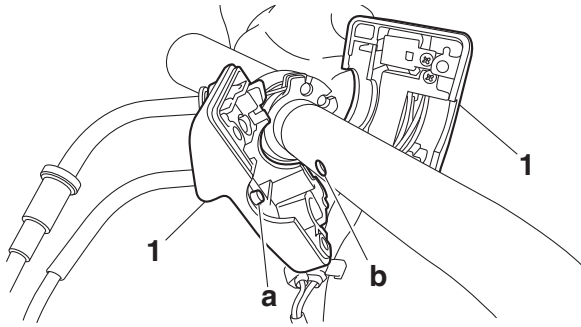
- Clutch lever holder "1"



Clutch lever holder bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

Align the mating surfaces of the clutch lever holder with the punch mark "a" on the handlebar.



10.Install:

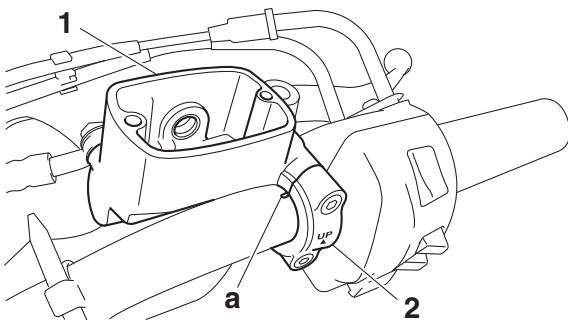
- Front brake master cylinder “1”
- Front brake master cylinder holder “2”



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



11.Adjust:

- Clutch lever free play
Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-10.



Clutch lever free play
5.0–10.0 mm (0.20–0.39 in)

12.Adjust:

- Throttle grip free play
Refer to “CHECKING THE THROTTLE GRIP OPERATION” on page 3-26.

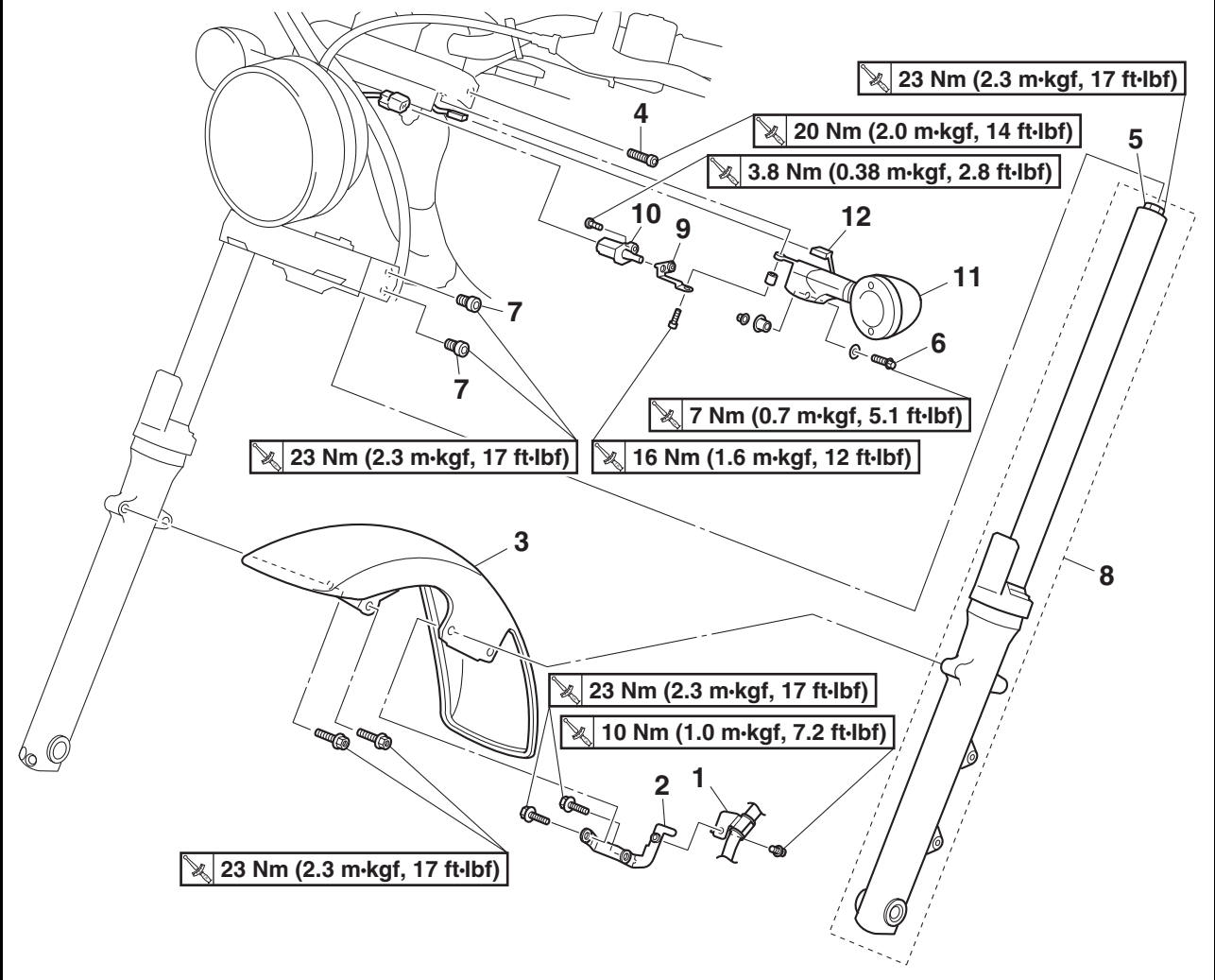


Throttle grip free play
4.0–6.0 mm (0.16–0.24 in)

EAS22950

FRONT FORK

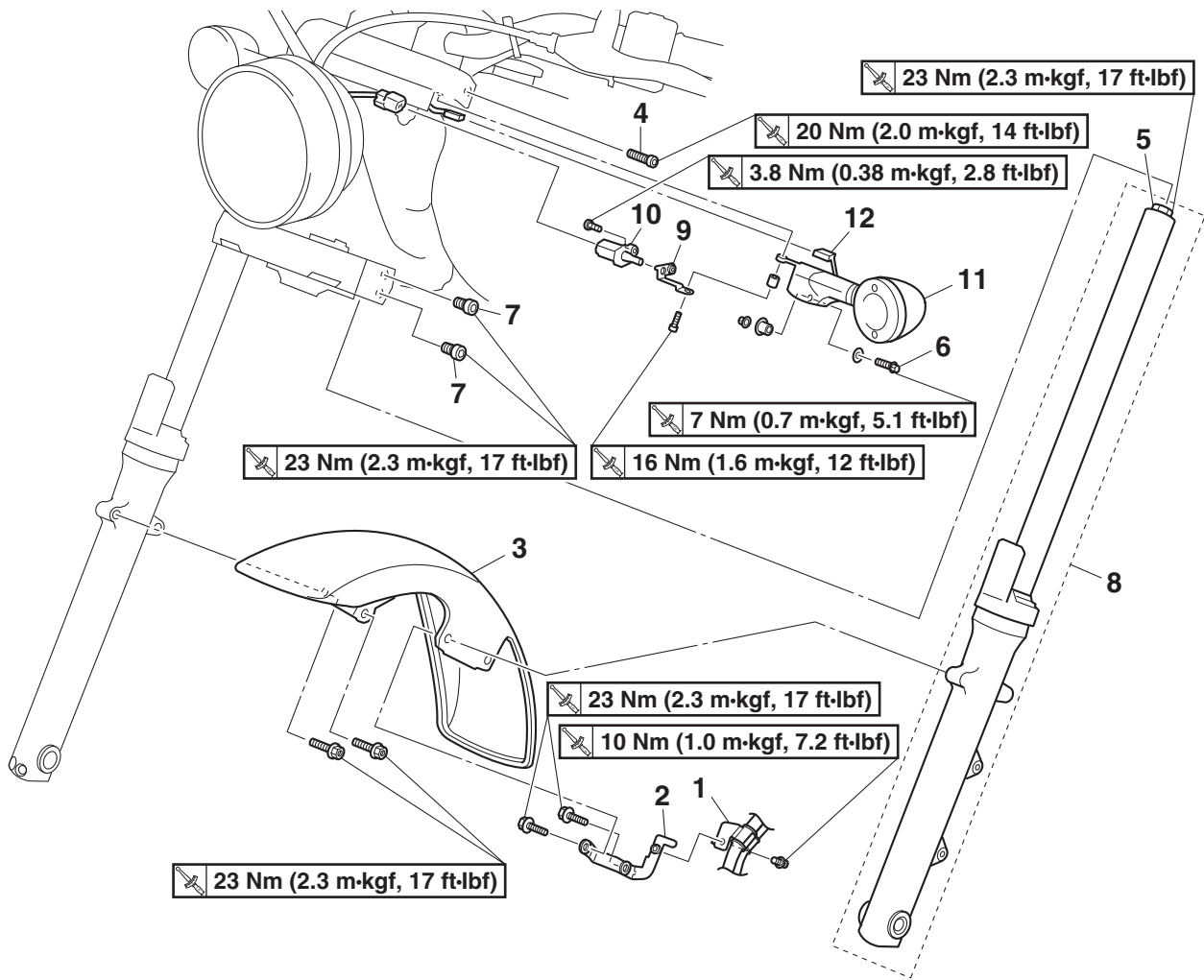
Removing the front fork legs (except for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL" on page 4-10.
1	Front brake hose holder	1	
2	Front brake hose holder bracket	1	
3	Front fender	1	
4	Upper bracket pinch bolt	1	Loosen.
5	Front fork cap bolt	1	Loosen.
6	Front turn signal light pinch bolt	1	Loosen.
7	Lower bracket pinch bolt	2	Loosen.
8	Front fork leg	1	
9	Air temperature sensor bracket	1	Left side only.
10	Air temperature sensor	1	Left side only.
11	Front turn signal light	1	
12	Front turn signal light coupler	1	Disconnect.
			For installation, reverse the removal procedure.

FRONT FORK

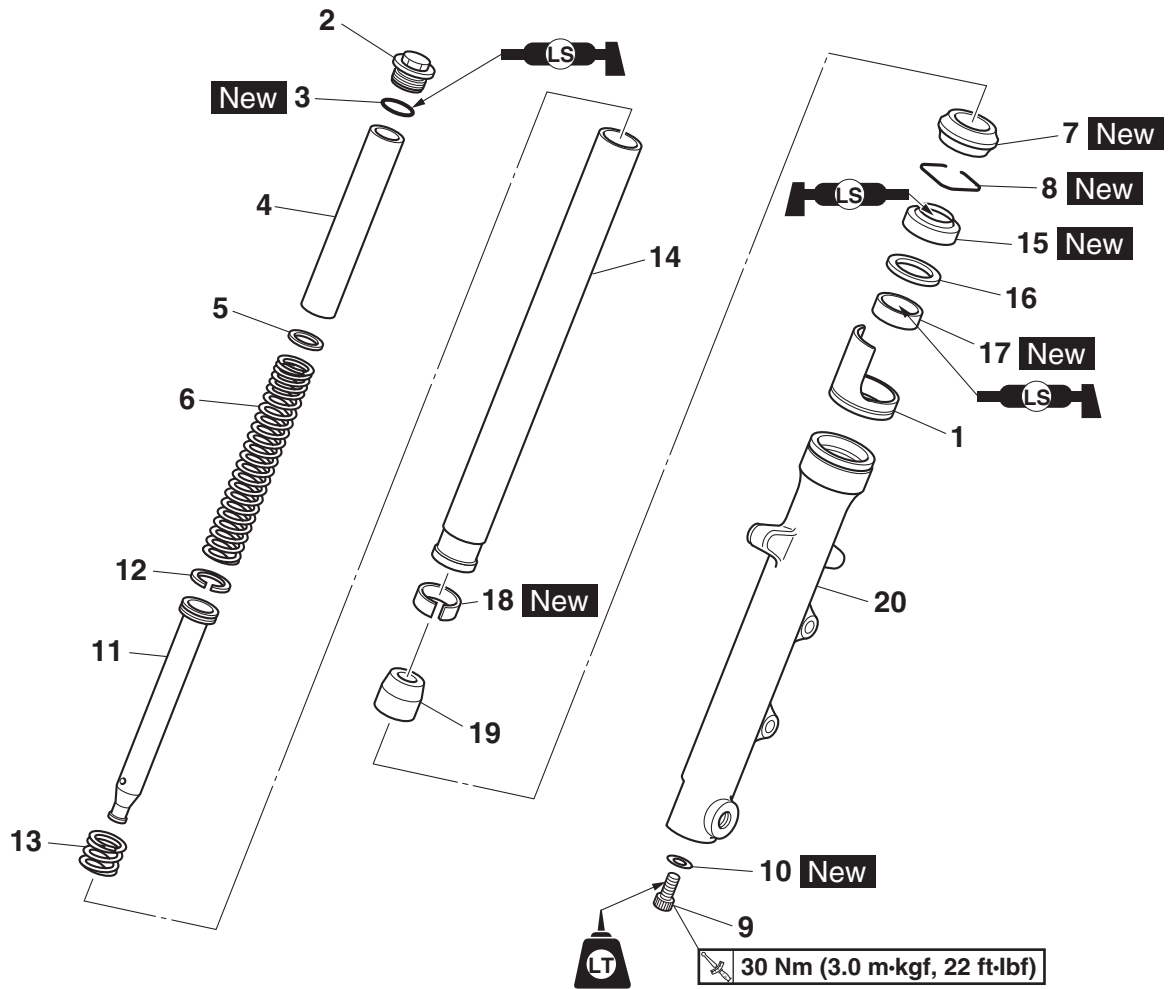
Removing the front fork legs (for ABS models)



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL" on page 4-10.
1	Front brake hose/wheel sensor lead holder	1	
2	Front brake hose/wheel sensor lead holder bracket	1	
3	Front fender	1	
4	Upper bracket pinch bolt	1	Loosen.
5	Front fork cap bolt	1	Loosen.
6	Front turn signal light pinch bolt	1	Loosen.
7	Lower bracket pinch bolt	2	Loosen.
8	Front fork leg	1	
9	Air temperature sensor bracket	1	Left side only.
10	Air temperature sensor	1	Left side only.
11	Front turn signal light	1	
12	Front turn signal light coupler	1	Disconnect.
			For installation, reverse the removal procedure.

FRONT FORK

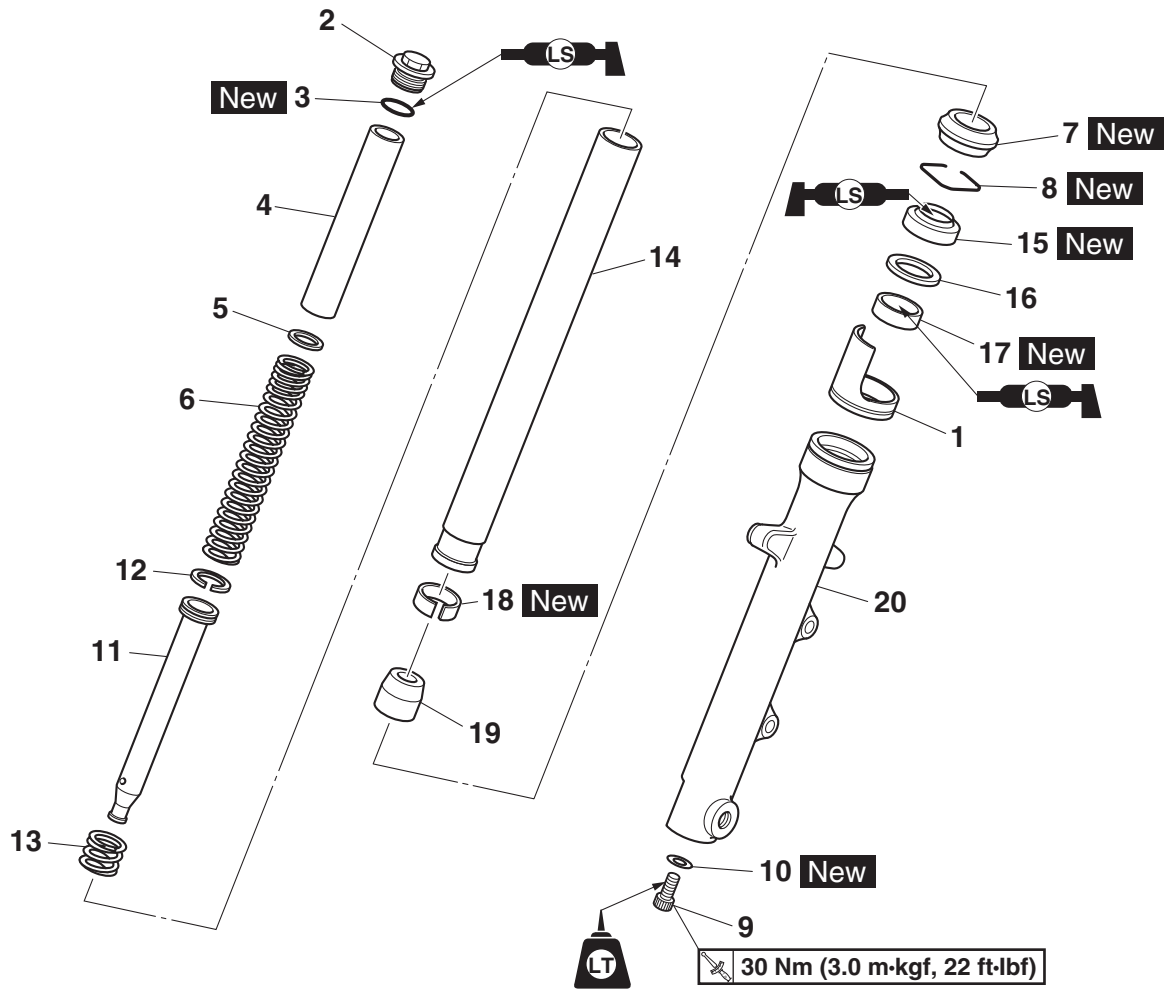
Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
1	Protector	1	
2	Front fork cap bolt	1	
3	O-ring	1	
4	Spacer	1	
5	Spring seat	1	
6	Fork spring	1	
7	Dust seal	1	
8	Oil seal clip	1	
9	Front fork damper rod bolt	1	
10	Copper washer	1	
11	Damper rod	1	
12	Damper rod ring	1	
13	Rebound spring	1	
14	Inner tube	1	
15	Oil seal	1	
16	Washer	1	

FRONT FORK

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
17	Outer tube bushing	1	
18	Inner tube bushing	1	
19	Oil flow stopper	1	
20	Outer 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:

- Front fork cap bolt
- Upper bracket pinch bolt
- Lower bracket pinch bolts

EWA1TP1009

WARNING

Before loosening the lower bracket pinch bolts, support the front fork leg.

EAS22980

DISASSEMBLING THE FRONT FORK LEGS

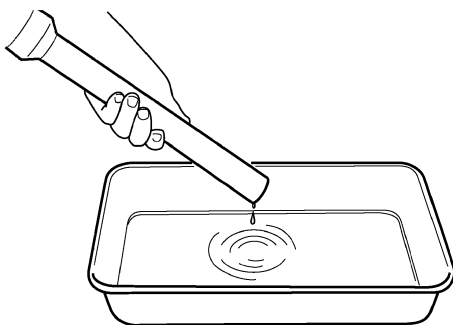
The following procedure applies to both of the front fork legs.

1. Drain:

- Fork oil

TIP

Stroke the outer tube several times while draining the fork oil.



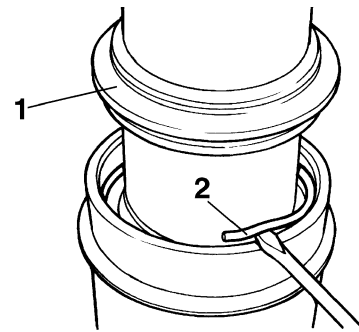
2. Remove:

- Dust seal "1"
- Oil seal clip "2"
(with a flathead screwdriver)

ECA14180

NOTICE

Do not scratch the inner tube.



3. Remove:

- Front fork damper rod bolt "1"
- Copper washer

TIP

While holding the damper rod with the damper rod holder "2" and T-handle "3", loosen the front fork damper rod bolt.



Damper rod holder (22 mm)

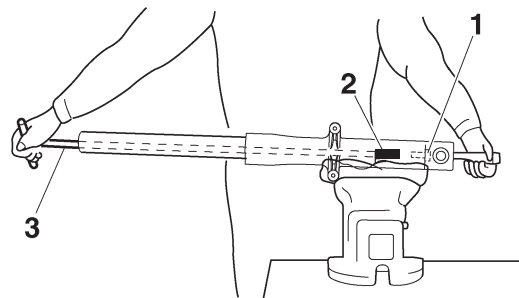
90890-01365

T-handle

90890-01326

T-handle 3/8" drive 60 cm long

YM-01326



4. Remove:

- Inner tube

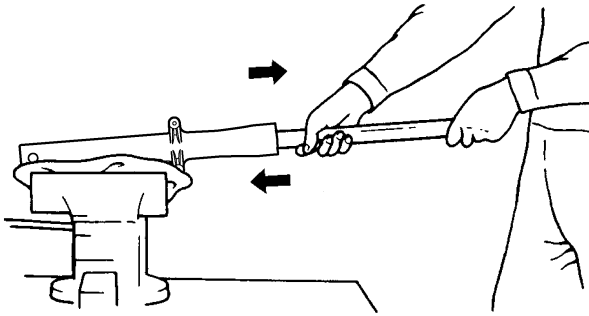


- a. Hold the front fork leg horizontally.
- b. Securely clamp the brake caliper bracket in a vise with soft jaws.
- c. Separate the inner tube from the outer tube by pulling the inner tube forcefully but carefully.

ECA14190

NOTICE

- Excessive force will damage the oil seal and bushing. A damaged oil seal or bushing must be replaced.
- Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.



EAS23010

CHECKING THE FRONT FORK LEGS

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

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

EWA13650

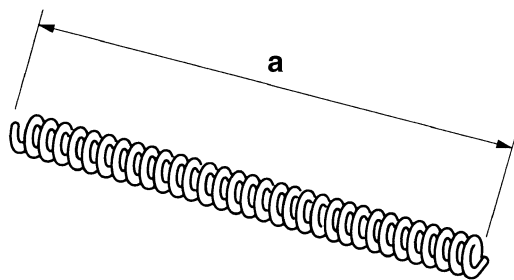
⚠ WARNING

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

2. Measure:
 - Fork spring free length "a"
 Out of specification → Replace.



Fork spring free length
322.2 mm (12.69 in)
Limit
315.8 mm (12.43 in)



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

ECA14200

NOTICE

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

EAS23020

ASSEMBLING THE FRONT FORK LEGS

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

EWA13660

⚠ WARNING

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

TIP

- When assembling the front fork leg, be sure to replace the following parts:
 - Inner tube bushing
 - Outer tube bushing
 - Oil seal
 - Dust seal
- Before assembling the front fork leg, make sure all of the components are clean.

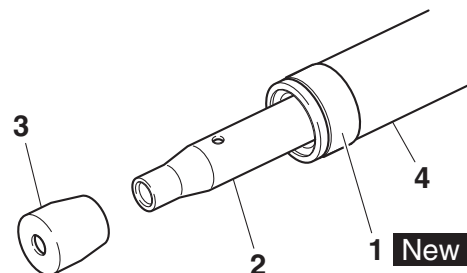
1. Install:

- Inner tube bushing "1" **New**
- Damper rod "2"
- Damper rod ring
- Rebound spring
- Oil flow stopper "3"

ECA1TP1011

NOTICE

Allow the damper rod to slide slowly down the inner tube "4" until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.



FRONT FORK

2. Lubricate:
- Inner tube's outer surface

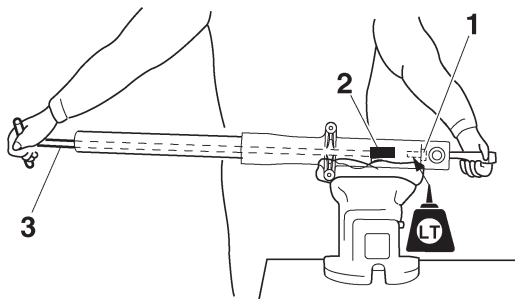
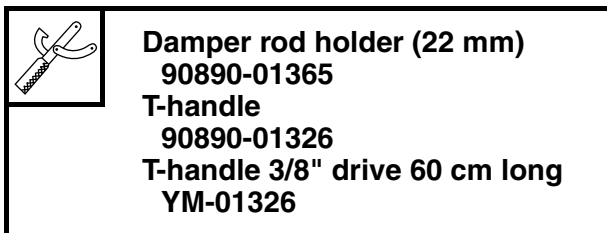


3. Install:
- Inner tube
(in the outer tube)
4. Install:
- Copper washer **New**
 - Front fork damper rod bolt
5. Tighten:
- Front fork damper rod bolt "1"



TIP _____

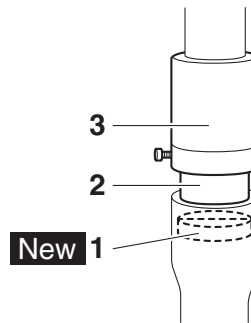
While holding the damper rod assembly with the damper rod holder "2" and T-handle "3", tighten the front fork damper rod bolt.



6. Install:
- Outer tube bushing "1" **New**
 - Washer
(with the fork seal driver attachment "2" and fork seal driver weight "3")



Fork seal driver weight
90890-01367
Replacement hammer
YM-A9409-7
Fork seal driver attachment (ø41)
90890-01381
Replacement 41 mm
YM-A5142-2



7. Install:
- Oil seal "1" **New**
(with the fork seal driver attachment "2" and fork seal driver weight "3")

ECA14220

NOTICE _____

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

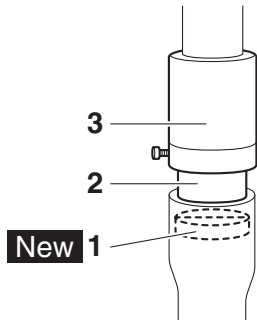
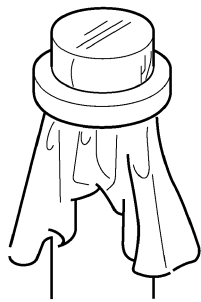
TIP _____

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



Fork seal driver weight
90890-01367
Replacement hammer
YM-A9409-7
Fork seal driver attachment (ø41)
90890-01381
Replacement 41 mm
YM-A5142-2

FRONT FORK

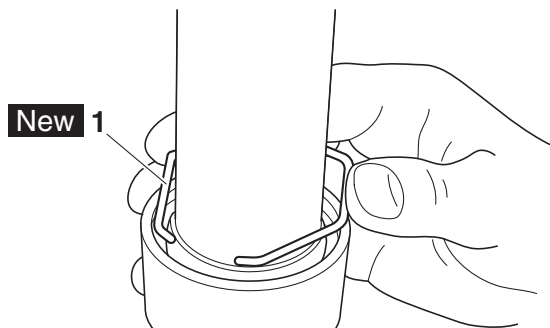


8. Install:

- Oil seal clip “1” **New**

TIP

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

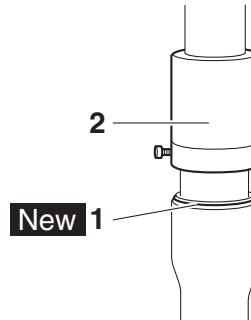


9. Install:

- Dust seal “1” **New**
(with the fork seal driver weight “2”)



Fork seal driver weight
90890-01367
Replacement hammer
YM-A9409-7



10.Fill:

- Front fork leg
(with the specified amount of the recommended fork oil)



Quantity
547.0 cm³ (18.49 US oz, 19.29 Imp.oz)
Recommended oil
Yamaha fork oil 10WT

11.Measure:

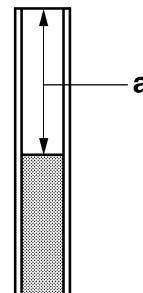
- Front fork leg oil level “a”
(from the top of the inner tube, with the outer tube fully compressed and without the fork spring)
Out of specification → Correct.



Level
116.0 mm (4.57 in)

TIP

- While filling the front fork leg, keep it upright.
- After filling, slowly pump the front fork leg up and down to distribute the fork oil.



12.Install:

- Fork spring
- Spring seat
- Spacer
- Front fork cap bolt
(along with the O-ring **New**)

TIP

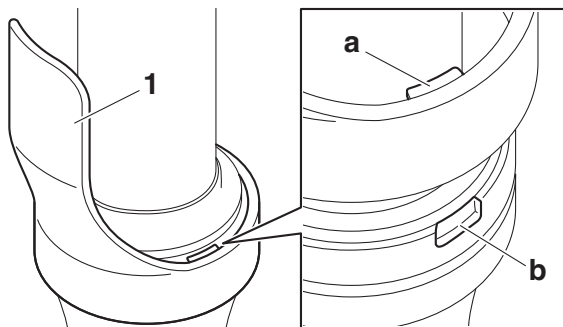
- Before installing the front fork cap bolt, lubricate its O-ring with grease.
- Temporarily tighten the front fork cap bolt.
- Tighten the front fork cap bolt specified torque, when installing the front fork with upper bracket.

13. Install:

- Protector "1"

TIP

Align the projection "a" on the protector "1" with the slot "b" in the outer tube.



EAS23050

INSTALLING THE FRONT FORK LEGS

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

1. Install:

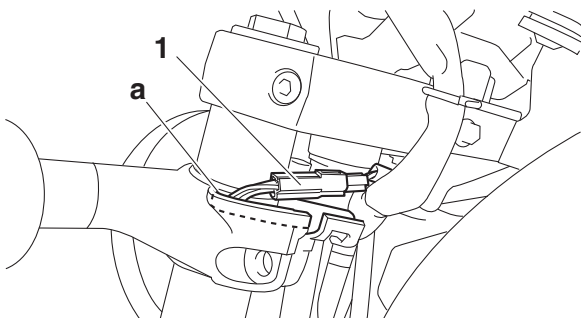
- Front turn signal light coupler "1"
- Front turn signal light
- Air temperature sensor (left side only)
- Air temperature sensor bracket (left side only)



Air temperature sensor bracket bolt
16 Nm (1.6 m·kgf, 12 ft·lbf)

TIP

Fit the front turn signal light coupler into the slot "a" in the front turn signal light.

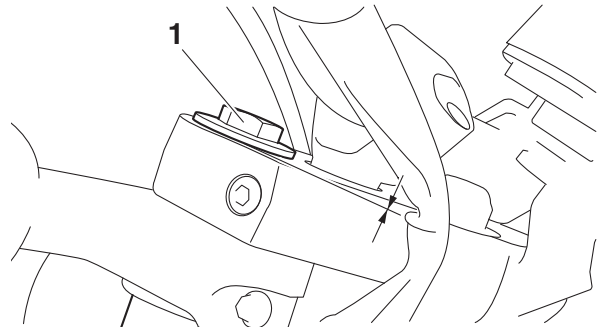


2. Install:

- Front fork leg "1"
Temporarily tighten the lower bracket pinch bolts.

TIP

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



3. Tighten:

- Lower bracket pinch bolts



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

TIP

Tighten the lower bracket pinch bolts to specification twice. Tighten the upper and lower bolts alternately, starting with the upper bolts.

4. Tighten:

- Front turn signal light pinch bolt
- Front fork cap bolt
- Upper bracket pinch bolt



Front turn signal light pinch bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)
Front fork cap bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)
Upper bracket pinch bolt
20 Nm (2.0 m·kgf, 14 ft·lbf)

EWA13680

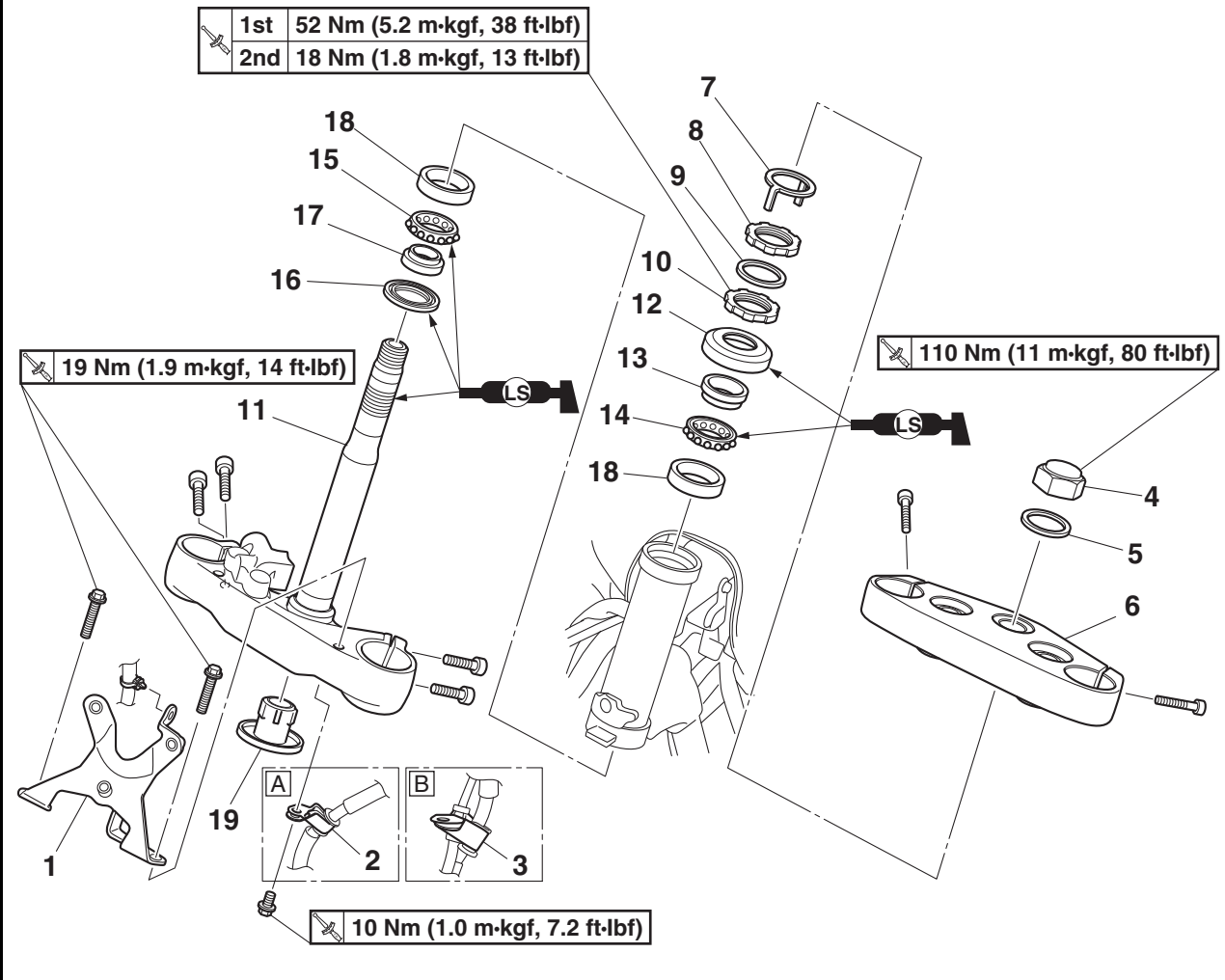
WARNING

Make sure the brake hoses are routed properly.

EAS23090

STEERING HEAD

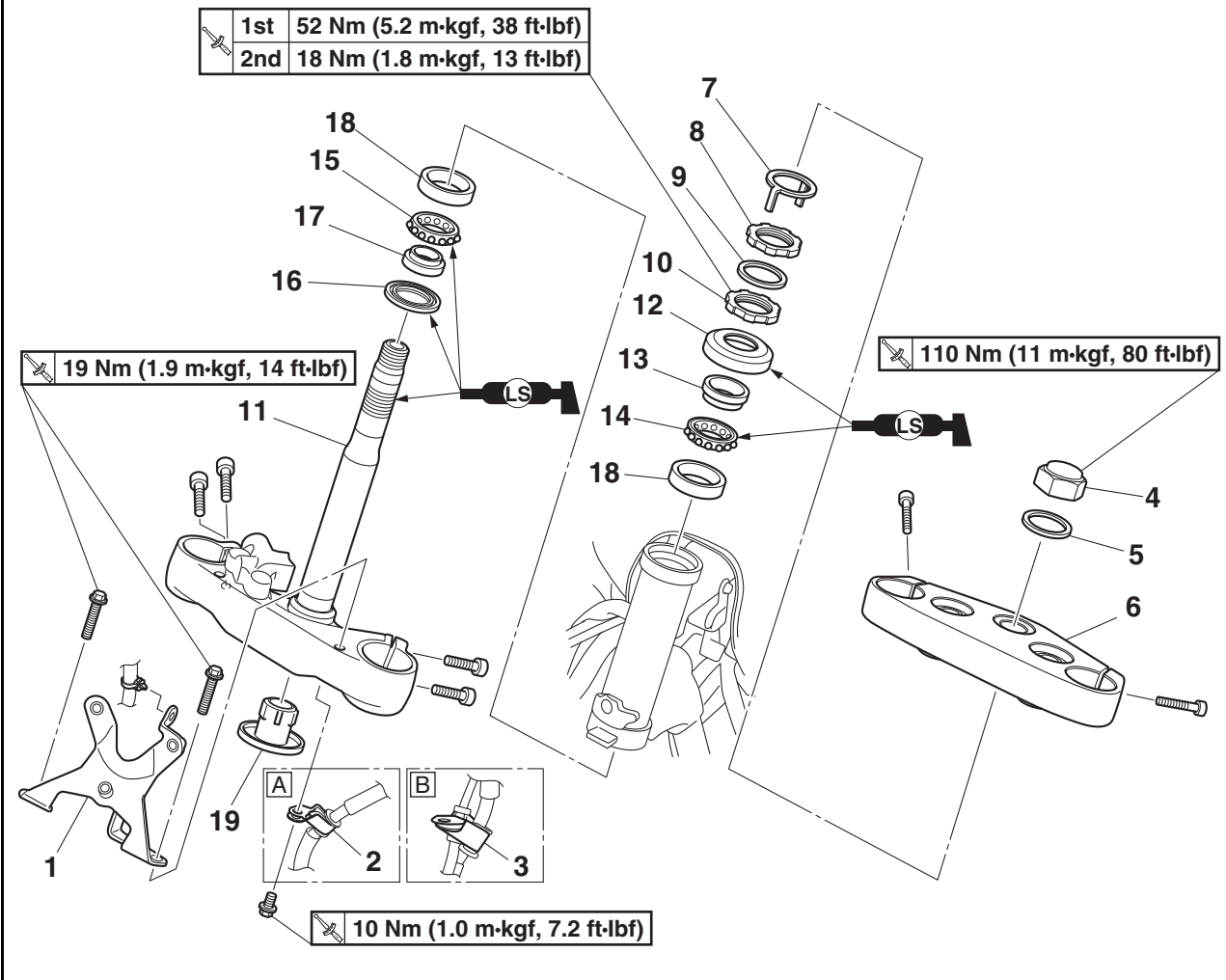
Removing the upper bracket and lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
	Headlight body		Refer to "GENERAL CHASSIS" on page 4-1.
	Handlebar/Cable guide		Refer to "HANDLEBAR" on page 4-71.
	Front fork legs/Air temperature sensor		Refer to "FRONT FORK" on page 4-76.
1	Headlight bracket	1	
2	Front brake hose holder	1	Except for ABS models
3	Front brake hose/wheel sensor lead holder	1	For ABS models
4	Steering stem nut	1	
5	Washer	1	
6	Upper bracket	1	
7	Lock washer	1	
8	Upper ring nut	1	
9	Rubber washer	1	
10	Lower ring nut	1	
11	Lower bracket	1	
12	Upper bearing cover	1	

STEERING HEAD

Removing the upper bracket and lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
13	Upper bearing inner race	1	
14	Upper bearing	1	
15	Lower bearing	1	
16	Dust seal	1	
17	Lower bearing inner race	1	
18	Bearing outer race	2	
19	Lower bracket cap	1	
			For installation, reverse the removal procedure.

A: Except for ABS models

B: For ABS models

STEERING HEAD

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

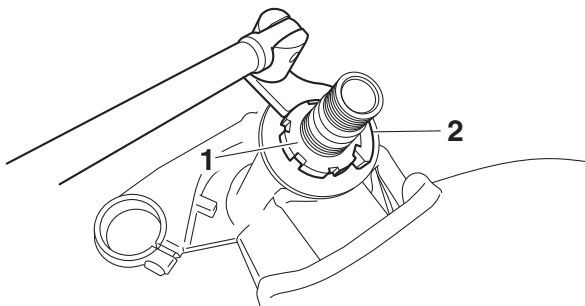
Securely support the lower bracket so that there is no danger of it falling.

TIP

Remove the lower ring nut with the steering nut wrench "2".



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
 - Bearing races
- Damage/pitting → Replace.

3. Replace:

- Bearings
- Bearing races

a. Remove the bearing races from the steering head pipe with a long rod "1" and hammer.

- b. Remove the bearing race from the lower bracket with a floor chisel "2" and hammer.
- c. Install a new dust seal and new bearing races.

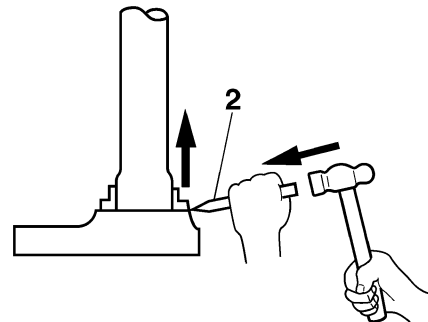
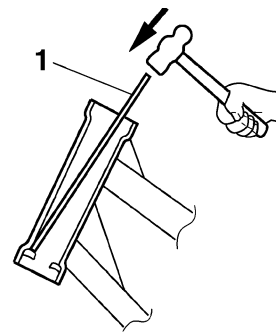
ECA14270

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.



4. Check:

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

EAS23140

INSTALLING THE STEERING HEAD

1. Lubricate:

- Upper bearing
- Lower bearing
- Bearing races



Recommended lubricant
Lithium-soap-based grease

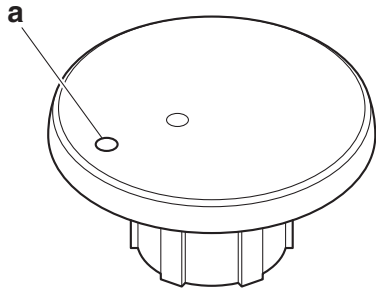
2. Install:

- Lower bracket
- Lower bracket cap

STEERING HEAD

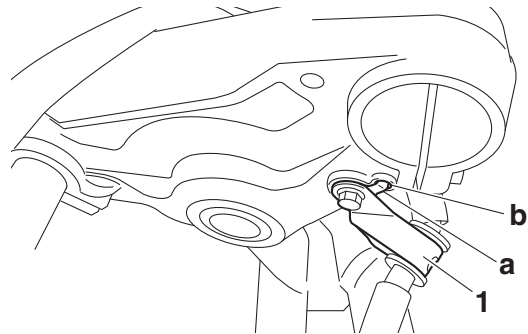
TIP

Face the hole "a" in the lower bracket cap rearward.



TIP

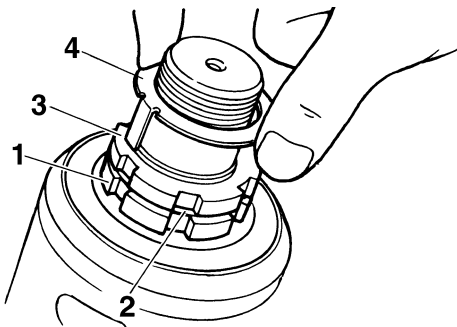
Align the projection "a" on the front brake hose holder with the hole "b" in the lower bracket.



3. 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 3-19.



4. Install:

- Upper bracket
- Washer
- Steering stem nut

TIP

Temporarily tighten the steering stem nut.

5. Install:

- Front fork legs
- Refer to "FRONT FORK" on page 4-76.

TIP

Temporarily tighten the upper and lower bracket pinch bolts.

6. Tighten:

- Steering stem nut



Steering stem nut
110 Nm (11 m·kgf, 80 ft·lbf)

7. Install:

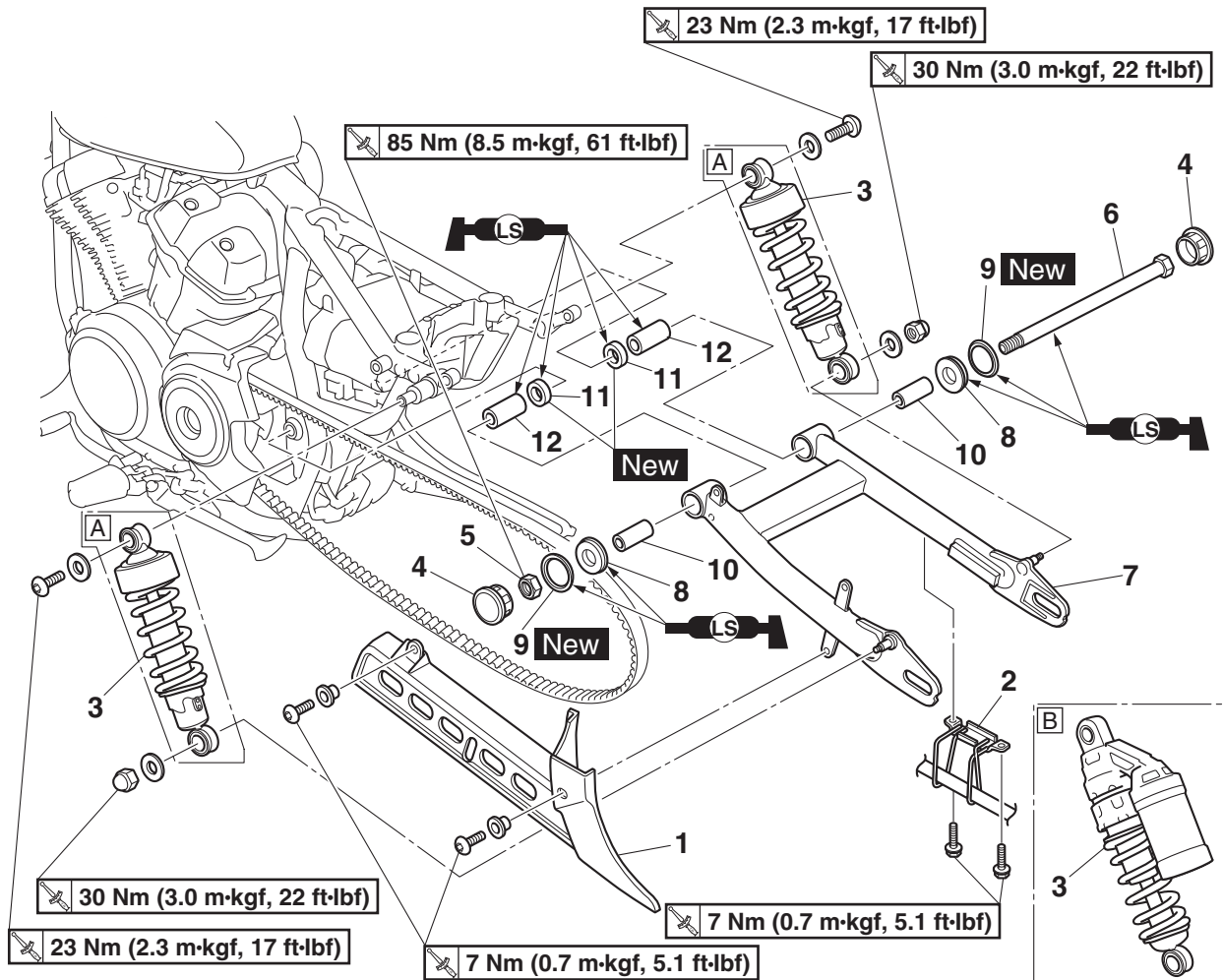
- Front brake hose holder "1"
- Headlight bracket

SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

EAS1TP1016

SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

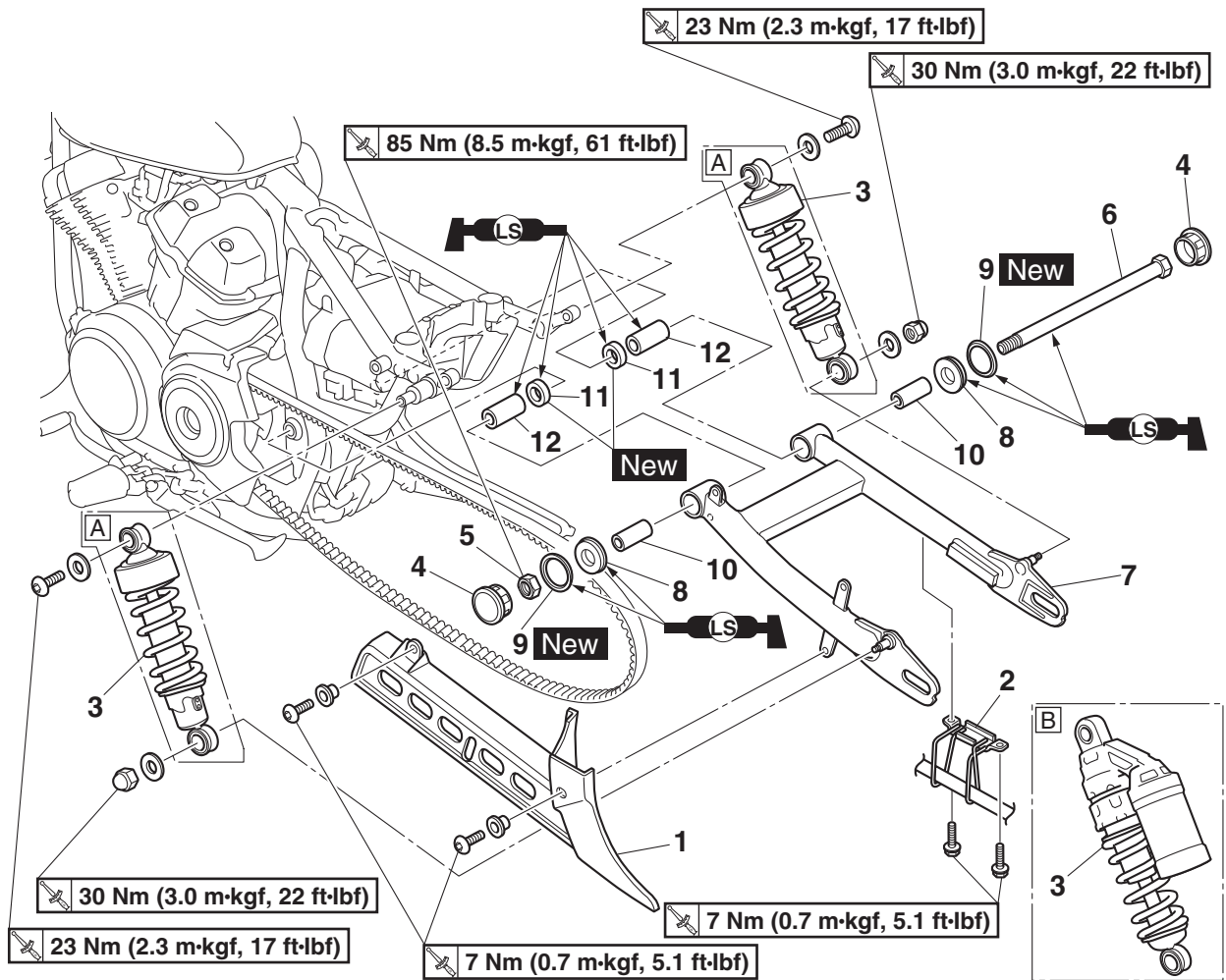
Removing the swingarm and rear shock absorber assemblies



Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-19.
	Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
1	Drive belt lower guard	1	
2	Rear brake hose guide	1	
3	Rear shock absorber assembly	2	
4	Pivot shaft cover	2	
5	Pivot shaft nut	1	
6	Pivot shaft	1	
7	Swingarm	1	
8	Collar	2	
9	Dust seal	2	
10	Spacer	2	
11	Dust seal	2	

SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

Removing the swingarm and rear shock absorber assemblies



Order	Job/Parts to remove	Q'ty	Remarks
12	Bearing	2	
			For installation, reverse the removal procedure.

A: For models not equipped with gas cylinders

B: For models equipped with gas cylinders

SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

EAS1TP1066

REMOVING THE SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

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 belt lower guard
- Rear brake hose guide
- Rear shock absorber assemblies

3. Measure:


- Swingarm side play
- Swingarm vertical movement

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

	Pivot shaft nut 85 Nm (8.5 m·kgf, 61 ft·lbf)
--	---

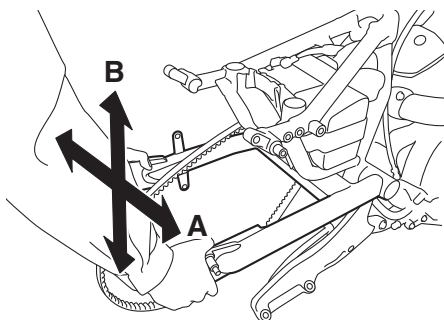
b. Measure the swingarm end free play "A" (axial) by moving the swingarm from side to side.

c. If the swingarm end free play (axial) is out of specification, check the spacers, bearings, collars, and dust seals.

	Swingarm end free play limit (axial) 0 mm (0 in)
---	---

d. Measure the swingarm end free play "B" (radial) by moving the swingarm up or down.

e. If swingarm vertical movement is not smooth or if there is binding, check the spacers, bearings, collars and dust seals.



EAS23360

CHECKING THE SWINGARM

1. Check:

- Swingarm
Bends/cracks/damage → Replace.

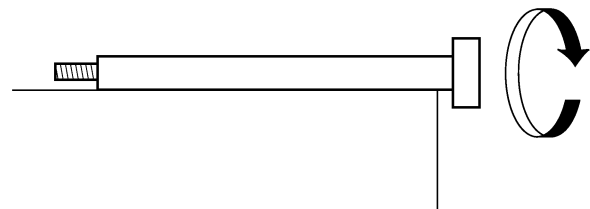
2. Check:

- 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 seals
- Spacers
- Collars
- Bearings

	Recommended cleaning solvent Kerosene
---	--

4. Check:

- Dust seals
- Spacer
Damage/wear → Replace.

5. Check:

- Bearings
Damage/pitting → Replace.

EAS1XC1037

HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER (for models equipped with gas cylinders)

EWA13750

WARNING

This rear shock absorber and gas cylinder contain highly compressed nitrogen gas. Before handling the rear shock absorber or gas cylinder, read and make sure you understand the following information. The manufacturer cannot be held responsible for

SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

property damage or personal injury that may result from improper handling of the rear shock absorber and gas cylinder.

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

EAS1XC1038

DISPOSING OF A REAR SHOCK ABSORBER (for models equipped with gas cylinders)

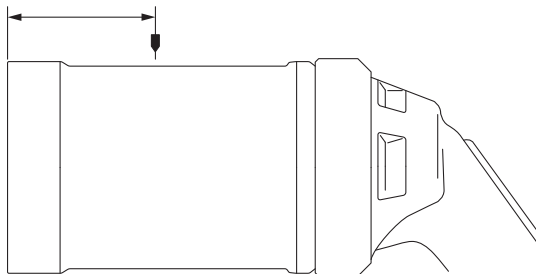
1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3 mm (0.08–0.12 in) hole through the rear shock absorber at a point 40 mm (1.57 in) from its end as shown.

EWA13760



WARNING

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



EAS1XC1039

CHECKING THE REAR SHOCK ABSORBER ASSEMBLIES

1. Check:

- Rear shock absorber rod
Bends/damage → Replace the rear shock absorber assembly.
- Rear shock absorber
Oil leaks → Replace the rear shock absorber assembly. (for models not equipped with gas cylinders)
Gas leaks/oil leaks → Replace the rear shock absorber assembly. (for models equipped with gas cylinders)

- Spring
Damage/wear → Replace the rear shock absorber assembly.
- Gas cylinder (for models equipped with gas cylinders)
Damage/gas leaks → Replace.
- Bushing
Damage/wear → Replace the rear shock absorber assembly.
- Bolts
Bends/damage/wear → Replace.

EAS1TP1071

INSTALLING THE SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

1. Lubricate:

- Bearings
- Collars
- Dust seals
- Pivot shaft



Recommended lubricant
Lithium-soap-based grease

2. Install:

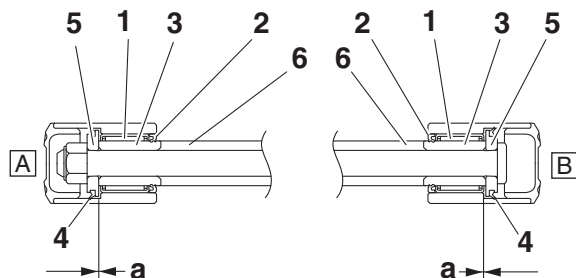
- Bearings “1”
- Dust seals “2”
- Spacers “3”
- Dust seals “4”
- Collars “5”
- Swingarm “6”



Installed depth “a”
0–1.0 mm (0–0.04 in)

TIP

Make sure that the dust seals “2” do not protrude past the edges of the swingarm.



- A. Left side
B. Right side

3. Install:

- Pivot shaft nut

SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES



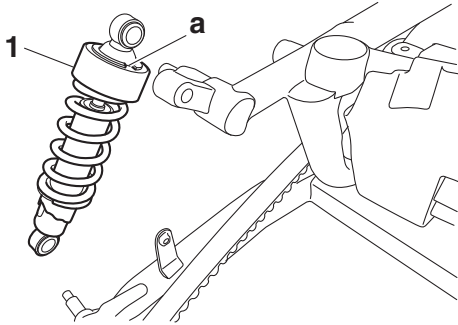
Pivot shaft nut
85 Nm (8.5 m·kgf, 61 ft·lbf)

4. Install:

- Rear shock absorber assembly “1”

TIP

Make sure that the slot “a” in the rear shock absorber assembly faces inward. (for models not equipped with gas cylinders)



5. Tighten:

- Rear shock absorber assembly upper bolt



Rear shock absorber assembly upper bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)

6. Tighten:

- Rear shock absorber assembly lower nut



Rear shock absorber assembly lower nut
30 Nm (3.0 m·kgf, 22 ft·lbf)

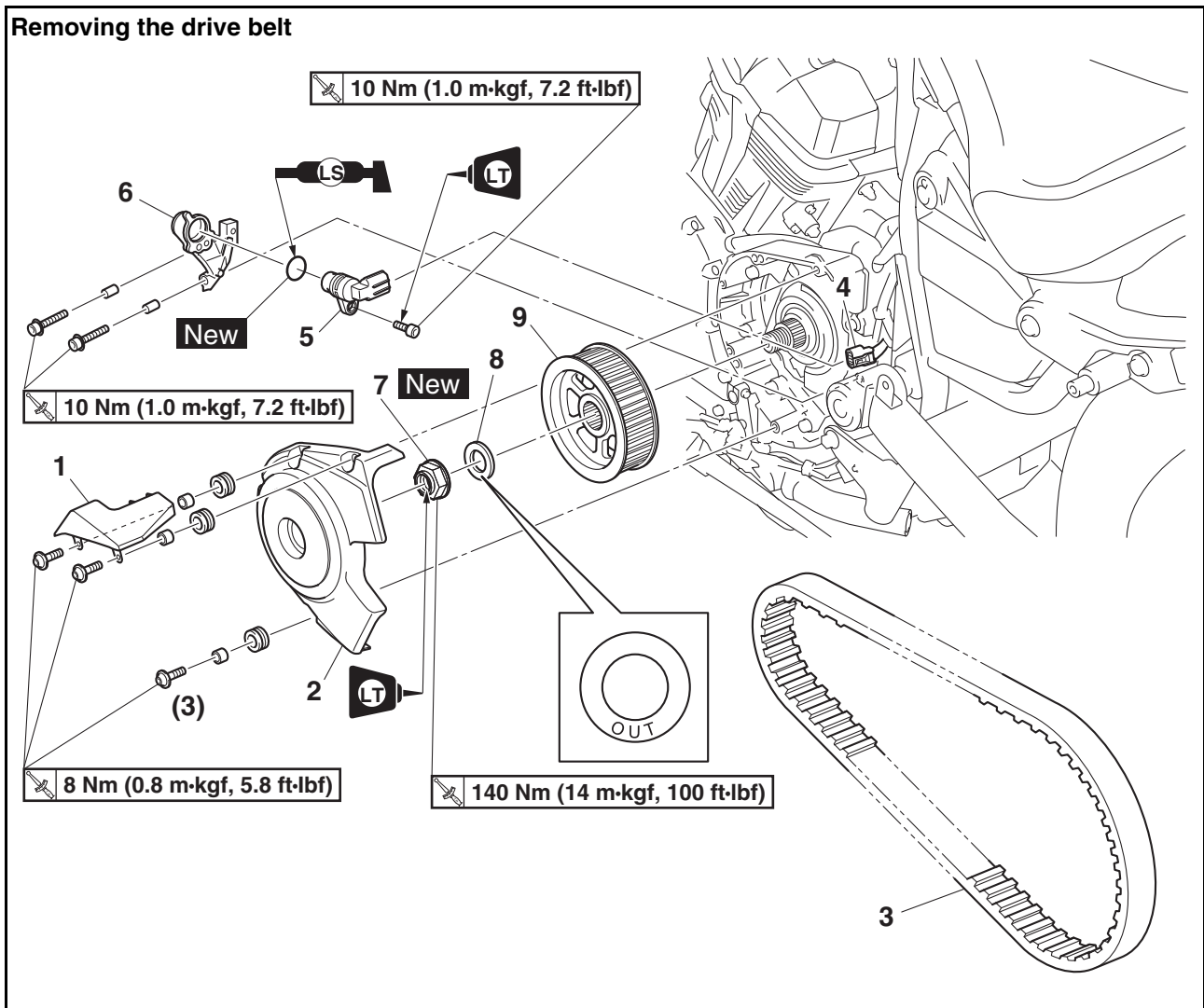
7. Adjust:

- Drive belt slack
Refer to “ADJUSTING THE DRIVE BELT SLACK” on page 3-18.

EAS23510

BELT DRIVE

Removing the drive belt

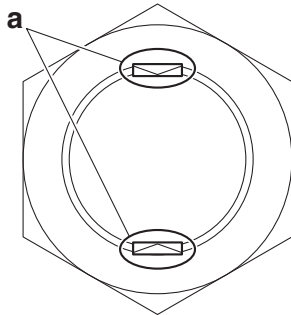


Order	Job/Parts to remove	Q'ty	Remarks
	Drive belt upper guard		Refer to "REAR WHEEL" on page 4-19.
	Drive belt lower guard/Rear shock absorber		Refer to "SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES" on page 4-89.
1	Air duct	1	
2	Drive pulley cover	1	
3	Drive belt	1	
4	Speed sensor coupler	1	Disconnect. Except for ABS models
5	Speed sensor	1	Except for ABS models
6	Speed sensor bracket	1	Except for ABS models
7	Drive pulley nut	1	
8	Washer	1	
9	Drive pulley	1	
			For installation, reverse the removal procedure.

EAS23520

REMOVING THE DRIVE BELT AND DRIVE PULLEY

1. Straighten the drive pulley nut ribs "a".



2. Loosen:
 - Drive pulley nut

TIP

When loosening the drive pulley nut, press down on the brake pedal so the drive pulley does not move.

3. Remove:
 - Drive belt

TIP

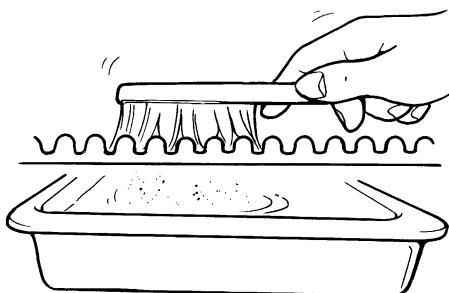
Push the rear wheel forward and remove the drive belt from the rear wheel pulley. Refer to "ADJUSTING THE DRIVE BELT SLACK" on page 3-18.

EAS23530

CHECKING THE DRIVE BELT

1. Clean:
 - Drive belt

- a. Wipe the drive belt with a clean cloth.
- b. Put the drive belt in a mixture of mild detergent and water. Then, remove any dirt from the drive belt.
- c. Remove the drive belt from the mixture and rinse it off with clean water. Then, let the drive belt thoroughly dry.

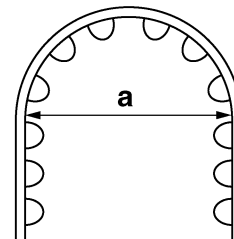


2. Check:
 - Drive belt

ECA1TP1030

NOTICE

- To protect the drive belt from damage, handle it with care.
- The drive belt can not be bent smaller than 125 mm (4.92 in) "a".
- The removed drive belt can not be twisted inside out.



3. Check:
 - Drive pulley
 - Rear wheel pulley
 Bent teeth → Replace the drive belt and pulleys as a set.

EAS23540

INSTALLING THE DRIVE BELT AND DRIVE PULLEY

1. Install:
 - Drive belt

ECA1TP1031

NOTICE

Align the mark of the drive belt with the progress direction "A".
Do not twist the drive belt when installing it.



2. Install:
 - Washer
 - Drive pulley nut **New**

TIP

Install the washer with its "OUT" mark facing outward.

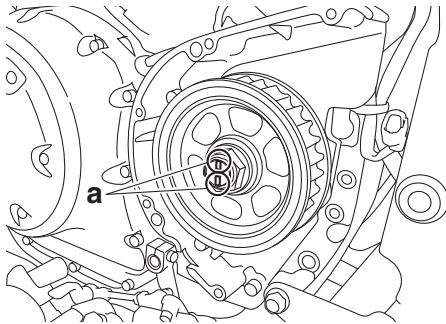
3. Tighten:
 - Drive pulley nut



Drive pulley nut
140 Nm (14 m·kgf, 100 ft·lbf)
LOCTITE®

TIP

- Stake the drive pulley nut at the cutouts “a” in the drive axle.
- When tightening the drive pulley nut, press down on the brake pedal so the drive pulley does not move.



4. Adjust:

- Drive belt slack
Refer to “ADJUSTING THE DRIVE BELT SLACK” on page 3-18.

ENGINE

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EAS1TP1047

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 3-4.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
 - Rear cylinder right cover
Refer to "ENGINE REMOVAL" on page 5-3.
4. Disconnect:
 - Spark plug caps
5. Remove:
 - Spark plug

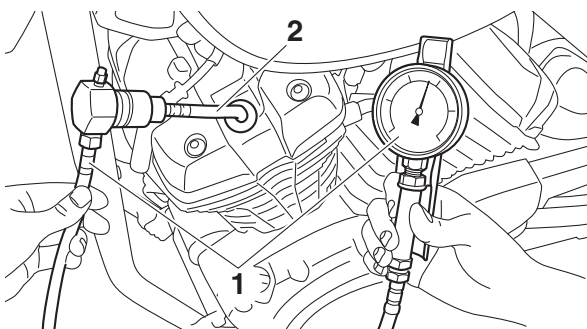
ECA13340

NOTICE _____

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

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

	<p>Compression gauge 90890-03081</p> <p>Engine compression tester YU-33223</p> <p>Extension 90890-04136</p>
---	--



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

	<p>Standard compression pressure (at sea level) 1400 kPa/400 r/min (14.0 kgf/cm²/400 r/min, 199.1 psi/400 r/min)</p> <p>Minimum-maximum 1250–1500 kPa (12.5–15.0 kgf/cm², 177.8–213.3 psi)</p>
---	--



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

TIP _____


The difference in compression pressure between cylinders should not exceed 100 kPa (1.0 kgf/cm², 14.5 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 → Replace.
Same as without oil	Piston, valves or cylinder head gasket possibly defective → Replace.



8. Install:
 - Spark plug

	<p>Spark plug 13 Nm (1.3 m·kgf, 9.4 ft·lbf)</p>
---	--

9. Connect:
 - Spark plug caps

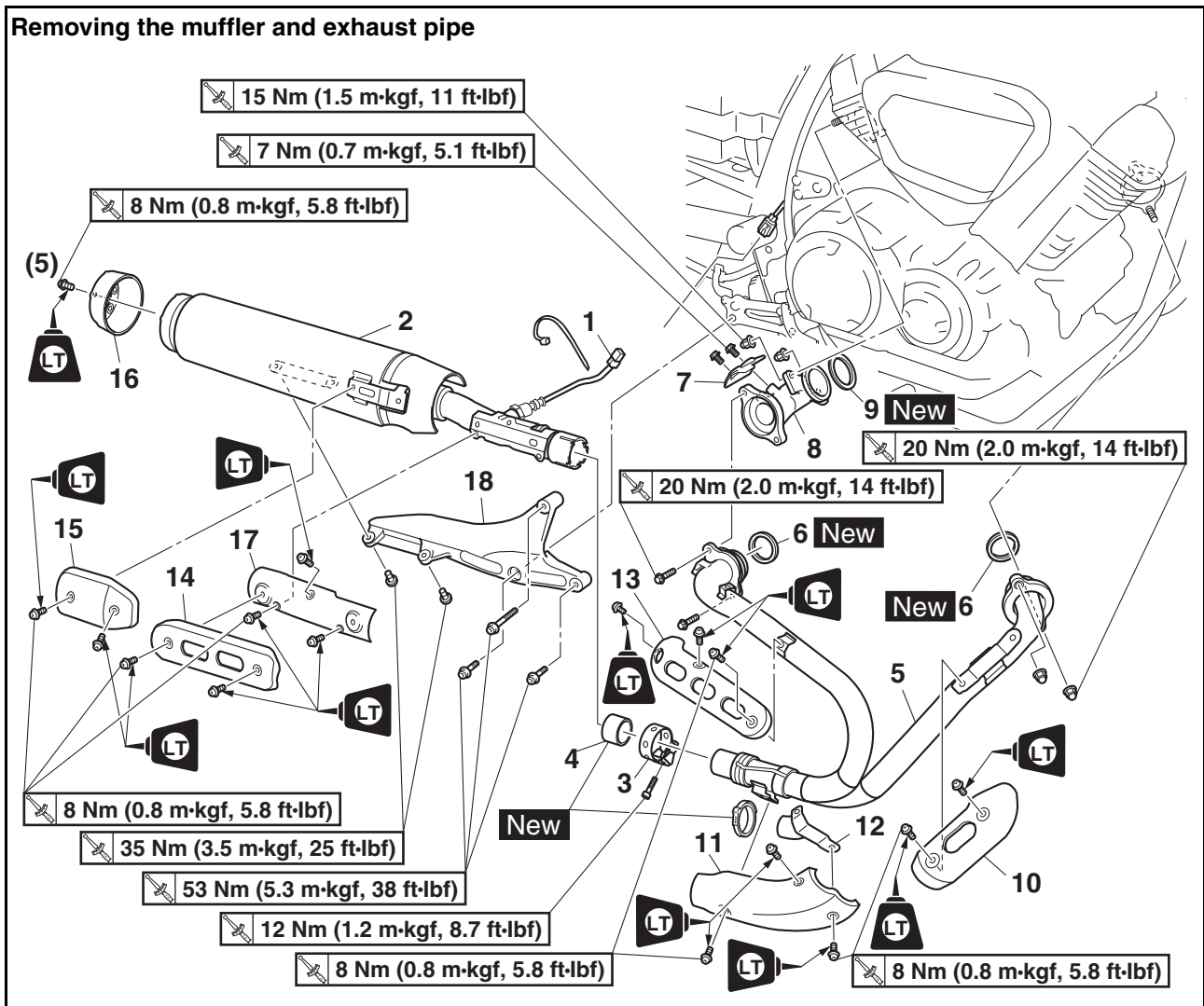
10.Install:

- Rear cylinder right cover
Refer to "ENGINE REMOVAL" on page 5-3.

EAS23710

ENGINE REMOVAL

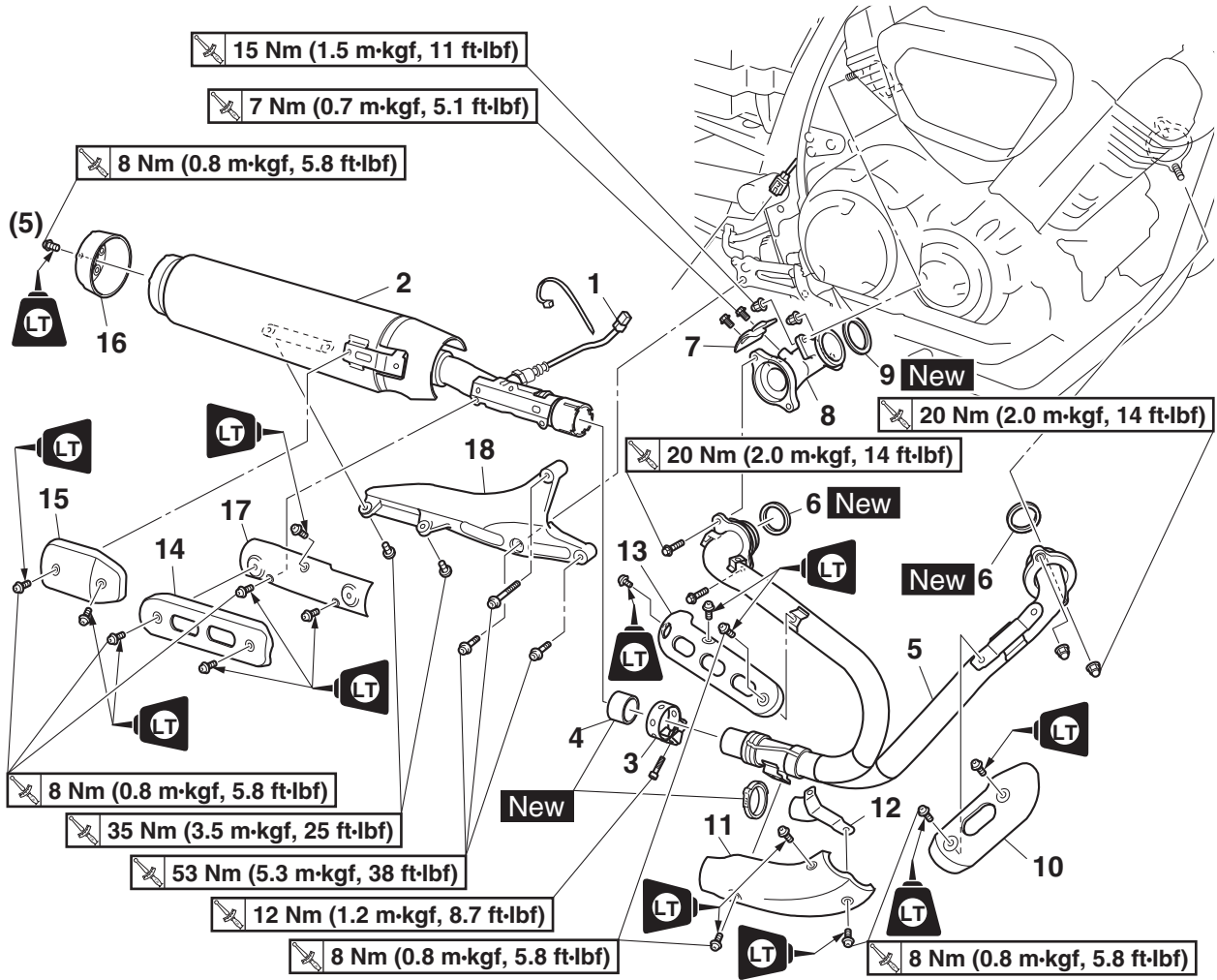
Removing the muffler and exhaust pipe



Order	Job/Parts to remove	Q'ty	Remarks
1	O ₂ sensor coupler	1	Disconnect.
2	Muffler	1	
3	Clamp	1	
4	Gasket	1	
5	Exhaust pipe	1	
6	Gasket	2	
7	Exhaust pipe joint cover	1	
8	Exhaust pipe joint	1	
9	Gasket	1	
10	Exhaust pipe protector 1	1	
11	Exhaust pipe protector 2	1	
12	Exhaust pipe protector 2 bracket	1	
13	Exhaust pipe protector 3	1	
14	Muffler protector 1	1	
15	Muffler protector 2	1	
16	Muffler cap	1	

ENGINE REMOVAL

Removing the muffler and exhaust pipe



Order	Job/Parts to remove	Q'ty	Remarks
17	Muffler protector (inner)	1	
18	Muffler bracket	1	
			For installation, reverse the removal procedure.

EAS1TP1068

INSTALLING THE EXHAUST PIPE

1. Install:

- Exhaust pipe joint
- Exhaust pipe joint cover



Exhaust pipe joint nut
15 Nm (1.5 m·kgf, 11 ft·lbf)
Exhaust pipe joint cover bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

TIP

Tighten the exhaust pipe joint nuts, and then install the exhaust pipe joint cover and bolts.

2. Install:

- Exhaust pipe protector 2 bracket band "1"

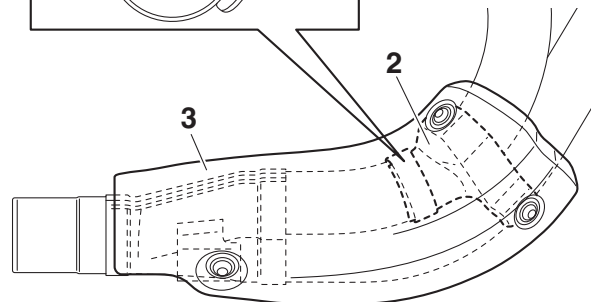
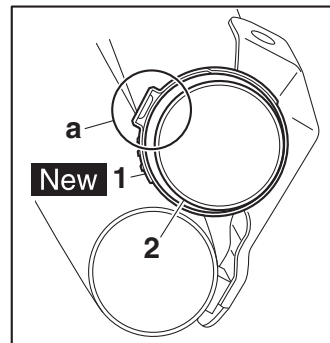
New

- Exhaust pipe protector 2 bracket "2"
- Exhaust pipe protector 2 "3"

- Fit the exhaust pipe protector 2 bracket band onto the exhaust pipe.
- Temporarily install the exhaust pipe protector 2 and exhaust pipe protector 2 bracket as shown in the illustration.
- Position the exhaust pipe protector 2 bracket band so that its section to crimp is positioned at the location "a" shown in the illustration.

TIP

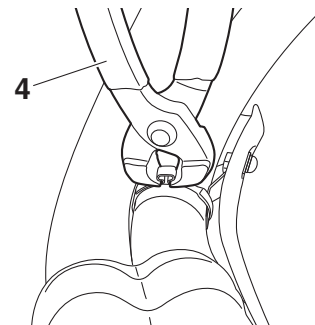
Be sure to place the exhaust pipe protector 2 bracket band over the exhaust pipe protector 2 bracket.



- Crimp the exhaust pipe protector 2 bracket band using the boots band installation tool "4".



Boots band installation tool
90890-01526
YM-01526



3. Tighten:

- Exhaust pipe protector 2 bolts



Exhaust pipe protector 2 bolt
8 Nm (0.8 m·kgf, 5.8 ft·lbf)
LOCTITE®

4. Install:

- Exhaust pipe assembly



Exhaust pipe bolt
20 Nm (2.0 m·kgf, 14 ft·lbf)
Exhaust pipe nut
20 Nm (2.0 m·kgf, 14 ft·lbf)

ENGINE REMOVAL

EAS1TP1048

INSTALLING THE MUFFLER

1. Install:

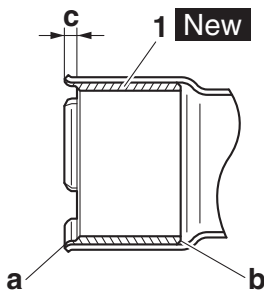
- Gasket "1" **New**
(to muffler)

TIP

Install the gasket with the chamfer "a", located on an inner rim of the gasket, and the chamfer "b", located on an outer rim of the gasket, as shown.



Installed depth of gasket "c"
3.5 mm (0.14 in)

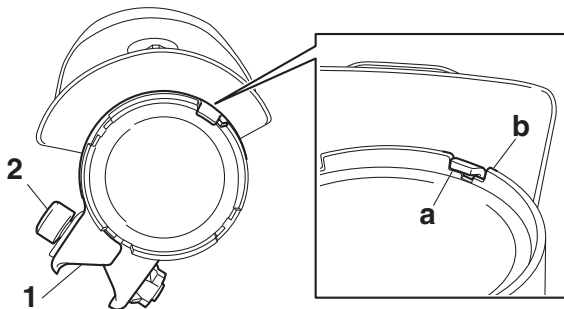


2. Install:

- Clamp "1"
(to the muffler assembly)

TIP

- Fit the projection "a" on the clamp into the slot "b" shown in the illustration.
- Temporarily tighten the clamp bolt "2".



3. Install:

- Muffler assembly
- Muffler bracket



Muffer bolt
35 Nm (3.5 m·kgf, 25 ft·lbf)
Muffer bracket bolt
53 Nm (5.3 m·kgf, 38 ft·lbf)

4. Tighten:

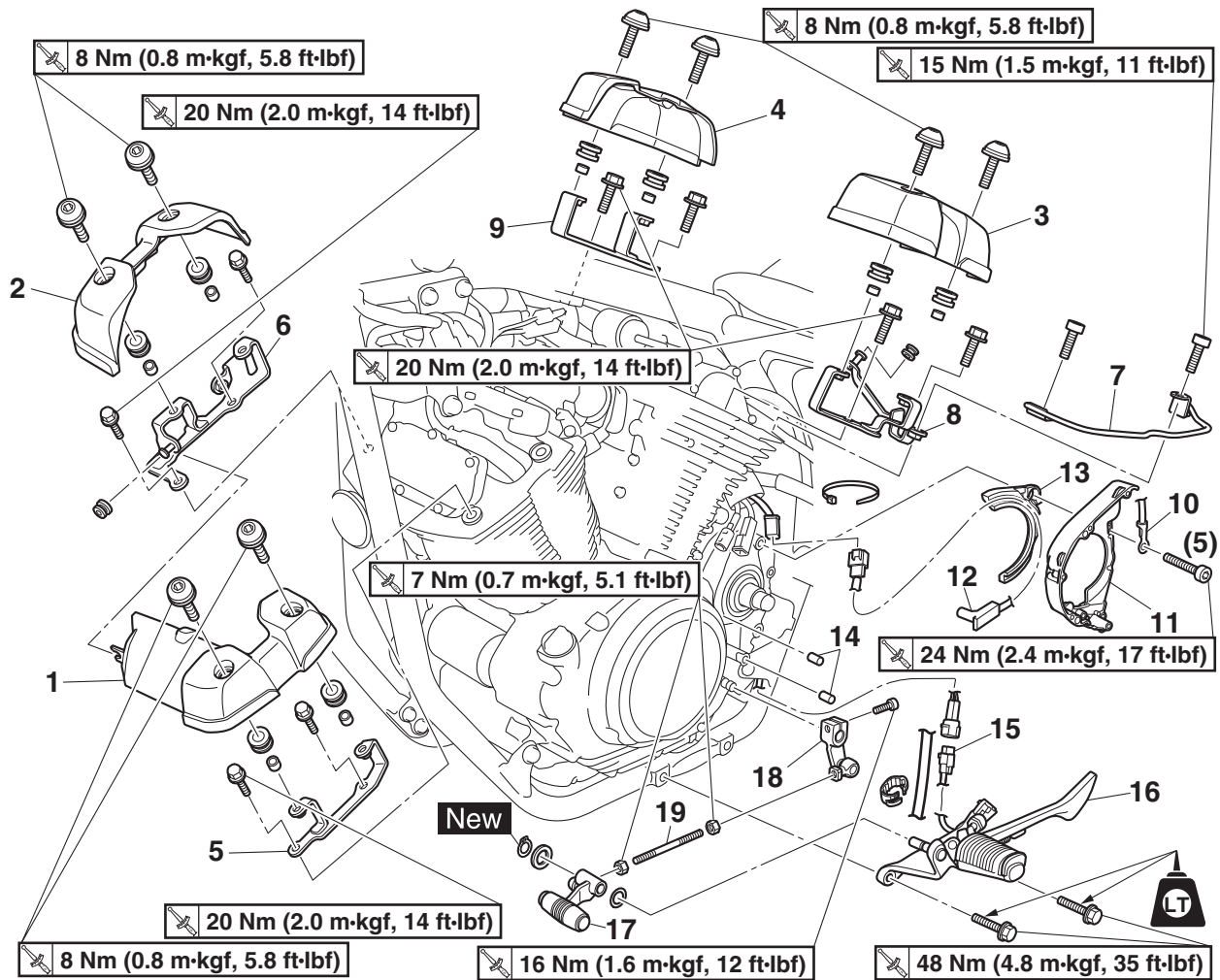
- Clamp bolt



Clamp bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)

ENGINE REMOVAL

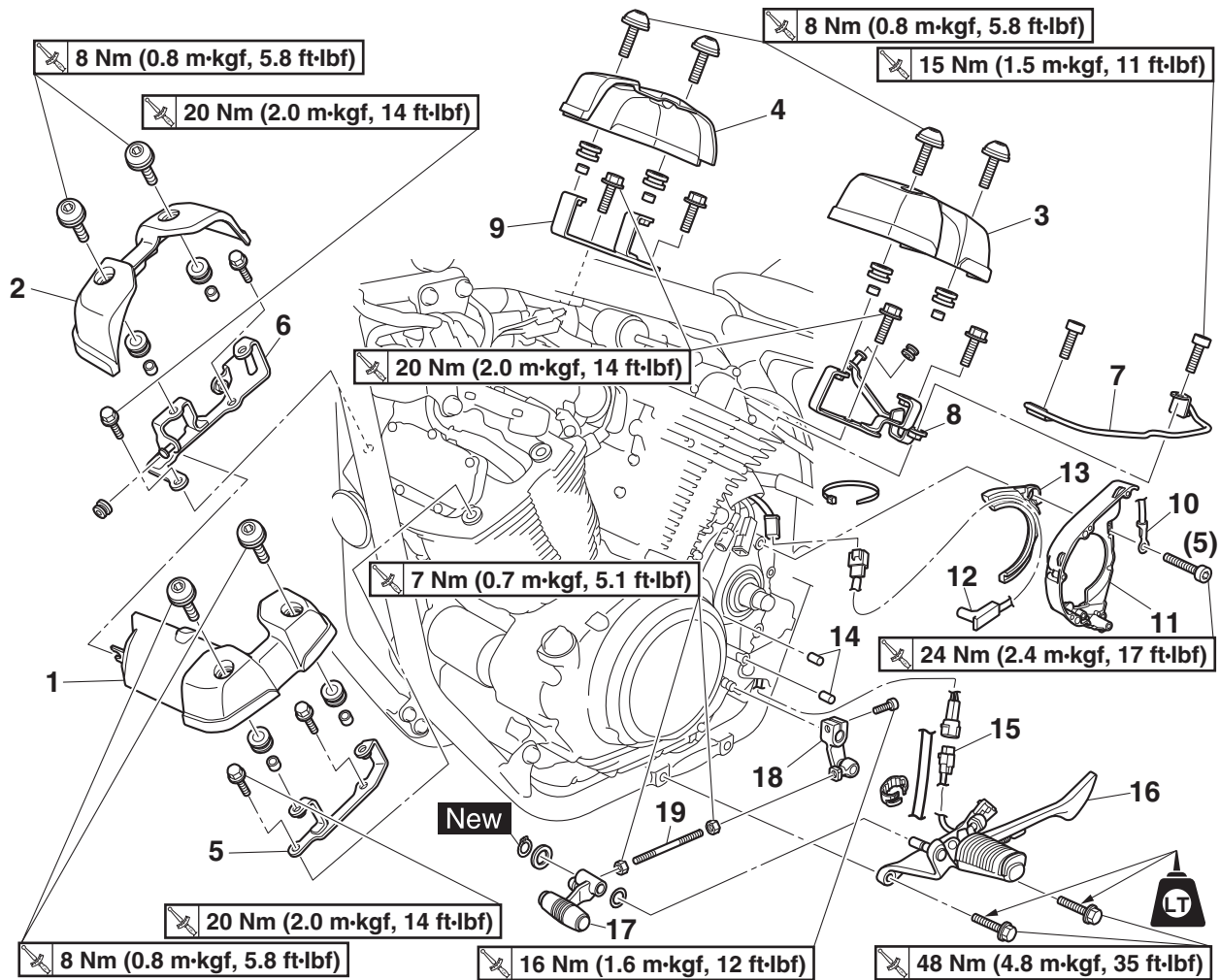
Removing the sidestand and drive pulley housing



Order	Job/Parts to remove	Q'ty	Remarks
	Drive belt		Refer to "BELT DRIVE" on page 4-94.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
1	Front cylinder left cover	1	
2	Front cylinder right cover	1	
3	Rear cylinder left cover	1	
4	Rear cylinder right cover	1	
5	Front cylinder left cover bracket	1	
6	Front cylinder right cover bracket	1	
7	Rear cylinder head guard	1	
8	Rear cylinder left cover bracket	1	
9	Rear cylinder right cover bracket	1	
10	Ground lead	1	Disconnect.
11	Drive pulley housing	1	
12	Neutral switch sub-wire harness	1	
13	Damper	1	
14	Dowel pin	2	
15	Sidestand switch coupler	1	Disconnect.

ENGINE REMOVAL

Removing the sidestand and drive pulley housing




Order	Job/Parts to remove	Q'ty	Remarks
16	Sidestand	1	
17	Shift pedal	1	
18	Shift arm	1	
19	Shift rod	1	
			For installation, reverse the removal procedure.

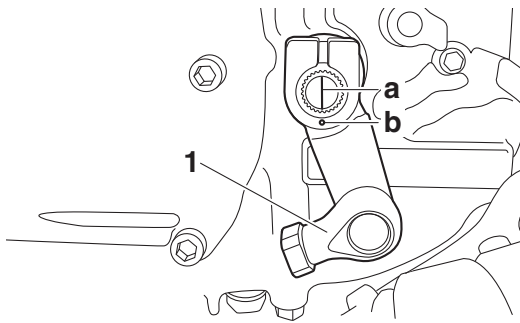
EAS1TP1050

INSTALLING THE SHIFT ARM

- Install:
 - Shift arm "1"

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

TIP
Align the "I" mark "a" in the shift shaft with the punch mark "b" in the shift arm.



EAS21380

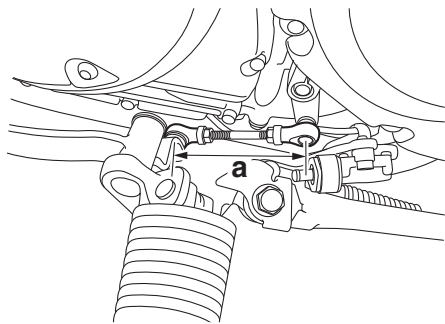
ADJUSTING THE SHIFT PEDAL

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

- Measure:
 - Installed shift rod length "a"

Incorrect → Adjust.

	Installed shift rod length 93.7–97.7 mm (3.69–3.85 in)
---	---



- Adjust:
 - Installed shift rod length

a. Loosen both locknuts "1".

ECA1TP1026

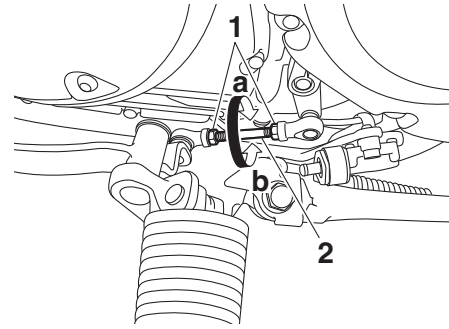
NOTICE

The shift rod locknut (shift pedal side) has left-hand threads.

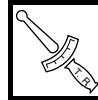
- Turn the shift rod "2" in direction "a" or "b" to obtain the correct shift rod length.

TIP
Make sure that the engaged thread length on both ends of the shift rod is 4 ridges or more.

Direction "a" Installed shift rod length is increased.
Direction "b" Installed shift rod length is decreased.



- Tighten the locknuts to specification.

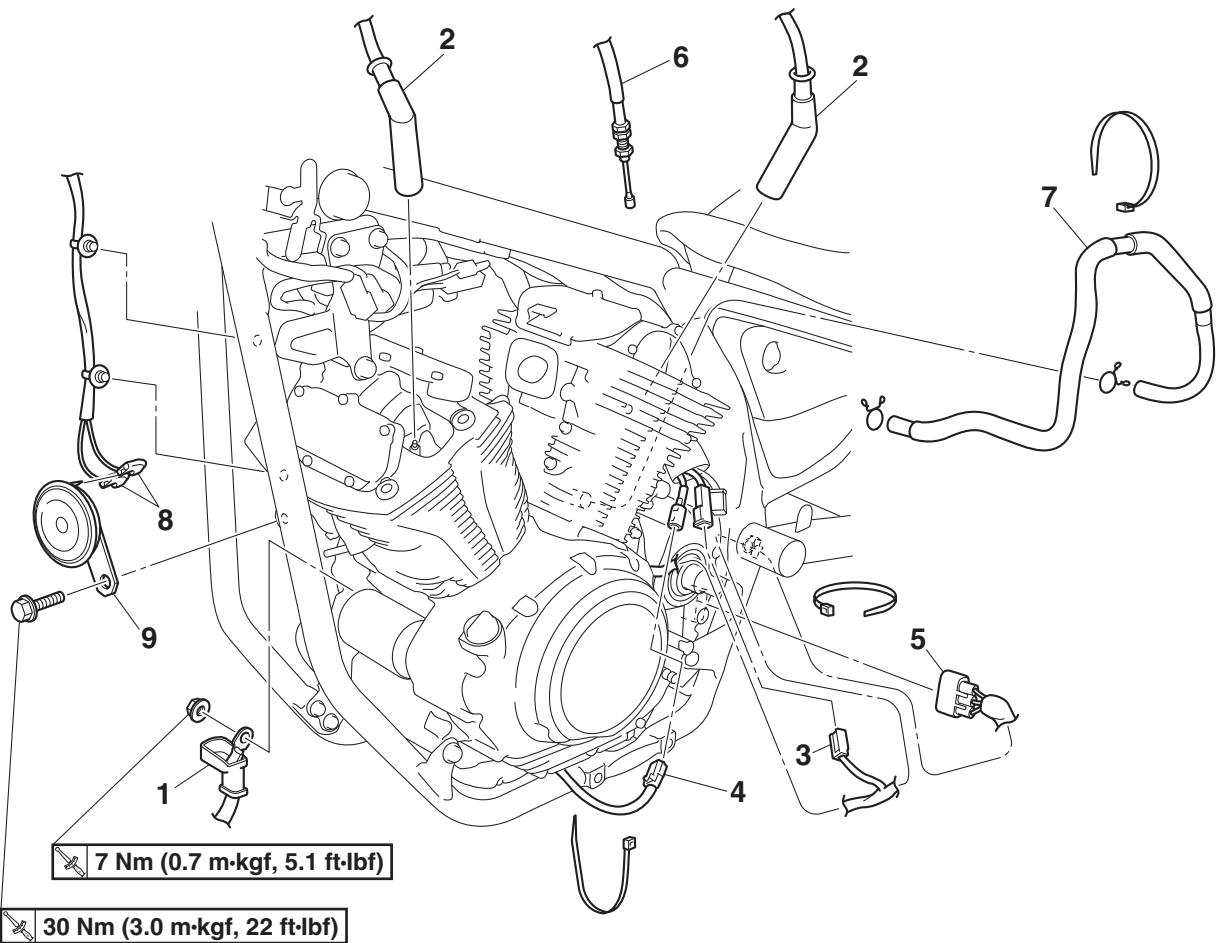
	Locknut 7 Nm (0.7 m·kgf, 5.1 ft·lbf)
--	---

- Make sure the installed shift rod length is within specification.



ENGINE REMOVAL

Disconnecting the leads and hoses



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Right footrest assembly		Refer to "REAR BRAKE" on page 4-47.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
	Throttle body assembly/Intake manifold assembly		Refer to "THROTTLE BODIES" on page 6-6.
1	Starter motor lead	1	Disconnect.
2	Spark plug cap	2	Disconnect.
3	Crankshaft position sensor coupler	1	Disconnect.
4	Oil level switch coupler	1	Disconnect.
5	Rectifier/regulator coupler	1	Disconnect.
6	Clutch cable	1	Disconnect.
7	Crankcase breather hose	1	
8	Horn connector	2	Disconnect.
9	Horn	1	
			For installation, reverse the removal procedure.

EAS1TP1070

INSTALLING THE HORN

1. Install:

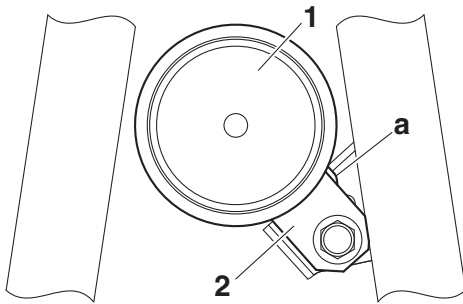
- Horn "1"



Horn bracket bolt
30 Nm (3.0 m·kgf, 22 ft·lbf)

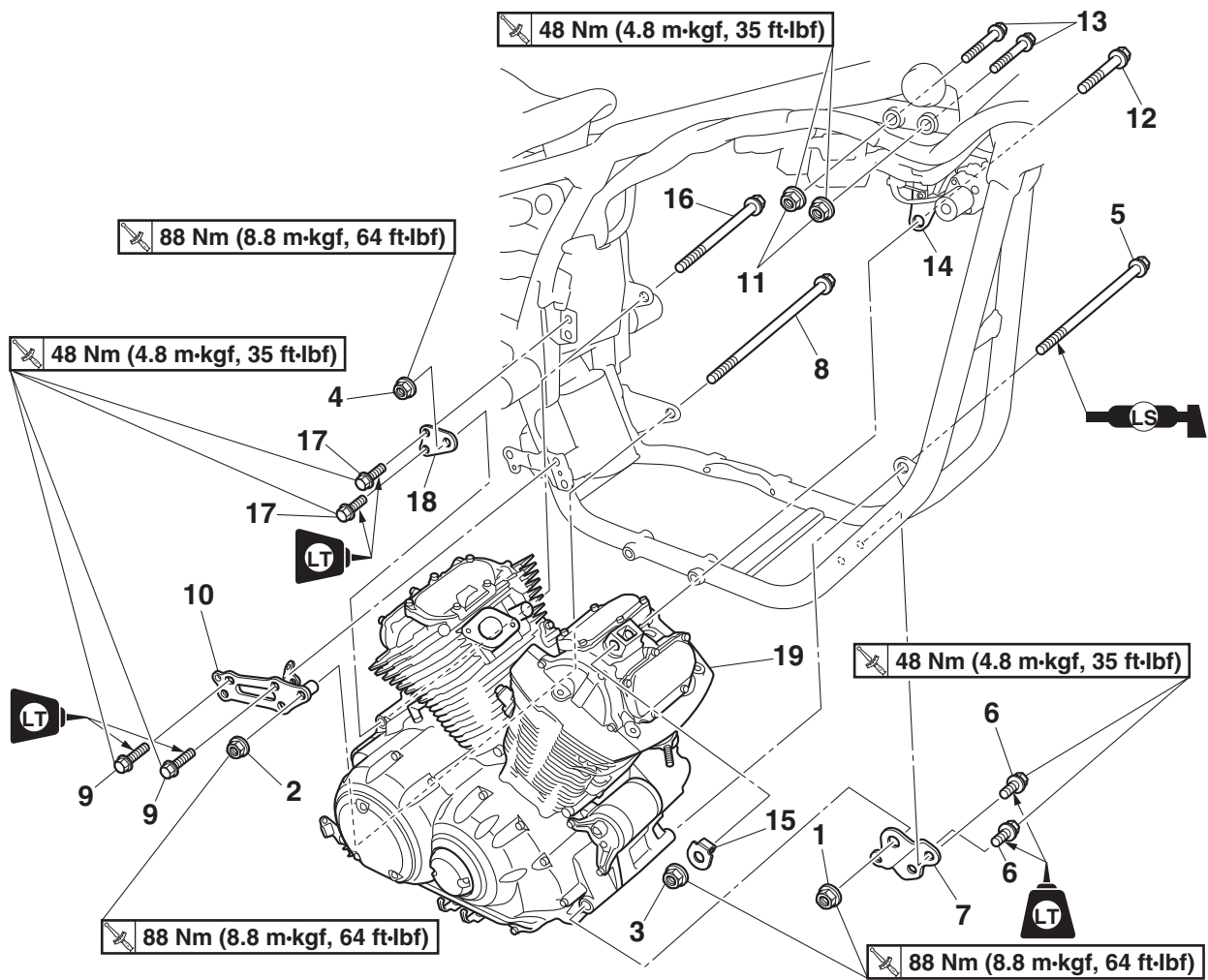
TIP

Make sure that the horn bracket "2" contacts the portion "a" of the stay on the frame.



ENGINE REMOVAL

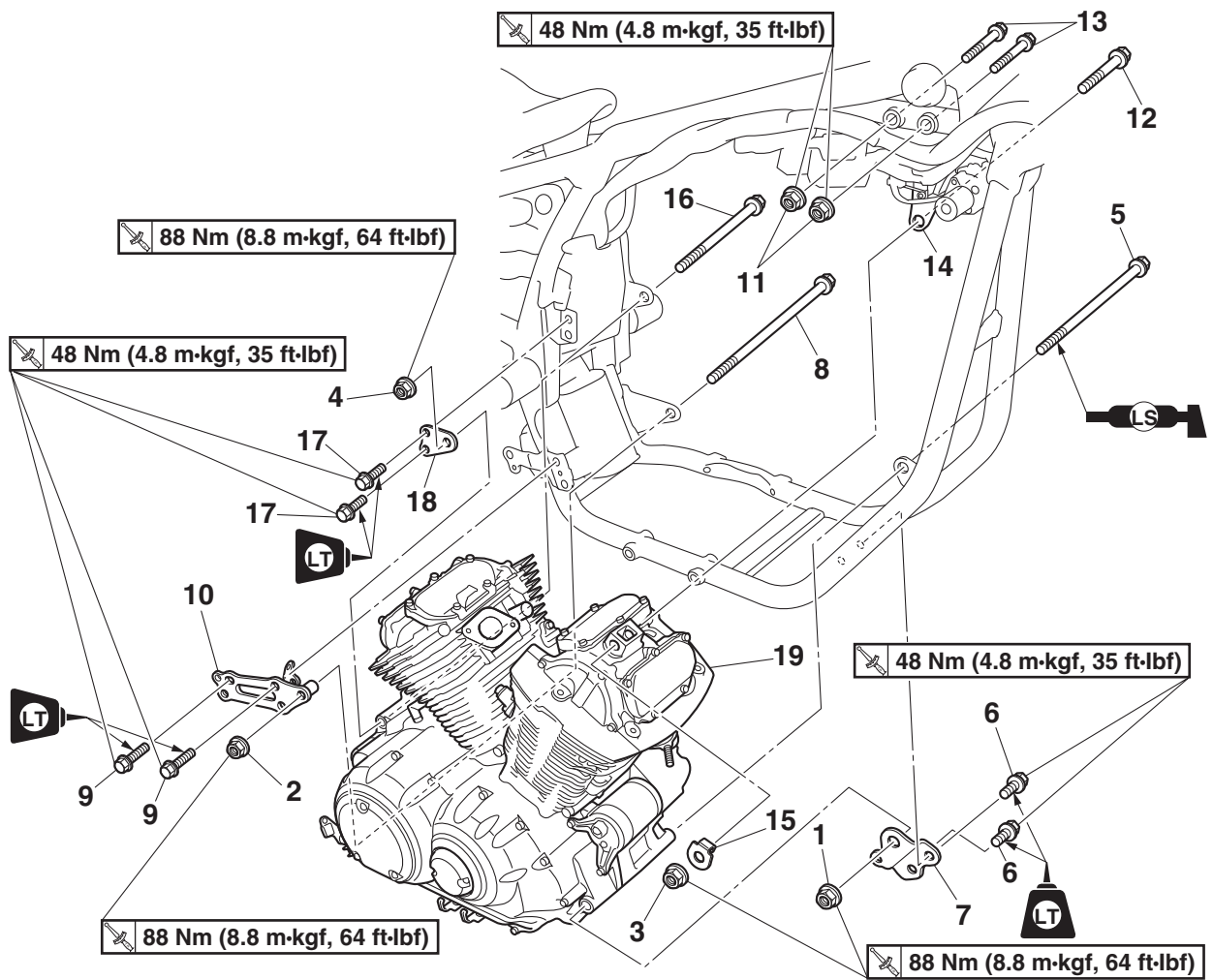
Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Engine mounting nut (front lower side)	1	
2	Engine mounting nut (rear lower side)	1	
3	Engine mounting nut (front upper side)	1	
4	Engine mounting nut (rear upper side)	1	
5	Engine mounting bolt (front lower side)	1	
6	Engine bracket bolt (front lower side)	2	
7	Engine bracket (front lower side)	1	
8	Engine mounting bolt (rear lower side)	1	
9	Engine bracket bolt (rear lower side)	2	
10	Engine bracket (rear lower side)	1	
11	Engine bracket nut (front upper side)	2	
12	Engine mounting bolt (front upper side)	1	
13	Engine bracket bolt (front upper side)	2	
14	Engine bracket (front upper side)	1	
15	Lock washer	1	

ENGINE REMOVAL

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
16	Engine mounting bolt (rear upper side)	1	
17	Engine bracket bolt (rear upper side)	2	
18	Engine bracket (rear upper side)	1	
19	Engine	1	
			For installation, reverse the removal procedure.

ENGINE REMOVAL

EAS1TP1051

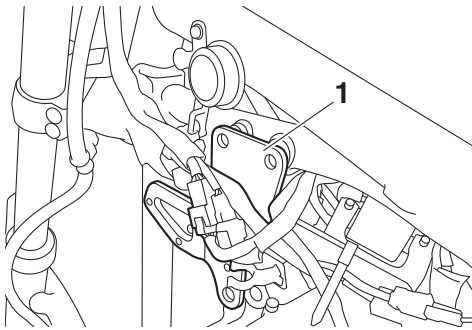
REMOVING THE ENGINE

1. Remove:

- Engine bracket (front upper side) "1"

TIP

Before removing the engine, remove the engine bracket (front upper side) so that the cylinder head does not strike the bracket.



EAS23720

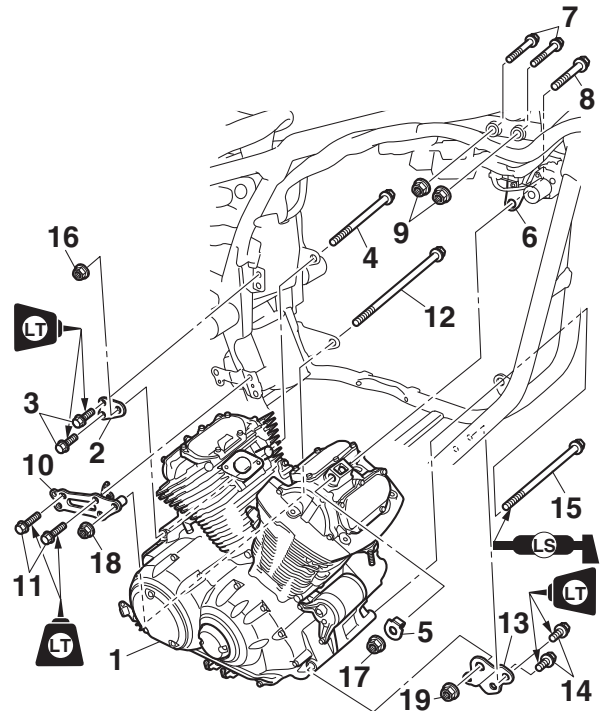
INSTALLING THE ENGINE

1. Install:

- Engine "1"
- Engine bracket (rear upper side) "2"
- Engine bracket bolts (rear upper side) "3"
- Engine mounting bolt (rear upper side) "4"
- Lock washer "5"
- Engine bracket (front upper side) "6"
- Engine bracket bolts (front upper side) "7"
- Engine mounting bolt (front upper side) "8"
- Engine bracket nuts (front upper side) "9"
- Engine bracket (rear lower side) "10"
- Engine bracket bolts (rear lower side) "11"
- Engine mounting bolt (rear lower side) "12"
- Engine bracket (front lower side) "13"
- Engine bracket bolts (front lower side) "14"
- Engine mounting bolt (front lower side) "15"
- Engine mounting nut (rear upper side) "16"
- Engine mounting nut (front upper side) "17"
- Engine mounting nut (rear lower side) "18"
- Engine mounting nut (front lower side) "19"

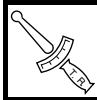
TIP

- Lubricate the engine mounting bolt (front lower side) threads with lithium-soap-based grease.
- Apply locking agent (LOCTITE®) to the threads of the engine bracket bolts (front lower side), engine bracket bolts (rear lower side), and engine bracket bolts (rear upper side).
- Do not tighten the bolts and nuts.



2. Tighten:

- Engine bracket bolts (rear upper side) "3"
- Engine bracket nuts (front upper side) "9"
- Engine bracket bolts (rear lower side) "11"
- Engine bracket bolts (front lower side) "14"



Engine bracket bolt (rear upper side)

48 Nm (4.8 m·kgf, 35 ft·lbf)

LOCTITE®

Engine bracket nut (front upper side)

48 Nm (4.8 m·kgf, 35 ft·lbf)

Engine bracket bolt (rear lower side)

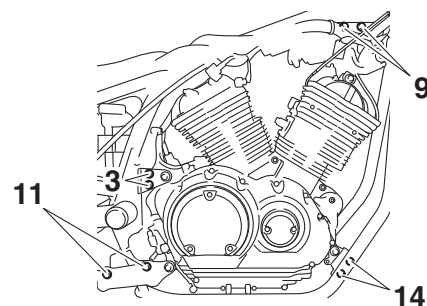
48 Nm (4.8 m·kgf, 35 ft·lbf)

LOCTITE®

Engine bracket bolt (front lower side)

48 Nm (4.8 m·kgf, 35 ft·lbf)

LOCTITE®



ENGINE REMOVAL

3. Tighten:

- Engine mounting nut (rear upper side) "16"
- Engine mounting nut (front upper side) "17"
- Engine mounting nut (rear lower side) "18"
- Engine mounting nut (front lower side) "19"



Engine mounting nut (rear upper side)

88 Nm (8.8 m·kgf, 64 ft·lbf)

Engine mounting nut (front upper side)

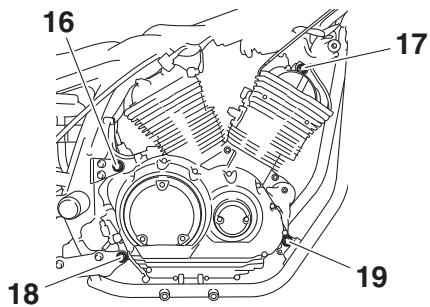
88 Nm (8.8 m·kgf, 64 ft·lbf)

Engine mounting nut (rear lower side)

88 Nm (8.8 m·kgf, 64 ft·lbf)

Engine mounting nut (front lower side)

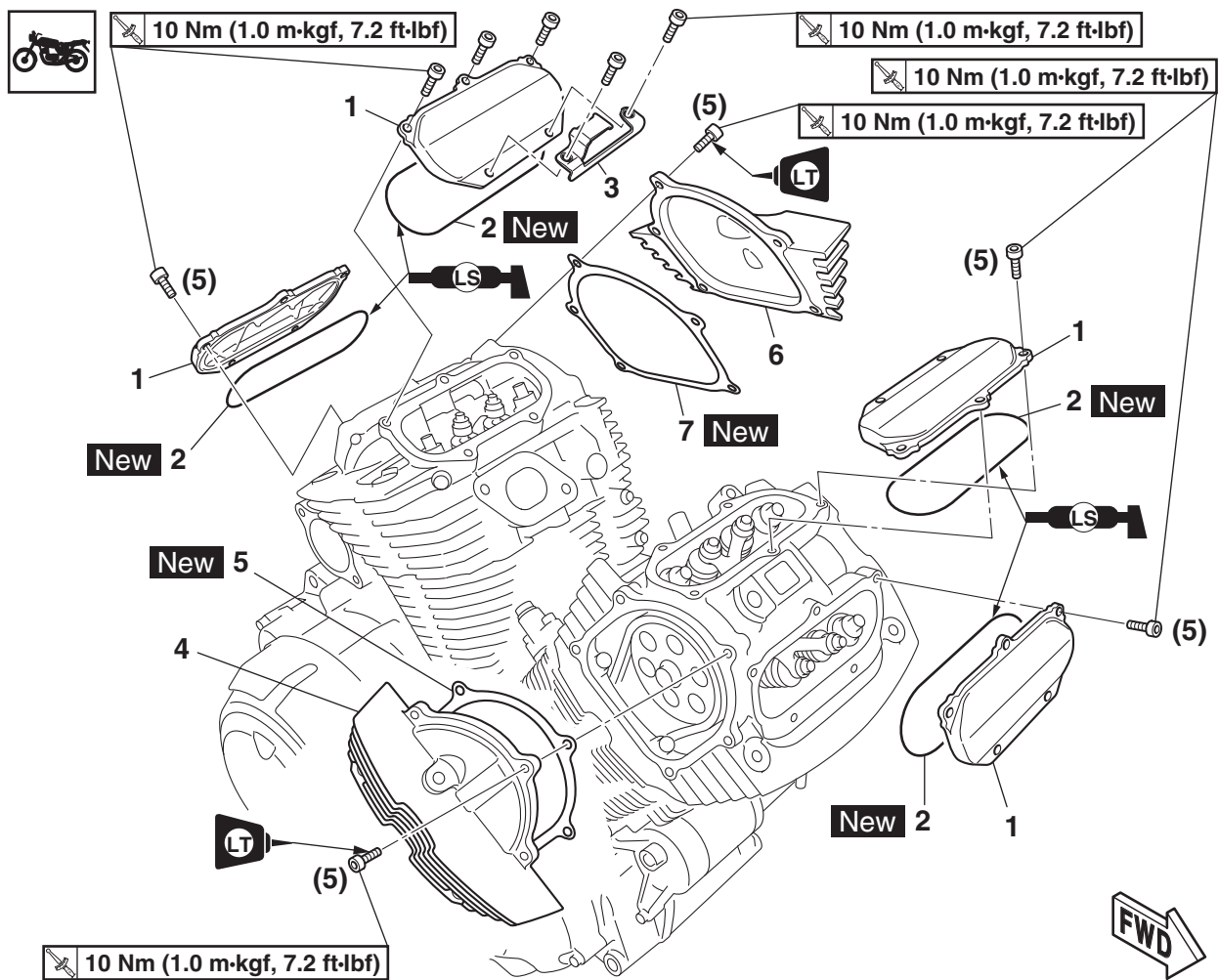
88 Nm (8.8 m·kgf, 64 ft·lbf)



EAS23740

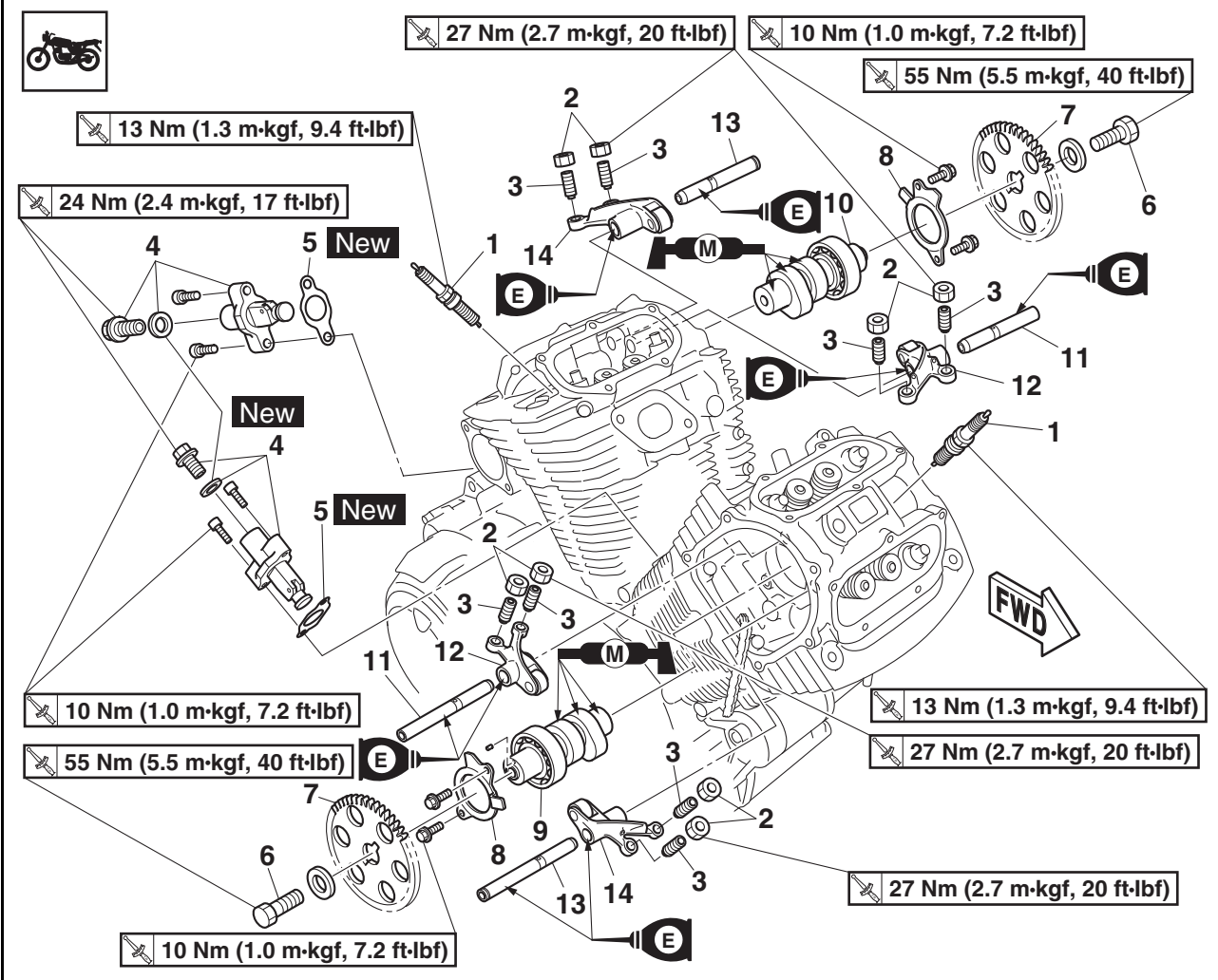
CAMSHAFTS

Removing the cylinder head covers



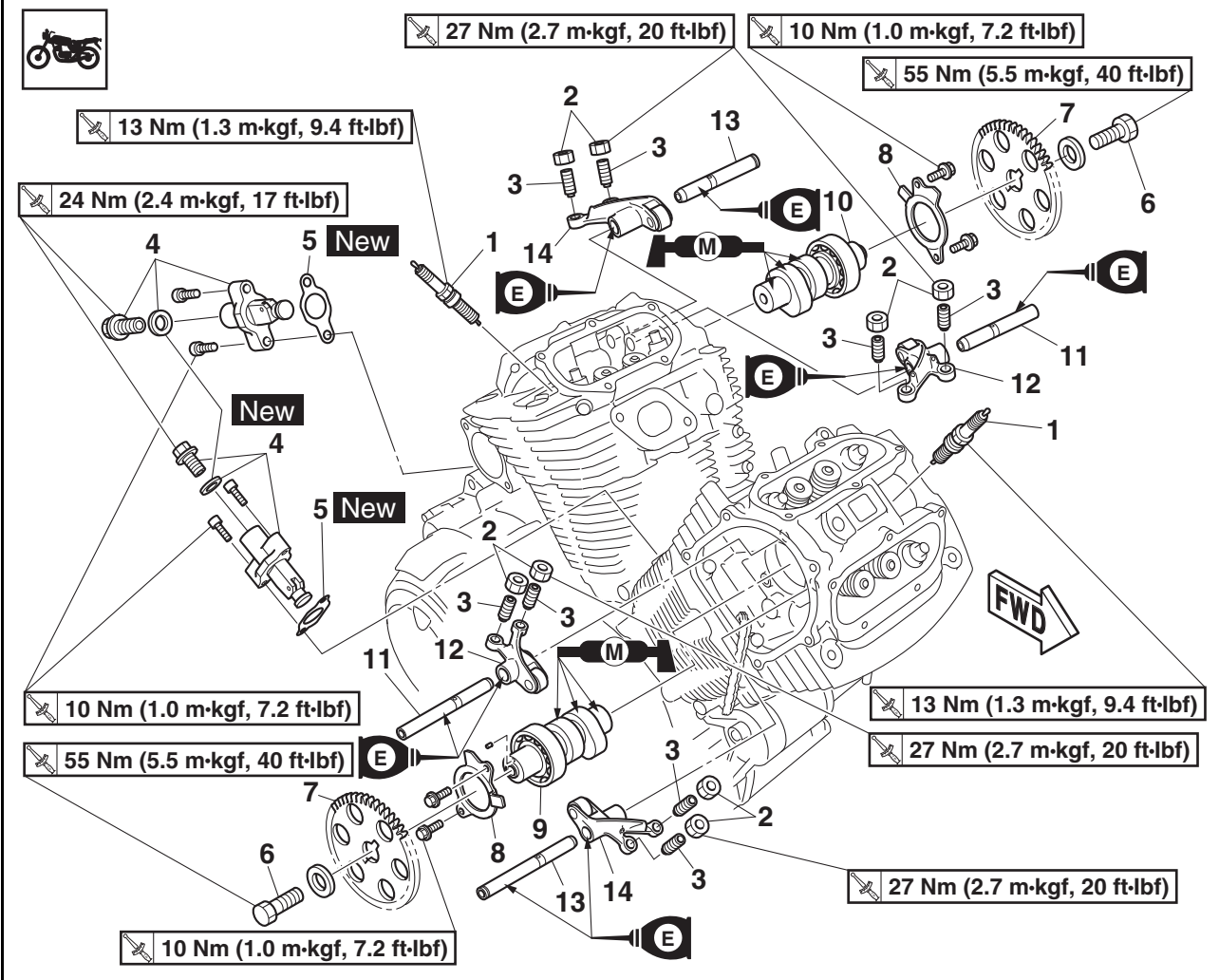
Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Cylinder covers/Cylinder cover brackets/Rear cylinder head guard		Refer to "ENGINE REMOVAL" on page 5-3.
	Fuel tank/Hose holder		Refer to "FUEL TANK" on page 6-1.
	Throttle body/Intake manifold assembly		Refer to "THROTTLE BODIES" on page 6-6.
1	Tappet cover	4	
2	O-ring	4	
3	Fuel filter bracket	1	
4	Front cylinder side cover	1	
5	Front cylinder side cover gasket	1	
6	Rear cylinder side cover	1	
7	Rear cylinder side cover gasket	1	
			For installation, reverse the removal procedure.

Removing the camshafts and rocker arms



Order	Job/Parts to remove	Q'ty	Remarks
	Drive belt upper guard		Refer to "REAR WHEEL" on page 4-19.
	Drive belt lower guard		Refer to "SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES" on page 4-89.
	Air duct/Drive pulley cover/Drive pulley		Refer to "BELT DRIVE" on page 4-94.
	Drive pulley housing		Refer to "ENGINE REMOVAL" on page 5-3.
1	Spark plug	2	
2	Locknut	8	
3	Valve clearance adjusting screw	8	
4	Timing chain tensioner	2	
5	Timing chain tensioner gasket	2	
6	Camshaft bolt	2	
7	Camshaft sprocket	2	
8	Camshaft retainer	2	
9	Front cylinder camshaft	1	
10	Rear cylinder camshaft	1	
11	Intake rocker arm shaft	2	
12	Intake rocker arm	2	
13	Exhaust rocker arm shaft	2	

Removing the camshafts and rocker arms



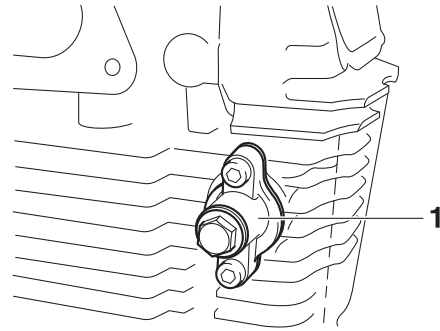
Order	Job/Parts to remove	Q'ty	Remarks
14	Exhaust rocker arm	2	
			For installation, reverse the removal procedure.

EAS1TP1052

REMOVING THE CAMSHAFTS AND ROCKER ARMS

1. Align:

- “I” mark on the front cylinder camshaft sprocket
(with the arrow mark on the front cylinder head)

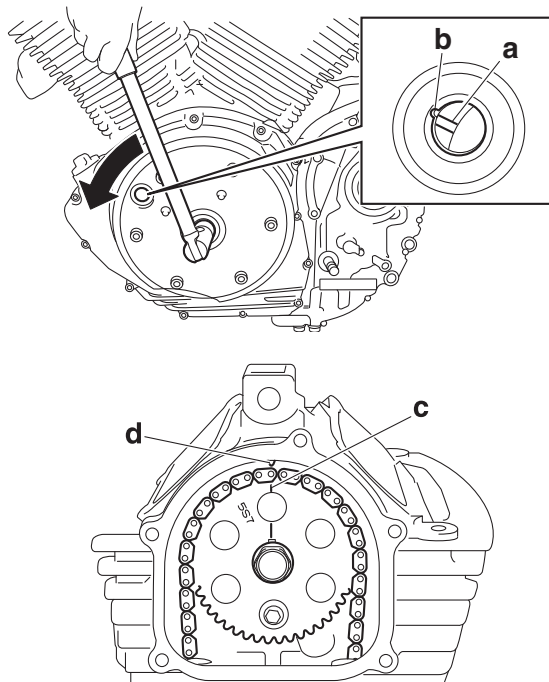


Front cylinder

- Turn the crankshaft counterclockwise.
- When the front cylinder piston is at TDC on the compression stroke, align the TDC mark “a” on the generator rotor with the slot “b” in the generator cover.

TIP

To position the front cylinder piston at TDC on the compression stroke, align the “I” mark “c” on the camshaft sprocket with the arrow mark “d” on the front cylinder head.



2. Remove:

- Front cylinder timing chain tensioner “1”

3. Remove:

- Front cylinder camshaft sprocket

TIP

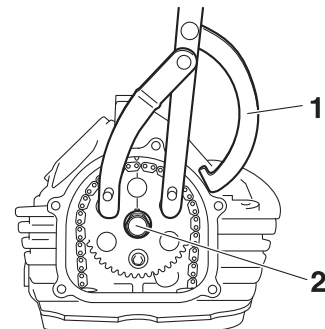
- While holding the camshaft sprocket with the rotor holding tool “1”, loosen the camshaft sprocket bolt “2”.
- To prevent the timing chain from falling into the crankcase, fasten it with a wire.



Rotor holding tool

90890-01235

Universal magneto & rotor holder
YU-01235



4. Remove:

- Camshaft retainer
- Front cylinder camshaft

5. Remove:

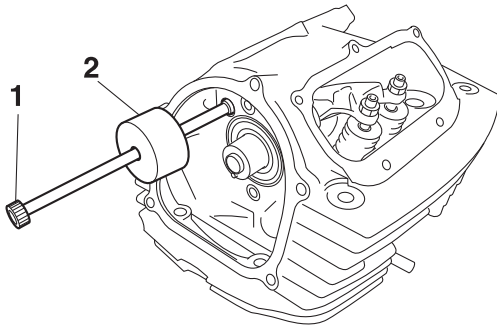
- Intake rocker arm shaft
- Exhaust rocker arm shaft
- Intake rocker arm
- Exhaust rocker arm

TIP

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



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



6. Align:
- “I” mark on the rear cylinder camshaft sprocket (with the arrow mark on the rear cylinder head)

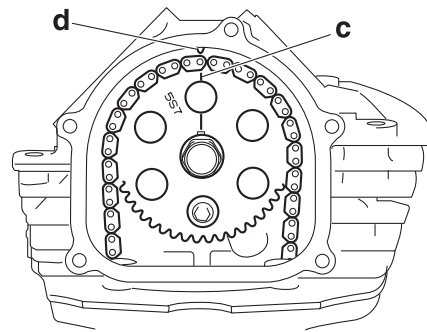
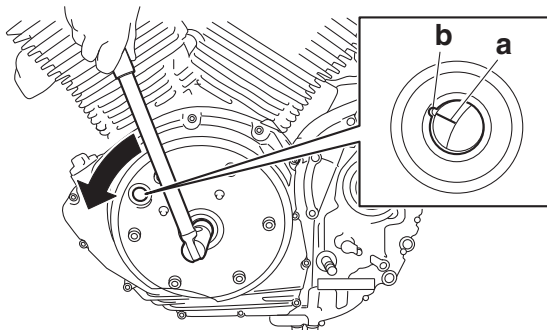


Rear cylinder

- Turn the crankshaft counterclockwise from the front cylinder piston TDC by 300 degrees.
- When the rear cylinder piston is at TDC on the compression stroke, align the TDC mark “a” on the generator rotor with the slot “b” in the generator cover.

TIP

To position the rear cylinder piston at TDC on the compression stroke, align the “I” mark “c” on the camshaft sprocket with the arrow mark “d” on the rear cylinder head.



7. Remove:
- Rear cylinder timing chain tensioner
 - Rear cylinder camshaft sprocket
 - Camshaft retainer
 - Rear cylinder camshaft
 - Intake rocker arm shaft
 - Exhaust rocker arm shaft
 - Intake rocker arm
 - Exhaust rocker arm

TIP

Remove the parts using the same procedure as for the front cylinder camshaft and rocker arm.

EAS23840

CHECKING THE CAMSHAFTS

- Check:
 - Camshaft lobes
Blue discoloration/pitting/scratches → Replace the camshaft.
- Measure:
 - Camshaft lobe dimensions “a” and “b”
Out of specification → Replace the camshaft.



Camshaft lobe dimensions

Intake A

42.470–42.570 mm (1.6720–1.6760 in)

Limit

42.370 mm (1.6681 in)

Intake B

37.041–37.141 mm (1.4583–1.4622 in)

Limit

36.941 mm (1.4544 in)

Exhaust A

42.138–42.238 mm (1.6590–1.6629 in)

Limit

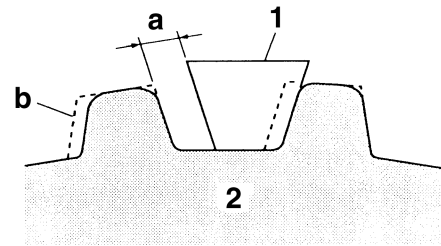
42.038 mm (1.6550 in)

Exhaust B

37.015–37.115 mm (1.4573–1.4612 in)

Limit

36.915 mm (1.4533 in)



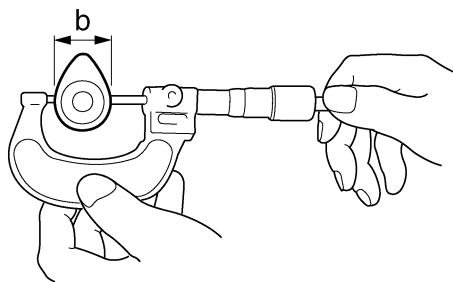
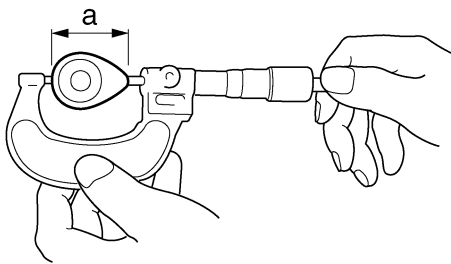
- a. 1/4 tooth
- b. Correct
- 1. Timing chain roller
- 2. Camshaft sprocket

EAS23880

CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

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

1. Check:
 - Rocker arm
 - Rocker arm roller
 Damage/wear → Replace.
2. Check:
 - Rocker arm shaft
 Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.
3. Measure:
 - Rocker arm inside diameter
 Out of specification → Replace.



3. Check:

- Camshaft oil passage
- Obstruction → Blow out with compressed air.

EAS23870

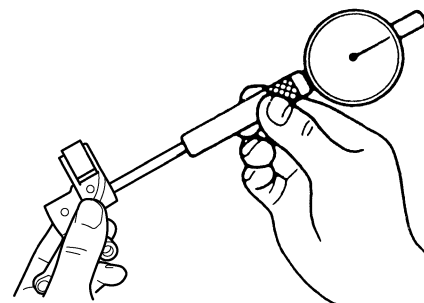
CHECKING THE CAMSHAFT SPROCKETS

1. Check:

- Camshaft sprockets
- More than 1/4 tooth wear “a” → Replace the camshaft sprocket and the timing chain as a set.



Rocker arm inside diameter
 12.000–12.018 mm (0.4724–0.4731 in)
Limit
 12.036 mm (0.4739 in)



4. Measure:

- Rocker arm shaft outside diameter “a”
- Out of specification → Replace.

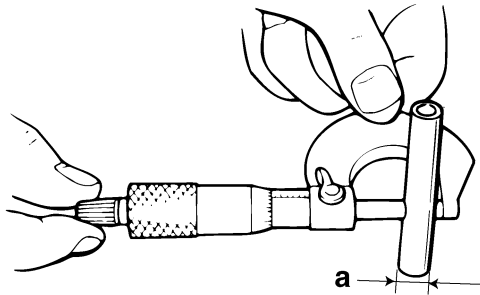


Rocker arm shaft outside diameter

11.981–11.991 mm (0.4717–0.4721 in)

Limit

11.941 mm (0.4701 in)



5. Calculate:

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

TIP

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

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



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

0.009–0.037 mm (0.0004–0.0015 in)

Limit

0.095 mm (0.0037 in)

EAS23970

CHECKING THE TIMING CHAIN TENSIONERS

The following procedure applies to all of the timing chain tensioners.

1. Check:

- Timing chain tensioner
Cracks/damage → Replace.

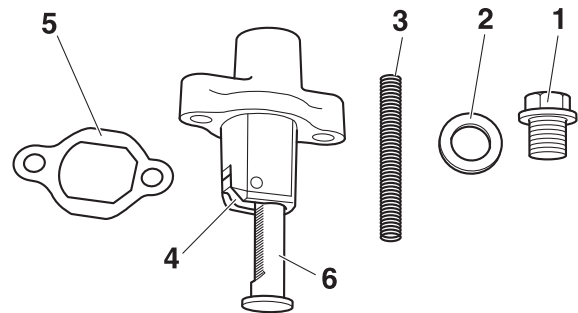
2. Check:

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

3. Check:

- Timing chain tensioner cap bolt “1”
- Copper washer “2”
- Timing chain tensioner spring “3”
- One-way cam “4”
- Timing chain tensioner gasket “5”

- Timing chain tensioner rod “6”
Damage/wear → Replace the defective part(s).



EAS24040

INSTALLING THE ROCKER ARMS AND CAMSHAFTS

The following procedure applies to all of the rocker arms and camshafts.

1. Lubricate:

- Rocker arm shafts



Recommended lubricant
Engine oil

2. Install:

- Rocker arms
- Rocker arm shafts

3. Lubricate:

- Camshaft



Recommended lubricant
Camshaft
Molybdenum disulfide oil
Camshaft bearing
Engine oil

4. Install:

- Camshaft “1”
- Camshaft retainer “2”



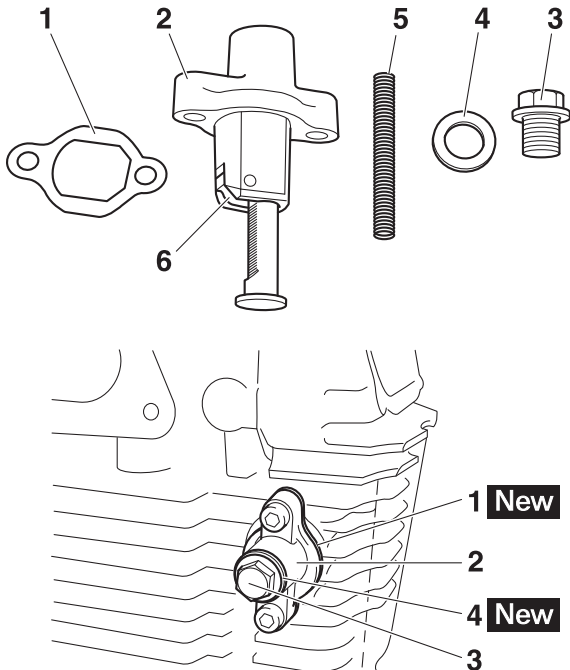
Camshaft retainer bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

The front cylinder camshaft is identified by the punch mark “a”. The rear cylinder camshaft does not have a punch mark.

- Copper washer “4” **New**
- Timing chain tensioner cap bolt “3”

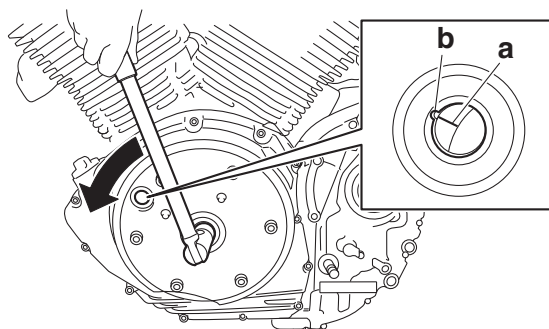
 **Timing chain tensioner cap bolt**
24 Nm (2.4 m·kgf, 17 ft·lbf)



9. Install:
- Rear cylinder camshaft sprocket

Rear cylinder

- Turn the crankshaft counterclockwise from the front cylinder piston TDC by 300 degrees.
- When the rear cylinder piston is at TDC on the compression stroke, align the TDC mark “a” on the generator rotor with the slot “b” in the generator cover.



- Install the timing chain “1” onto the rear cylinder camshaft sprocket “2”, then install the camshaft sprocket onto the camshaft, and then finger tighten the camshaft sprocket bolt “3”.

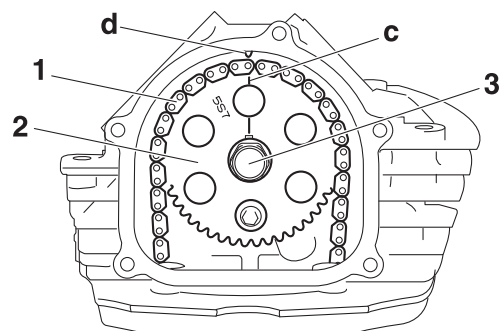
ECA13740

NOTICE

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

TIP

- To position the rear cylinder piston at TDC on the compression stroke, align the “I” mark “c” on the camshaft sprocket with the arrow mark “d” on the rear cylinder head.
- When installing the rear cylinder camshaft sprocket, be sure to keep the timing chain as tight as possible on the intake side.



- Remove the wire from the timing chain.



10. Tighten:
- Rear cylinder camshaft sprocket bolt “1”

TIP

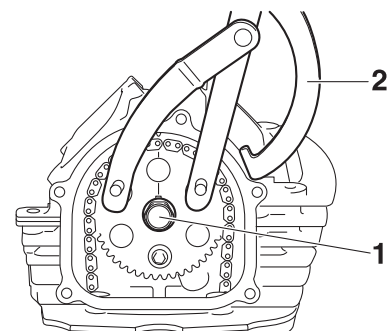
While holding the camshaft sprocket with the rotor holding tool “2”, tighten the camshaft sprocket bolt.



Rotor holding tool
90890-01235
Universal magneto & rotor holder
YU-01235



Camshaft sprocket bolt
55 Nm (5.5 m·kgf, 40 ft·lbf)



11. Install:

- Rear cylinder timing chain tensioner gasket "1" **New**
- Rear cylinder timing chain tensioner "2"

TIP

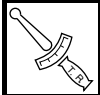
To push in the timing chain tensioner rod, release the lock by pushing in the one-way cam "6".



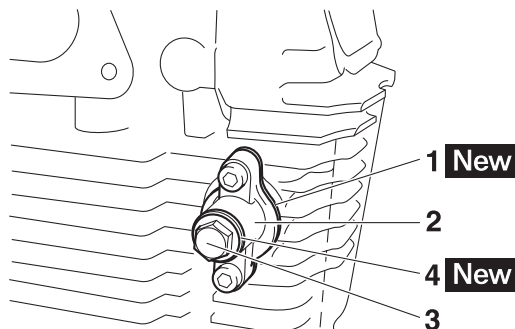
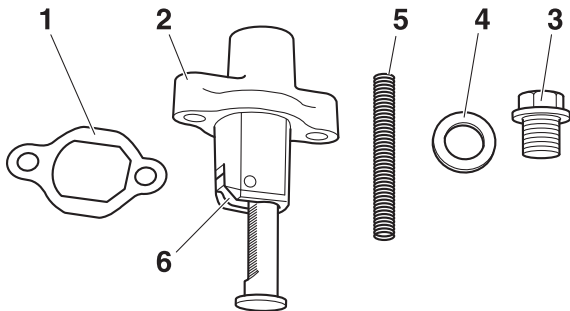
Rear cylinder timing chain tensioner bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

12. Install:

- Timing chain tensioner spring "5"
- Copper washer "4" **New**
- Timing chain tensioner cap bolt "3"



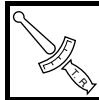
Timing chain tensioner cap bolt
24 Nm (2.4 m·kgf, 17 ft·lbf)



13. Measure:

- Valve clearance
Out of specification → Adjust.
Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-4.

- Tappet covers



Rear cylinder side cover bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®
Tappet cover
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

2. Install:

- Front cylinder side cover
- Tappet covers



Front cylinder side cover bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®
Tappet cover
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

EAS1TP1053

INSTALLING THE CYLINDER HEAD COVERS

1. Install:

- Rear cylinder side cover
- Fuel filter bracket

EAS24110

CYLINDER HEADS

Removing the cylinder heads

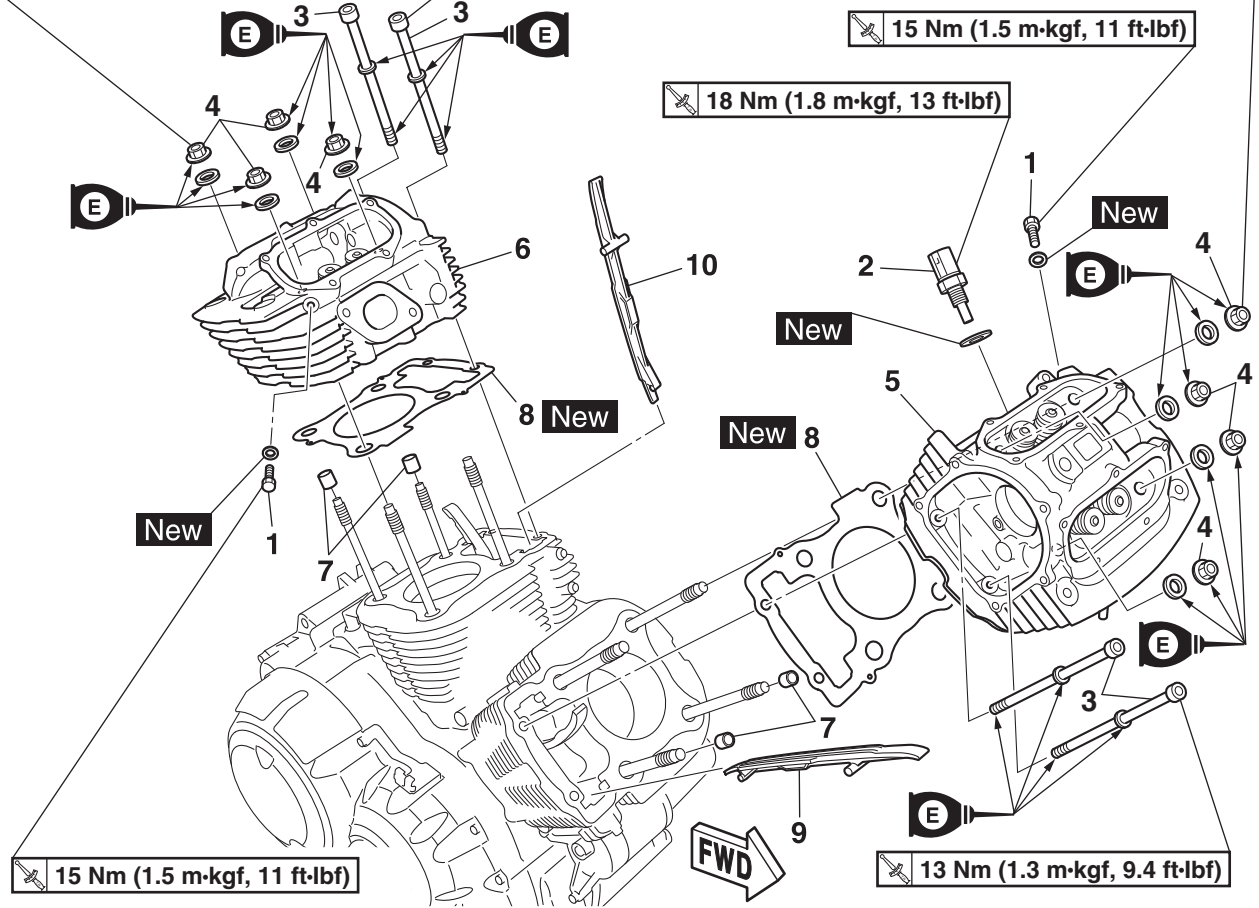
1st	15 Nm (1.5 m·kgf, 11 ft·lbf)
2nd	25 Nm (2.5 m·kgf, 18 ft·lbf)
Final	65 Nm (6.5 m·kgf, 47 ft·lbf)

13 Nm (1.3 m·kgf, 9.4 ft·lbf)

1st	15 Nm (1.5 m·kgf, 11 ft·lbf)
2nd	25 Nm (2.5 m·kgf, 18 ft·lbf)
Final	65 Nm (6.5 m·kgf, 47 ft·lbf)

15 Nm (1.5 m·kgf, 11 ft·lbf)

18 Nm (1.8 m·kgf, 13 ft·lbf)



15 Nm (1.5 m·kgf, 11 ft·lbf)

13 Nm (1.3 m·kgf, 9.4 ft·lbf)

Order	Job/Parts to remove	Q'ty	Remarks
	Camshaft assemblies		Refer to "CAMSHAFTS" on page 5-16.
1	Oil check bolt	2	
2	Engine temperature sensor	1	
3	Cylinder head bolt	4	
4	Cylinder head nut	8	
5	Front cylinder head	1	
6	Rear cylinder head	1	
7	Dowel pin	4	
8	Cylinder head gasket	2	
9	Timing chain guide (exhaust side)	1	
10	Timing chain guide (intake side)	1	
			For installation, reverse the removal procedure.

CYLINDER HEADS

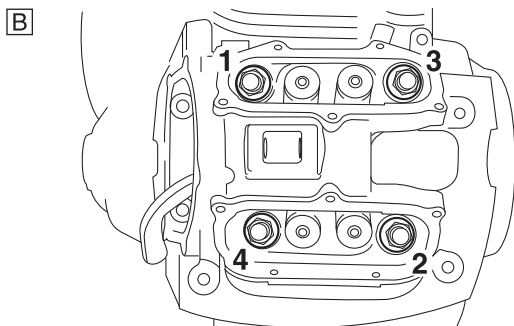
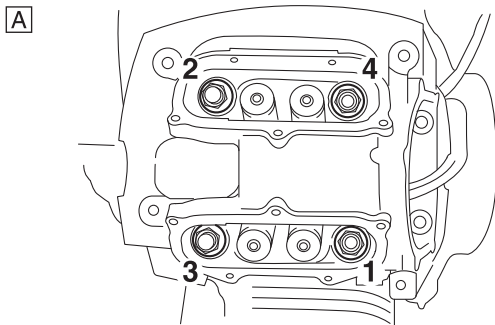
EAS24150

REMOVING THE CYLINDER HEADS

- Remove:
 - Cylinder head bolts
 - Cylinder head nuts

TIP

- Loosen the cylinder head nuts in the proper sequence as shown.
- Loosen each cylinder head nut 1/2 of a turn at a time. After all of the cylinder head nut are fully loosened, remove them.



- Front cylinder head
- Rear cylinder head

EAS24170

CHECKING THE CYLINDER HEADS

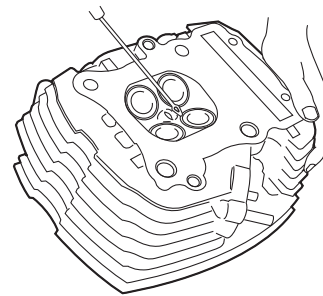
The following procedure applies to all of the cylinder heads.

- 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

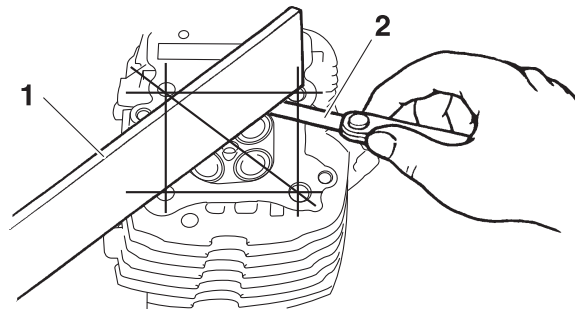


- Check:
 - Cylinder heads
Damage/scratches → Replace.
- Measure:
 - Cylinder head warpage
Out of specification → Resurface the cylinder head.



Warpage limit
0.03 mm (0.0012 in)

- Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



- Measure the warpage.
- If the limit is exceeded, resurface the cylinder head as follows.
- Place 400–600 grit wet sandpaper on a 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.

EAS24230

INSTALLING THE CYLINDER HEADS

- Tighten:
 - Cylinder head nuts
 - Cylinder head bolts

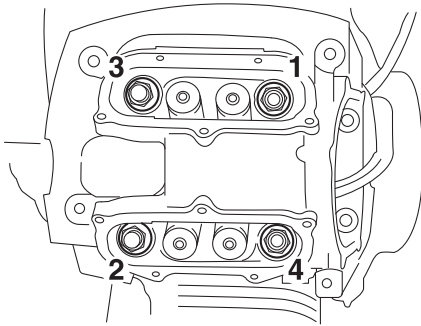


Cylinder head nut
1st: 15 Nm (1.5 m·kgf, 11 ft·lbf)
2nd: 25 Nm (2.5 m·kgf, 18 ft·lbf)
Final: 65 Nm (6.5 m·kgf, 47 ft·lbf)
Cylinder head bolt
13 Nm (1.3 m·kgf, 9.4 ft·lbf)

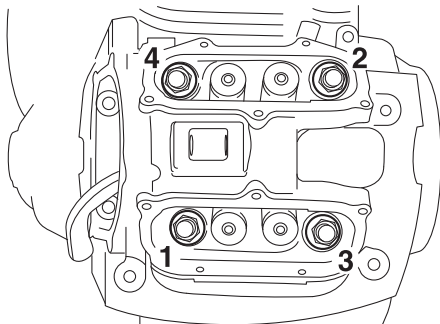
TIP

- Lubricate the cylinder head nuts and washers with engine oil.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in three stages.

A



B



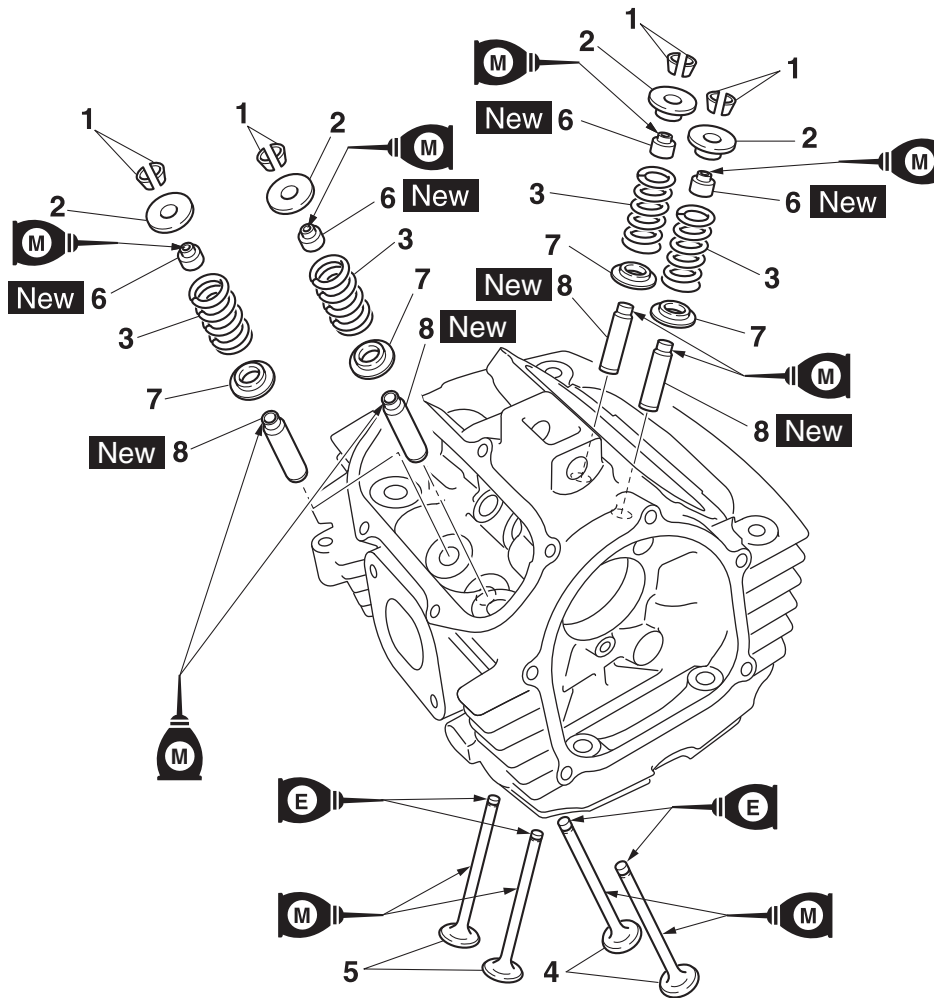
- A. Front cylinder head
B. Rear cylinder head

VALVES AND VALVE SPRINGS

EAS24270

VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both cylinders.
	Cylinder heads		Refer to "CYLINDER HEADS" on page 5-26.
1	Valve cotter	8	
2	Upper spring seat	4	
3	Valve spring	4	
4	Intake valve	2	
5	Exhaust valve	2	
6	Valve stem seal	4	
7	Lower spring seat	4	
8	Valve guide	4	
			For installation, reverse the removal procedure.

VALVES AND VALVE SPRINGS

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, and valve seats), make sure the valves properly seal.

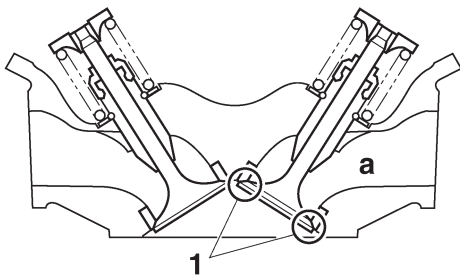
1. Check:

- 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 5-32.

- Pour a clean solvent "a" into the intake and exhaust ports.
- Check that the valves properly seal.

TIP

There should be no leakage at the valve seat "1".



2. Remove:

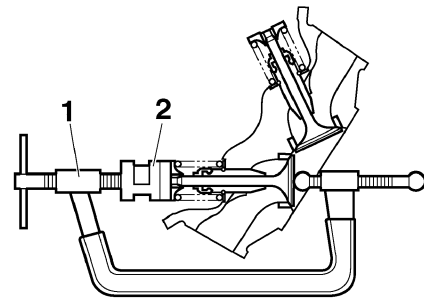
- Valve cotters

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
90890-01243
Valve spring compressor adapter (26 mm)
YM-01253-1

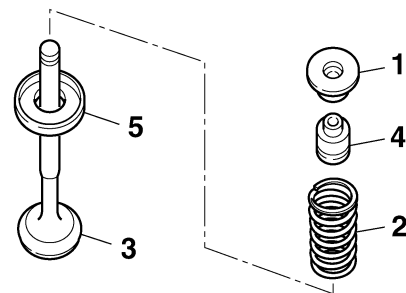


3. Remove:

- Upper spring seat "1"
- Valve spring "2"
- Valve "3"
- Valve stem seal "4"
- Lower spring seat "5"

TIP

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



EAS24290

CHECKING THE VALVES AND VALVE GUIDES

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

1. Measure:

- Valve-stem-to-valve-guide clearance
Out of specification → Replace the valve guide.

• Valve-stem-to-valve-guide clearance =
Valve guide inside diameter "a" -
Valve stem diameter "b"

VALVES AND VALVE SPRINGS

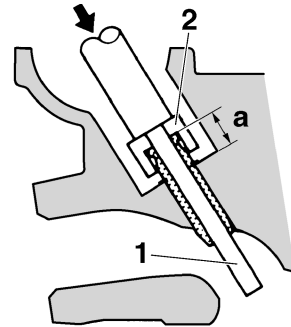


Valve-stem-to-valve-guide clearance (intake)
 0.010–0.037 mm (0.0004–0.0015 in)
Limit
 0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)
 0.025–0.052 mm (0.0010–0.0020 in)
Limit
 0.100 mm (0.0039 in)

b. Install the new valve guide with the valve guide installer “2” and valve guide remover “1”.

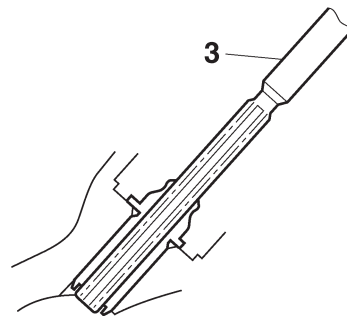
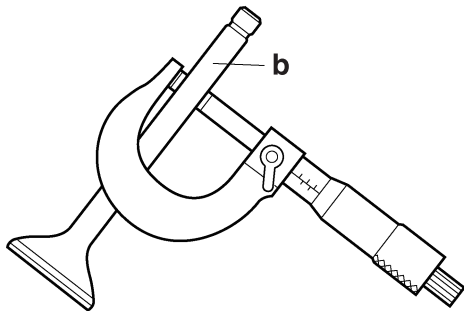
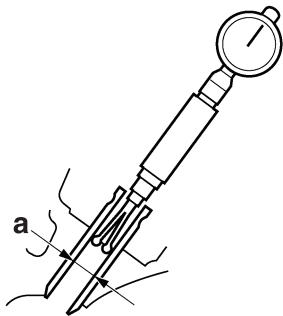


Valve guide position
 12.7–13.1 mm (0.500–0.515 in)



a. Valve guide position

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.

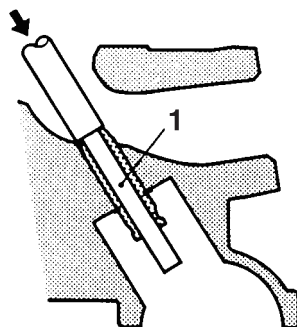


2. Replace:
 • Valve guide

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”.



TIP

After replacing the valve guide, reface the valve seat.




Valve guide remover (ø6)
 90890-04064
Valve guide remover (6.0 mm)
 YM-04064-A
Valve guide installer (ø6)
 90890-04065
Valve guide installer (6.0 mm)
 YM-04065-A
Valve guide reamer (ø6)
 90890-04066
Valve guide reamer (6.0 mm)
 YM-04066

3. Eliminate:

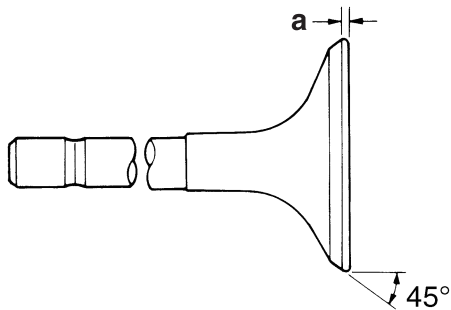
- Carbon deposits
 (from the valve face and valve seat)

VALVES AND VALVE SPRINGS

4. Check:
 - Valve face
Pitting/wear → Grind the valve face.
 - Valve stem end
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
 - Valve margin thickness “a”
Out of specification → Replace the valve.




Valve margin thickness D (intake)
1.00 mm (0.0394 in)
Valve margin thickness D (exhaust)
1.00 mm (0.0394 in)



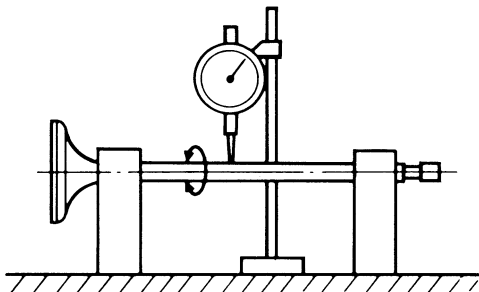
6. Measure:
 - Valve stem runout
Out of specification → Replace the valve.

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

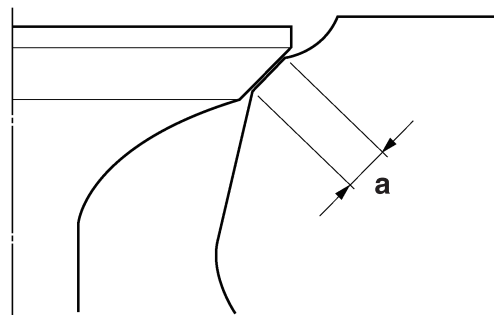
CHECKING THE VALVE SEATS

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

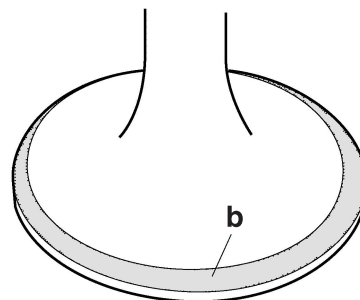
1. Eliminate:
 - Carbon deposits
(from the valve face and valve seat)
2. Check:
 - Valve seat
Pitting/wear → Replace the cylinder head.
3. Measure:
 - Valve seat width “a”
Out of specification → Replace the cylinder head.



Valve seat width C (intake)
1.00–1.20 mm (0.0394–0.0472 in)
Limit
1.6 mm (0.06 in)
Valve seat width C (exhaust)
1.00–1.20 mm (0.0394–0.0472 in)
Limit
1.6 mm (0.06 in)



- a. Apply blue layout fluid “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 blue layout fluid will have been removed.

VALVES AND VALVE SPRINGS

4. Lap:
- Valve face
 - Valve seat

TIP

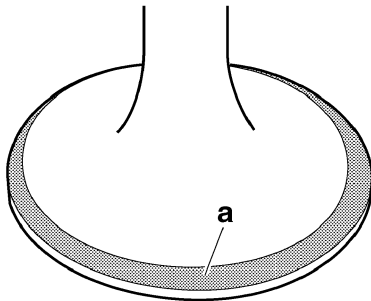
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

- a. Apply a coarse lapping compound "a" to the valve face.

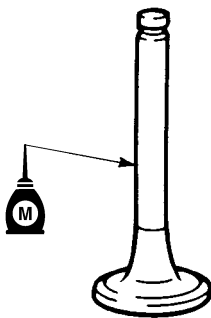
ECA13790

NOTICE

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



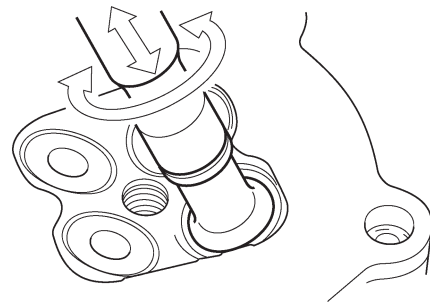
- b. Apply molybdenum disulfide oil onto the valve stem.



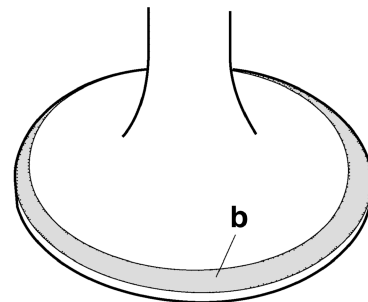
- c. Install the valve into the cylinder head.
 d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

TIP

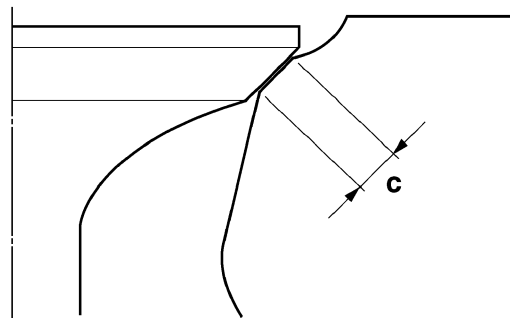
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



- 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 blue layout fluid "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.




EAS24310

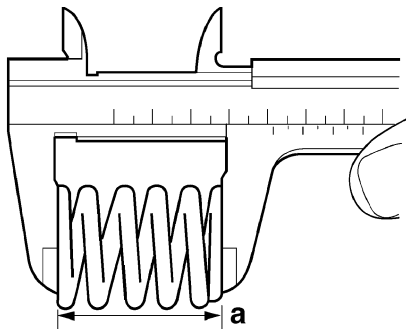
CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.


1. Measure:
- Valve spring free length "a"
- Out of specification → Replace the valve spring.

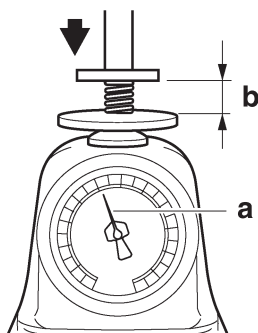
VALVES AND VALVE SPRINGS

	Free length (intake)	42.43 mm (1.67 in)
	Limit	40.31 mm (1.59 in)
	Free length (exhaust)	42.43 mm (1.67 in)
	Limit	40.31 mm (1.59 in)




2. Measure:
- Compressed valve spring force "a"
Out of specification → Replace the valve spring.

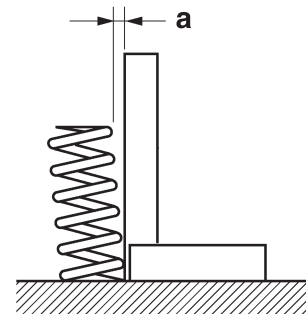
	Installed compression spring force (intake)	171.00–197.00 N (17.44–20.09 kgf, 38.44–44.29 lbf)
	Installed compression spring force (exhaust)	171.00–197.00 N (17.44–20.09 kgf, 38.44–44.29 lbf)
	Installed length (intake)	35.00 mm (1.38 in)
	Installed length (exhaust)	35.00 mm (1.38 in)



b. Installed length

3. Measure:
- Valve spring tilt "a"
Out of specification → Replace the valve spring.

	Spring tilt (intake)	2.5 °/1.9 mm (0.07 in)
	Spring tilt (exhaust)	2.5 °/1.9 mm (0.07 in)

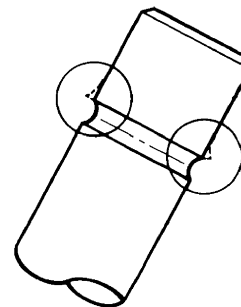


EAS24340


INSTALLING THE VALVES

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

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



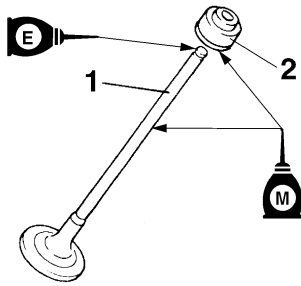
2. Lubricate:
- Valve stem "1"
 - Valve stem seal "2"
(with the recommended lubricant)

	Recommended lubricant Molybdenum disulfide oil
---	--

3. Lubricate:
- Valve stem end
(with the recommended lubricant)

	Recommended lubricant Engine oil
---	--

VALVES AND VALVE SPRINGS

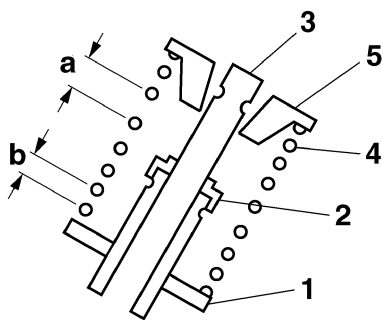
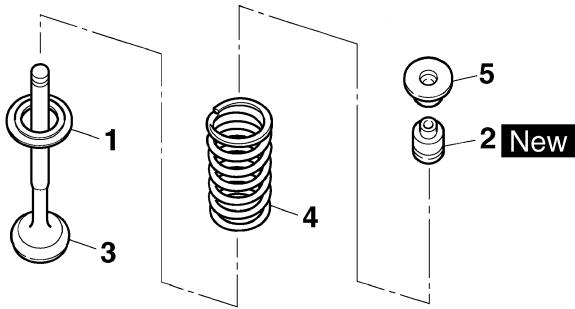


4. Install:

- Lower spring seat “1”
- Valve stem seal “2” **New**
- Valve “3”
- Valve spring “4”
- Upper spring seat “5”
(into the cylinder head)

TIP

- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch “a” facing up.



- a. Larger pitch
- b. Smaller pitch

5. Install:

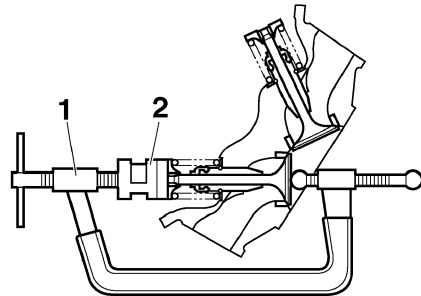
- Valve cotters

TIP

Install 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
90890-01243
Valve spring compressor adapter (26 mm)
YM-01253-1

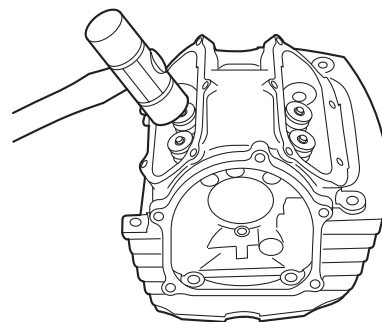


6. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

NOTICE

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

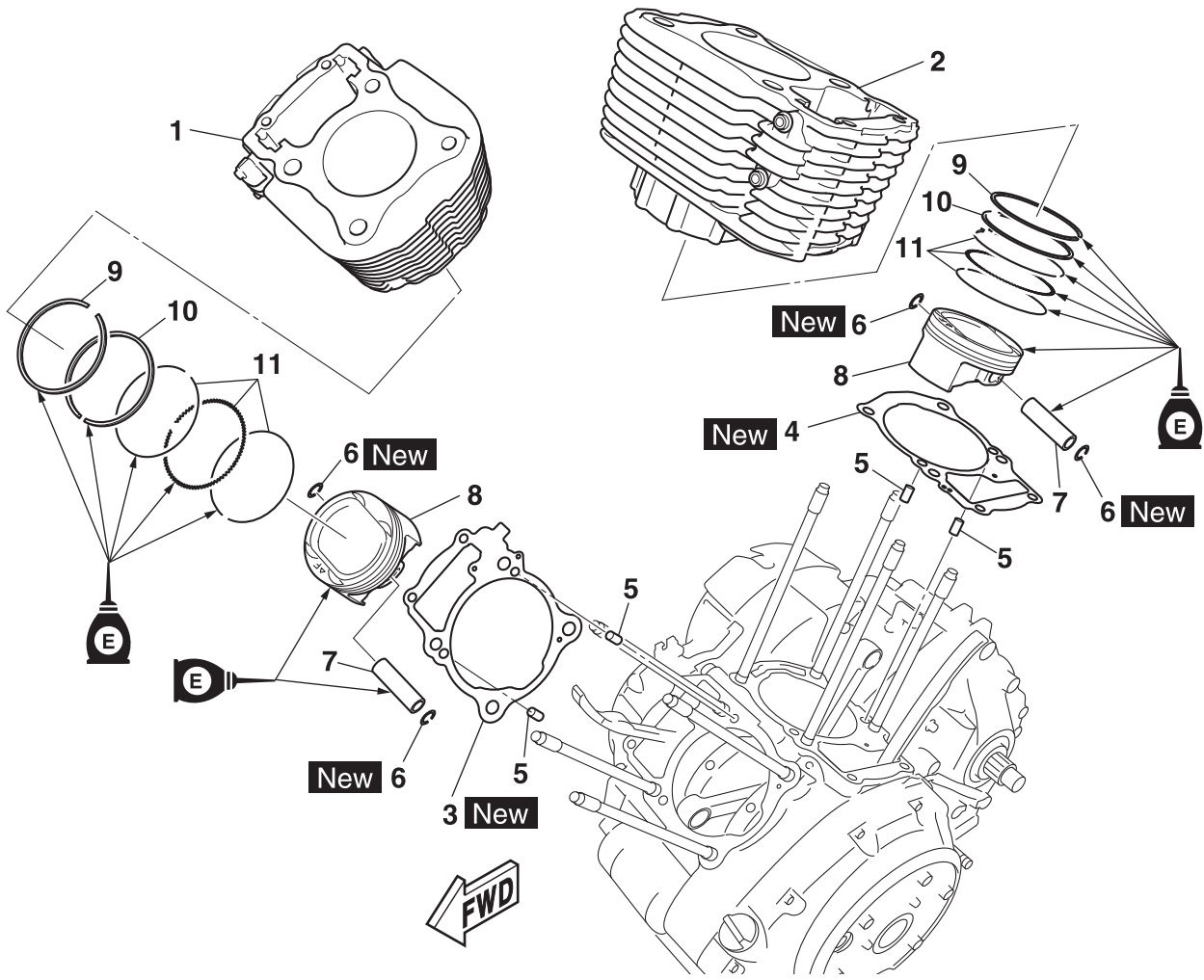


CYLINDERS AND PISTONS

EAS24360

CYLINDERS AND PISTONS

Removing the cylinders and pistons



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder heads		Refer to "CYLINDER HEADS" on page 5-26.
1	Front cylinder	1	
2	Rear cylinder	1	
3	Front cylinder gasket	1	
4	Rear cylinder gasket	1	
5	Dowel pin	4	
6	Circlip	4	
7	Piston pin	2	
8	Piston	2	
9	Top ring	2	
10	2nd ring	2	
11	Oil ring	2	
			For installation, reverse the removal procedure.

CYLINDERS AND PISTONS

EAS24380

REMOVING THE PISTONS

The following procedure applies to all of the pistons.

- Remove:
 - Circlips "1"
 - Piston pin "2"
 - Piston "3"

ECA13810

NOTICE

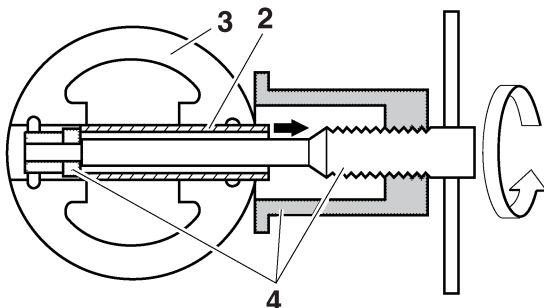
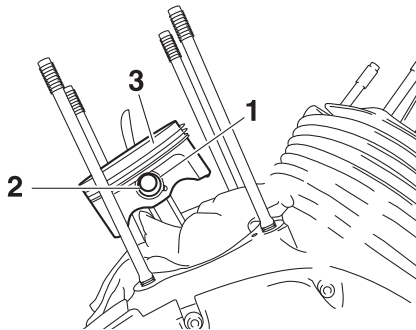
Do not use a hammer to drive the piston pin out.

TIP

- Before removing the circlips, cover the crankcase opening with a clean rag to prevent the circlips from falling into the crankcase.
- Before removing the piston pin, deburr the circlips' groove and the piston's pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set "4".



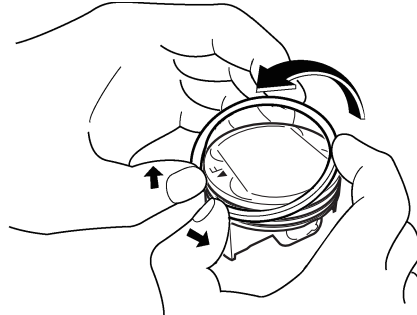
**Piston pin puller set
90890-01304
Piston pin puller
YU-01304**



- 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.



EAS24410

CHECKING THE CYLINDERS AND PISTONS

The following procedure applies to all of the cylinders and pistons.

- Check:

- Piston wall
- Cylinder wall

Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.

- Measure:

- Piston-to-cylinder clearance

- Measure the cylinder bore with the cylinder bore gauge.

TIP

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



Bore

85.000–85.010 mm (3.3465–3.3468 in)

Wear limit

85.100 mm (3.3504 in)

Out of round limit

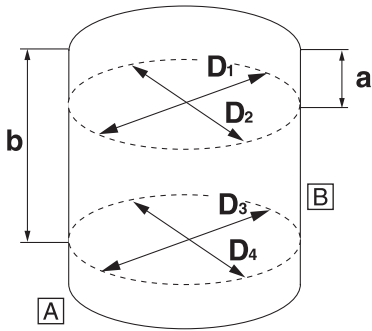
0.050 mm (0.0020 in)

Bore = maximum of D_1 – D_4

Wear limit = maximum of D_1 or D_3

Out of round limit = maximum of D_1 or D_3 - minimum of D_2 or D_4

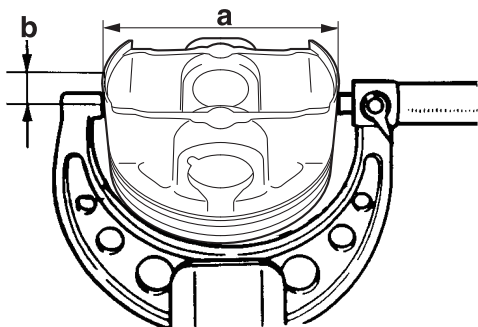
CYLINDERS AND PISTONS



- a. 10.0 mm (0.39 in)
- b. 85.6 mm (3.37 in)
- A. Intake side
- B. Exhaust side

- b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.
- c. Measure the piston skirt diameter “D” “a” with the micrometer.

Piston Diameter D
84.955–84.970 mm (3.3447–3.3453 in)



- b. 8 mm (0.31 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 “D”

Piston-to-cylinder clearance
0.030–0.055 mm (0.0012–0.0022 in)
Limit
0.15 mm (0.0059 in)

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



EAS24430

CHECKING THE PISTON RINGS

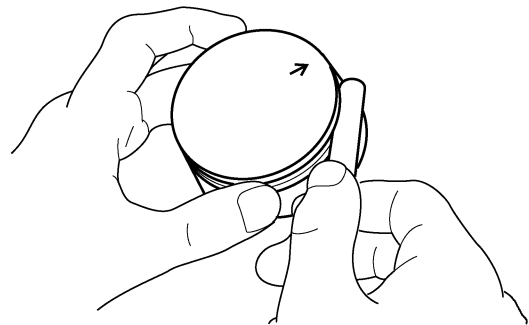
The following procedure applies to all of the piston rings.

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
Top ring
Ring side clearance
0.040–0.080 mm (0.0016–0.0032 in)
Limit
0.100 mm (0.0039 in)
2nd ring
Ring side clearance
0.030–0.070 mm (0.0012–0.0028 in)
Limit
0.100 mm (0.0039 in)

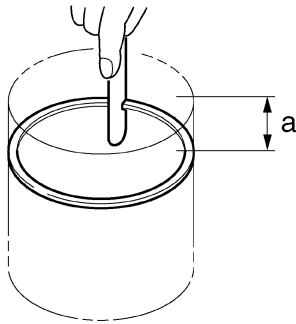


2. Install:
 - Piston ring
(into the cylinder)

TIP

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

CYLINDERS AND PISTONS



a. 10 mm (0.39 in)

3. Measure:

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

TIP

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



Piston ring

Top ring

End gap (installed)
0.15–0.30 mm (0.0059–0.0118 in)

Limit
0.60 mm (0.0236 in)

2nd ring

End gap (installed)
0.30–0.45 mm (0.0118–0.0177 in)

Limit
0.80 mm (0.0315 in)

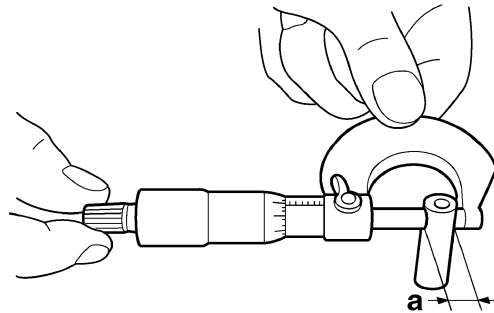
Oil ring

End gap (installed)
0.20–0.70 mm (0.0079–0.0276 in)



Piston pin outside diameter
20.991–21.000 mm (0.8264–0.8268 in)

Limit
20.971 mm (0.8256 in)



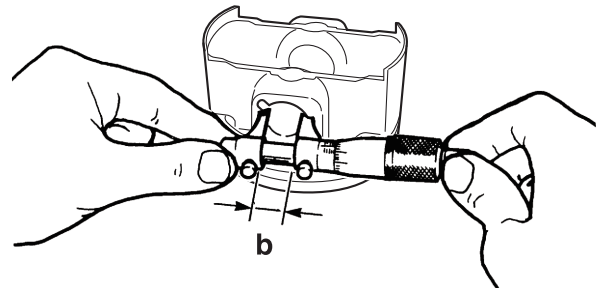
3. Measure:

- Piston pin bore diameter "b"
Out of specification → Replace the piston.



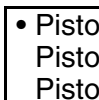
Piston pin bore inside diameter
21.004–21.015 mm (0.8269–0.8274 in)

Limit
21.045 mm (0.8285 in)



4. Calculate:

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



• Piston-pin-to-piston-pin-bore clearance =
Piston pin bore diameter "b" -
Piston pin outside diameter "a"



Piston-pin-to-piston-pin-bore clearance

0.004–0.024 mm (0.00016–0.00094 in)

Limit
0.074 mm (0.0029 in)

EAS24440

CHECKING THE PISTON PINS

The following procedure applies to all of the piston pins.

1. Check:

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

2. Measure:

- Piston pin outside diameter "a"
Out of specification → Replace the piston pin.

CYLINDERS AND PISTONS

EAS24460

INSTALLING THE PISTONS AND CYLINDERS

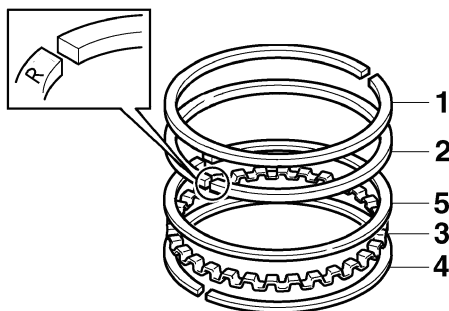
The following procedure applies to all of the pistons and cylinders.

1. Install:

- Top ring "1"
- 2nd ring "2"
- Oil ring expander "3"
- Lower oil ring rail "4"
- Upper oil ring rail "5"

TIP

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

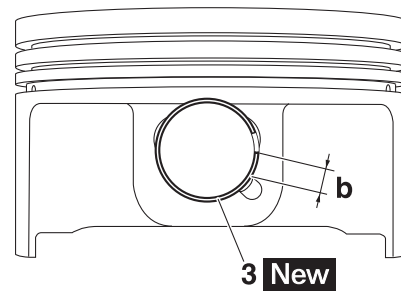
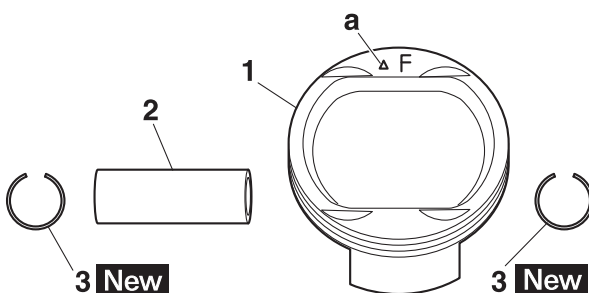


2. Install:

- Piston "1"
- Piston pin "2"
- Circlips "3" **New**

TIP

- Apply engine oil onto the piston pin.
- Make sure the arrow mark "a" on the piston faces towards the front side of the cylinder.
- Before installing the circlips, cover the crankcase opening with a clean rag to prevent the clips from falling into the crankcase.
- Install the circlips so that the clip ends are 3 mm (0.12 in) "b" or more from the cutout in the piston.
- Reinstall each piston into its original cylinder.



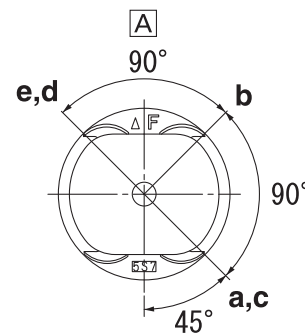
3. Lubricate:

- Piston
- Piston rings
- Cylinder
(with the recommended lubricant)



4. Offset:

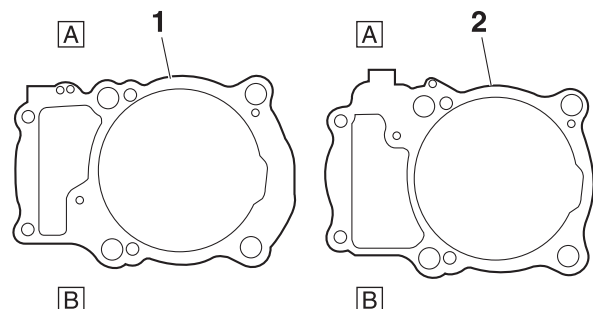
- Piston ring end gaps



- a. Top ring
- b. Upper oil ring rail
- c. Oil ring expander
- d. Lower oil ring rail
- e. 2nd ring
- A. forward

5. Install:

- Rear cylinder gasket "1"
- Front cylinder gasket "2"



- A. Intake side
- B. Exhaust side

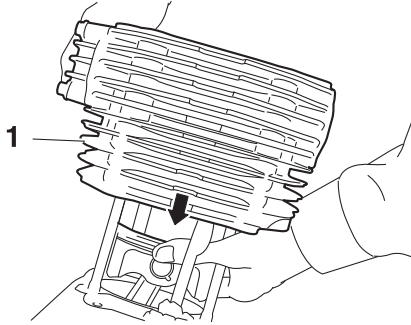
CYLINDERS AND PISTONS

6. Install:

- Cylinder "1"

TIP _____

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

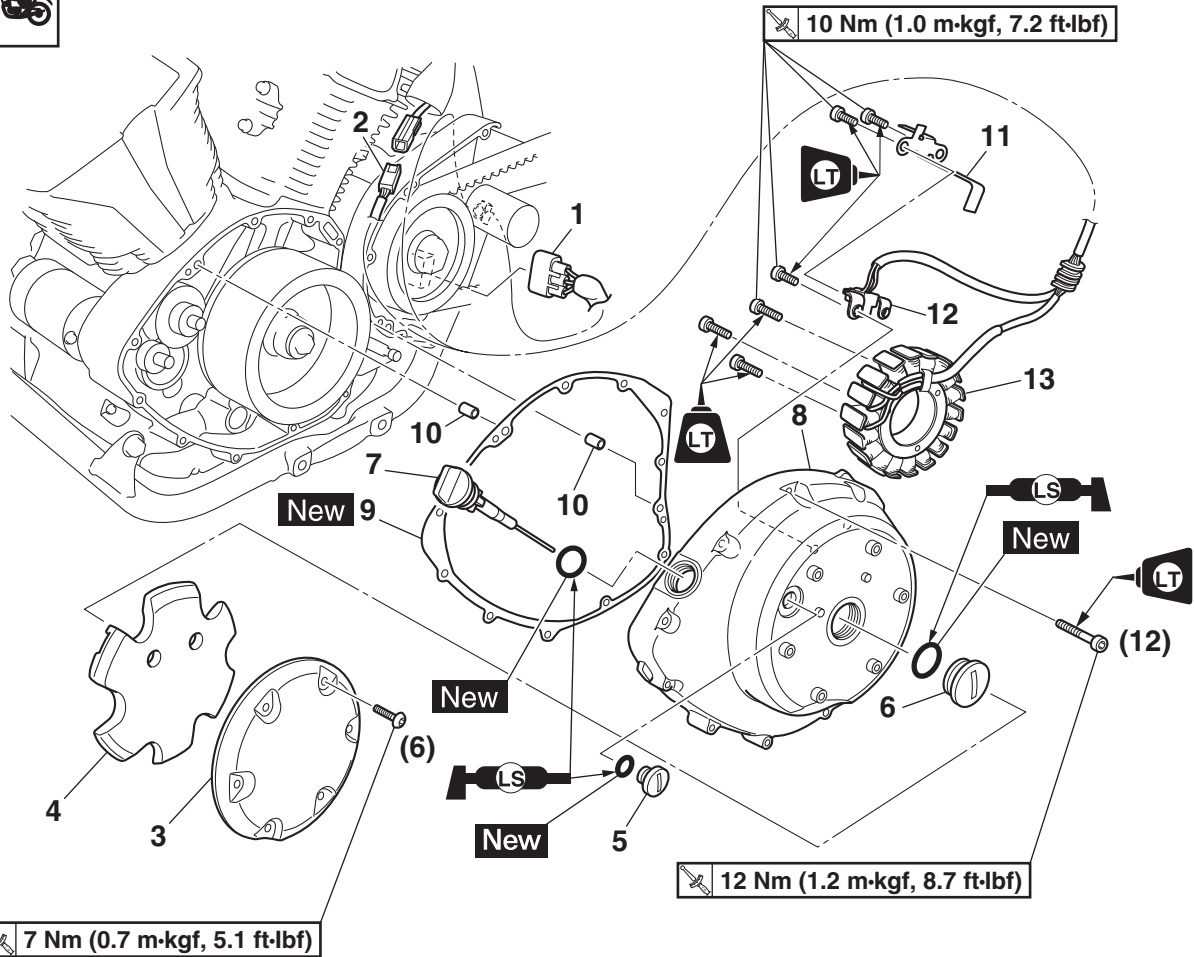


GENERATOR AND STARTER CLUTCH

EAS24480

GENERATOR AND STARTER CLUTCH

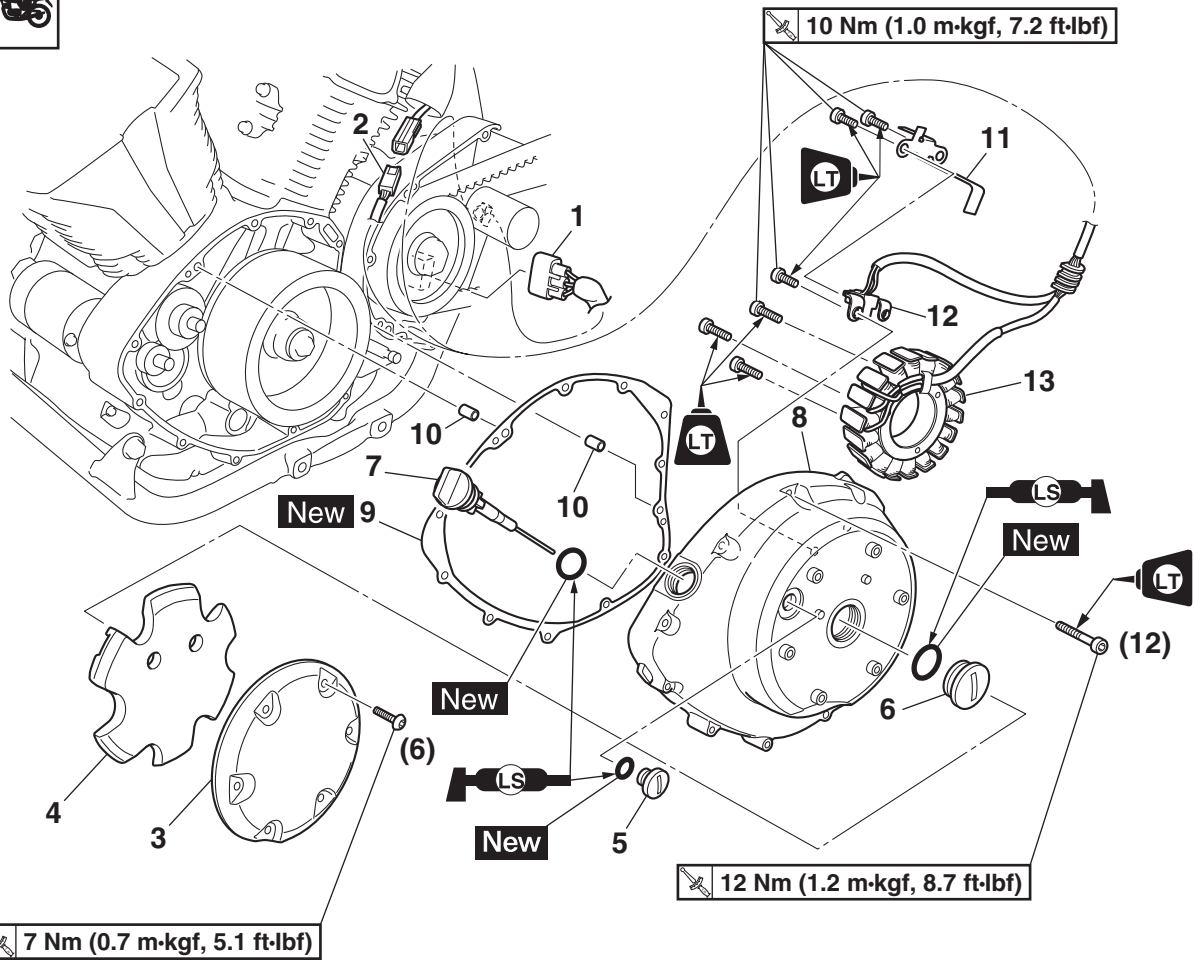
Removing the stator coil



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Drive pulley cover		Refer to "BELT DRIVE" on page 4-94.
	Left footrest assembly		Refer to "ENGINE REMOVAL" on page 5-3.
1	Rectifier/regulator coupler	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3	Damper cover	1	
4	Generator cover damper	1	
5	Crankshaft end accessing screw	1	
6	Timing mark accessing screw	1	
7	Oil level gauge	1	
8	Generator cover	1	
9	Generator cover gasket	1	
10	Dowel pin	2	
11	Crankshaft position sensor lead holder	1	
12	Crankshaft position sensor	1	

GENERATOR AND STARTER CLUTCH

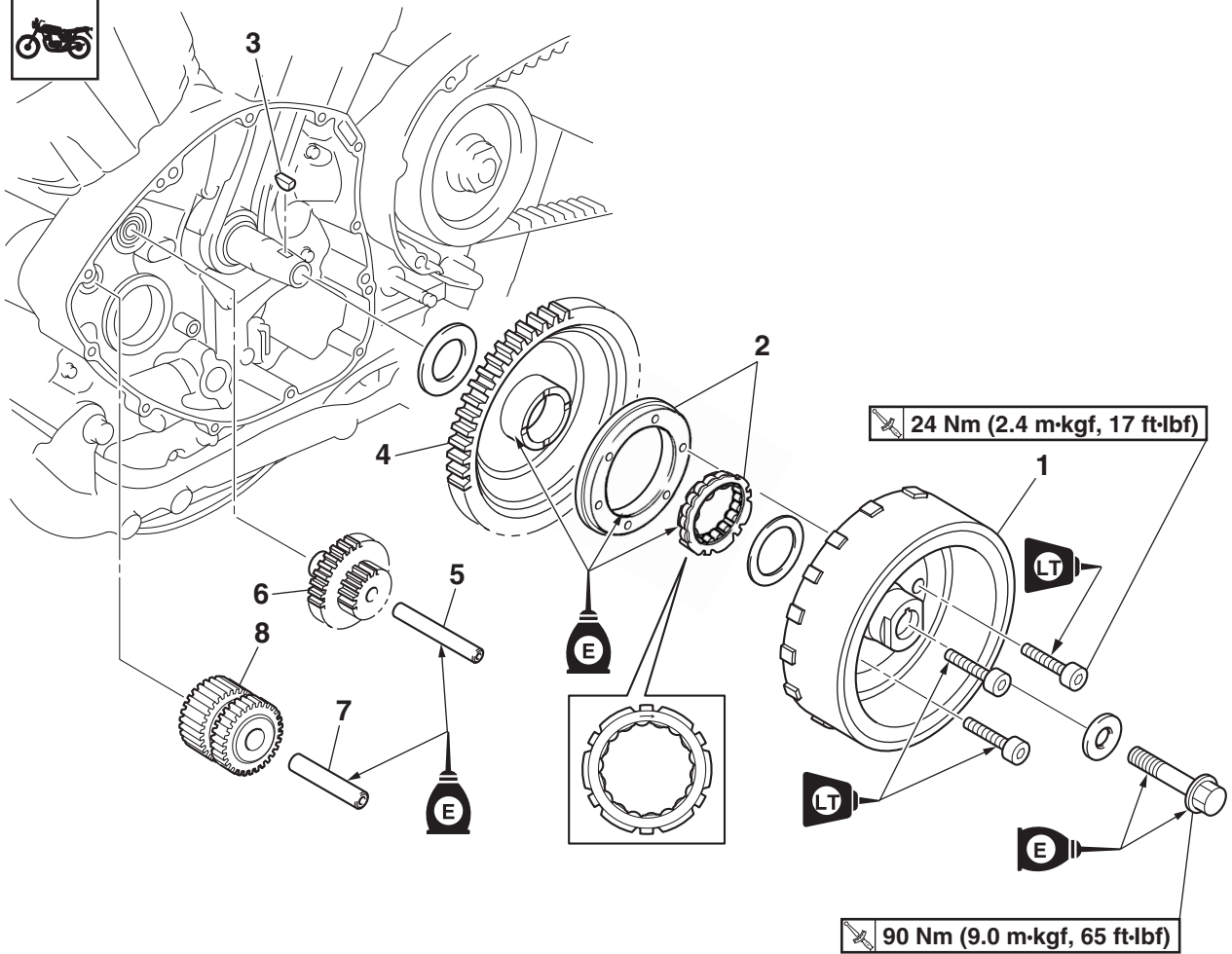
Removing the stator coil



Order	Job/Parts to remove	Q'ty	Remarks
13	Stator coil	1	
			For installation, reverse the removal procedure.

GENERATOR AND STARTER CLUTCH

Removing the generator rotor and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Generator rotor	1	
2	Starter clutch	1	
3	Woodruff key	1	
4	Starter clutch gear	1	
5	Starter clutch idle gear 2 shaft	1	
6	Starter clutch idle gear 2	1	
7	Starter clutch idle gear 1 shaft	1	
8	Starter clutch idle gear 1	1	
			For installation, reverse the removal procedure.

GENERATOR AND STARTER CLUTCH

EAS24490

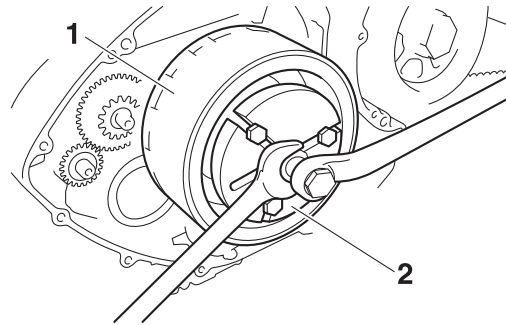
REMOVING THE GENERATOR

1. Remove:

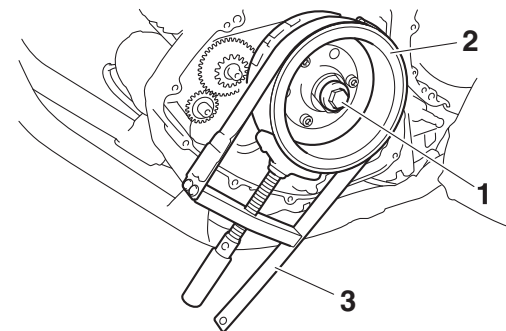
- Generator rotor bolt "1"
- Washer

TIP

- While holding the generator rotor "2" with the sheave holder "3", loosen the generator rotor bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.



	Sheave holder 90890-01701 Primary clutch holder YS-01880-A
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2. Remove:

- Generator rotor "1"
(with the flywheel puller "2")
- Woodruff key


ECA1TP1029

NOTICE

To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set's center bolt and the crankshaft.

TIP

- Install the flywheel puller bolts to the threaded holes of the starter clutch.
- Make sure the flywheel puller is centered over the generator rotor.

	Flywheel puller 90890-01362 Heavy duty puller YU-33270-B
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EAS24560

REMOVING THE STARTER CLUTCH

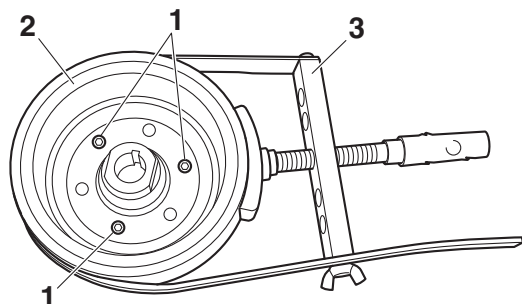
1. Remove:

- Starter clutch bolts "1"
- Starter clutch

TIP

While holding the generator rotor "2" with the sheave holder "3", loosen the starter clutch bolts.

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



EAS24570

CHECKING THE STARTER CLUTCH

1. Check:

- Starter clutch rollers
Damage/wear → Replace.

2. Check:

- Starter clutch idle gears
- Starter clutch gear
Burr/chips/roughness/wear → Replace the defective part(s).

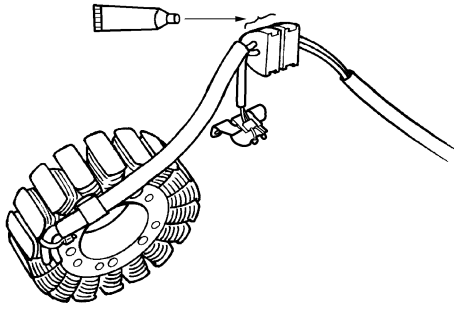
3. Check:

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

4. Check:

- Starter clutch operation

GENERATOR AND STARTER CLUTCH



EAS1TP1054

INSTALLING THE GENERATOR COVER

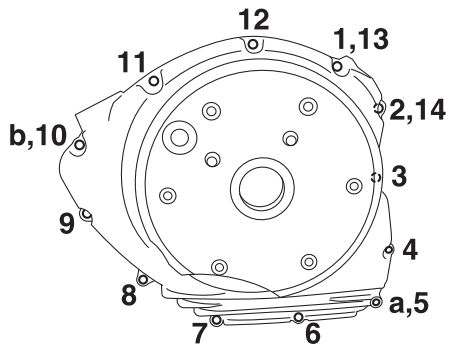
1. Install:



Generator cover bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)

TIP

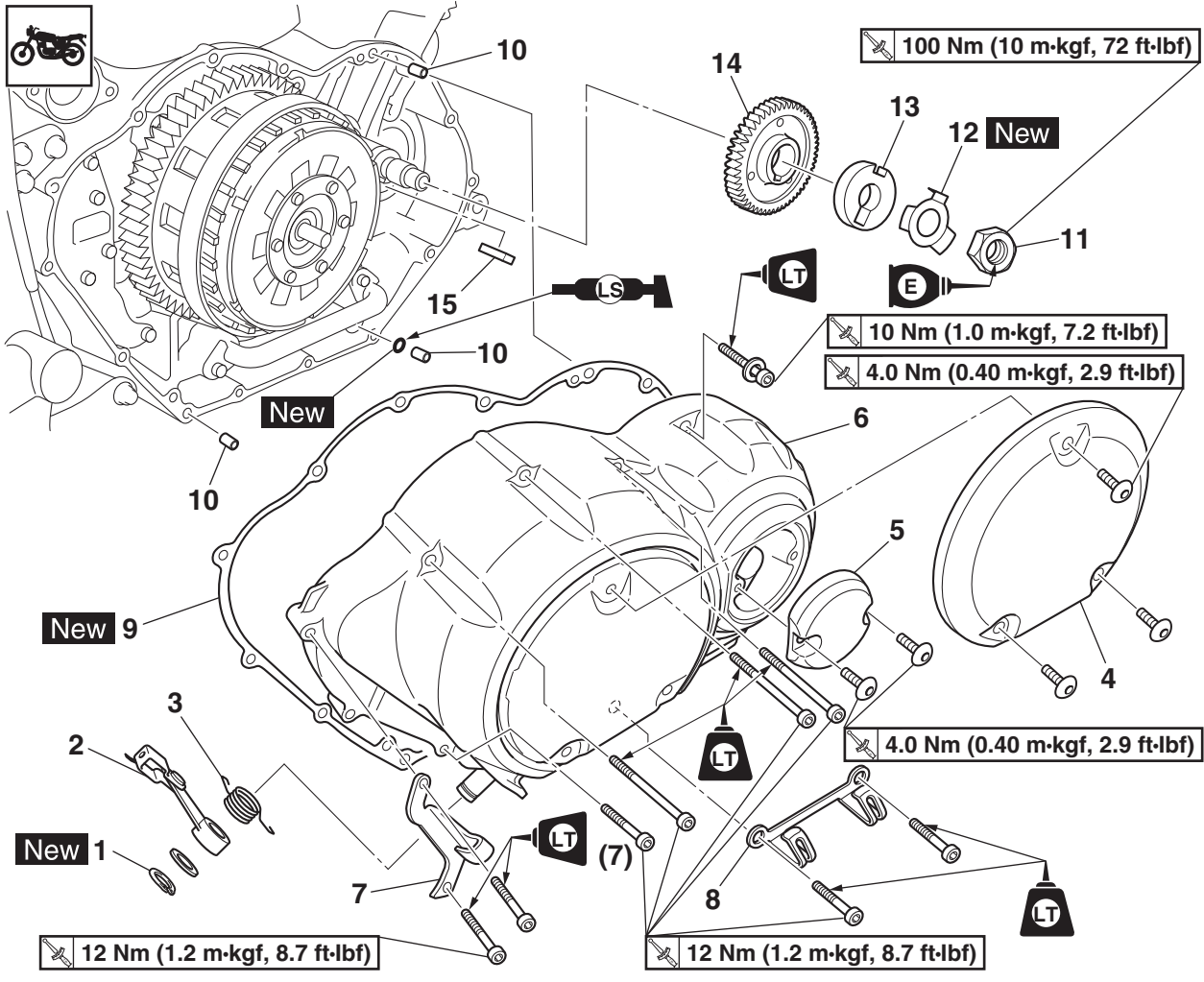
Temporarily tighten “a” and “b” and then tighten the generator cover bolts in the order shown in the illustration.



EAS25060

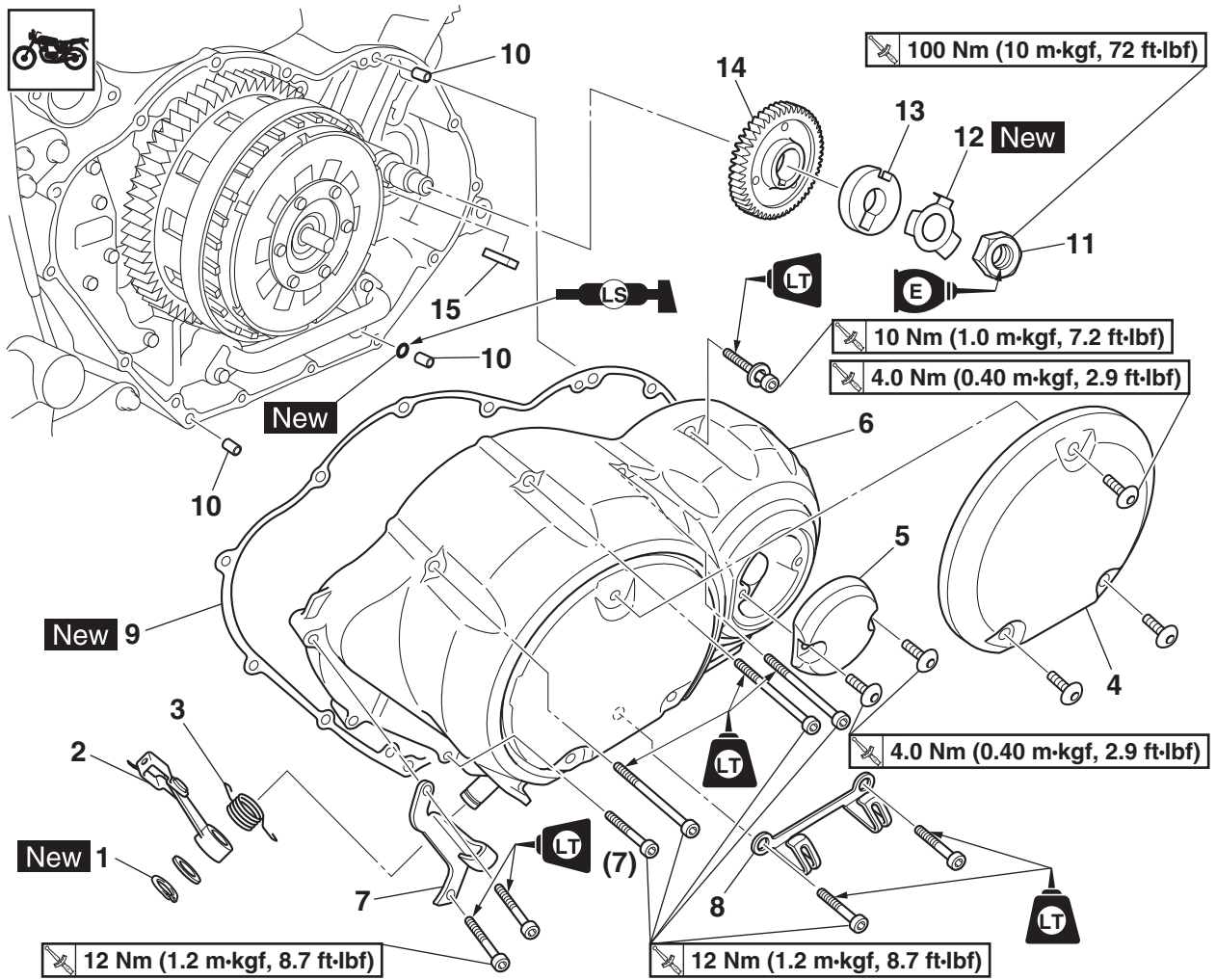
CLUTCH

Removing the primary drive gear



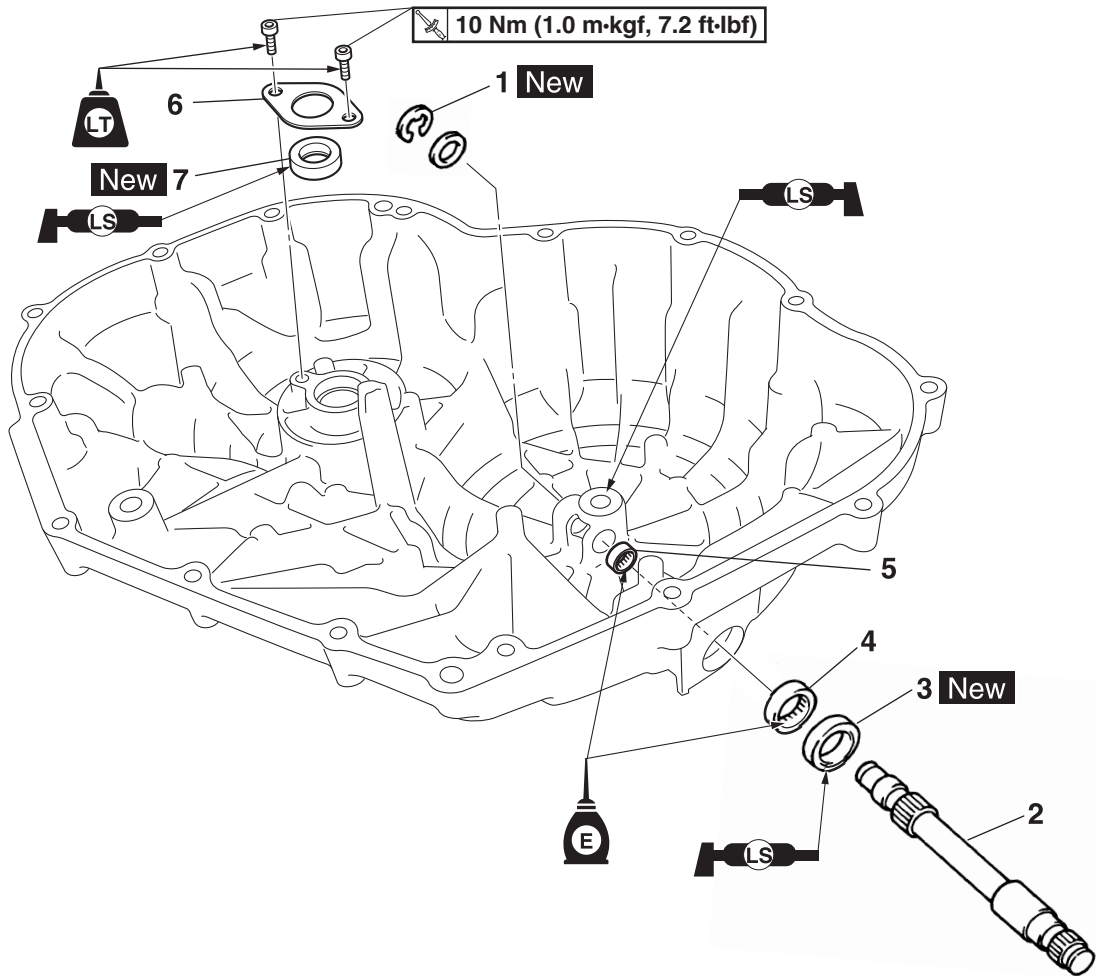
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-3.
	Clutch cable		Disconnect. Refer to "ENGINE REMOVAL" on page 5-3.
	Left footrest assembly		Refer to "ENGINE REMOVAL" on page 5-3.
	Generator cover		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-42.
	Rear brake master cylinder/Right footrest assembly/Rear brake light switch		Refer to "REAR BRAKE" on page 4-47.
1	Circlip	1	
2	Pull lever	1	
3	Pull lever spring	1	
4	Clutch plastic cover 1	1	
5	Clutch plastic cover 2	1	
6	Clutch cover	1	
7	Clutch cable holder	1	

Removing the primary drive gear



Order	Job/Parts to remove	Q'ty	Remarks
8	Starter motor lead and rear brake light switch lead holder	1	
9	Clutch cover gasket	1	
10	Dowel pin	3	
11	Primary drive gear nut	1	
12	Lock washer	1	
13	Spacer	1	
14	Primary drive gear	1	
15	Woodruff key	1	
			For installation, reverse the removal procedure.

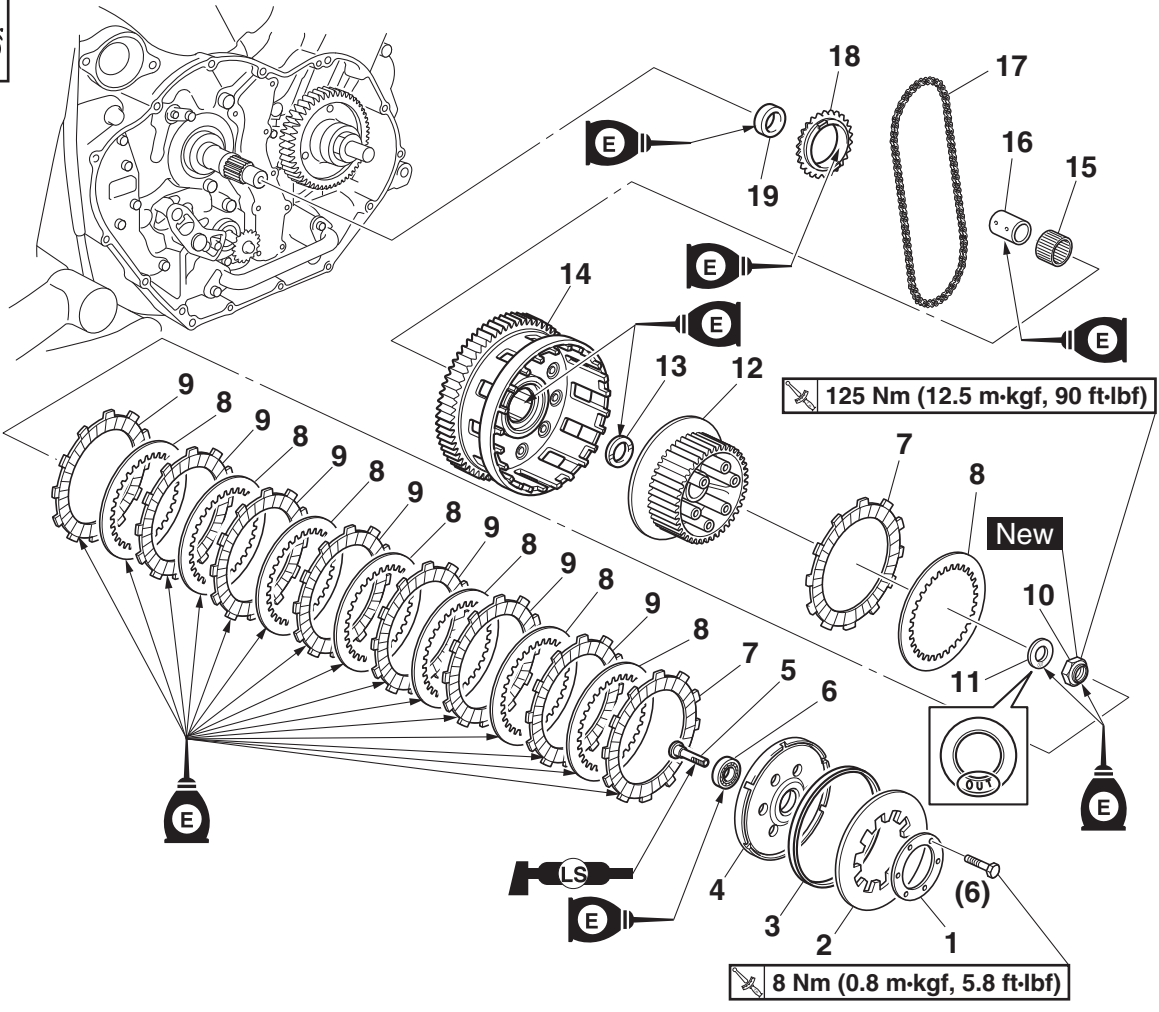
Removing the pull lever shaft



Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	1	
2	Pull lever shaft	1	
3	Oil seal	1	
4	Bearing	1	
5	Bearing	1	
6	Oil seal retainer	1	
7	Oil seal	1	
			For installation, reverse the removal procedure.

CLUTCH

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch spring plate retainer	1	
2	Clutch spring plate	1	
3	Clutch spring plate seat	1	
4	Pressure plate	1	
5	Pull rod	1	
6	Bearing	1	
7	Friction plate 1	2	Inside diameter: 124 mm (4.88 in)
8	Clutch plate	8	
9	Friction plate 2	7	Inside diameter: 124 mm (4.88 in)
10	Clutch boss nut	1	
11	Conical spring washer	1	
12	Clutch boss	1	
13	Thrust washer 1	1	
14	Clutch housing	1	
15	Bearing	1	
16	Collar	1	
17	Oil pump drive chain	1	

EAS25090

REMOVING THE PRIMARY DRIVE GEAR

1. Straighten the lock washer tab.
2. Remove:

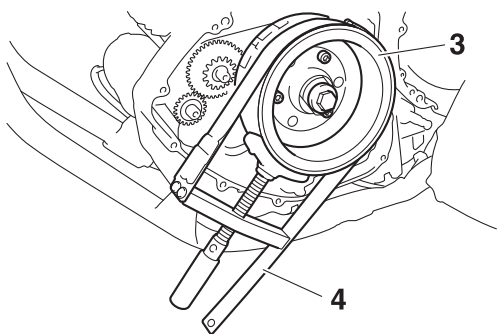
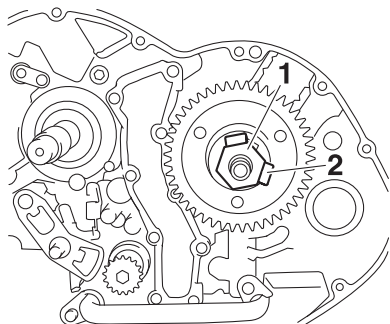
- Primary drive gear nut "1"
- Lock washer "2"

TIP

- While holding the generator rotor "3" with the sheave holder "4", loosen the primary drive gear nut.
- Do not allow the sheave holder to touch the projection on the generator rotor.



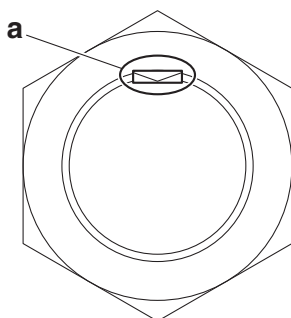
Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



EAS25080

REMOVING THE CLUTCH

1. Straighten the clutch boss nut rib "a".



2. Loosen:

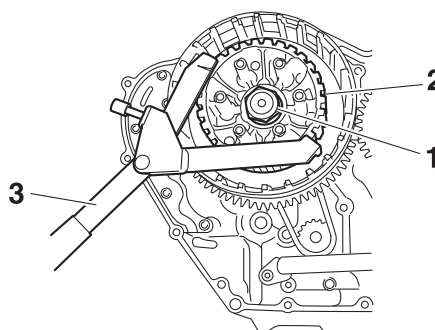
- Clutch boss nut "1"

TIP

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

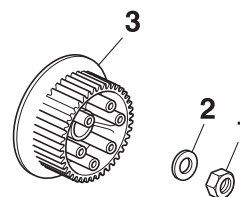


Universal clutch holder
90890-04086
YM-91042



3. Remove:

- Clutch boss nut "1"
- Conical spring washer "2"
- Clutch boss "3"



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.

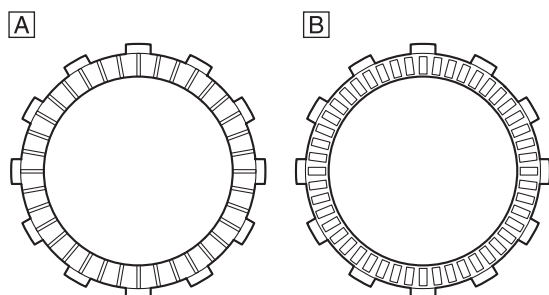
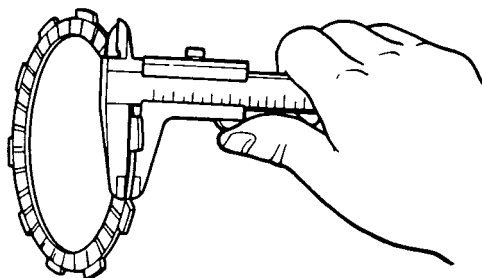
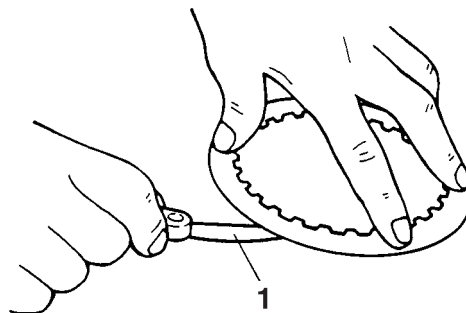
2. Measure:

- Friction plate thickness
Out of specification → Replace the friction plates as a set.

TIP

Measure each friction plate at four places.

	Friction plate 1 thickness
	2.90–3.10 mm (0.114–0.122 in)
	Wear limit
	2.80 mm (0.110 in)
	Friction plate 2 thickness
	2.92–3.08 mm (0.115–0.121 in)
	Wear limit
	2.82 mm (0.111 in)




- A. Friction plate 1
- B. Friction plate 2

EAS25110

CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:
 - Clutch plate
Damage → Replace the clutch plates as a set.
2. Measure:
 - Clutch plate warpage
(with a surface plate and thickness gauge “1”)
Out of specification → Replace the clutch plates as a set.

	Warpage limit
	0.20 mm (0.008 in)

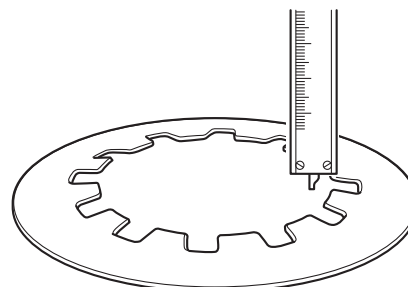
EAS25130

CHECKING THE CLUTCH SPRING PLATE

1. Check:
 - Clutch spring plate
Damage → Replace.
2. Check:
 - Clutch spring plate seat
Damage → Replace.
3. Measure:
 - Clutch spring free height
Out of specification → Replace the clutch spring plate.



Clutch spring height
7.40 mm (0.29 in)
Minimum height
7.03 mm (0.28 in)



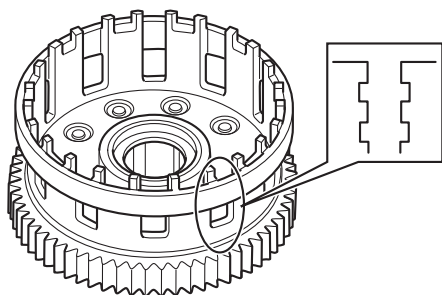
EAS25150

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.

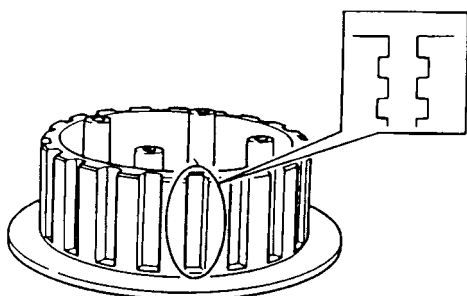
EAS25160

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
Cracks/damage → Replace.
 - Bearing
Damage/wear → Replace.

EAS25200

CHECKING THE PRIMARY DRIVE GEAR

1. Check:
 - Primary drive gear
Damage/wear → Replace the primary drive and primary driven gears as a set.
Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

EAS25210

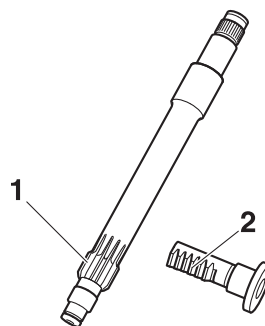
CHECKING THE PRIMARY DRIVEN GEAR

1. Check:
 - Primary driven gear
Damage/wear → Replace the primary drive and primary driven gears as a set.
Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

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 pinion gear as a set.



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

EAS1TP1055

CHECKING THE OIL PUMP DRIVE SPROCKET AND OIL PUMP DRIVE CHAIN

1. Check:
 - Oil pump drive sprocket
Cracks/damage/wear → Replace the oil pump drive chain, and oil pump drive and driven sprockets as a set.
2. Check:
 - Oil pump drive chain
Damage/stiffness → Replace the oil pump drive chain, and oil pump drive and driven sprockets as a set.

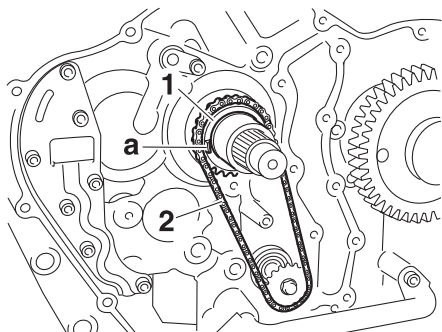
EAS25240

INSTALLING THE CLUTCH

1. Install:
 - Oil pump drive sprocket “1”
 - Oil pump drive chain “2”

TIP

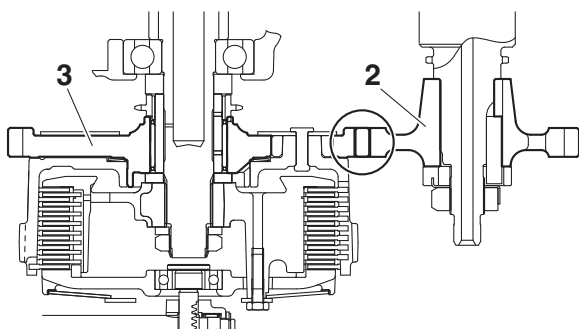
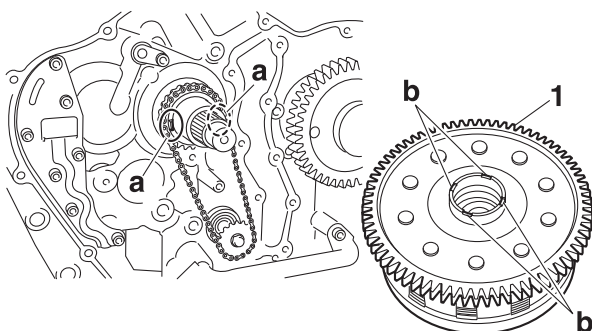
Install the oil pump drive sprocket with its projections “a” facing outward.



2. Install:
- Clutch housing "1"

TIP

- Fit the projections "a" on the oil pump drive sprocket into the grooves "b" in the clutch housing.
- Lubricate the clutch housing bearing with engine oil.
- Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.
- After installing the clutch housing, make sure that the primary drive gear "2" and clutch housing primary driven gear "3" are aligned as shown in the illustration.



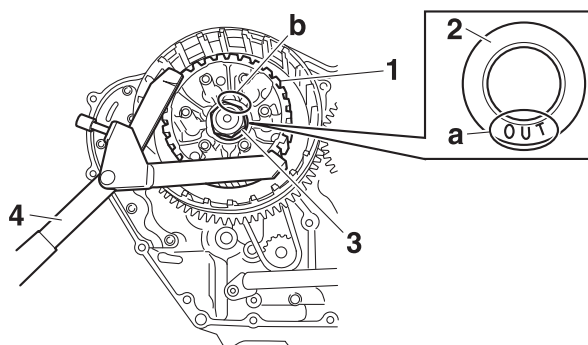
3. Install:
- Clutch boss "1"
 - Washer
 - Conical spring washer "2"
 - Clutch boss nut "3" **New**

	<p>Clutch boss nut 125 Nm (12.5 m.kgf, 90 ft.lbf)</p>
--	--

TIP

- Lubricate the clutch boss nut threads and conical spring washer mating surfaces with engine oil.
- Install the conical spring washer with the "OUT" mark "a" facing out.
- While holding the clutch boss with the universal clutch holder "4", tighten the clutch boss nut.
- Stake the clutch boss nut "3" at cutout "b" in the main axle.

	<p>Universal clutch holder 90890-04086 YM-91042</p>
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4. Lubricate:
- Friction plates
 - Clutch plates
- (with the recommended lubricant)

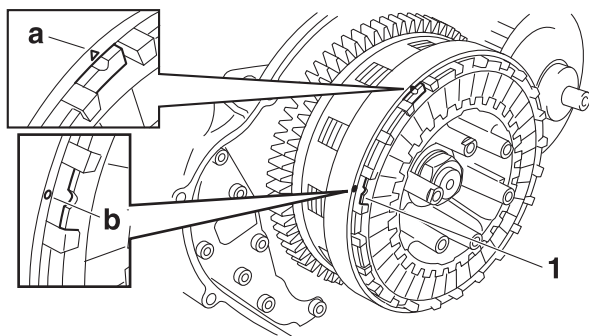
	<p>Recommended lubricant Engine oil</p>
--	--

5. Install:
- Friction plates 2
 - Clutch plates
 - Friction plates 1

TIP

- First, install a friction plate and then alternate between a clutch plate and a friction plate.
- Align the cutout in the tab of each friction plate 1 and 2 with the "△" mark "a" on the clutch housing and align the cutout in the tab of the last friction plate 1 "1" with the punch mark "b" on the housing.

CLUTCH



6. Install:
- Clutch spring plate
 - Clutch spring plate retainer



Clutch spring plate retainer bolt
8 Nm (0.8 m·kgf, 5.8 ft·lbf)

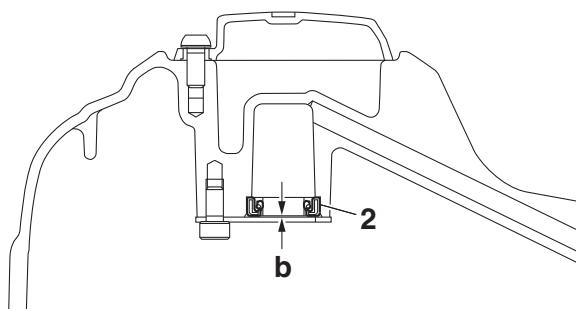
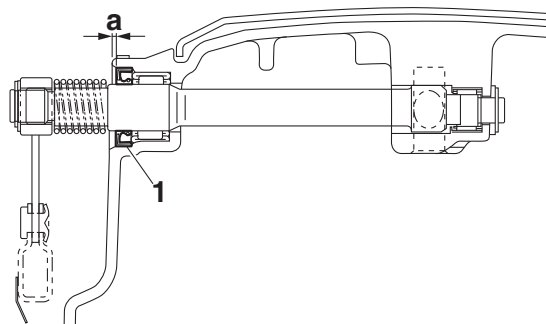
TIP

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

7. Install:
- Oil seals “1”, “2”
(to the clutch cover)



Installed depth “a”
1.0–1.5 mm (0.04–0.06 in)
Installed depth “b”
0–0.5 mm (0–0.02 in)



8. Install:
- Clutch cover
 - Clutch cable holder

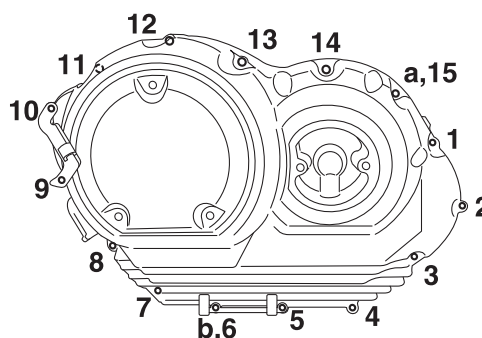
- Starter motor lead and rear brake light switch lead holder



Clutch cover bolt “1”–“13”, “15”
12 Nm (1.2 m·kgf, 8.7 ft·lbf)
Clutch cover bolt (with washer)
“14”
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

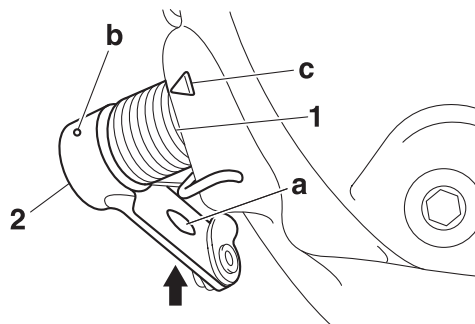
Temporarily tighten the bolts “a” and “b”, and then tighten the clutch cover bolts in the order shown in the illustration.



9. Install:
- Pull lever spring “1”
 - Pull lever “2”
 - Washer
 - Circlip **New**

TIP

- Make sure that the mark “a” on the pull lever is facing forward.
- When installing the pull lever, push it and check that its punch mark “b” aligns with the mark “c” on the clutch cover.
- Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.



10. Adjust:
- Clutch lever free play
Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-10.

EAS25230

INSTALLING THE PRIMARY DRIVE GEAR

1. Install:

- Primary drive gear "1"
- Spacer "2"
- Lock washer "3" **New**
- Primary drive gear nut



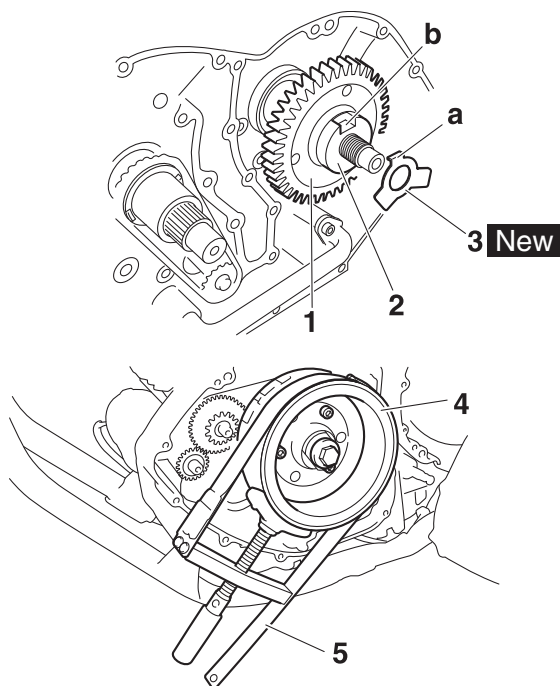
Primary drive gear nut
100 Nm (10 m·kgf, 72 ft·lbf)

TIP

- Make sure that the shorter side of the primary drive gear is facing outward.
- Align the tab "a" on the lock washer with the groove "b" in the spacer.
- While holding the generator rotor "4" with the sheave holder "5", tighten the primary drive gear nut.
- Do not allow the sheave holder to touch the projection on the generator rotor.
- Lubricate the primary drive gear nut threads with engine oil.



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

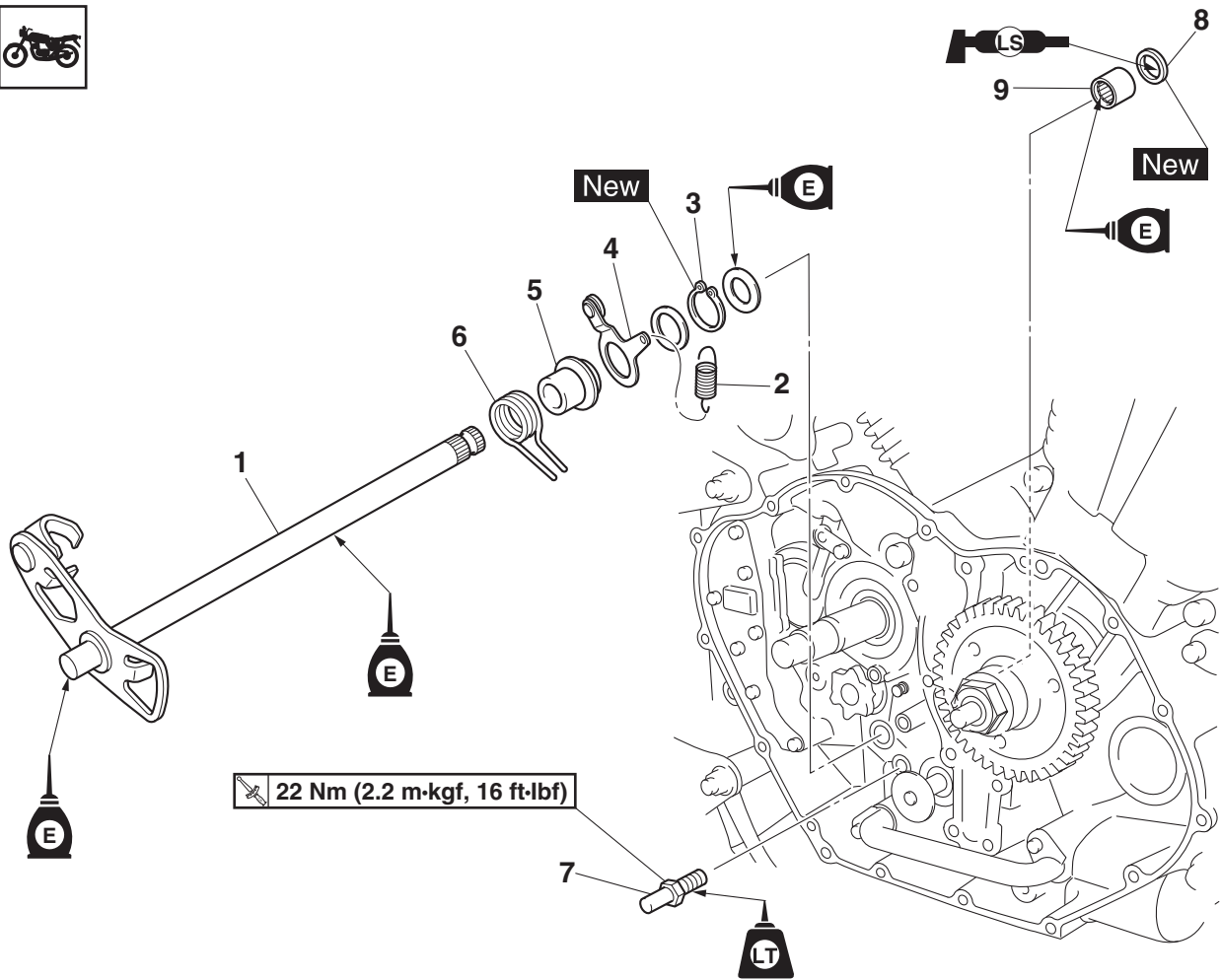


- ### 2. Bend lock washer tab along a flat side of the nut.

EAS25410

SHIFT SHAFT

Removing the shift shaft and stopper lever

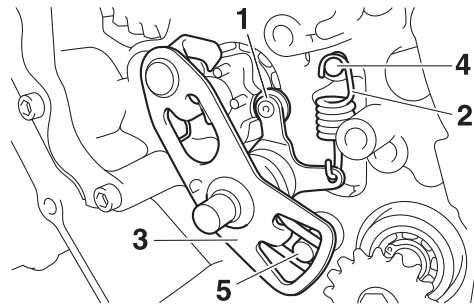


Order	Job/Parts to remove	Q'ty	Remarks
	Drive pulley cover		Refer to "BELT DRIVE" on page 4-94.
	Shift arm		Refer to "ENGINE REMOVAL" on page 5-3.
	Clutch cover/Clutch housing		Refer to "CLUTCH" on page 5-48.
1	Shift shaft	1	
2	Stopper lever spring	1	
3	Circlip	1	
4	Stopper lever	1	
5	Collar	1	
6	Shift shaft spring	1	
7	Shift shaft spring stopper	1	
8	Oil seal	1	
9	Bearing	1	
			For installation, reverse the removal procedure.

EAS25420

CHECKING THE SHIFT SHAFT

1. Check:
 - Shift shaft
Bends/damage/wear → Replace.
 - Shift shaft spring
Damage/wear → Replace.



EAS25430

CHECKING THE STOPPER LEVER

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

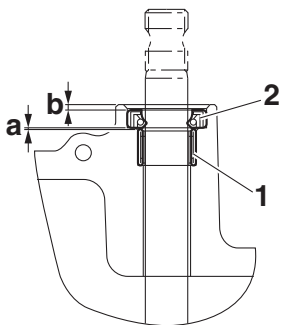
EAS25450

INSTALLING THE SHIFT SHAFT

1. Install:
 - Bearing "1"
 - Oil seals "2"
(to the crankcase)



Installed depth "a"
0–0.5 mm (0–0.02 in)
Installed depth "b"
1.0–1.5 mm (0.04–0.06 in)



2. Install:
 - Stopper lever "1"
 - Stopper lever spring "2"
 - Shift shaft "3"

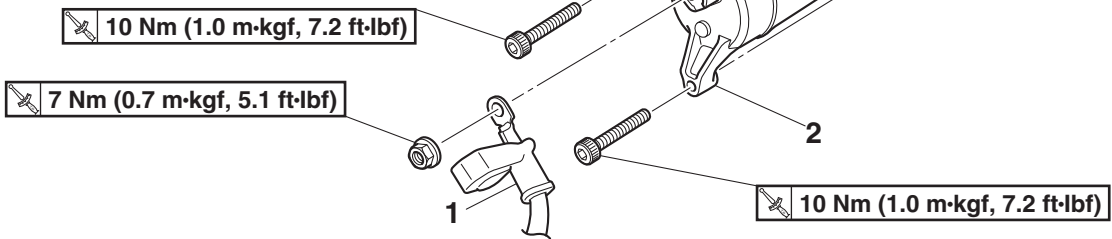
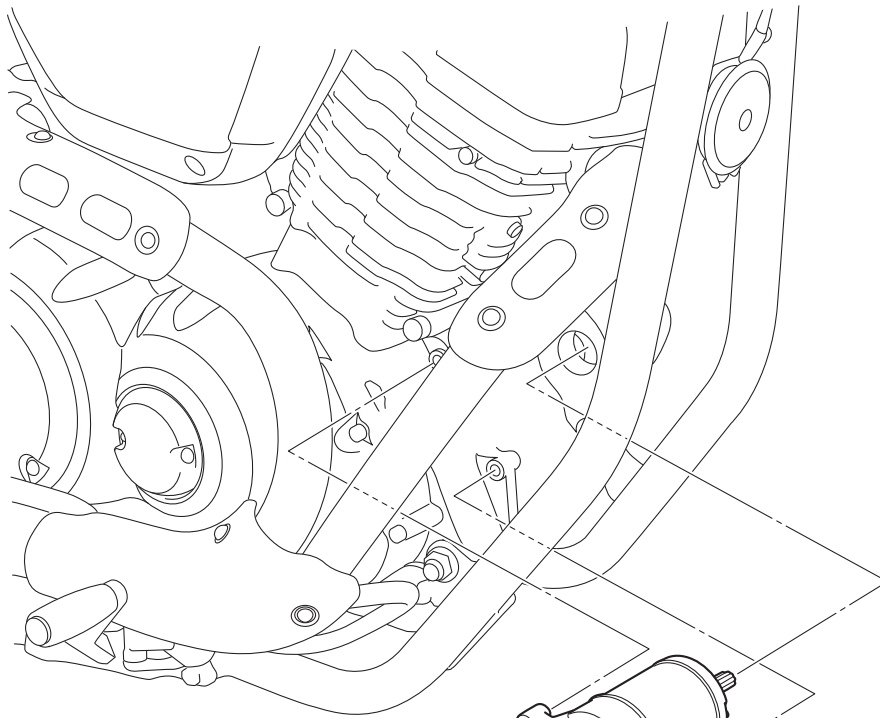
TIP

- Lubricate the oil seal lips with lithium-soap-based grease.
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss "4".
- Mesh the stopper lever with the shift drum segment assembly.
- Hook the end of the shift shaft spring onto the shift shaft spring stopper "5".

EAS24780

ELECTRIC STARTER

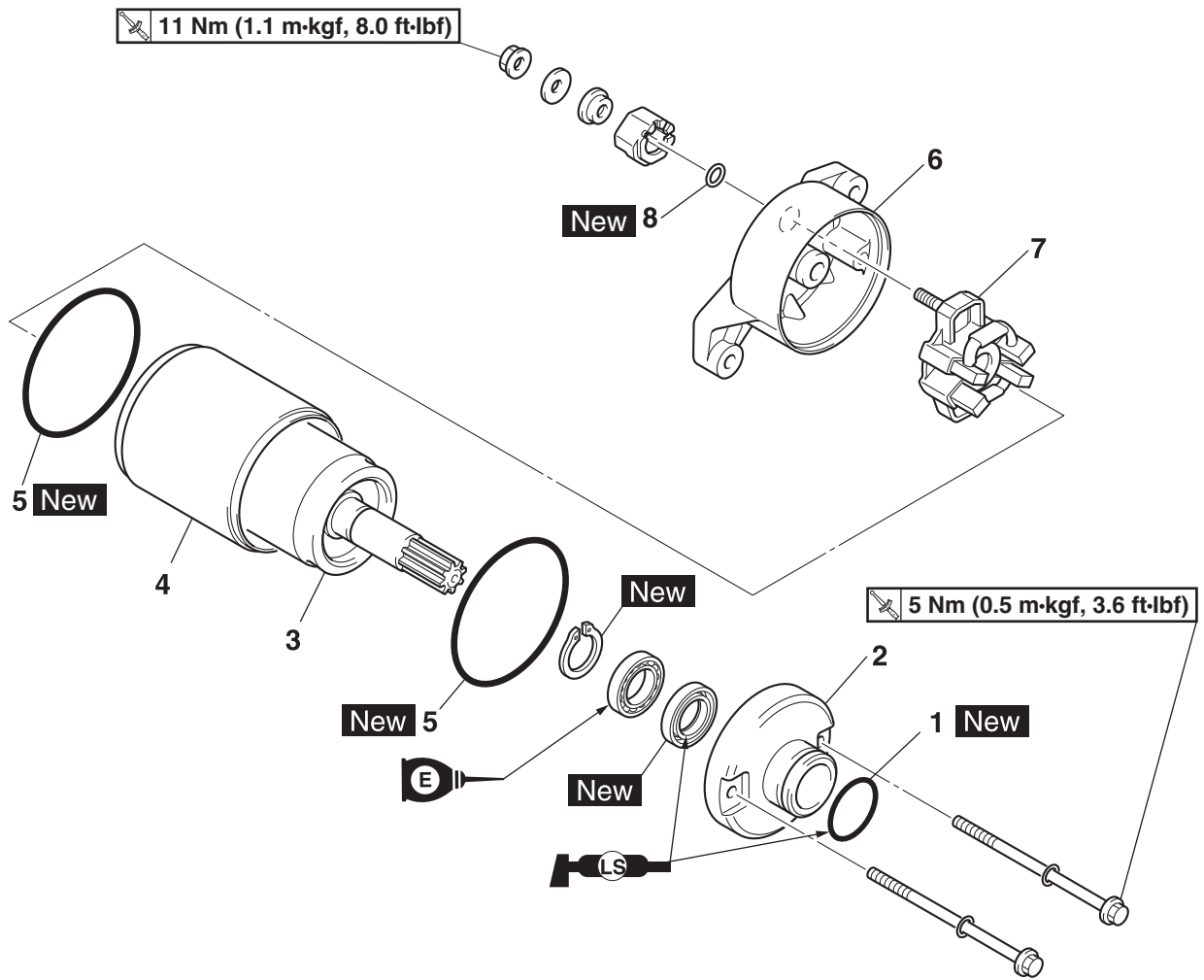
Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
1	Starter motor lead	1	Disconnect.
2	Starter motor	1	
			For installation, reverse the removal procedure.

ELECTRIC STARTER

Disassembling the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Starter motor front cover	1	
3	Armature assembly	1	
4	Starter motor yoke	1	
5	Gasket	2	
6	Starter motor rear cover	1	
7	Brush set assembly	1	
8	O-ring	1	
			For assembly, reverse the disassembly procedure.

ELECTRIC STARTER

EAS24790

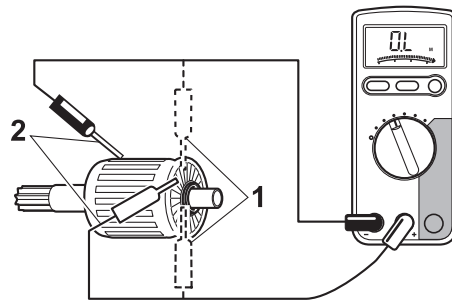
CHECKING THE STARTER MOTOR


1. Check:

- Commutator
Dirt → Clean with 600 grit sandpaper.

2. Measure:

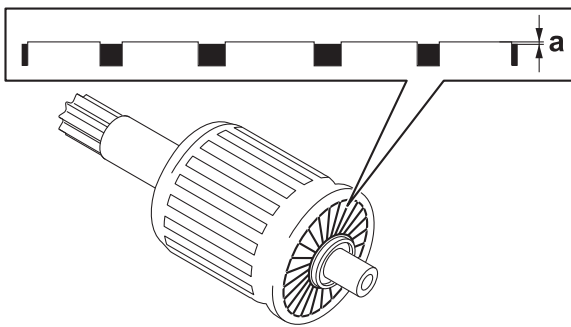
- Mica undercut "a"
Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



	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.

a. Measure the armature assembly resistances with the pocket tester.

	Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927
---	--


	Armature coil Commutator resistance "1" Continuity (0.0050–0.0150 Ω at 20 °C (68 °F)) Insulation resistance "2" No continuity (Above 1 MΩ at 20 °C (68 °F))
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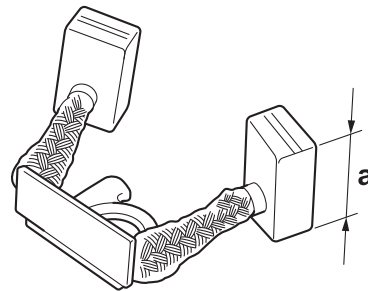
b. If any resistance is out of specification, replace the starter motor.



4. Measure:


- Brush length "a"
Out of specification → Replace the brush set assembly.

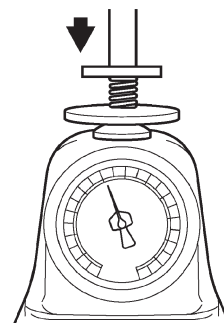
	Brush overall length 12.0 mm (0.47 in) Limit 6.50 mm (0.26 in)
---	---



5. Measure:

- Brush spring force
Out of specification → Replace the brush set assembly.

	Brush spring force 6.025–6.515 N (614–664 gf, 21.69–23.45 oz)
---	--



6. Check:

- Gear teeth
Damage/wear → Replace the starter motor.

7. Check:

- Bearing
Damage/wear → Replace the starter motor.

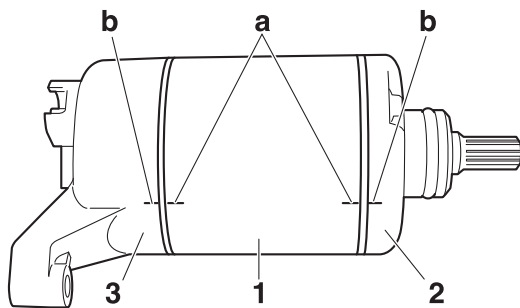
EAS24800

ASSEMBLING THE STARTER MOTOR

1. Install:
 - Brush set assembly
2. Install:
 - Starter motor yoke "1"
 - Starter motor front cover "2"
 - Starter motor rear cover "3"

TIP

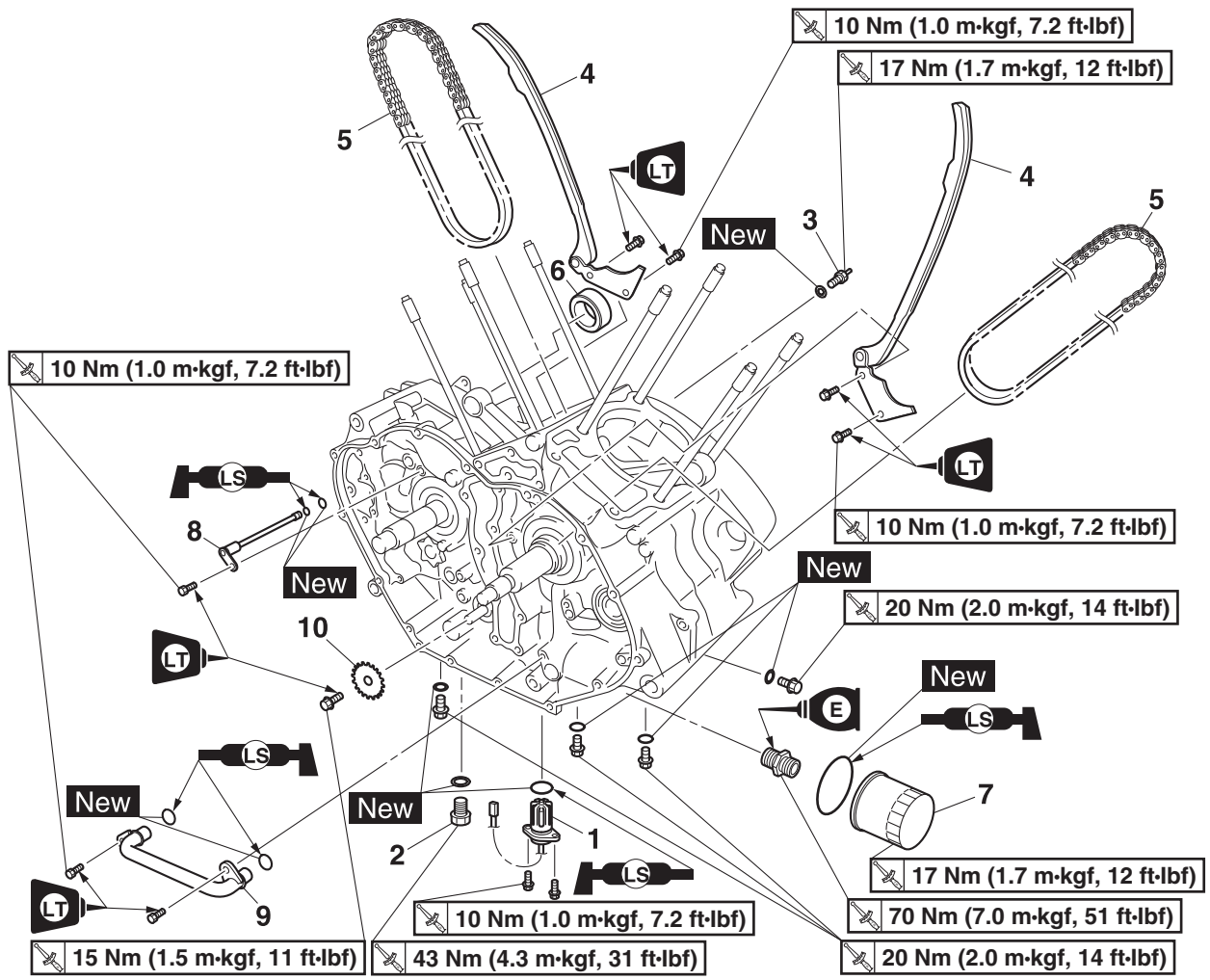
Align the match marks "a" on the starter motor yoke with the match marks "b" on the starter motor front and rear covers.



EAS25540

CRANKCASE

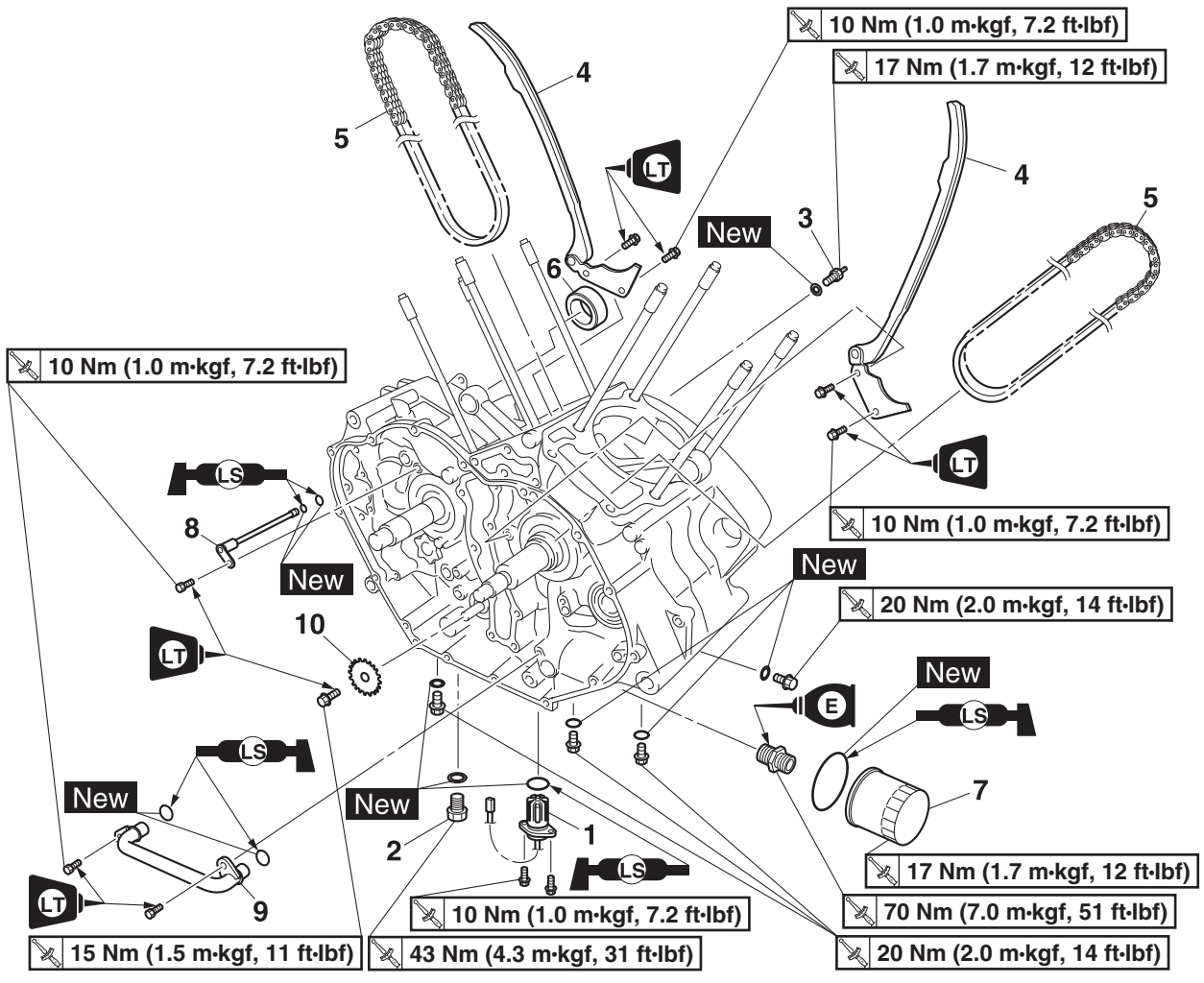
Removing the oil delivery pipes and timing chains



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-3.
	Piston		Refer to "CYLINDERS AND PISTONS" on page 5-36.
	Clutch		Refer to "CLUTCH" on page 5-48.
	Primary drive gear		Refer to "CLUTCH" on page 5-48.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-59.
1	Oil level switch	1	
2	Engine oil drain bolt	1	
3	Neutral switch	1	
4	Timing chain guide	2	
5	Timing chain	2	
6	Spacer	1	
7	Oil filter cartridge	1	
8	Oil delivery pipe 1	1	
9	Oil delivery pipe 2	1	

CRANKCASE

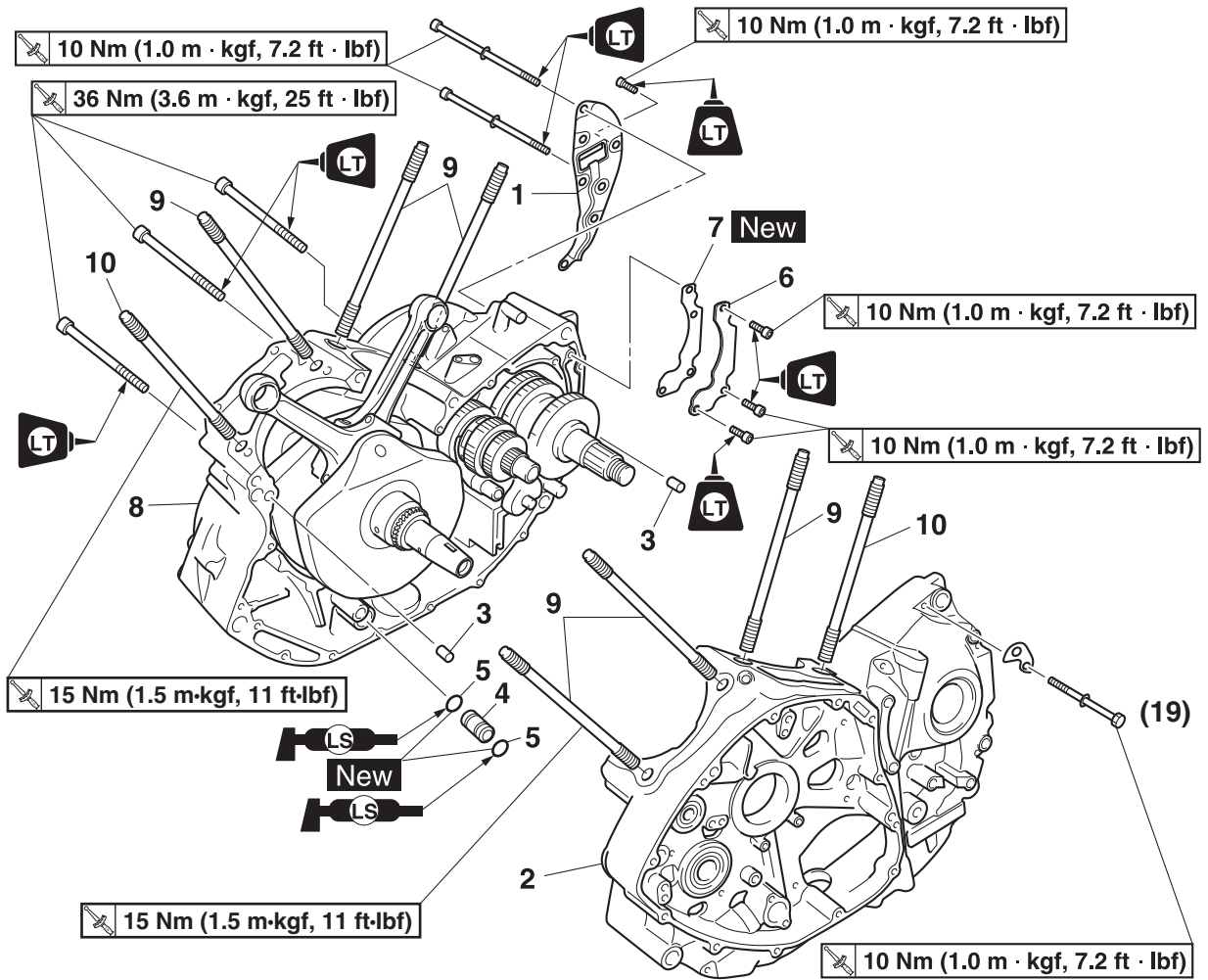
Removing the oil delivery pipes and timing chains



Order	Job/Parts to remove	Q'ty	Remarks
10	Oil pump driven sprocket	1	
			For installation, reverse the removal procedure.

CRANKCASE

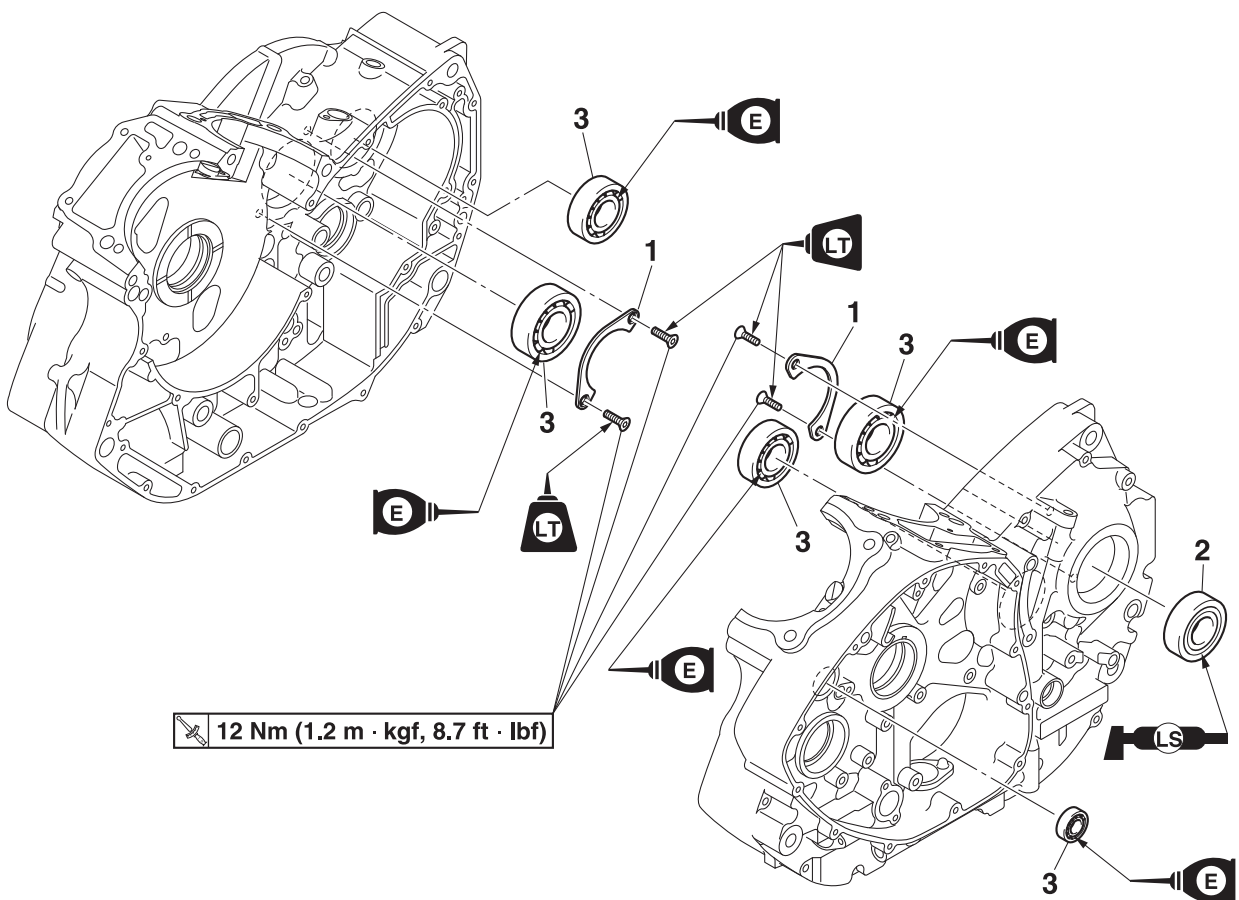
Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil baffle plate 1	1	
2	Left crankcase	1	
3	Dowel pin	2	
4	Joint pipe	1	
5	O-ring	2	
6	Oil baffle plate 2	1	
7	Gasket	1	
8	Right crankcase	1	
9	Stud bolt	6	l = 239 mm (9.41 in)
10	Stud bolt	2	l = 210 mm (8.27 in)
			For installation, reverse the removal procedure.

CRANKCASE

Removing the oil seal and bearings



Order	Job/Parts to remove	Q'ty	Remarks
	Oil pump assembly		Refer to "OIL PUMP" on page 5-72.
	Crankshaft		Refer to "CRANKSHAFT" on page 5-75.
	Transmission		Refer to "TRANSMISSION" on page 5-80.
1	Bearing retainer	2	
2	Oil seal	1	
3	Bearing	5	
			For installation, reverse the removal procedure.

EAS25560

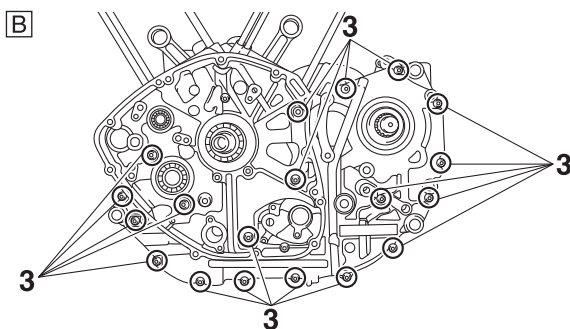
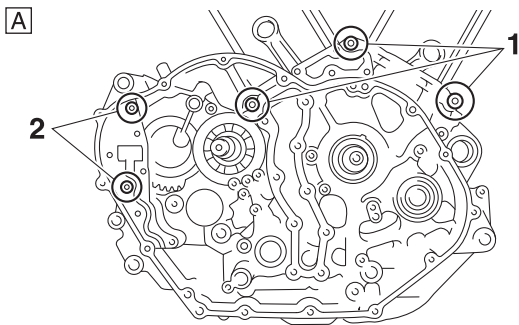
DISASSEMBLING THE CRANKCASE

1. 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.

- M10 × 110 mm bolts “1”
- M6 × 120 mm bolts “2”
- M6 × 80 mm bolts “3”



- A. Right crankcase
B. Left crankcase

2. Remove:
 - Left 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.

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.

EAS1TP1056

CHECKING THE BEARINGS AND OIL SEAL

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

EAS1TP1057

CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes and joint pipe.

1. Check:
 - Oil delivery pipe
 - Joint pipe
Damage → Replace.
Obstruction → Wash and blow out with compressed air.

EAS25620

CHECKING THE TIMING CHAINS

1. Check:
 - Timing chains
Damage/stiffness → Replace the timing chain and camshaft sprocket as a set.

EAS1TP1058

CHECKING THE OIL PUMP DRIVEN SPROCKET

1. Check:
 - Oil pump driven sprocket
Cracks/damage/wear → Replace the oil pump driven sprocket and the oil pump drive chain as a set.

EAS1TP1059

INSTALLING THE BEARING RETAINERS

1. Install:
 - Bearing retainers “1”

TIP

- Install each bearing retainer “1” with its “OUT” mark “a” facing outward.

CRANKCASE

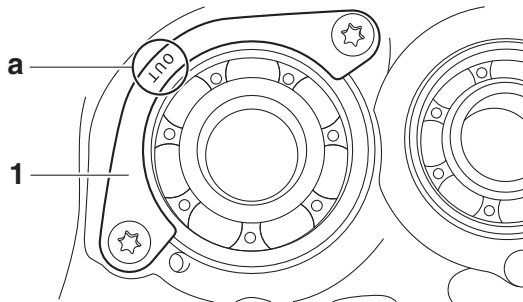
- Apply locking agent (LOCTITE®) to the threads of the bearing retainer bolt.



Bearing retainer bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)
LOCTITE®



Crankcase bolt (M10)
36 Nm (3.6 m·kgf, 26 ft·lbf)
Crankcase bolt (M6)
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
Oil baffle plate 1 bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

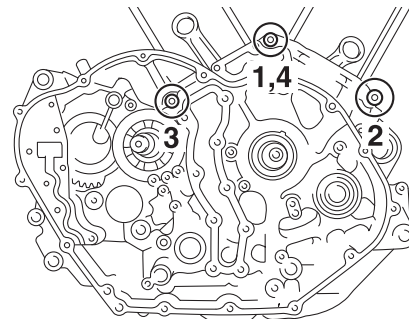


TIP

- Apply locking agent (LOCTITE®) to the threads of the right crankcase bolts and oil baffle plate 1 bolts.
- Tighten the crankcase bolts in the proper tightening sequence as shown in the illustration.

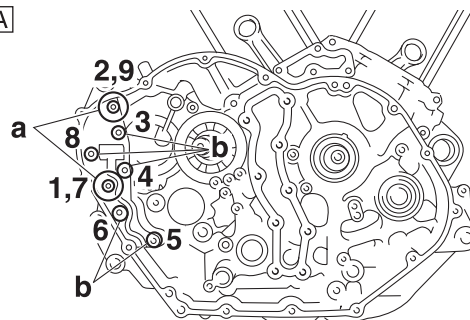
- M10 × 110 mm bolts

A



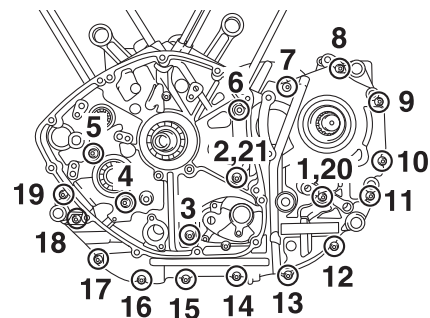
- M6 × 120 mm bolts: "a"
- Oil baffle plate 1 bolts: "b"

A



- M6 × 80 mm bolts

B



- A. Right crankcase
- B. Left crankcase

EAS25700

ASSEMBLING THE CRANKCASE

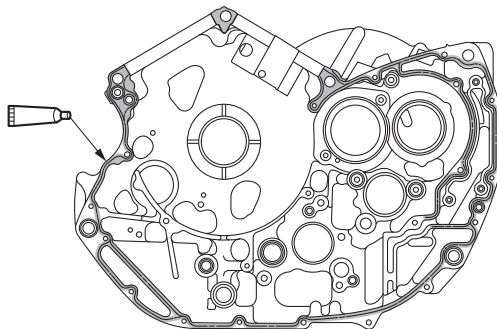
1. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.
2. Apply:
 - Sealant (onto the crankcase mating surfaces)



Yamaha bond No. 1215
90890-85505
(Three Bond No.1215®)

TIP

Do not allow any sealant to come into contact with the oil gallery.



3. Install:
 - Left crankcase (onto the right crankcase)

TIP

Tap lightly on the left crankcase with a soft-face hammer.

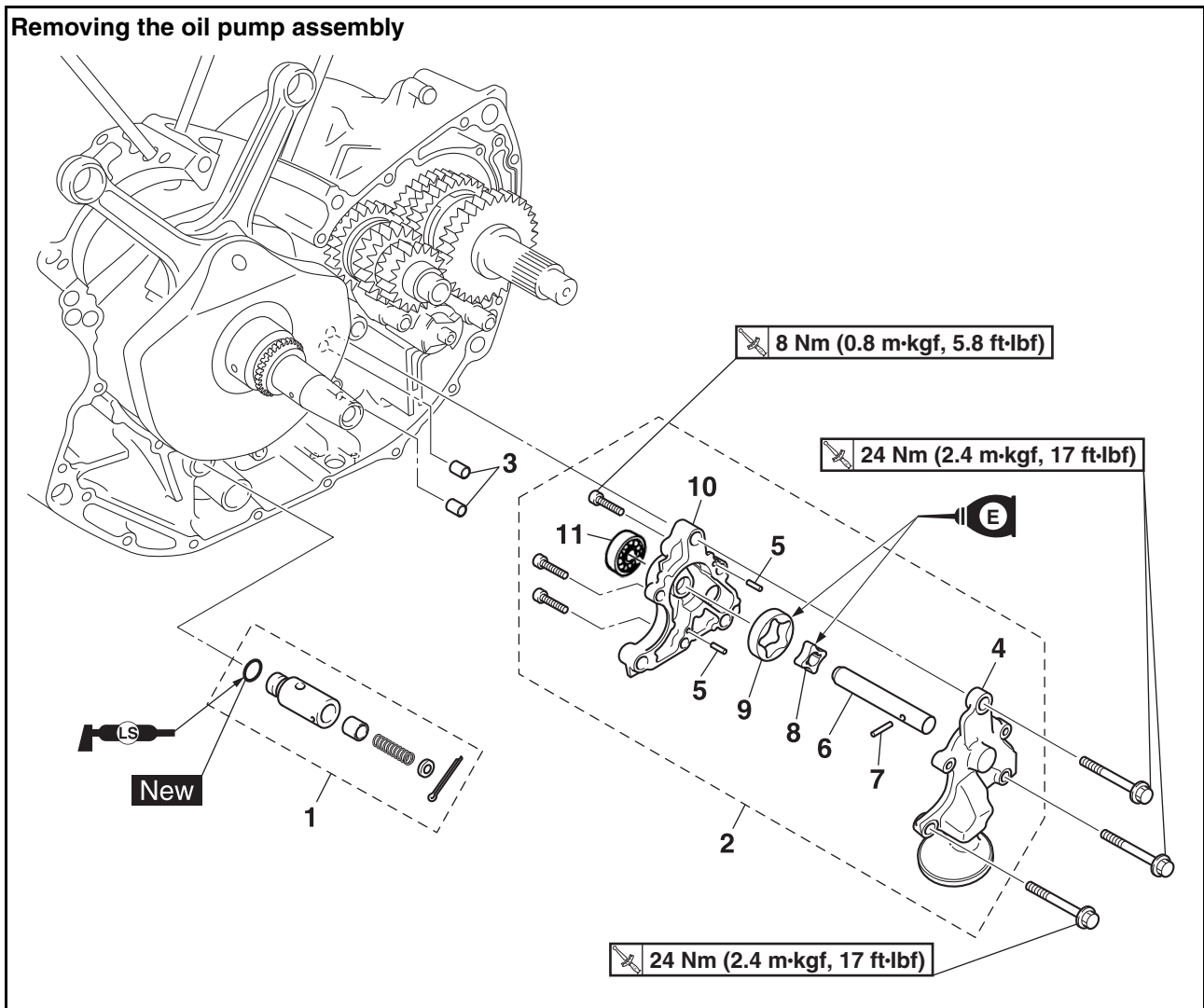
4. Install:
 - Crankcase bolts (M10)
 - Crankcase bolts (M6)
 - Oil baffle plate 1 bolts

5. Apply:
 - Engine oil
(onto the crankshaft pin bearings and oil delivery holes)
6. Check:
 - Crankshaft and transmission operation
Rough movement → Repair.

EAS24910

OIL PUMP

Removing the oil pump assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Refer to "CRANKCASE" on page 5-65.
1	Relief valve assembly	1	
2	Oil pump assembly	1	
3	Dowel pin	2	
4	Oil pump housing	1	
5	Dowel pin	2	
6	Impeller shaft	1	
7	Pin	1	
8	Oil pump inner rotor	1	
9	Oil pump outer rotor	1	
10	Oil pump housing cover	1	
11	Bearing	1	
			For installation, reverse the removal procedure.

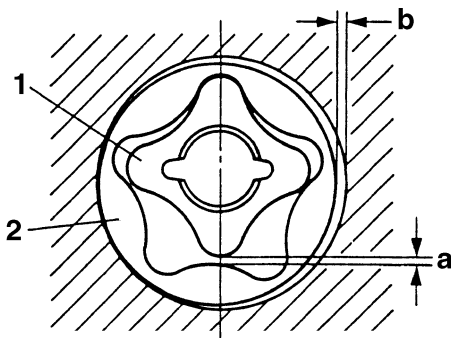
EAS24960

CHECKING THE OIL PUMP

1. Check:
 - Oil pump housing
Cracks/damage/wear → Replace the oil pump assembly.
2. Measure:
 - Inner-rotor-to-outer-rotor-tip clearance “a”
 - Outer-rotor-to-oil-pump-housing clearance “b”
 Out of specification → Replace the oil pump assembly.

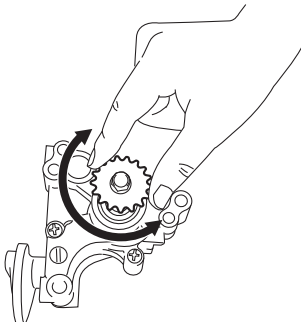


Inner-rotor-to-outer-rotor-tip clearance
 Less than 0.120 mm (0.0047 in)
Limit
 0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance
 0.09–0.19 mm (0.0035–0.0075 in)
Limit
 0.26 mm (0.0102 in)



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

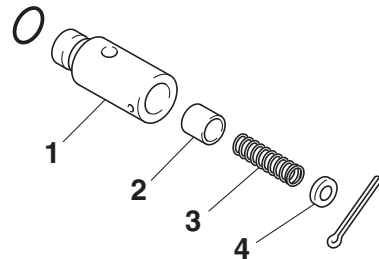
3. Check:
 - Oil pump operation
Rough movement → Repeat steps (1) and (2) or replace the oil pump assembly.



EAS24970

CHECKING THE RELIEF VALVE

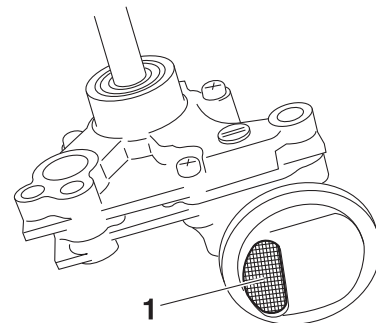
1. Check:
 - Relief valve body “1”
 - Relief valve “2”
 - Spring “3”
 - Spring retainer “4”
 Damage/wear → Replace the relief valve assembly.



EAS24990

CHECKING THE OIL STRAINER

1. Check:
 - Oil strainer “1”
Damage → Replace.
Contaminants → Clean with solvent.



EAS25000

ASSEMBLING THE OIL PUMP

1. Lubricate:
 - Inner rotor
 - Outer rotor
 (with the recommended lubricant)

	Recommended lubricant Engine oil
--	--

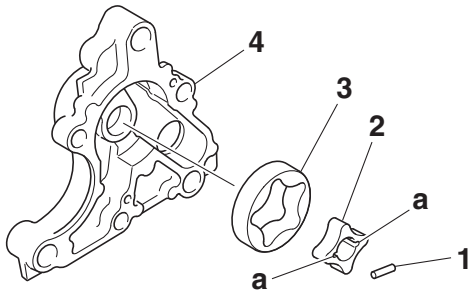
2. Install:
 - Pin “1”
 - Oil pump inner rotor “2”
 - Oil pump outer rotor “3”
 - Dowel pin
 - Oil pump housing “4”

TIP

When installing the inner rotor, align the pin in the impeller shaft with the grooves “a” in the inner rotor.



Oil pump housing screw
8 Nm (0.8 m-kgf, 5.8 ft-lbf)



3. Check:

- Oil pump operation
Refer to “CHECKING THE OIL PUMP” on page 5-73.

EAS1TP1060

INSTALLING THE OIL PUMP ASSEMBLY

1. Install:

- Oil pump assembly

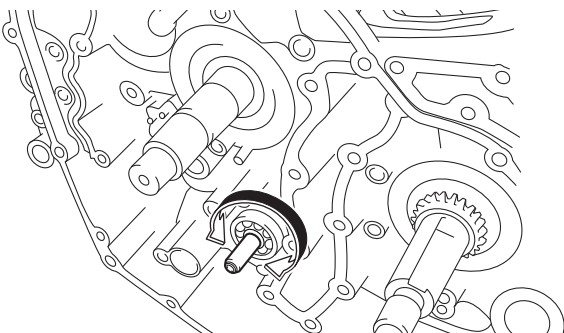


Oil pump assembly bolt
24 Nm (2.4 m-kgf, 17 ft-lbf)

ECA1TP1021

NOTICE

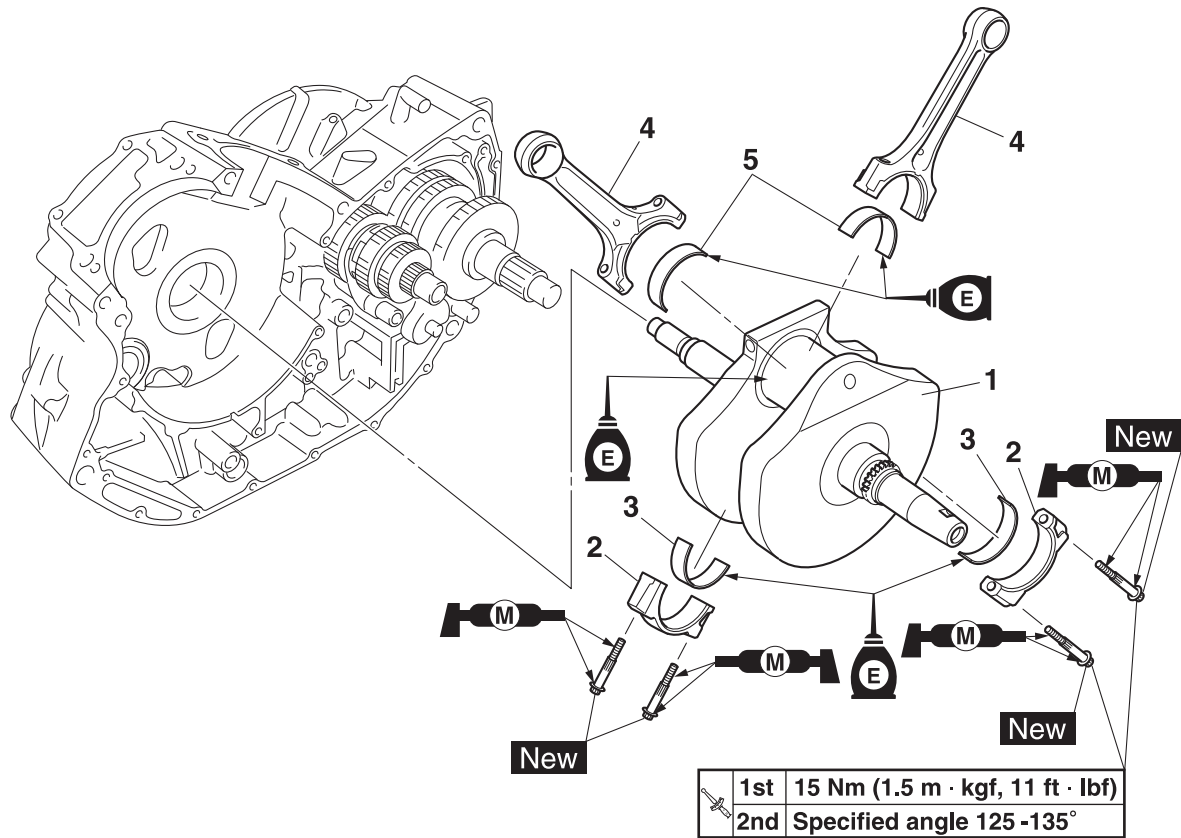
After tightening the bolts, make sure the oil pump assembly turns smoothly.



EAS25960

CRANKSHAFT

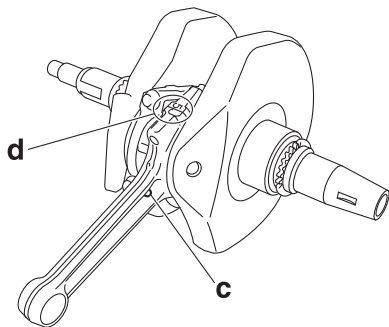
Removing the crankshaft



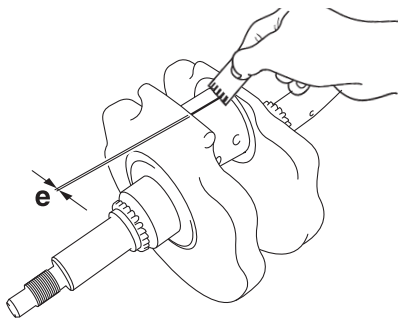
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-65.
1	Crankshaft	1	
2	Connecting rod cap	2	
3	Big end lower bearing	2	
4	Connecting rod	2	
5	Big end upper bearing	2	
			For installation, reverse the removal procedure.

CRANKSHAFT

- Make sure the characters “d” on both the connecting rod and connecting rod cap are aligned.



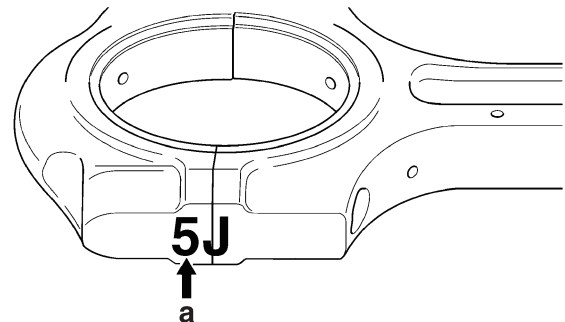
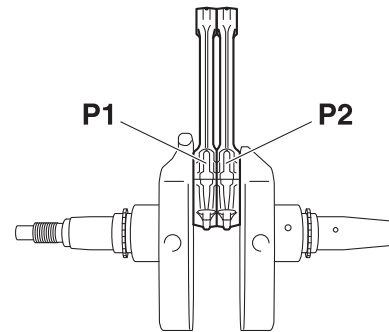
- Tighten the connecting rod bolts. Refer to “INSTALLING THE CONNECTING RODS” on page 5-78.
- Remove the connecting rod and big end bearings. Refer to “REMOVING THE CONNECTING RODS” on page 5-76.
- Measure the compressed Plastigauge® width “e” on the crankshaft pin. If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



- Select:
 - Big end bearings (P_1 – P_2)

TIP

- The numbers “a” on the connecting rods are used to determine the replacement big end bearing sizes.
- P_1 – P_2 refer to the bearings shown in the crankshaft illustration.



For example, if the connecting rod P_1 number is 5, then the bearing size for P_1 is 5 (brown).

	Bearing color code
	4. Black 5. Brown 6. Green

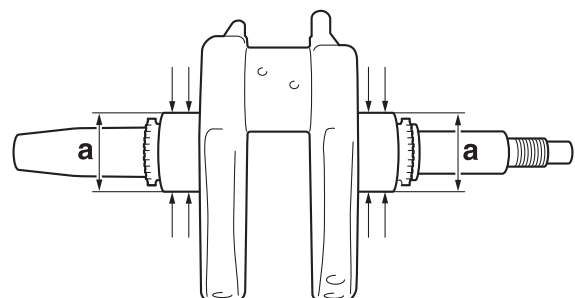
5. Measure:

- Crankshaft journal diameter “a”
Out of specification → Replace the crankshaft.

TIP

Measure the diameter of each crankshaft journal at two places.

	Crankshaft journal diameter
	49.968–49.980 mm (1.9672–1.9677 in)



6. Measure:

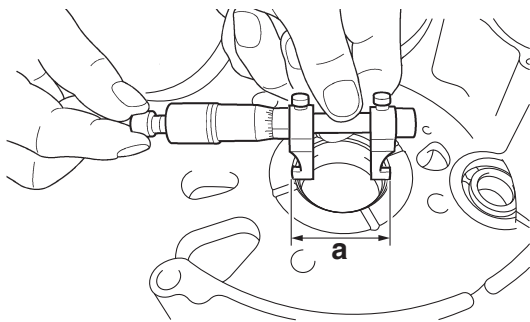
- Crankshaft journal bearing inside diameter "a"
Out of specification → Replace the crankcase assembly.

TIP

Measure the inside diameter of each crankshaft journal bearing at two places.



Crankshaft journal bearing inside diameter
50.010–50.028 mm (1.9689–1.9696 in)



7. Calculate:

- Crankshaft-journal-to-crankshaft-journal-bearing clearance
Out of specification → Replace the crankshaft and crankcase as a set.

TIP

Calculate the clearance by subtracting the crankshaft journal diameter from the crankshaft journal bearing inside diameter.



Crankshaft-journal-to-crankshaft-journal-bearing clearance
0.030–0.060 mm (0.0012–0.0024 in)

EAS26150

INSTALLING THE CONNECTING RODS

1. Lubricate:

- Bolt threads
(with the recommended lubricant)



Recommended lubricant
Molybdenum disulfide grease

2. Lubricate:

- Crankshaft pin
- Big end bearings
- Connecting rod inner surface
(with the recommended lubricant)



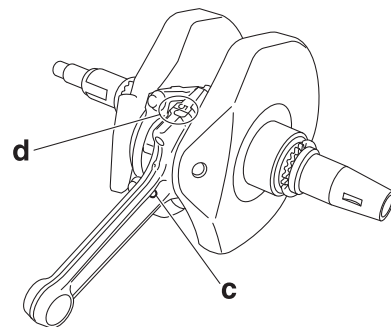
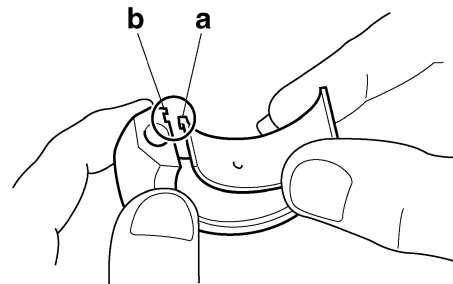
Recommended lubricant
Engine oil

3. Install:

- Big end bearings
- Connecting rods
- Connecting rod caps
(onto the crankshaft pin)

TIP

- Align the projections "a" on the big end bearings with the notches "b" in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- Make sure the projection "c" on each connecting rod faces towards the left side of the crankshaft.
- Make sure the characters "d" on both the connecting rod and connecting rod cap are aligned.



4. Tighten:

- Connecting rod bolts

EWA1TP1018


WARNING

- Replace the connecting rod bolts with new ones.
- Clean the connecting rod bolts.

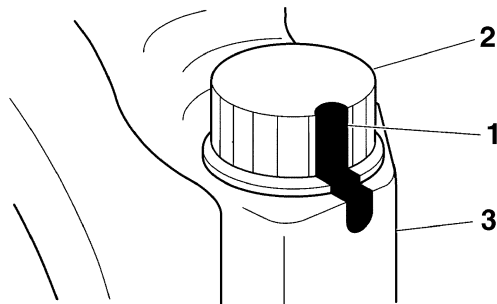
TIP

Tighten the connecting rod bolts using the following procedure.

- a. Tighten the connecting rod bolts to specification with a torque wrench.

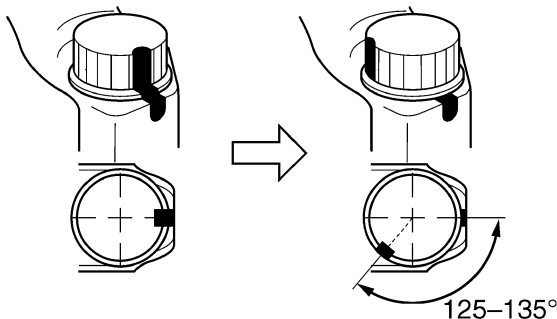
	<p>Connecting rod bolt (1st) 15 Nm (1.5 m·kgf, 11 ft·lbf)</p>
---	--

- 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 125–135°.

	<p>Connecting rod bolt (final) Specified angle 125–135°</p>
---	--



EWA1TP1019

WARNING

When a bolt is tightened more than the specified angle, do not loosen and then retighten it.

Replace the bolt with a new one and perform the procedure again.

ECA1TP1022

NOTICE

- Do not use a torque wrench to tighten the bolt to the specified angle.
- Tighten the bolt until it is at the specified angle.



EAS26210

INSTALLING THE CRANKSHAFT ASSEMBLY

1. Install:
 - Crankshaft assembly

ECA1TP1023

NOTICE

To avoid scratching the crankshaft and to ease the installation procedure, lubricate each bearing with engine oil.

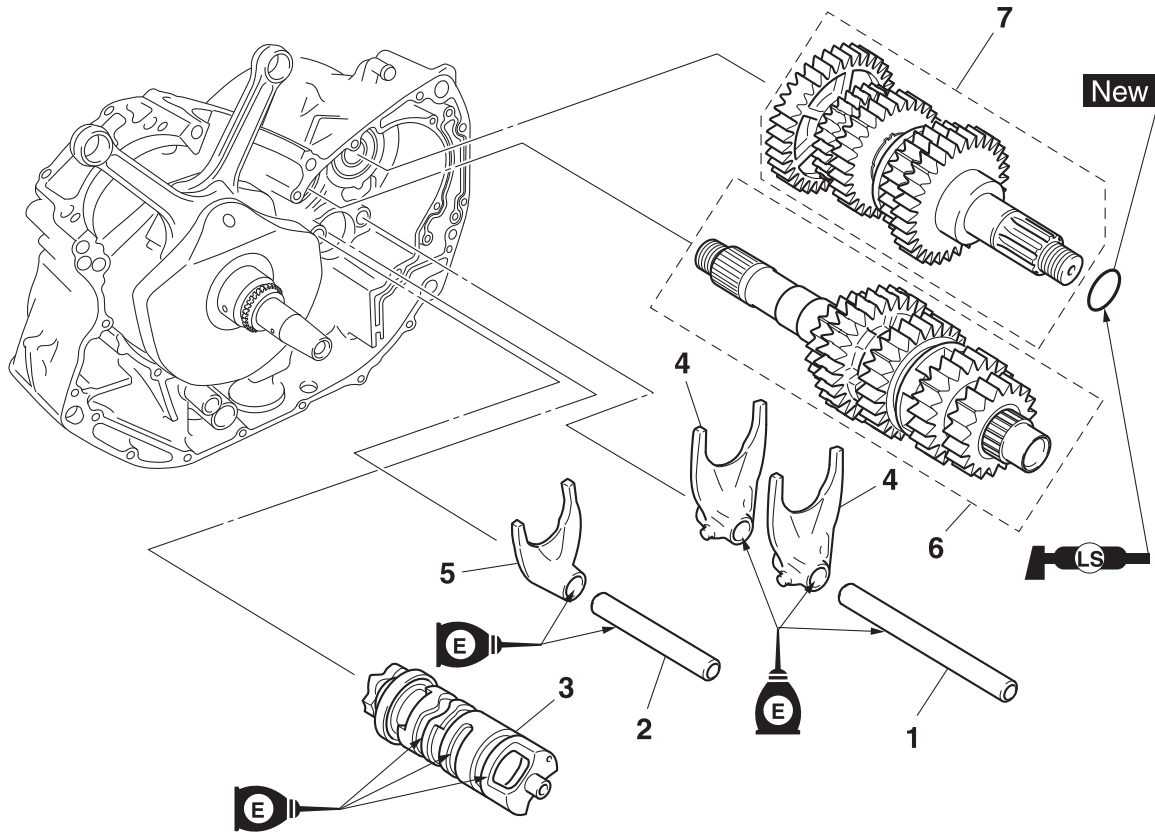
TIP

Align the right connecting rod with the rear cylinder sleeve hole.

EAS26240

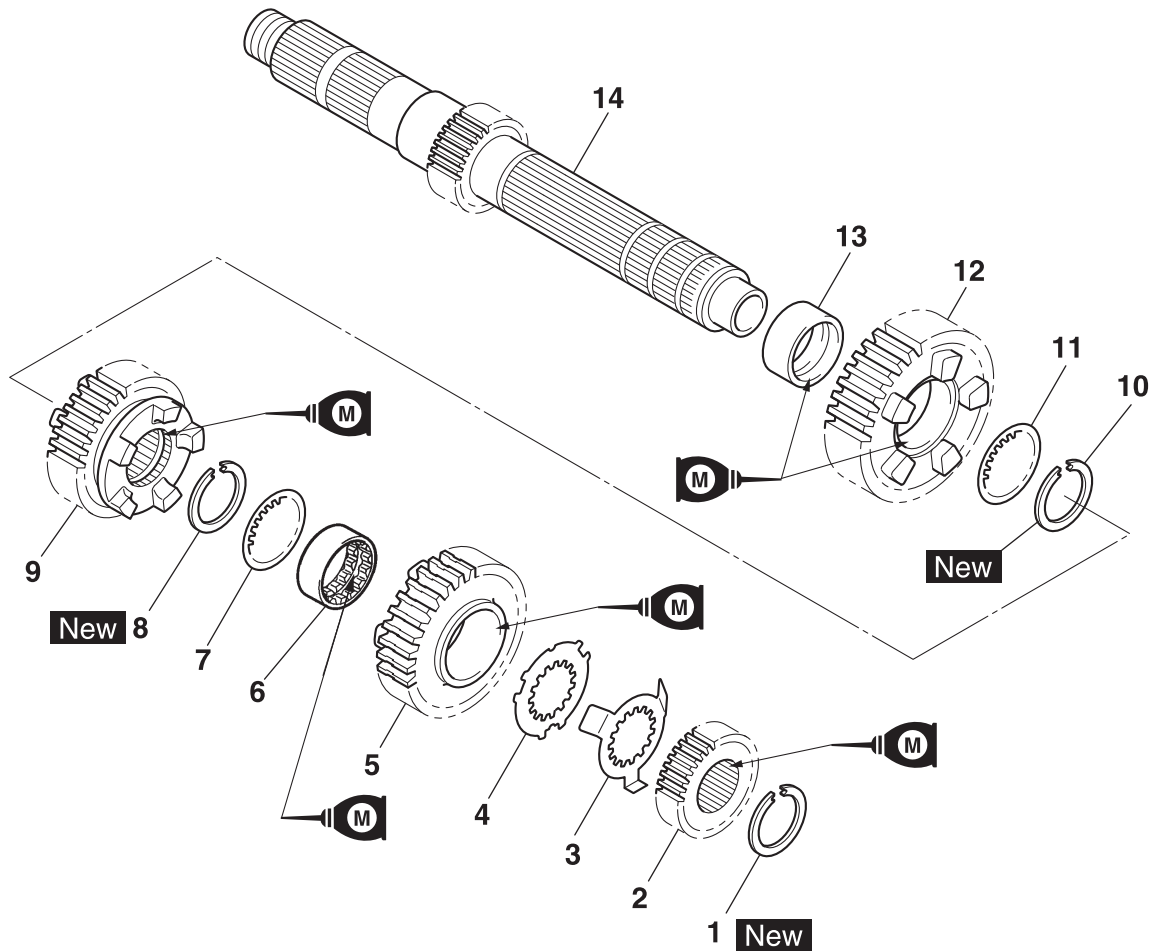
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-65.
1	Long shift fork guide bar	1	
2	Short shift fork guide bar	1	
3	Shift drum assembly	1	
4	Shift fork 1	2	
5	Shift fork 2	1	
6	Main axle assembly	1	
7	Drive axle assembly	1	
			For installation, reverse the removal procedure.

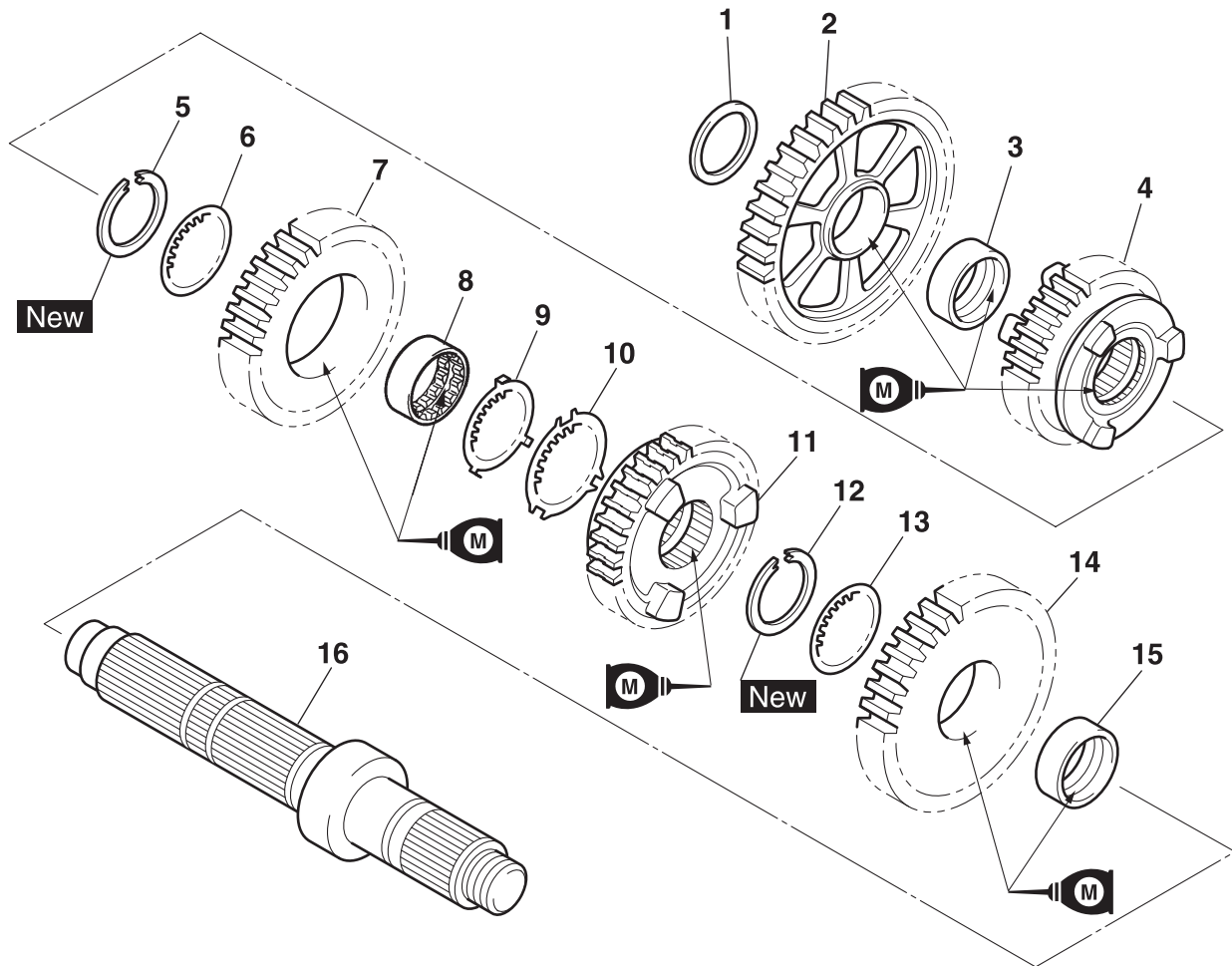
Disassembling the main axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	1	
2	2nd pinion gear	1	
3	Toothed lock washer	1	
4	Toothed lock washer retainer	1	
5	4th pinion gear	1	
6	Collar	1	
7	Toothed washer	1	
8	Circlip	1	
9	3rd pinion gear	1	
10	Circlip	1	
11	Toothed washer	1	
12	5th pinion gear	1	
13	Collar	1	
14	Main axle/1st pinion gear	1	
			For assembly, reverse the disassembly procedure.

TRANSMISSION

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	Toothed 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	Circlip	1	
13	Toothed washer	1	
14	2nd wheel gear	1	
15	Collar	1	
16	Drive axle	1	
			For assembly, reverse the disassembly procedure.

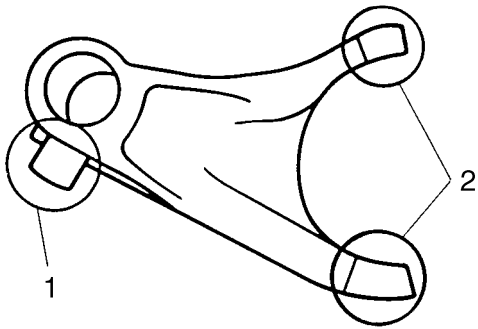
EAS26260

CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks and shift fork guide bars.

1. Check:

- Shift fork cam follower "1"
 - Shift fork pawls "2"
- Bends/damage/scoring/wear → Replace the shift fork.



2. Check:

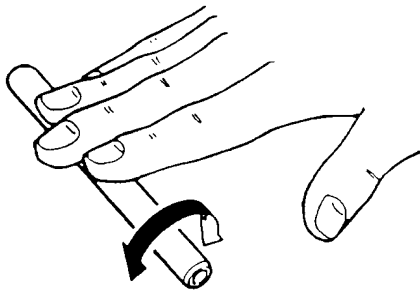
- Shift fork guide bar
- Roll the shift fork guide bar on a flat surface.
Bends → Replace.

EWA12840



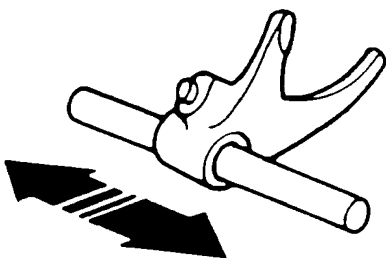
WARNING

Do not attempt to straighten a bent shift fork guide bar.



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.

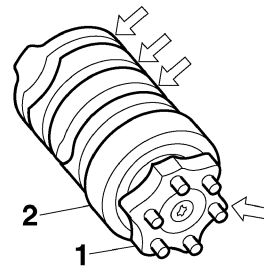


EAS26270

CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:

- Shift drum grooves
Damage/scratches/wear → Replace the shift drum assembly.
 - Shift drum segment "1"
 - Shift drum bearing "2"
- Damage/wear → Replace the shift drum assembly.
Damage/pitting → Replace the shift drum assembly.



EAS26300

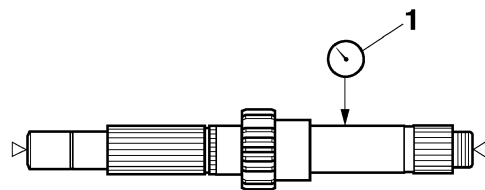
CHECKING THE TRANSMISSION

1. Measure:

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



**Main axle runout limit
0.08 mm (0.0032 in)**

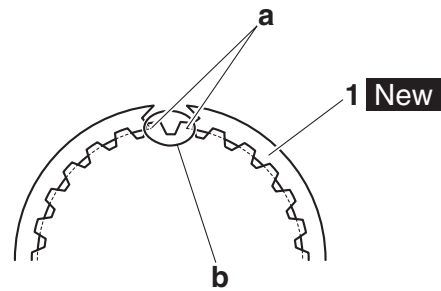
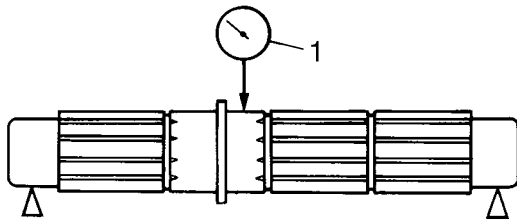


2. Measure:

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

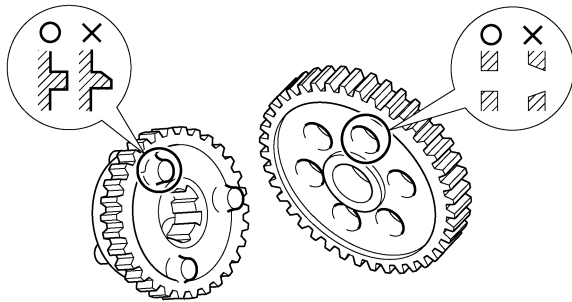


**Drive axle runout limit
0.08 mm (0.0032 in)**



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).

EAS1TP1061

ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:

- Toothed washer
- Circlip "1" **New**

TIP

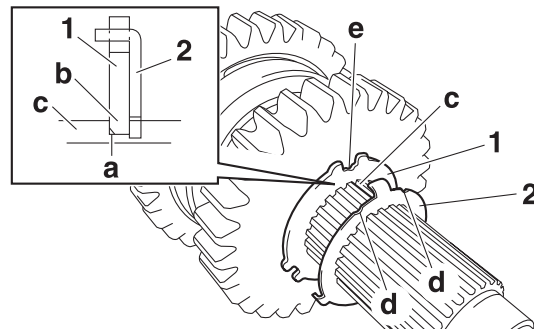
Install the circlip so that both ends "a" rest on the sides of a spline "b" with both axles aligned.

2. Install:

- Toothed lock washer retainer "1"
- Toothed lock washer "2"

TIP

- With the toothed lock washer retainer in the groove "a" in the drive axle, align the projection "b" on the retainer with an axle spline "c", and then install the toothed lock washer.
- Be sure to align the projection on the toothed lock washer that is between the alignment marks "d" with the alignment mark "e" on the retainer.



EAS26320

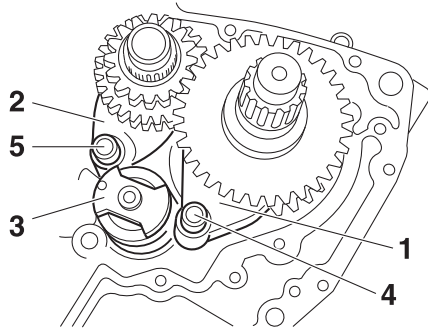
INSTALLING THE SHIFT FORKS AND SHIFT DRUM ASSEMBLY

1. Install:

- Shift forks 1 "1"
- Shift fork 2 "2"
- Shift drum assembly "3"
- Long shift fork guide bar "4"
- Short shift fork guide bar "5"

TIP

The embossed marks "3D8" on the shift forks should face towards the left side of the engine.

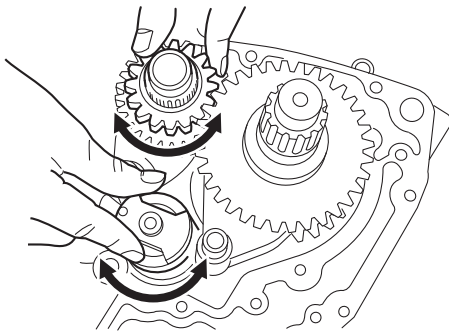


2. Check:

- Transmission
Rough movement → Repair.

TIP

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



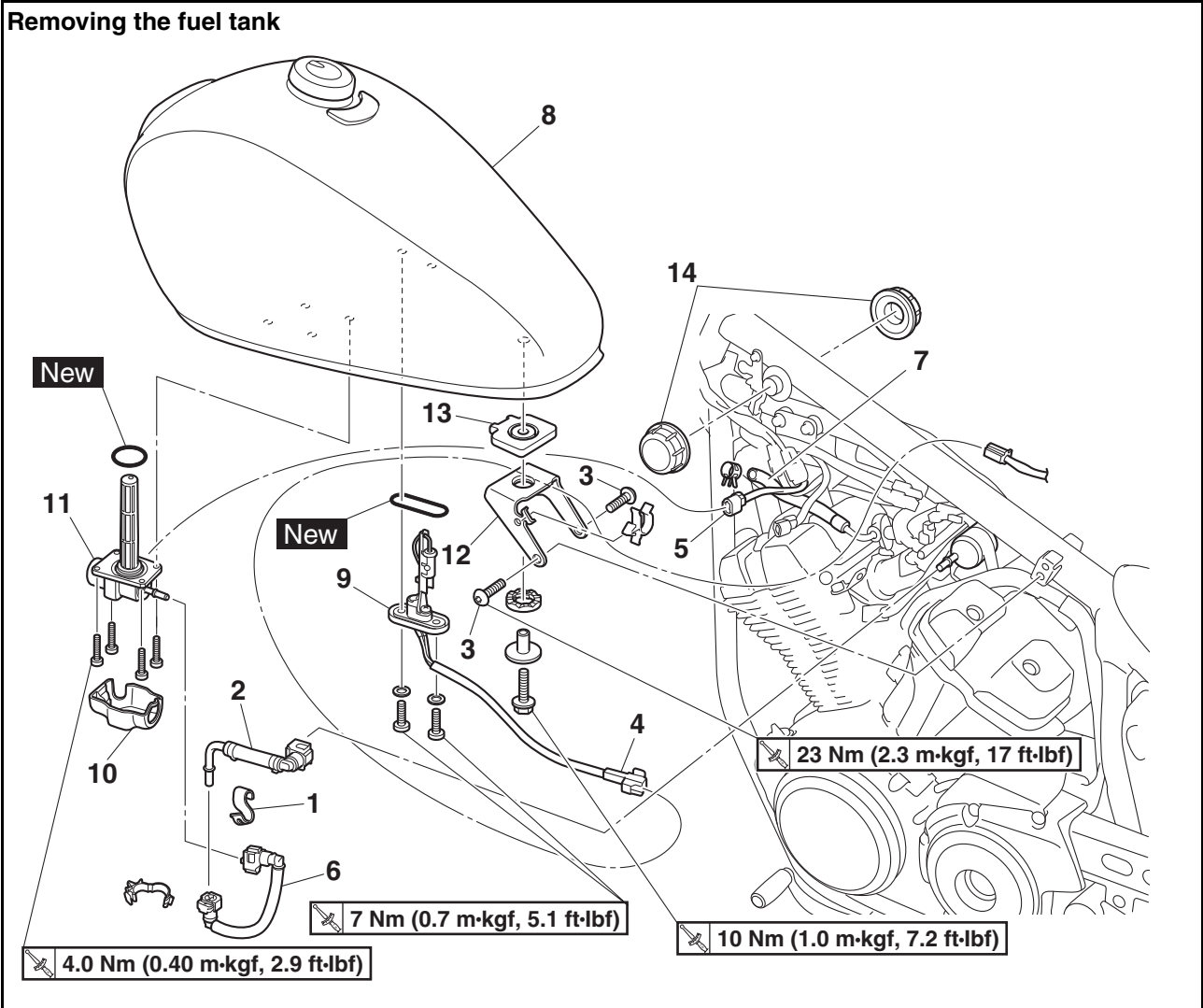
FUEL SYSTEM

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EAS26620

FUEL TANK

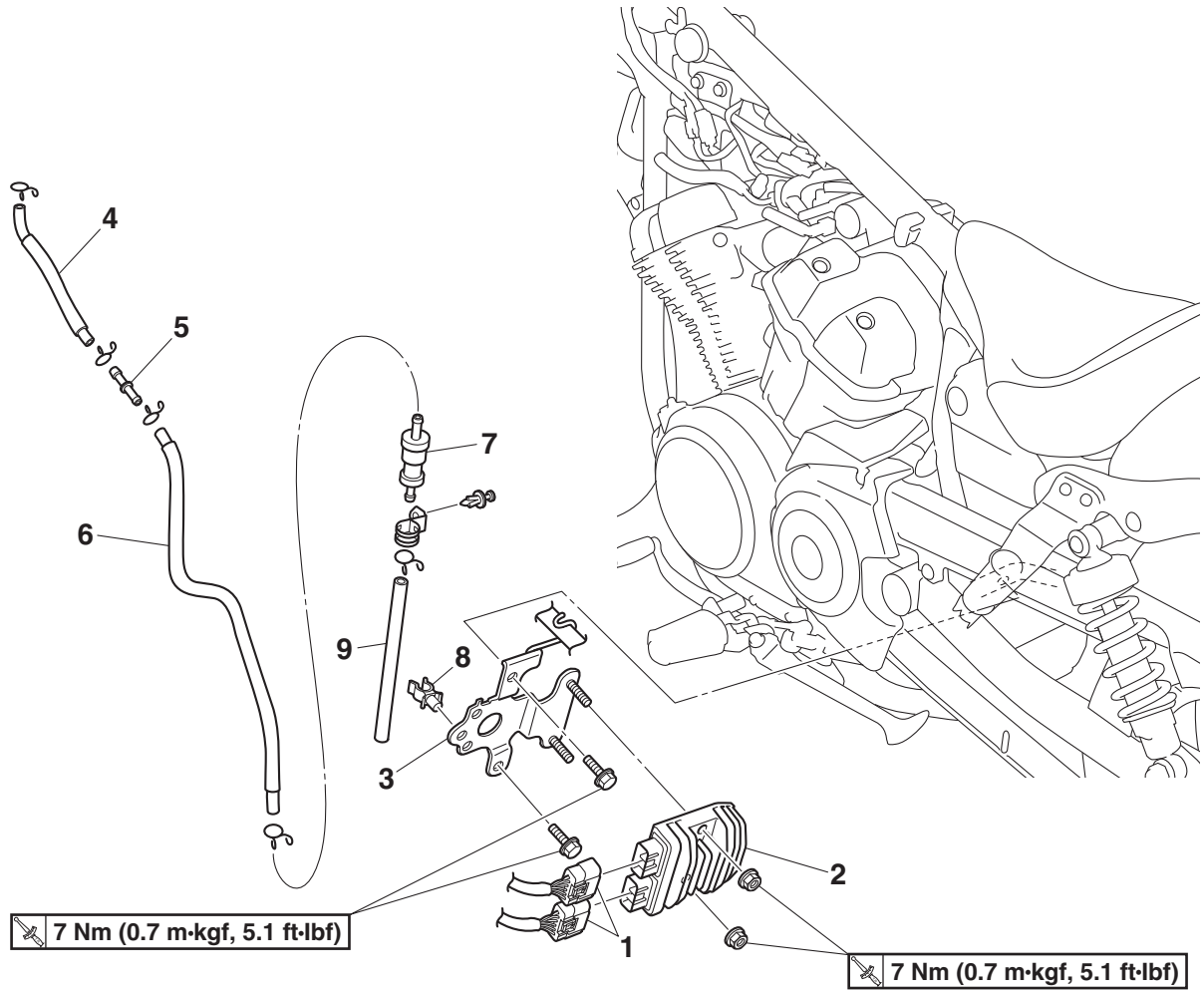
Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
1	Fuel hose holder	1	
2	Fuel hose (fuel hose to fuel filter)	1	
3	Fuel tank bracket bolt	2	
4	Fuel sender coupler	1	Disconnect.
5	Fuel pump coupler	1	Disconnect.
6	Fuel hose (fuel pump to fuel hose)	1	
7	Fuel return hose	1	Disconnect.
8	Fuel tank	1	
9	Fuel sender	1	
10	Fuel pump cover	1	
11	Fuel pump	1	
12	Fuel tank bracket	1	
13	Fuel tank bracket damper	1	
14	Fuel tank stopper	2	
			For installation, reverse the removal procedure.

FUEL TANK

Removing the rollover valve



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
1	Rectifier/regulator coupler	2	Disconnect.
2	Rectifier/regulator	1	
3	Rectifier/regulator bracket	1	
4	Fuel tank breather/overflow hose (fuel tank to fuel hose joint)	1	
5	Fuel hose joint	1	
6	Fuel tank breather/overflow hose (fuel hose joint to rollover valve)	1	
7	Rollover valve	1	
8	Fuel tank breather/overflow hose holder	1	
9	Fuel tank breather/overflow hose	1	
			For installation, reverse the removal procedure.

EAS1TP1036

REMOVING THE FUEL TANK

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

ECA1TP1024

NOTICE

Make sure that the fuel tank does not strike the meter assembly when removing it.

EAS1TP1037

REMOVING THE FUEL PUMP

1. Remove:
 - Fuel hose

EWA1TP1014

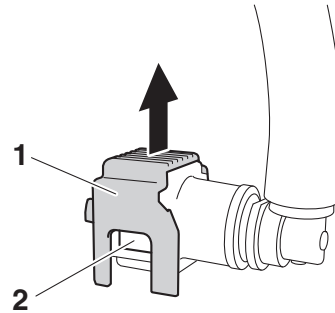
WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

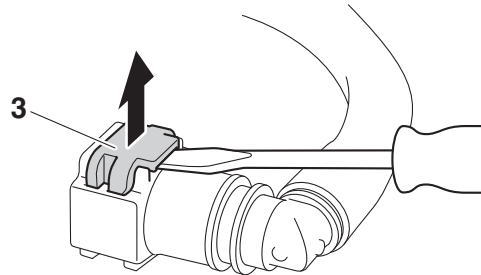
TIP

- To disconnect the fuel hose from the fuel pump or fuel filter, 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 disconnect the hose.
- To disconnect the fuel hose (fuel pump to fuel hose) from the fuel hose (fuel hose to fuel filter), slide the fuel hose connector lock "3" in the direction of the arrow shown using a slotted head screwdriver, and then disconnect the hose.
- Disconnect the fuel hose from the fuel pump and fuel filter manually without using any tools.
- Before disconnecting the hose, place a few rags in the area under where it will be removed.

A



B



- A. Connection to fuel pump and fuel filter
B. Connection between fuel hoses

2. Remove:
 - Fuel pump cover

TIP

When removing the fuel pump cover, remove the cover from the fuel hose end of the fuel pump first.

3. Remove:
 - Fuel pump

ECA1TP1016

NOTICE

- **Do not drop the fuel pump or give it a strong shock.**
- **Do not touch the filter portion of the fuel pump.**

EAS26670

CHECKING THE FUEL PUMP BODY

1. Check:
 - Fuel pump body
 - Obstruction → Clean.
 - Cracks/damage → Replace the fuel pump.

EAS1TP1038

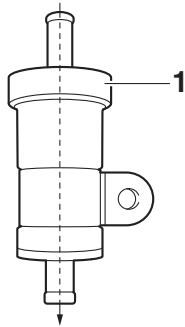
CHECKING THE ROLLOVER VALVE

1. Check:
 - Rollover valve "1"
 - Damage/faulty → Replace.

TIP

- Check that air flows smoothly only in the direction of the arrow shown in the illustration.

- The rollover valve must be in an upright position when checking the airflow.



ECA1TP1039

INSTALLING THE FUEL PUMP

1. Install:
 - Fuel pump
 - Gasket **New**



Fuel pump bolt
4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)

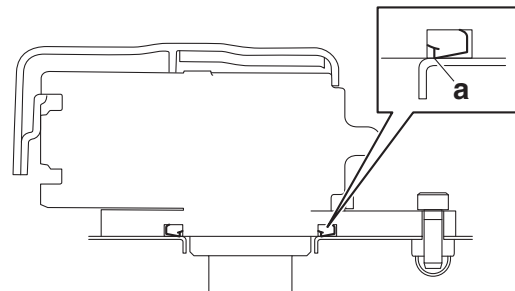
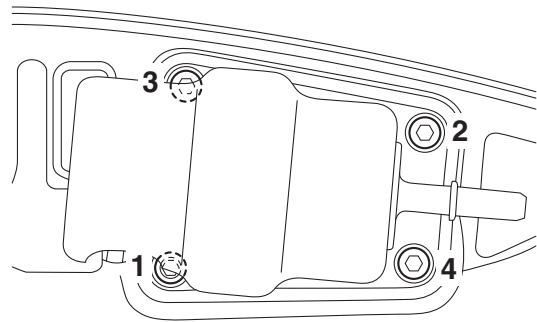
ECA1TP1027

NOTICE

Do not touch the filter portion of the fuel pump.

TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump as shown in the illustration.
- The gasket lip “a” shall face toward the fuel tank.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



2. Install:
 - Fuel hoses

ECA1TP1017

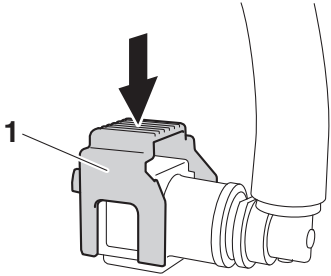
NOTICE

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

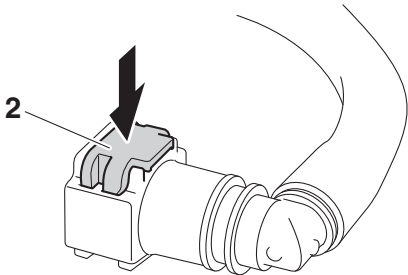
TIP

- Connect the fuel hoses until a distinct “click” is heard.
- To connect a fuel hose, slide the fuel hose connector cover “1” or fuel hose connector lock “2” in the direction of the arrow.

A



B




- A. Connection to fuel pump and fuel filter
- B. Connection between fuel hoses

EAS1TP1040

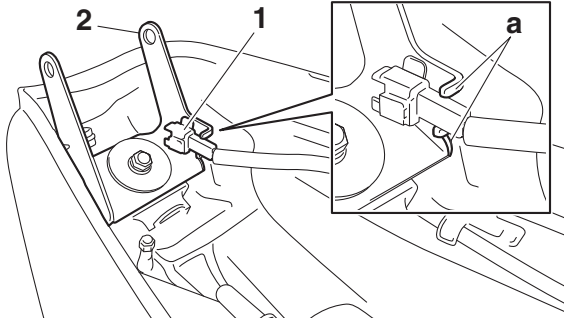
INSTALLING THE FUEL SENDER

- 1. Install:
 - Fuel sender
 - O-ring **New**

	Fuel sender bolt 7 Nm (0.7 m-kgf, 5.1 ft-lbf)
---	---

TIP

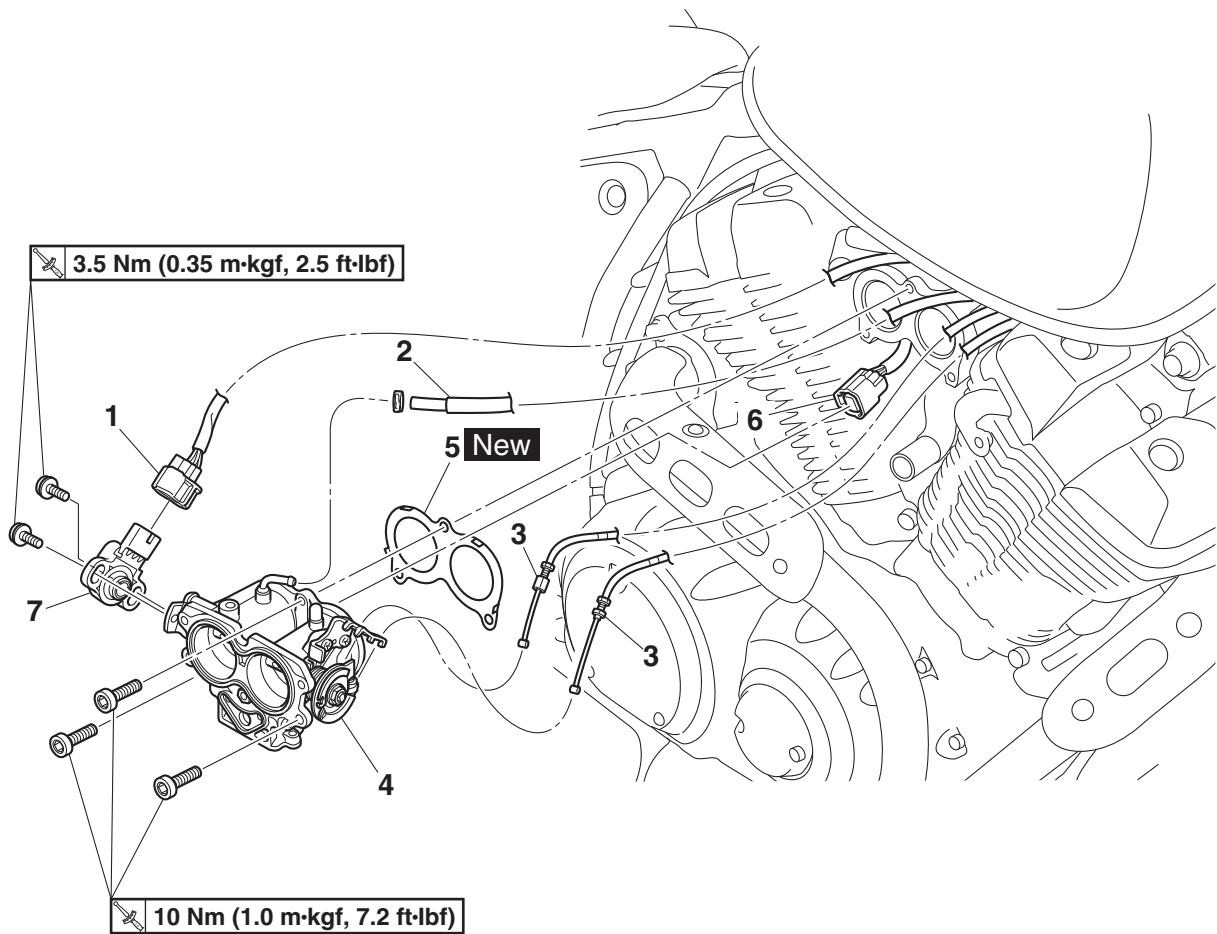
Position the fuel sender coupler “1” between the guides “a” on the fuel tank bracket “2”.



EAS26970

THROTTLE BODIES

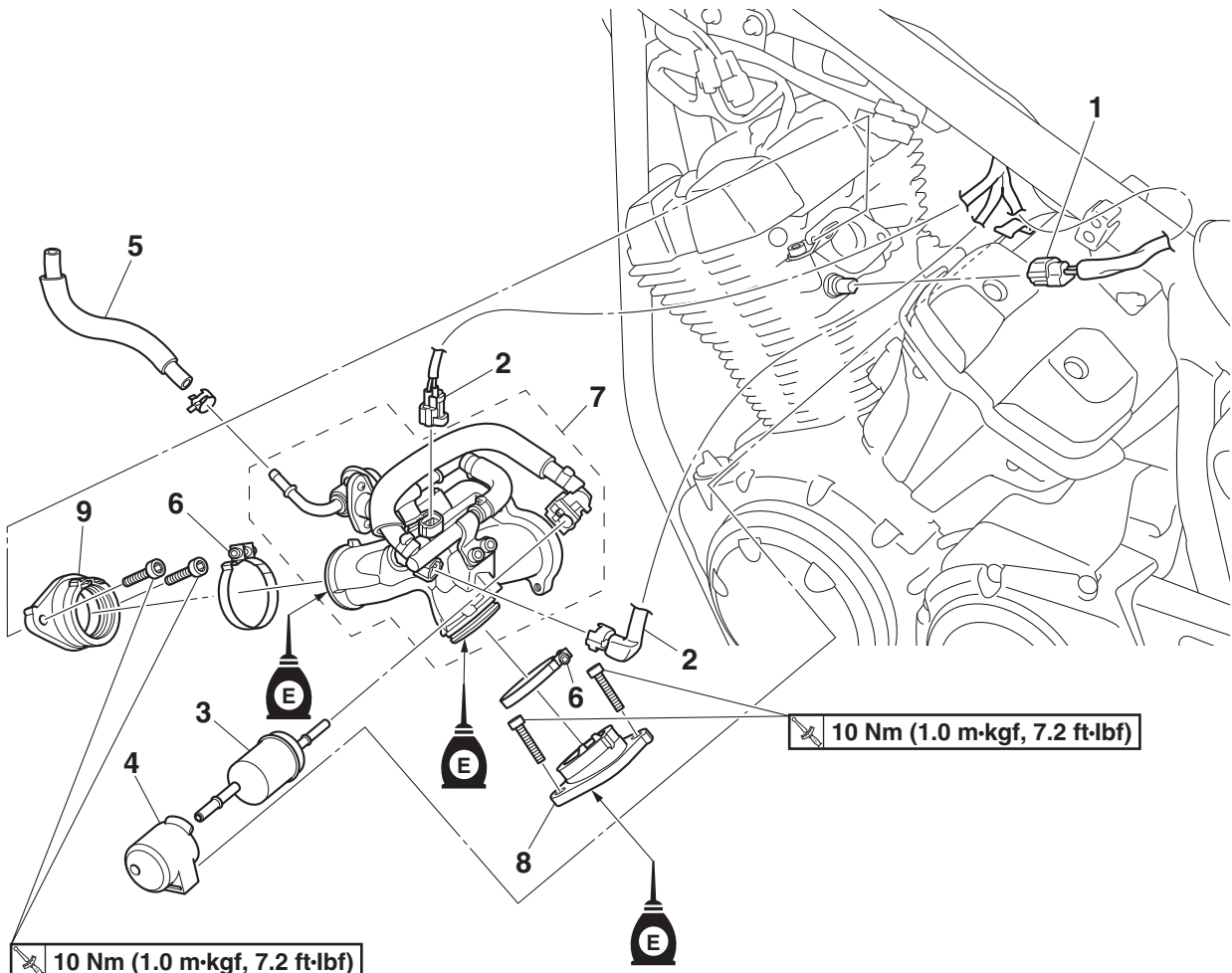
Removing the throttle body



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
1	Throttle position sensor coupler	1	Disconnect.
2	Intake air pressure sensor hose	1	Disconnect.
3	Throttle cable	2	Disconnect.
4	Throttle body	1	ECA1TP1018 NOTICE The throttle body should not be disassembled.
5	Gasket	1	
6	ISC (idle speed control) unit coupler	1	Disconnect.
7	Throttle position sensor	1	
			For installation, reverse the removal procedure.

THROTTLE BODIES

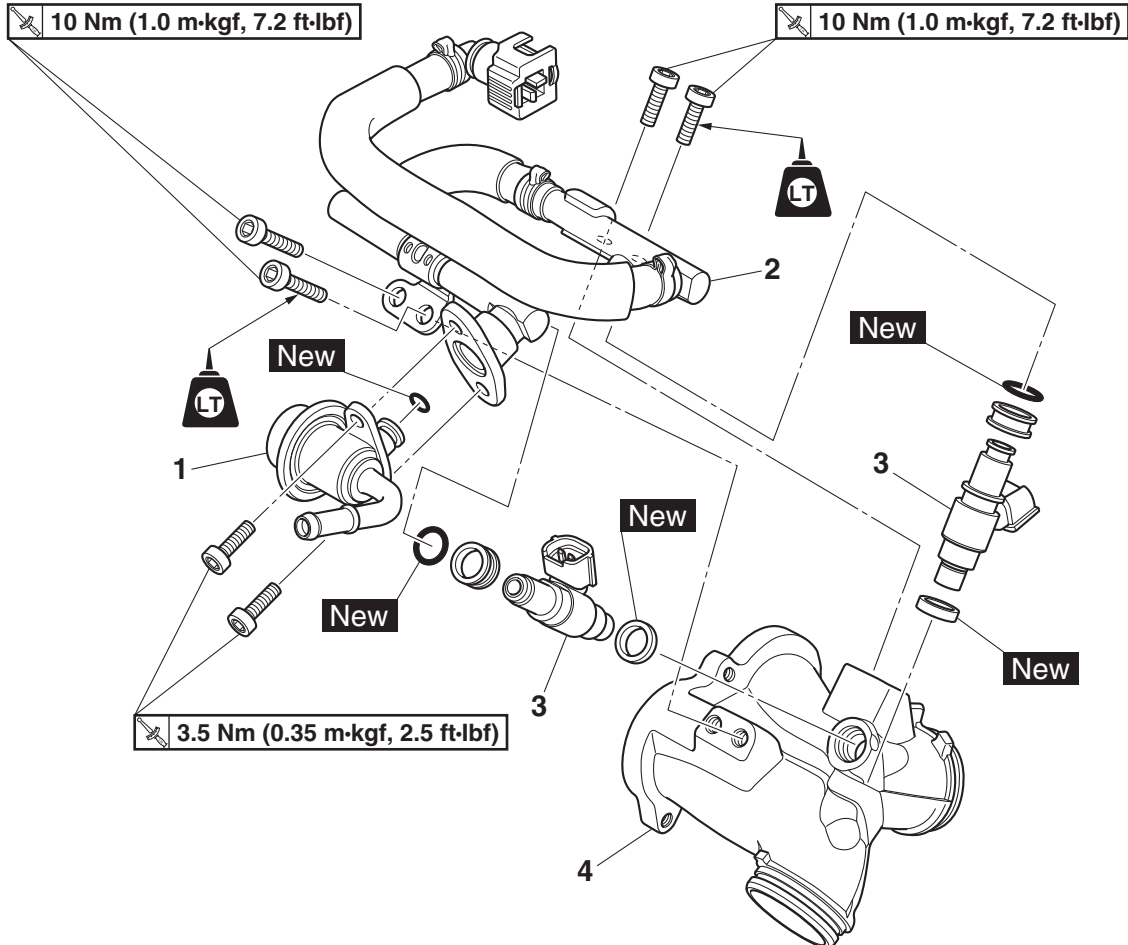
Removing the intake manifold assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
	Throttle body		Refer to "THROTTLE BODIES" on page 6-6.
1	Engine temperature sensor coupler	1	Disconnect.
2	Fuel injector coupler	2	Disconnect.
3	Fuel filter	1	
4	Fuel filter cover	1	
5	Fuel return hose	1	
6	Intake manifold joint clamp screw	2	Loosen.
7	Intake manifold assembly	1	
8	Rear cylinder intake manifold joint	1	
9	Front cylinder intake manifold joint	1	
			For installation, reverse the removal procedure.

THROTTLE BODIES

Disassembling the intake manifold



Order	Job/Parts to remove	Q'ty	Remarks
1	Pressure regulator	1	
2	Inlet pipe assembly	1	
3	Injector	2	
4	Intake manifold	1	
			For assembly, reverse the disassembly procedure.

THROTTLE BODIES



Vacuum/pressure pump gauge set

90890-06756

Mityvac brake bleeding tool

YS-42423

Pressure gauge

90890-03153

YU-03153

Fuel pressure adapter

90890-03176

YM-03176

TIP

The vacuum pressure should not exceed 100 kPa (760 mmHg).

- Increase the vacuum pressure → Fuel pressure is decreased
- Decrease the vacuum pressure → Fuel pressure is increased

Faulty → Replace the fuel pump and pressure regulator.

EAS27030

ADJUSTING THE THROTTLE POSITION SENSOR

1. Check:

- Throttle position sensor
Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 7-167.

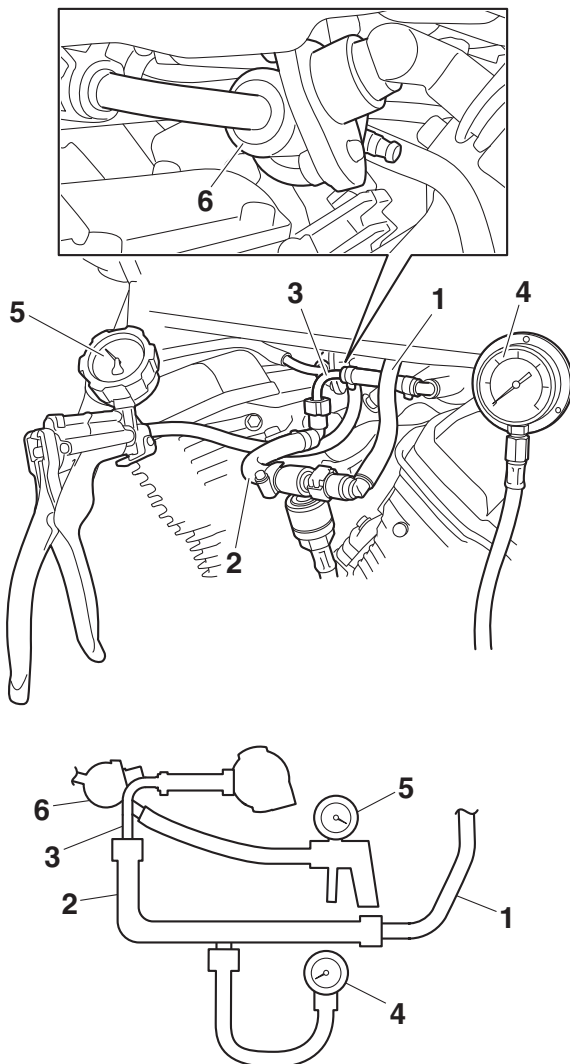
2. Adjust:

- Throttle position sensor angle

a. Connect the Test harness-TPS(3P) "1" to the throttle position sensor and wire harness as shown.

b. Connect the digital circuit tester to the Test harness-TPS(3P).

- Positive tester probe → yellow (wire harness color)
- Negative tester probe → black/blue (wire harness color)



e. Start the engine.

f. Measure the fuel pressure.



Fuel line pressure at idling
220 – 300 kPa (2.20 – 3.00
kgf/cm², 31.3 – 42.7 psi)

g. Use the vacuum/pressure pump gauge set to adjust the fuel pressure in relation to the vacuum pressure as described below.



Digital circuit tester

90890-03174

Model 88 Multimeter with tachometer

YU-A1927

Test harness– TPS (3P)

90890-03204

YU-03204

c. Turn the main switch to "ON".

d. Measure the throttle position sensor output voltage.

e. Adjust the throttle position sensor angle so that the output voltage is within the specified range.



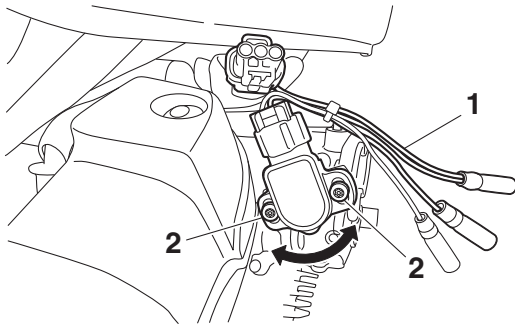
Output voltage (at idle)
0.63–0.73 V

f. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws "2".

THROTTLE BODIES

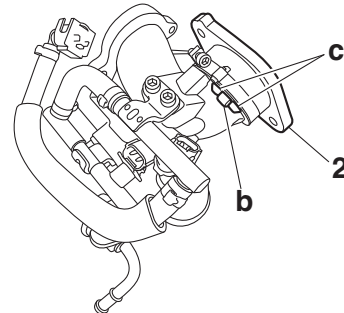


Throttle position sensor screw
3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)



TIP

Be sure to fit the projection “b” on the intake manifold assembly between the projections “c” on the rear cylinder intake manifold joint.



EAS1TP1045

REMOVING THE INTAKE MANIFOLD ASSEMBLY

1. Remove:
 - Intake manifold assembly

TIP

Remove the rear cylinder intake manifold joint together with the intake manifold assembly.

EAS1TP1046

INSTALLING THE INTAKE MANIFOLD ASSEMBLY

1. Install:
 - Intake manifold assembly

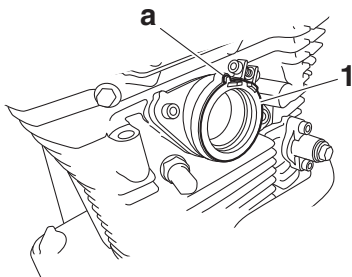
- a. Install the front cylinder intake manifold joint “1” to the front cylinder head.



Front cylinder intake manifold joint bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

Install the front cylinder intake manifold joint with its projection “a” facing up as shown in the illustration.



- b. Install the rear cylinder intake manifold joint “2” to the intake manifold assembly.

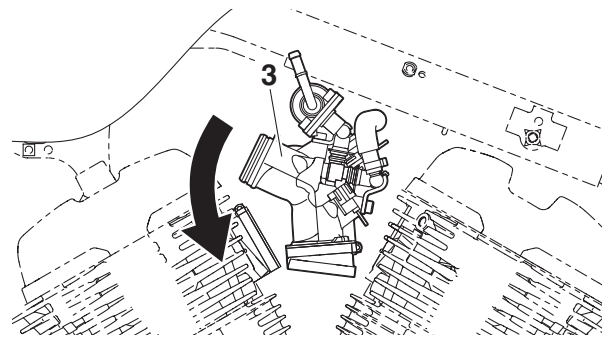
- c. Install the intake manifold assembly.



Rear cylinder intake manifold joint bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

- Lubricate the rear cylinder intake manifold joint and rear cylinder head mating surfaces with engine oil.
- Position the intake manifold assembly “3” as shown in the illustration, and then rotate it in the direction of the arrow shown to install it.



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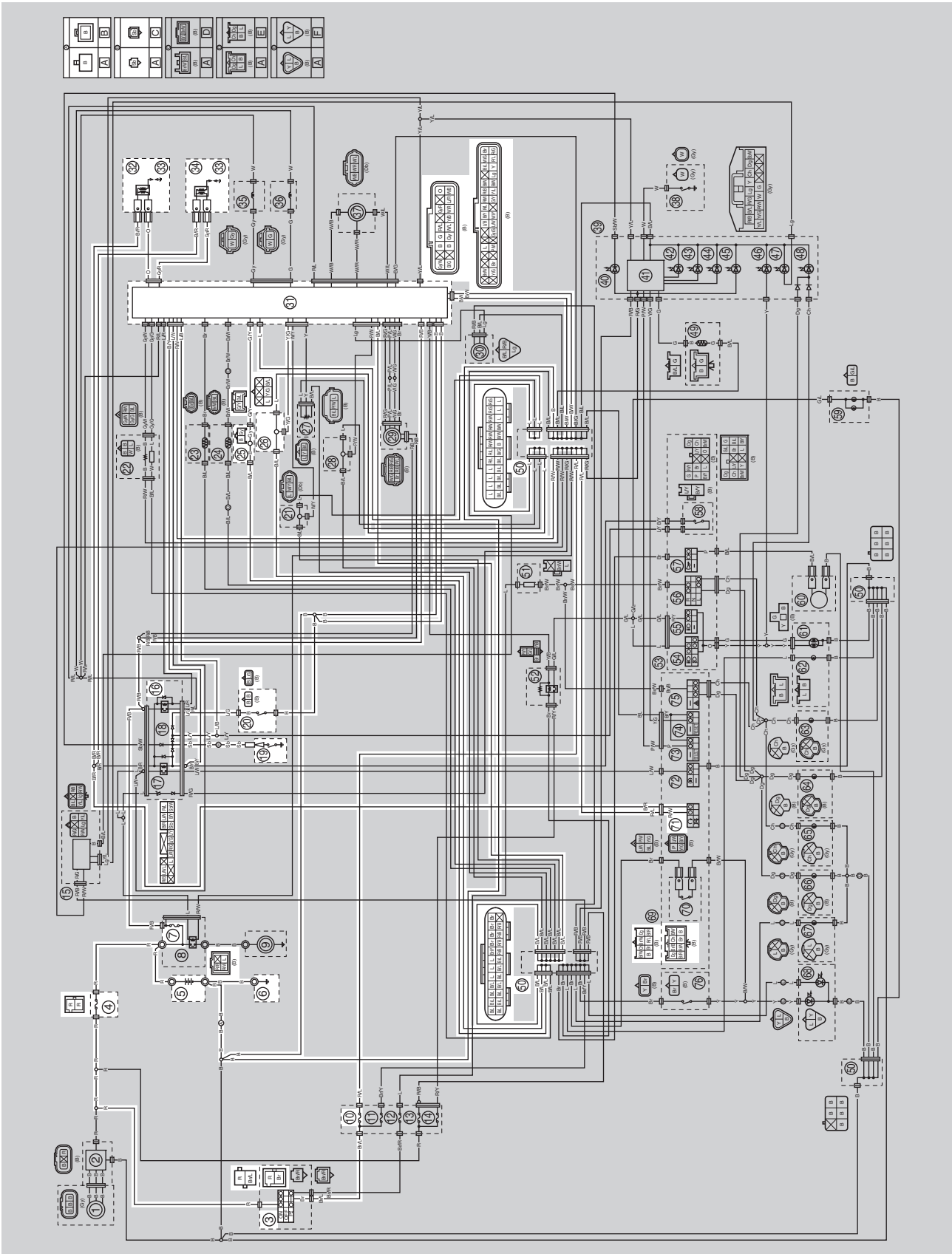
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EAS27090

IGNITION SYSTEM

EAS1XC1043

CIRCUIT DIAGRAM (except for ABS models)

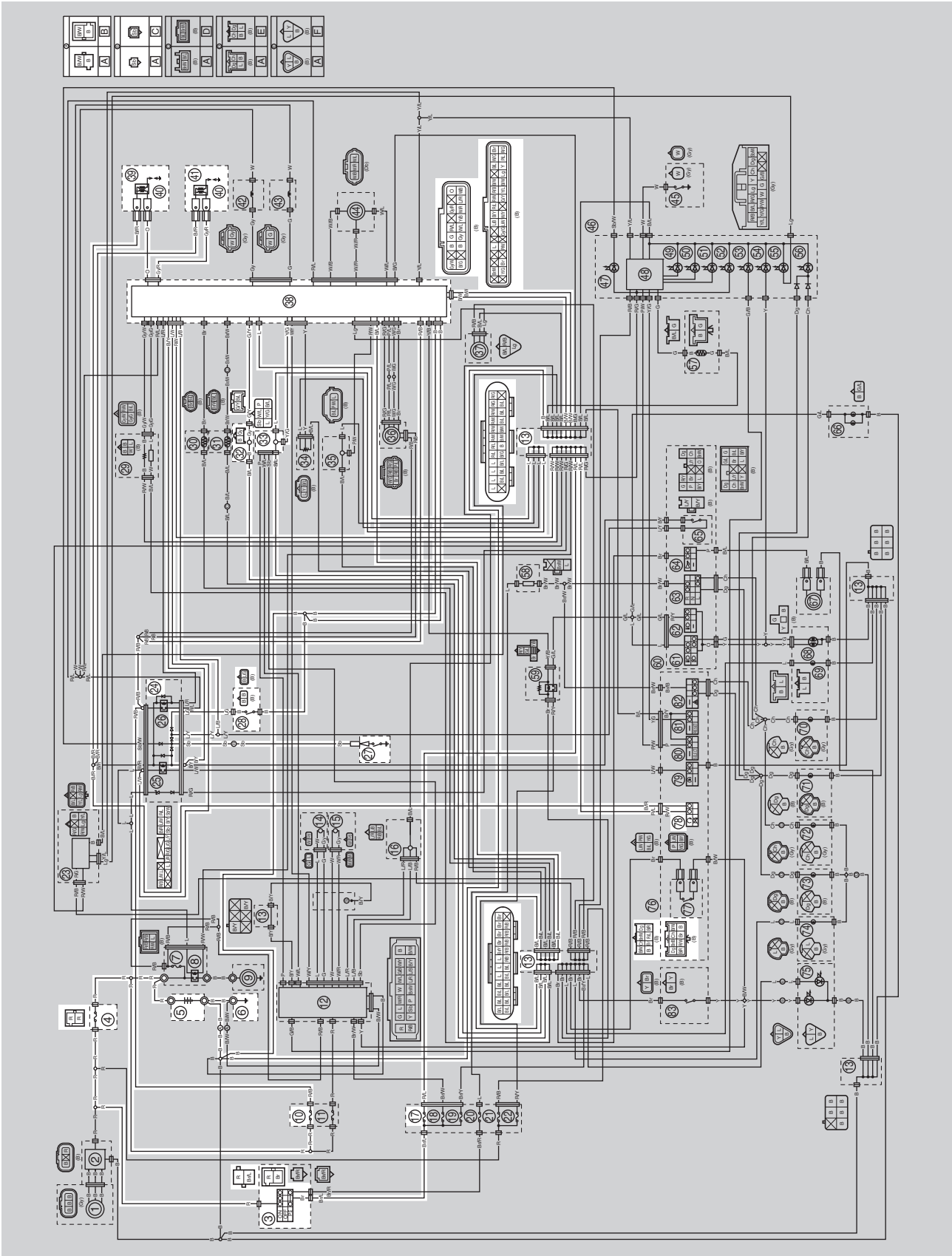


IGNITION SYSTEM

- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 7. Fuel injection system fuse
- 10. Ignition fuse
- 16. Relay unit
- 19. Neutral switch
- 20. Sidestand switch
- 25. Crankshaft position sensor
- 26. Lean angle sensor
- 31. ECU (engine control unit)
- 32. Front cylinder ignition coil
- 33. Spark plug
- 34. Rear cylinder ignition coil
- 50. Joint coupler
- 71. Engine stop switch
- A. Wire harness
- B. Negative battery sub-wire harness
- C. Neutral switch sub-wire harness

EAS1XC1044

CIRCUIT DIAGRAM (for ABS models)



IGNITION SYSTEM

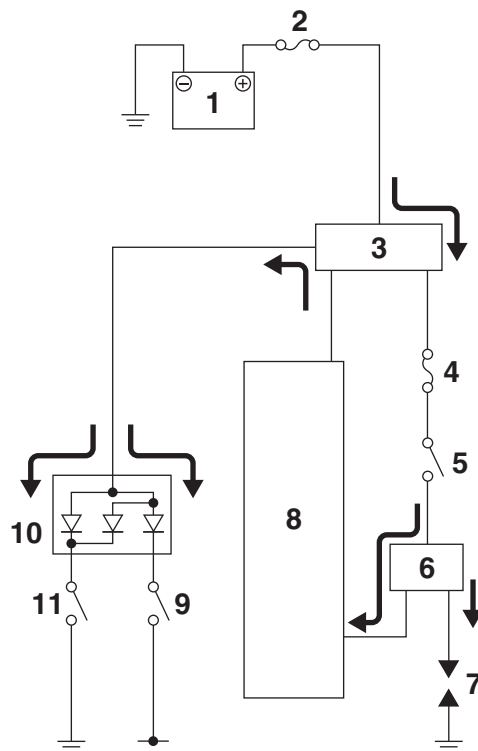
- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 10. Fuel injection system fuse
- 13. Joint coupler
- 17. Ignition fuse
- 24. Relay unit
- 27. Neutral switch
- 28. Sidestand switch
- 32. Crankshaft position sensor
- 33. Lean angle sensor
- 38. ECU (engine control unit)
- 39. Front cylinder ignition coil
- 40. Spark plug
- 41. Rear cylinder ignition coil
- 78. Engine stop switch
- A. Wire harness
- B. Negative battery sub-wire harness
- C. Neutral switch sub-wire harness

EAS3D81009

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 is open) and the sidestand is up (the sidestand switch is closed).
- The transmission is in neutral (the neutral switch is closed) and the sidestand is down (the sidestand switch 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

EAS27140

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

• Before troubleshooting, remove the following part(s):

1. Left side cover
2. Rider seat
3. Fuel tank
4. Rear cylinder right cover
5. Air duct
6. Drive pulley

<p>1. Check the fuses. (Main and ignition and fuel injection system) Refer to "CHECKING THE FUSES" on page 7-155.</p>	<p>NG →</p>	<p>Replace the fuse(s).</p>
<p>OK ↓</p>		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-156.</p>	<p>NG →</p>	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
<p>OK ↓</p>		
<p>3. Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-4.</p>	<p>NG →</p>	<p>Regap or replace the spark plug(s).</p>
<p>OK ↓</p>		
<p>4. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 7-162.</p>	<p>OK →</p>	<p>Ignition system is OK.</p>
<p>NG ↓</p>		
<p>5. Check the spark plug caps. Refer to "CHECKING THE SPARK PLUG CAPS" on page 7-162.</p>	<p>NG →</p>	<p>Replace the spark plug cap(s).</p>
<p>OK ↓</p>		
<p>6. Check the ignition coils. Refer to "CHECKING THE IGNITION COILS" on page 7-162.</p>	<p>NG →</p>	<p>Replace the ignition coil(s).</p>
<p>OK ↓</p>		
<p>7. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 7-163.</p>	<p>NG →</p>	<p>Replace the crankshaft position sensor/stator assembly.</p>
<p>OK ↓</p>		

IGNITION SYSTEM

8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	NG →	Replace the main switch/immobilizer unit.
OK ↓		
9. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	NG →	<ul style="list-style-type: none">• The engine stop switch is faulty.• Replace the right handlebar switch.
OK ↓		
10. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	NG →	Replace the neutral switch.
OK ↓		
11. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	NG →	Replace the sidestand switch.
OK ↓		
12. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 7-161.	NG →	Replace the relay unit.
OK ↓		
13. Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 7-163.	NG →	Replace the lean angle sensor.
OK ↓		
14. Check the entire ignition system wiring. Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-1 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-3.	NG →	Properly connect or replace the wire harness.
OK ↓		
Replace the ECU.		

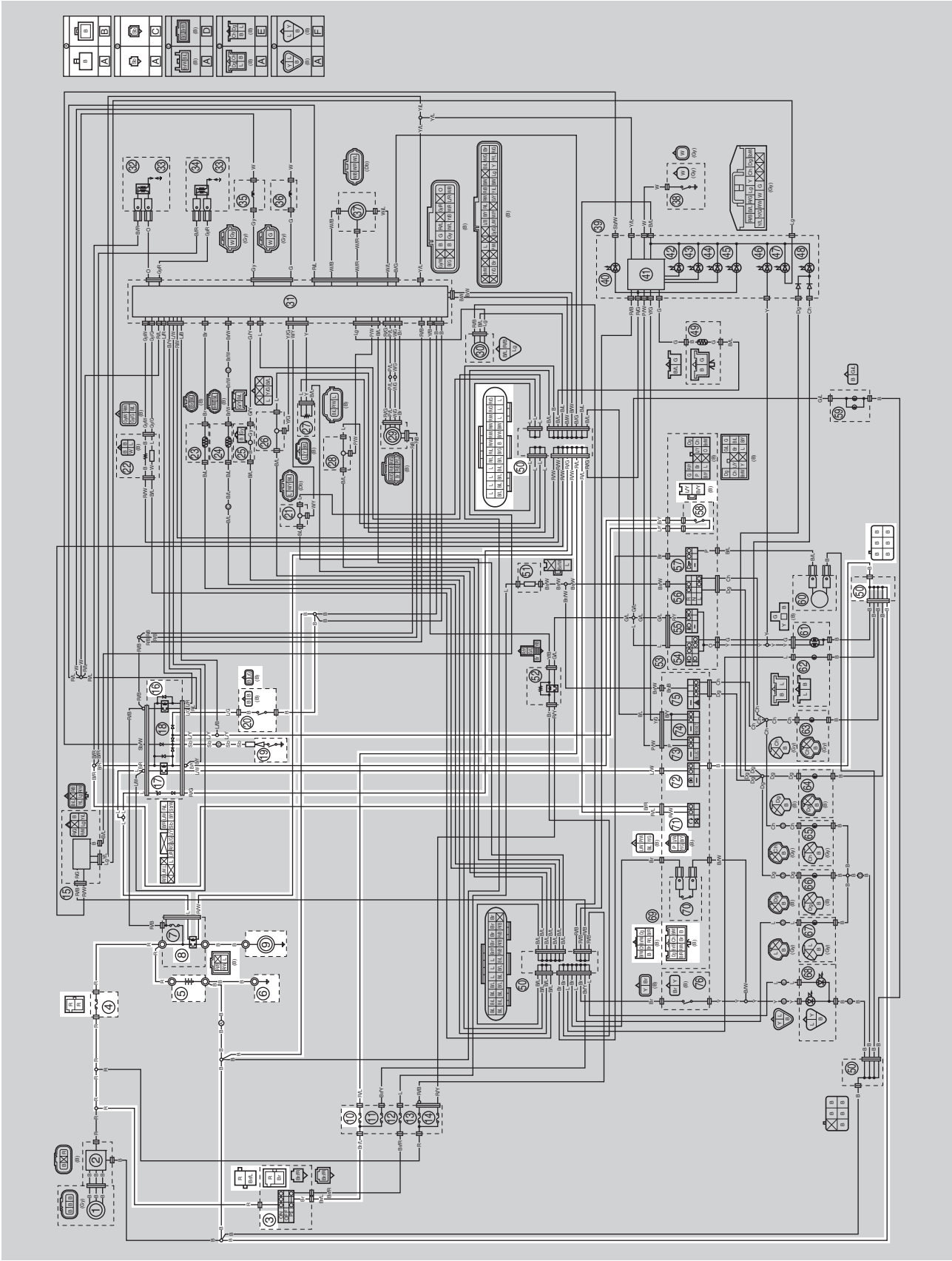
ELECTRIC STARTING SYSTEM

EAS27160

ELECTRIC STARTING SYSTEM

EAS1XC1045

CIRCUIT DIAGRAM (except for ABS models)



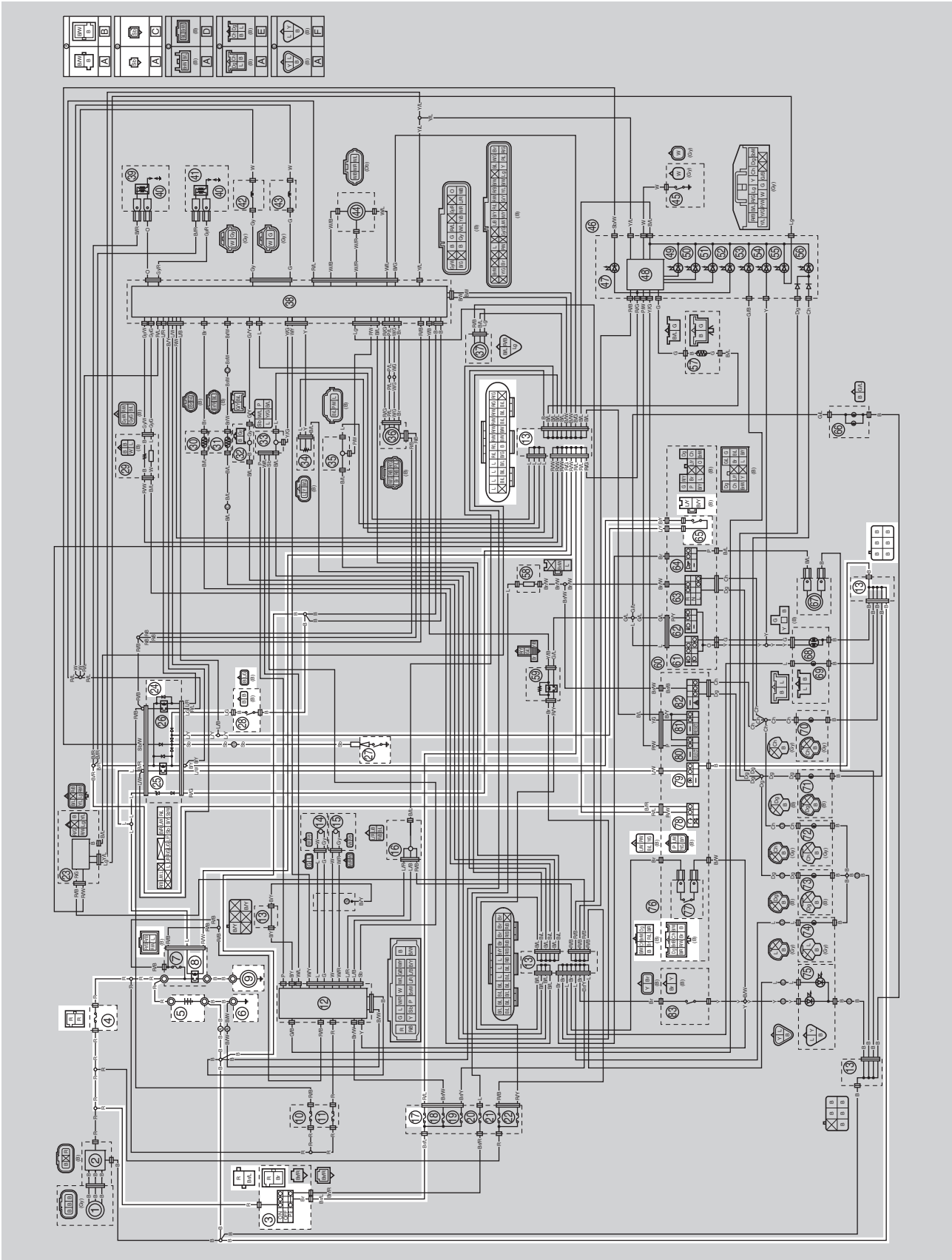
ELECTRIC STARTING SYSTEM

- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 8. Starter relay
- 9. Starter motor
- 10. Ignition fuse
- 16. Relay unit
- 17. Starting circuit cut-off relay
- 19. Neutral switch
- 20. Sidestand switch
- 50. Joint coupler
- 58. Clutch switch
- 71. Engine stop switch
- 72. Start switch
- A. Wire harness
- B. Negative battery sub-wire harness
- C. Neutral switch sub-wire harness

ELECTRIC STARTING SYSTEM

EAS1XC1046

CIRCUIT DIAGRAM (for ABS models)



ELECTRIC STARTING SYSTEM

- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 8. Starter relay
- 9. Starter motor
- 13. Joint coupler
- 17. Ignition fuse
- 24. Relay unit
- 25. Starting circuit cut-off relay
- 27. Neutral switch
- 28. Sidestand switch
- 65. Clutch switch
- 78. Engine stop switch
- 79. Start switch
- A. Wire harness
- B. Negative battery sub-wire harness
- C. Neutral switch sub-wire harness

ELECTRIC STARTING SYSTEM

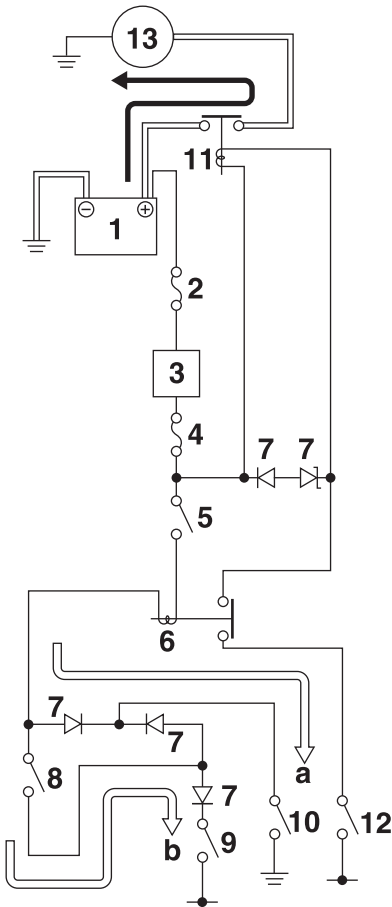
EAS27180

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 start switch.



- | | |
|---|---------------------|
| a. WHEN THE TRANSMISSION IS IN NEUTRAL | 8. Clutch switch |
| b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR | 9. Sidestand switch |
| 1. Battery | 10. Neutral switch |
| 2. Main fuse | 11. Starter relay |
| 3. Main switch | 12. Start switch |
| 4. Ignition fuse | 13. Starter motor |
| 5. Engine stop switch | |
| 6. Relay unit (starting circuit cut-off relay) | |
| 7. Relay unit (diode) | |

ELECTRIC STARTING SYSTEM

EAS27190

TROUBLESHOOTING

The starter motor fails to turn.

TIP

• Before troubleshooting, remove the following part(s):

1. Left side cover
2. Rider seat
3. Fuel tank
4. Air duct
5. Drive pulley

1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 7-155.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-156.	NG →	<ul style="list-style-type: none">• 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 7-164.	OK →	The 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 5-63.	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 7-159.	NG →	Replace the relay unit.
OK ↓		
6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 7-161.	NG →	Replace the relay unit.
OK ↓		
7. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 7-159.	NG →	Replace the starter relay.
OK ↓		

ELECTRIC STARTING SYSTEM

8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	NG →	Replace the main switch/immobilizer unit.
OK ↓		
9. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	NG →	<ul style="list-style-type: none">• The engine stop switch is faulty.• Replace the right handlebar switch.
OK ↓		
10. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	NG →	Replace the neutral switch.
OK ↓		
11. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	NG →	Replace the sidestand switch.
OK ↓		
12. Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	NG →	Replace the clutch switch.
OK ↓		
13. Check the start switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	NG →	<ul style="list-style-type: none">• The start switch is faulty.• Replace the right handlebar switch.
OK ↓		
14. Check the entire starting system wiring. Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-9 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-11.	NG →	Properly connect or replace the wire harness.
OK ↓		
The starting system circuit is OK.		

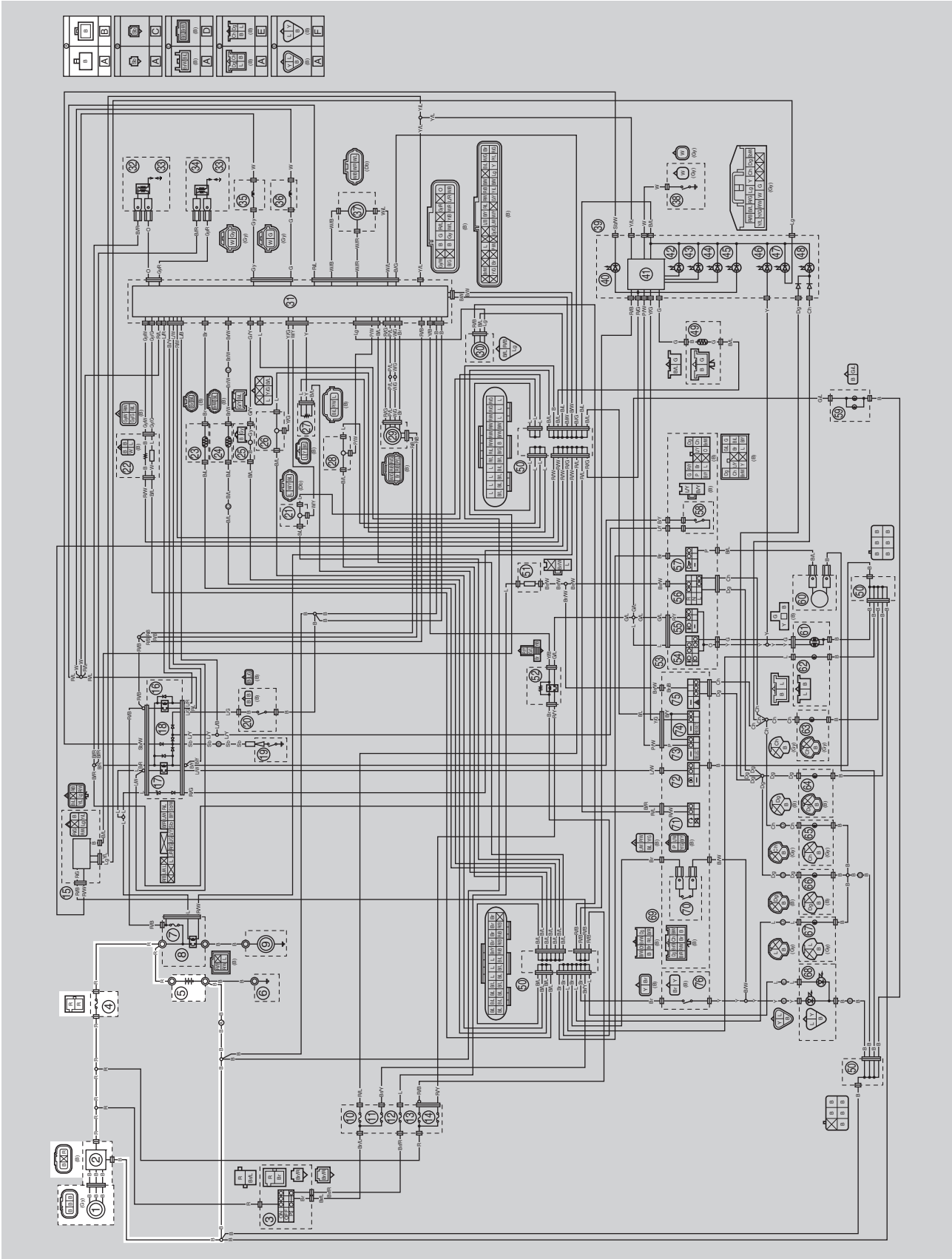
ELECTRIC STARTING SYSTEM

EAS27200

CHARGING SYSTEM

EAS1XC1047

CIRCUIT DIAGRAM (except for ABS models)

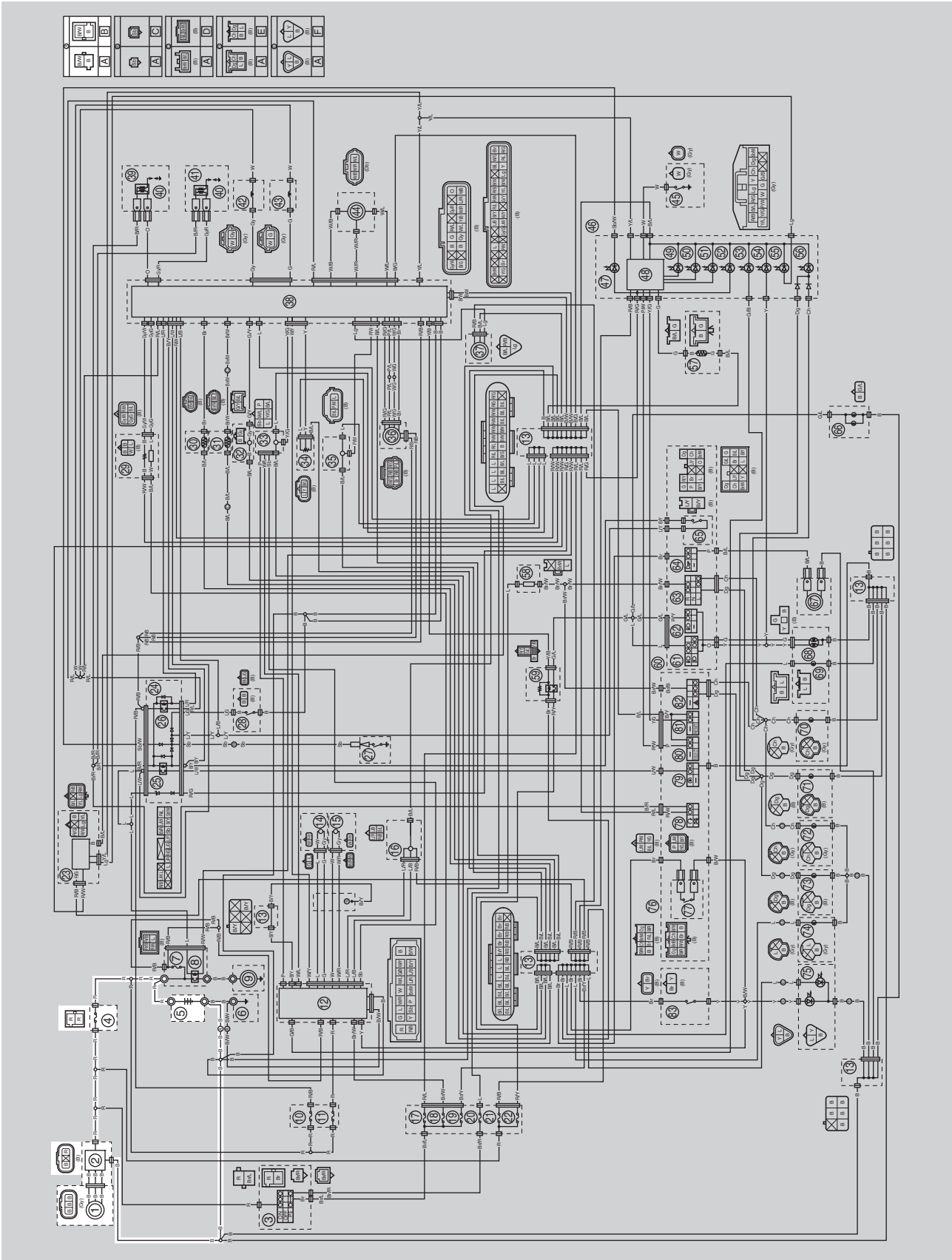


CHARGING SYSTEM

1. AC magneto
2. Rectifier/regulator
4. Main fuse
5. Battery
 - A. Wire harness
 - B. Negative battery sub-wire harness

EAS1XC1048

CIRCUIT DIAGRAM (for ABS models)



CHARGING SYSTEM

1. AC magneto
2. Rectifier/regulator
4. Main fuse
5. Battery
 - A. Wire harness
 - B. Negative battery sub-wire harness

CHARGING SYSTEM

EAS27230

TROUBLESHOOTING

The battery is not being charged.

TIP

• Before troubleshooting, remove the following part(s):

1. Left side cover
2. Rider seat
3. Air duct

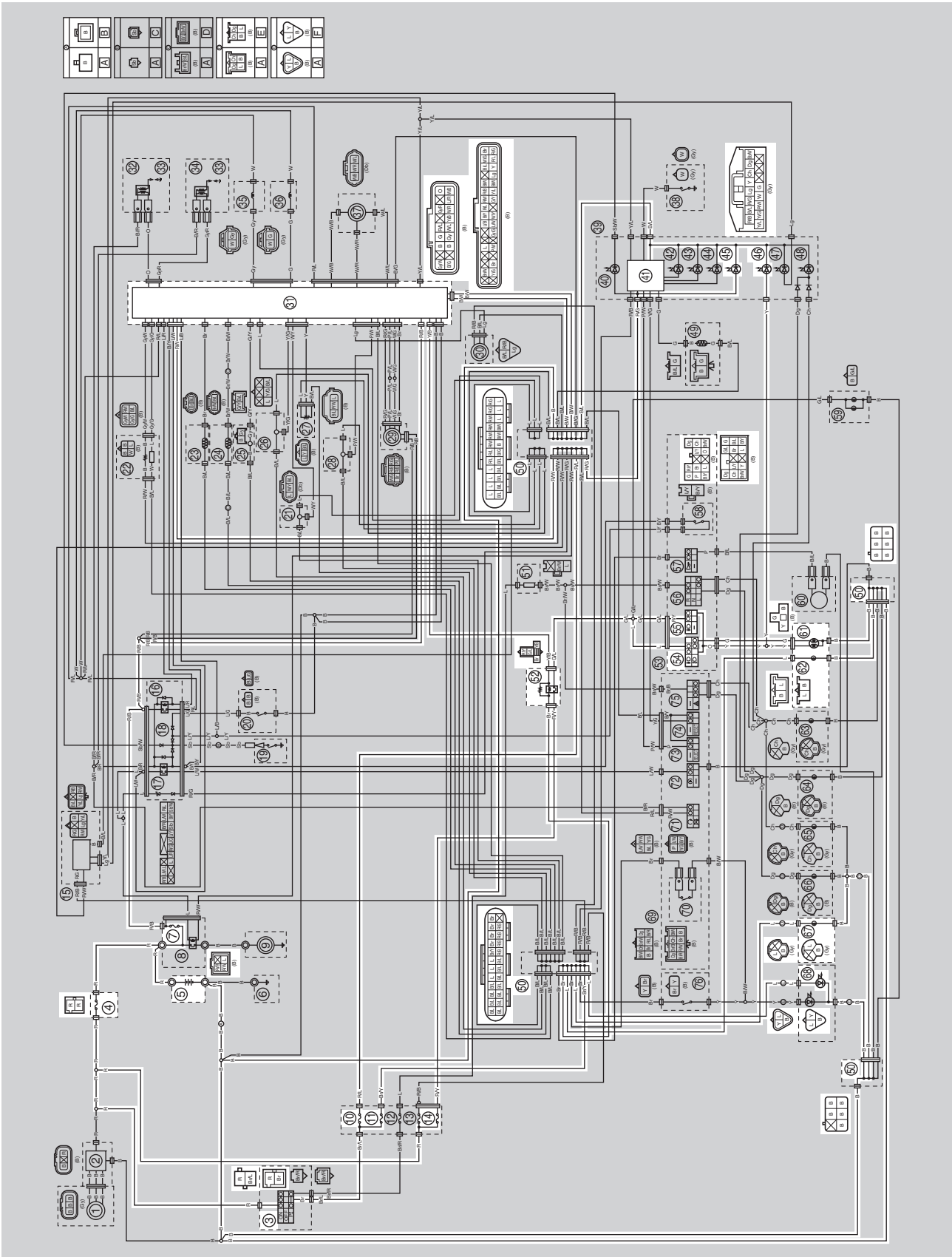
1. Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 7-155.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-156.	NG →	<ul style="list-style-type: none">• Clean the battery terminals.• Recharge or replace the battery.
OK ↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 7-164.	NG →	Replace the crankshaft position sensor/stator assembly.
OK ↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 7-165.	NG →	Replace the rectifier/regulator.
OK ↓		
5. Check the entire charging system wiring. Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-17 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-19.	NG →	Properly connect or replace the wire harness.
OK ↓		
The charging system circuit is OK.		

EAS27240

LIGHTING SYSTEM

EAS1XC1049

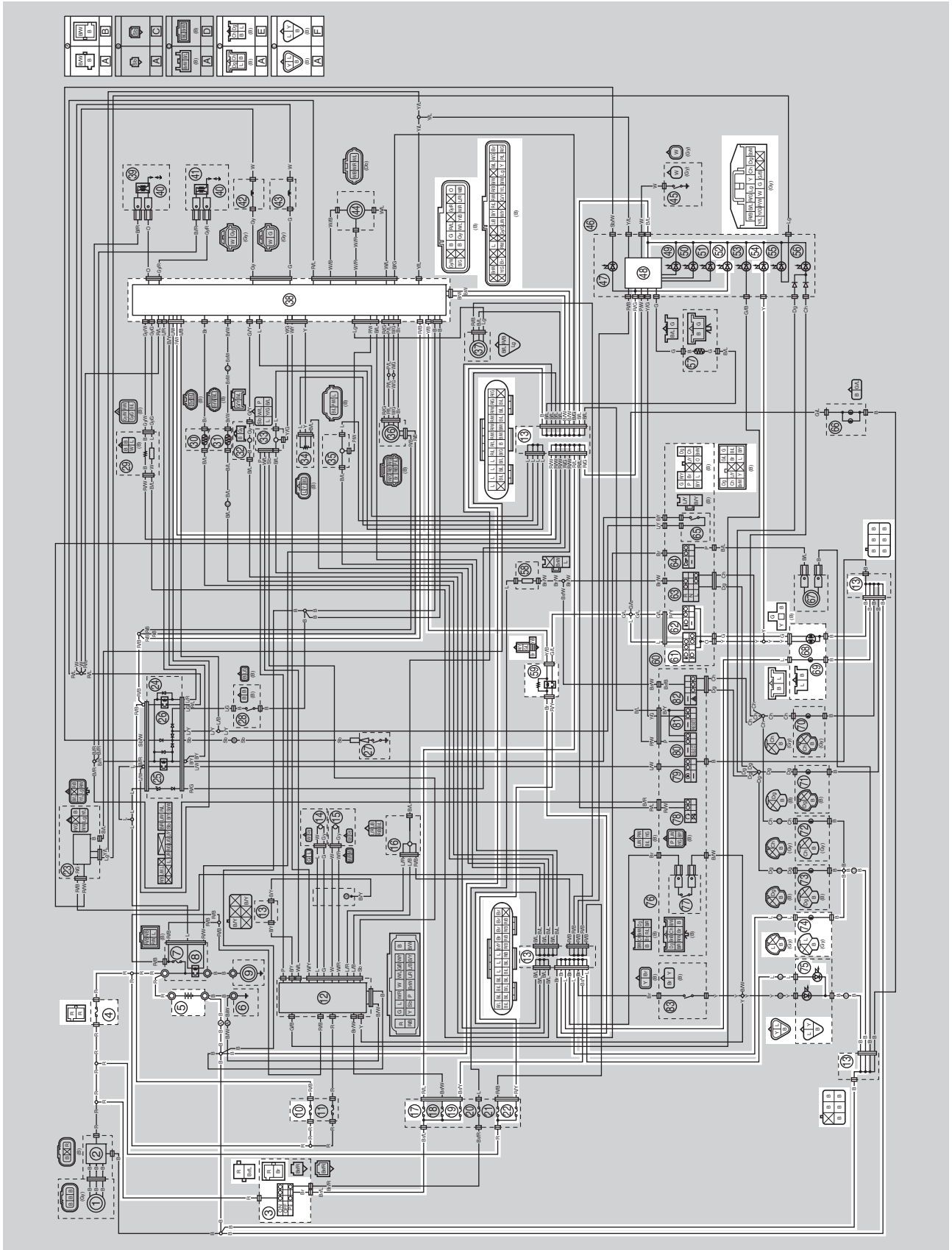
CIRCUIT DIAGRAM (except for ABS models)



- 3. Main switch
- 4. Main fuse
- 5. Battery
- 7. Fuel injection system fuse
- 10. Ignition fuse
- 11. Signaling system fuse
- 14. Headlight fuse
- 31. ECU (engine control unit)
- 41. Multi-function meter
- 45. Meter light
- 46. High beam indicator light
- 50. Joint coupler
- 52. Headlight relay
- 54. Dimmer switch
- 55. Pass switch
- 61. Headlight
- 62. Auxiliary light
- 67. License plate light
- 68. Tail/brake light
- A. Wire harness
- B. Negative battery sub-wire harness
- E. Rear turn signal light and license plate light sub-wire harness
- F. Tail/brake light sub-wire harness

EAS1XC1050

CIRCUIT DIAGRAM (for ABS models)



- 3. Main switch
- 4. Main fuse
- 5. Battery
- 10. Fuel injection system fuse
- 13. Joint coupler
- 17. Ignition fuse
- 19. Signaling system fuse
- 22. Headlight fuse
- 38. ECU (engine control unit)
- 48. Multi-function meter
- 52. Meter light
- 54. High beam indicator light
- 59. Headlight relay
- 61. Dimmer switch
- 62. Pass switch
- 68. Headlight
- 69. Auxiliary light
- 74. License plate light
- 75. Tail/brake light
- A. Wire harness
- B. Negative battery sub-wire harness
- E. Rear turn signal light and license plate light sub-wire harness
- F. Tail/brake light sub-wire harness

EAS27260

TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, license plate light, meter light or auxiliary light.

TIP

1. Left side cover
2. Rider seat
3. Fuel tank
4. Tail/brake light

<p>1. Check the condition of each bulb and bulb socket. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 7-154.</p>	<p>NG →</p>	<p>Replace the bulb(s) and bulb socket(s).</p>
<p>OK ↓</p>		
<p>2. Check the fuses. (Main, headlight, fuel injection system, ignition and signaling system) Refer to "CHECKING THE FUSES" on page 7-155.</p>	<p>NG →</p>	<p>Replace the fuse(s).</p>
<p>OK ↓</p>		
<p>3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-156.</p>	<p>NG →</p>	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
<p>OK ↓</p>		
<p>4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-151.</p>	<p>NG →</p>	<p>Replace the main switch/immobilizer unit.</p>
<p>OK ↓</p>		
<p>5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 7-151.</p>	<p>NG →</p>	<ul style="list-style-type: none"> • The dimmer switch is faulty. • Replace the left handlebar switch.
<p>OK ↓</p>		
<p>6. Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 7-151.</p>	<p>NG →</p>	<ul style="list-style-type: none"> • The pass switch is faulty. • Replace the left handlebar switch.
<p>OK ↓</p>		
<p>7. Check the headlight relay. Refer to "CHECKING THE RELAYS" on page 7-159.</p>	<p>NG →</p>	<p>Replace the headlight relay.</p>
<p>OK ↓</p>		

LIGHTING SYSTEM

8. Check the entire lighting system wiring.
Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-23 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-25.

NG →

Properly connect or replace the wire harness.

OK ↓

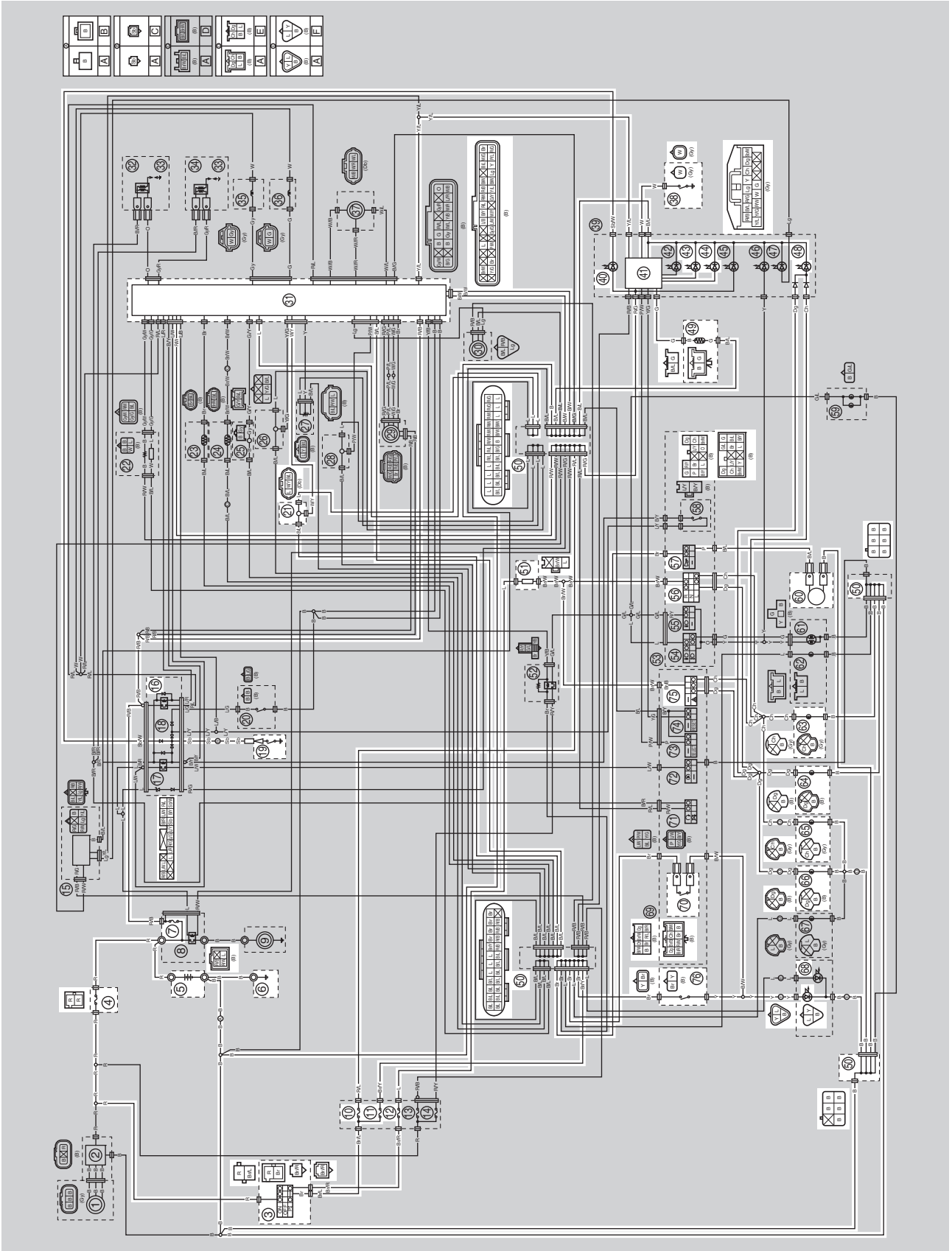
Replace the ECU, meter assembly or Tail/brake light.

EAS27270

SIGNALING SYSTEM

EAS1XC1017

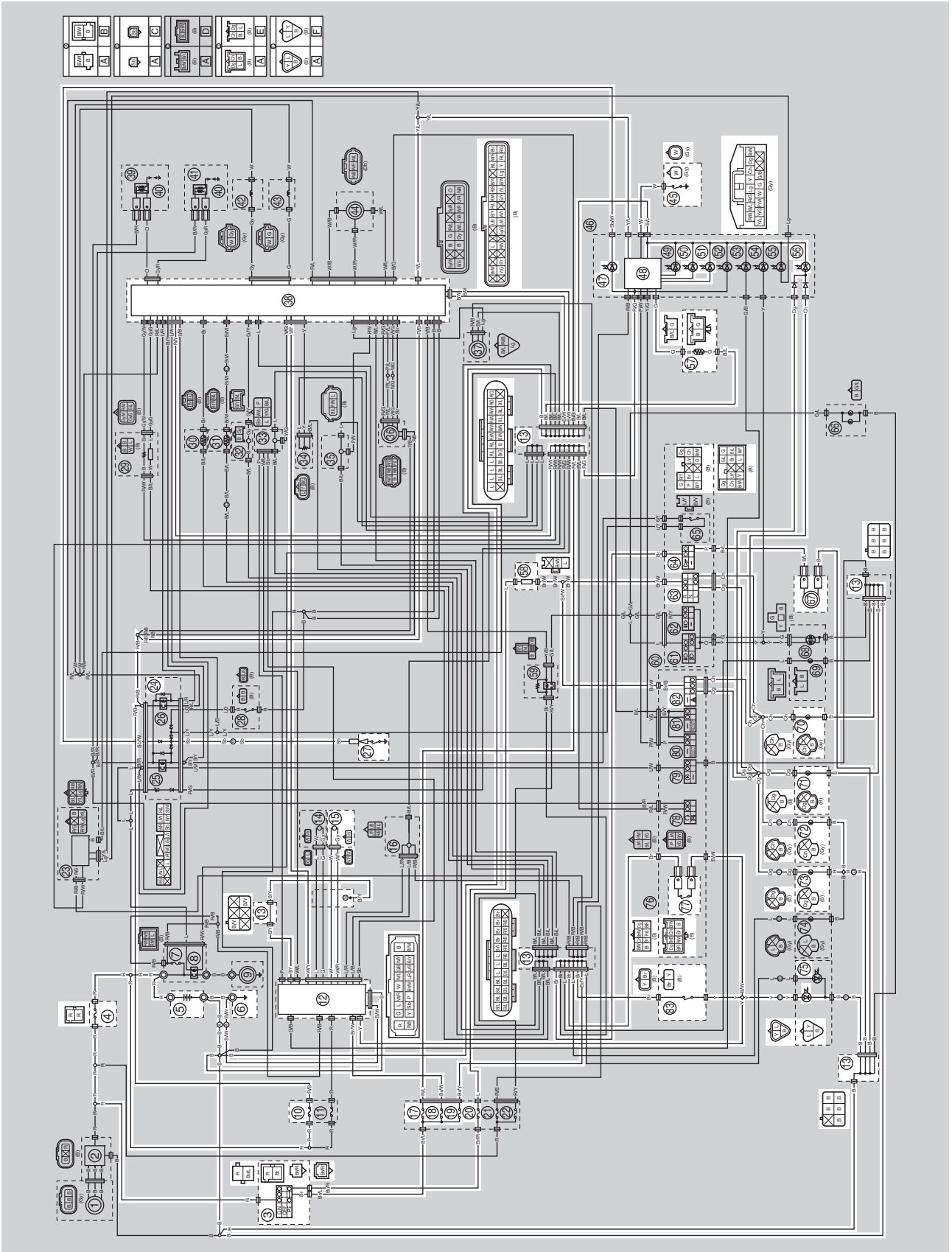
CIRCUIT DIAGRAM (except for ABS models)



- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 7. Fuel injection system fuse
- 10. Ignition fuse
- 11. Signaling system fuse
- 12. Hazard lighting fuse
- 16. Relay unit
- 19. Neutral switch
- 21. Speed sensor
- 31. ECU (engine control unit)
- 38. Oil level switch
- 40. Neutral indicator light
- 41. Multi-function meter
- 43. Oil level warning light
- 44. Fuel level warning light
- 48. Turn signal indicator light
- 49. Fuel sender
- 50. Joint coupler
- 51. Turn signal/hazard relay
- 56. Turn signal switch
- 57. Horn switch
- 60. Horn
- 63. Front left turn signal light
- 64. Front right turn signal light
- 65. Rear left turn signal light
- 66. Rear right turn signal light
- 68. Tail/brake light
- 70. Front brake light switch
- 75. Hazard switch
- 76. Rear brake light switch
- A. Wire harness
- B. Negative battery sub-wire harness
- C. Neutral switch sub-wire harness
- E. Rear turn signal light and license plate light sub-wire harness
- F. Tail/brake light sub-wire harness

EAS1XC1018

CIRCUIT DIAGRAM (for ABS models)



- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 10. Fuel injection system fuse
- 12. ABS ECU (electronic control unit)
- 13. Joint coupler
- 15. Rear wheel sensor
- 17. Ignition fuse
- 18. ABS ECU fuse
- 19. Signaling system fuse
- 20. Hazard lighting fuse
- 24. Relay unit
- 27. Neutral switch
- 38. ECU (engine control unit)
- 45. Oil level switch
- 47. Neutral indicator light
- 48. Multi-function meter
- 50. Oil level warning light
- 51. Fuel level warning light
- 56. Turn signal indicator light
- 57. Fuel sender
- 58. Turn signal/hazard relay
- 63. Turn signal switch
- 64. Horn switch
- 67. Horn
- 70. Front left turn signal light
- 71. Front right turn signal light
- 72. Rear left turn signal light
- 73. Rear right turn signal light
- 75. Tail/brake light
- 77. Front brake light switch
- 82. Hazard switch
- 83. Rear brake light switch
- A. Wire harness
- B. Negative battery sub-wire harness
- C. Neutral switch sub-wire harness
- E. Rear turn signal light and license plate light sub-wire harness
- F. Tail/brake light sub-wire harness

EAS27290

TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.
- The fuel meter fails to come on.
- The speedometer fails to operate.

TIP

- Before troubleshooting, remove the following part(s):
 1. Left side cover
 2. Rider seat
 3. Fuel tank
 4. Air duct
 5. Drive pulley
 6. Tail/brake light

<p>1. Check the fuses. (Main, signaling system, ignition, fuel injection system, hazard lighting and ABS ECU (for ABS models)) Refer to "CHECKING THE FUSES" on page 7-155.</p>	<p>NG →</p>	<p>Replace the fuse(s).</p>
<p>OK ↓</p>		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-156.</p>	<p>NG →</p>	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
<p>OK ↓</p>		
<p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-151.</p>	<p>NG →</p>	<p>Replace the main switch/immobilizer unit.</p>
<p>OK ↓</p>		
<p>4. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-29 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-31.</p>	<p>NG →</p>	<p>Properly connect or replace the wire harness.</p>
<p>OK ↓</p>		
<p>Check the condition of each of the signaling system's circuits. Refer to "Checking the signaling system".</p>		

Checking the signaling system

The horn fails to sound.

1. Check the horn switch.
Refer to "CHECKING THE SWITCHES" on page 7-151.

NG →

- The horn switch is faulty.
- Replace the left handlebar switch.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-29 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-31.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the hone.

The tail/brake light fails to come on.

1. Check the front brake light switch.
Refer to "CHECKING THE SWITCHES" on page 7-151.

NG →

Replace the front brake light switch.

OK ↓

2. Check the rear brake light switch.
Refer to "CHECKING THE SWITCHES" on page 7-151.

NG →

Replace the rear brake light switch.

OK ↓

3. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-29 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-31.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the tail/brake light.

The turn signal light, turn signal indicator light or both fail to blink.

1. Check the turn signal light bulbs and sockets.
Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 7-154.

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 7-151.

NG →

- The turn signal switch is faulty.
- Replace the left handlebar switch.

OK ↓

SIGNALING SYSTEM

<p>3. Check the hazard switch. Refer to "CHECKING THE SWITCHES" on page 7-151.</p>	NG →	<ul style="list-style-type: none">• The hazard switch is faulty.• Replace the right handlebar switch.
OK ↓		
<p>4. Check the turn signal/hazard relay. Refer to "CHECKING THE RELAYS" on page 7-159.</p>	NG →	Replace the turn signal/hazard relay.
OK ↓		
<p>5. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-29 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-31.</p>	NG →	Properly connect or replace the wire harness.
OK ↓		
<p>Replace the meter assembly.</p>		
<u>The neutral indicator light fails to come on.</u>		
<p>1. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 7-151.</p>	NG →	Replace the neutral switch.
OK ↓		
<p>2. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 7-161.</p>	NG →	Replace the relay unit.
OK ↓		
<p>3. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-29 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-31.</p>	NG →	Properly connect or replace the wire harness.
OK ↓		
<p>Replace the meter assembly.</p>		
<u>The oil level warning light fails to come on.</u>		
<p>1. Check the oil level switch. Refer to "CHECKING THE OIL LEVEL SWITCH" on page 7-165.</p>	NG →	Replace the oil level switch.
OK ↓		

SIGNALING SYSTEM

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-29 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-31.

NG →

Properly connect or replace the wire harness.

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 7-166.

NG →

Replace the fuel sender.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-29 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-31.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the meter assembly.

The speedometer fails to operate (except for ABS models).

1. Check the speed sensor.
Refer to "CHECKING THE SPEED SENSOR (except for ABS models)" on page 7-166.

NG →

Replace the speed sensor.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-29.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the ECU or meter assembly.

The speedometer fails to operate (for ABS models).

1. Check the rear wheel sensor.
Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR (for ABS models)" on page 4-26.

NG →

Replace the rear wheel sensor.

OK ↓

SIGNALING SYSTEM

2. Check the entire wheel sensor wiring.
Refer to TIP.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the hydraulic unit assembly, ECU or meter assembly.

TIP

Replace the wire harness if there is an open or short circuit.

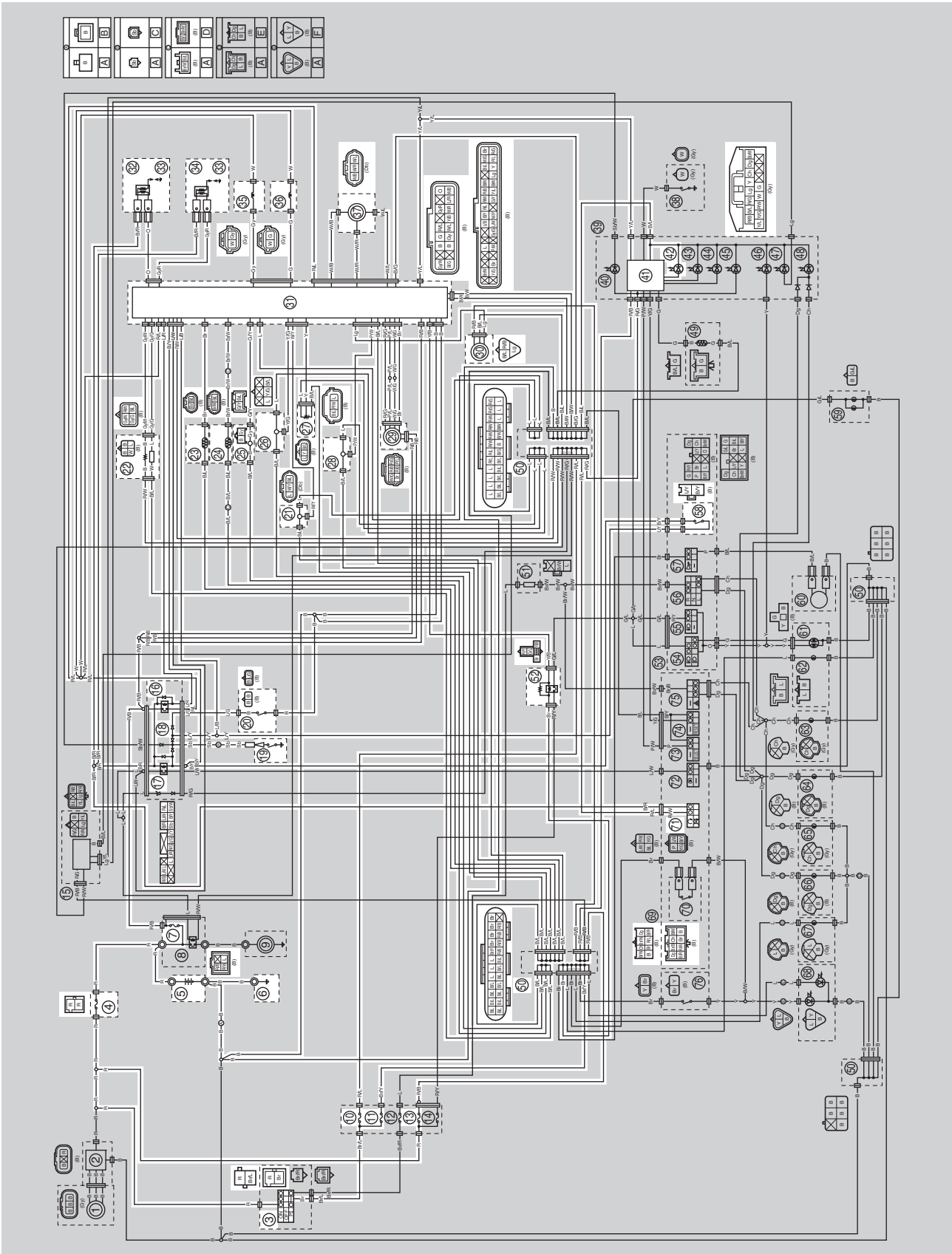
- Between rear wheel sensor coupler and ABS ECU coupler.
(white–white)
(white/red–white/red)
- Between ABS ECU coupler and ECU coupler.
(white/yellow–white/yellow)
- Between ECU coupler and meter assembly coupler.
(yellow/blue–yellow/blue)

EAS27330

FUEL INJECTION SYSTEM

EAS1XC1019

CIRCUIT DIAGRAM (except for ABS models)



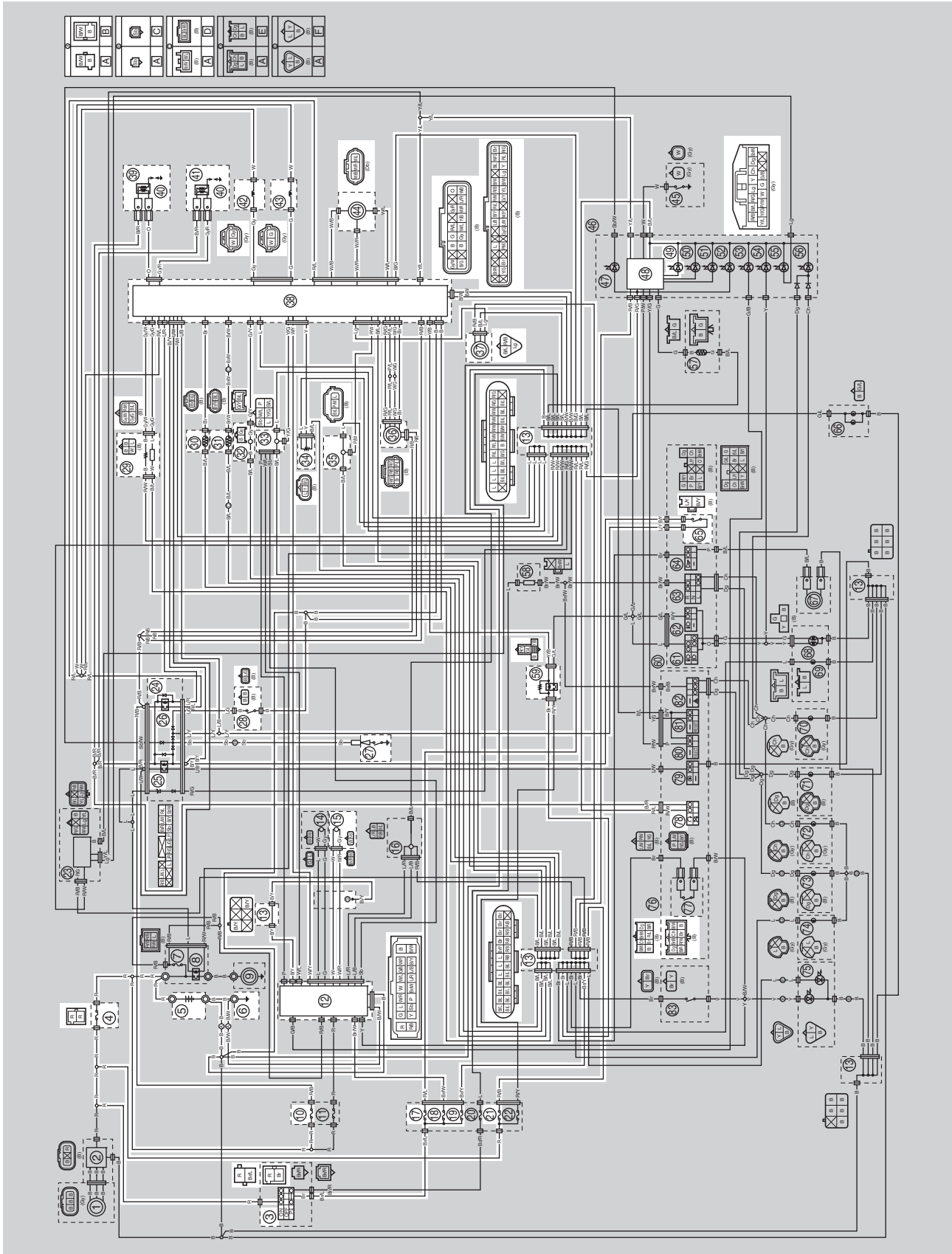
FUEL INJECTION SYSTEM

3. Main switch
4. Main fuse
5. Battery
6. Engine ground
7. Fuel injection system fuse
10. Ignition fuse
11. Signaling system fuse
13. Backup fuse
16. Relay unit
17. Starting circuit cut-off relay
18. Fuel pump relay
19. Neutral switch
20. Sidestand switch
21. Speed sensor
22. O₂ sensor
23. Engine temperature sensor
24. Intake air temperature sensor
25. Crankshaft position sensor
26. Lean angle sensor
27. Throttle position sensor
28. Intake air pressure sensor
29. ISC (idle speed control) unit
30. Yamaha diagnostic tool coupler
31. ECU (engine control unit)
32. Front cylinder ignition coil
33. Spark plug
34. Rear cylinder ignition coil
35. Front cylinder injector
36. Rear cylinder injector
37. Fuel pump
41. Multi-function meter
42. Engine trouble warning light
50. Joint coupler
52. Headlight relay
58. Clutch switch
71. Engine stop switch
- A. Wire harness
- B. Negative battery sub-wire harness
- C. Neutral switch sub-wire harness
- D. Intake air temperature sensor sub-wire harness

FUEL INJECTION SYSTEM

EAS1XC1020

CIRCUIT DIAGRAM (for ABS models)



FUEL INJECTION SYSTEM

3. Main switch
4. Main fuse
5. Battery
6. Engine ground
10. Fuel injection system fuse
12. ABS ECU (electronic control unit)
13. Joint coupler
15. Rear wheel sensor
17. Ignition fuse
18. ABS ECU fuse
19. Signaling system fuse
21. Backup fuse
24. Relay unit
25. Starting circuit cut-off relay
26. Fuel pump relay
27. Neutral switch
28. Sidestand switch
29. O₂ sensor
30. Engine temperature sensor
31. Intake air temperature sensor
32. Crankshaft position sensor
33. Lean angle sensor
34. Throttle position sensor
35. Intake air pressure sensor
36. ISC (idle speed control) unit
37. Yamaha diagnostic tool coupler
38. ECU (engine control unit)
39. Front cylinder ignition coil
40. Spark plug
41. Rear cylinder ignition coil
42. Front cylinder injector
43. Rear cylinder injector
44. Fuel pump
48. Multi-function meter
49. Engine trouble warning light
59. Headlight relay
65. Clutch switch
78. Engine stop switch
- A. Wire harness
- B. Negative battery sub-wire harness
- C. Neutral switch sub-wire harness
- D. Intake air temperature sensor sub-wire harness

FUEL INJECTION SYSTEM

EAS27350

ECU SELF-DIAGNOSTIC FUNCTION

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

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, the ECU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the odometer/tripmeter/fuel reserve tripmeter/clock LCD. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

Engine trouble warning light indication and 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 conditions listed below is present and the start switch is pushed:

- | | | | |
|-----|--|-----|---|
| 12: | Crankshaft position sensor | 41: | Lean angle sensor (open or short-circuit) |
| 19: | Blue/black ECU lead (broken or disconnected) | 50: | ECU internal malfunction (memory check error) |
| 30: | Lean angle sensor (latch up detected) | | |

Checking the engine trouble warning light

The engine trouble warning light comes on for around 2 seconds after the main switch has been turned 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.

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



- Check the fault code number displayed on the multi-function meter display.
- Identify the faulty system with the fault code number.
- 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 "TROUBLE-SHOOTING DETAILS" on page 7-48. Monitor the operation of the sensors and actuators in the diagnostic mode.	Check and repair.

3. Perform the reinstatement action for the fuel injection system.

Refer to "Confirmation of service completion" in the appropriate table in "TROUBLE-SHOOTING DETAILS" on page 7-48.

4. Turn the main switch to "OFF", and back to "ON", 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 (code No. 62). Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 8-5.

TIP _____

Turning 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.

- 01: Throttle position sensor signal (throttle angle)
- 30: Front cylinder ignition coil
- 31: Rear cylinder ignition coil
- 36: Front cylinder injector
- 37: Rear cylinder injector

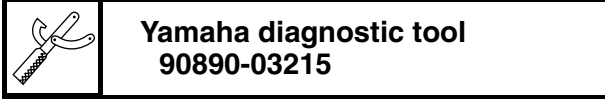
If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts. If no malfunction is detected in the sensors and actuators, check and repair the inner parts of the engine.

EAS1XC1028

YAMAHA DIAGNOSTIC TOOL

This model uses the Yamaha diagnostic tool to identify malfunctions.

For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



Features of the Yamaha diagnostic tool

You can use the Yamaha diagnostic tool to identify malfunctions quicker than with conventional methods.

By connecting the adapter interface, which is connected to the USB port of a computer, to a vehicle's ECU using the communication cable, you can display information that is necessary for identifying malfunctions and for maintenance to display on the computer. The displayed information includes the sensor output data and information recorded in the ECU.

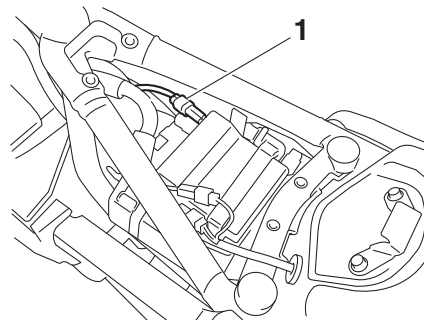
Functions of the Yamaha diagnostic tool

Fault diagnosis mode:	Fault codes recorded on the ECU are read, and the contents are displayed.
Function diagnostic mode:	Check the operation of the output value of each sensor and actuator.
Inspection mode:	Determine whether each sensor or actuator is functioning properly.
CO adjustment mode:	Adjust the concentration of CO admissions during idling.
Monitoring mode:	Displays a graph of sensor output values for actual operating conditions.
Logging mode:	Records and saves the sensor output value in actual driving conditions.
View log:	Displays the logging data.
ECU rewrite:	If necessary, the ECU is rewritten using ECU rewrite data provided by Yamaha. Ignition timing adjustment, etc. cannot be changed from the vehicle's original state.

However, the Diagnostic Tool cannot be used to freely change the basic vehicle functions, such as adjusting the ignition timing.

Connecting the Yamaha diagnostic tool

Remove the protective cap "1", and then connect the Yamaha diagnostic tool to the coupler.



TIP

When the Yamaha diagnostic tool is connected to the vehicle, the operation of the multi-function meter and indicators will be different from the normal operation.

FUEL INJECTION SYSTEM

Operation of the Yamaha diagnostic tool (Malfunction mode)

Malfunction results are displayed in the top part of the window area.

Code	ECU	Item	Condition	Symptom	Diagnosis code	F/D	ECU conduction time	Number of main switch operation after detection	Number of occurrences
Detected									
13	FI	Intake air pressure sensor 1	Detected	Open or short circuit of intake air pressure se...	03		17:07:04	3	8
245	FI	Engine stall	Detected	Engine stall detected			17:36:40	15	8
Recovered									
15	FI	Throttle position sensor	Recove...	Open or short circuit of throttle position senso...	01,13		17:07:12	2	8
21	FI	Coolant temperature sensor	Recove...	Open or short circuit of coolant temperature s...	06		17:08:40	7	8
244	FI	Difficult/unable to start engine	Recove...	Engine starting difficult / unable condition det...			17:36:40	8	8

1. Recovered

The item list of the malfunction detected in the past (already recovered) are displayed.

2. Detected

The item list of the malfunction currently occurred are displayed.

3. Code

The following icons and the fault code numbers for the detected malfunctions are displayed.

A



B



A. Detected malfunction

B. Recovered malfunction

4. ECU

The types of the control units are displayed.

FUEL INJECTION SYSTEM

5. Item
The item names of the detected malfunction are displayed.
6. Condition
The current conditions are displayed. (Detected/Recovered)
7. Symptom
The symptoms of the detected malfunction are displayed.
8. Diagnosis code
The diagnosis codes related to the detected malfunction are displayed.
9. FFD (only for models that can display freeze frame data)
The mark "□" is displayed when the freeze frame data is available.
10. ECU conduction time (hour: minute: second)
The total ECU conduction time (total hours the vehicle's main switch was ON) when the malfunction was detected is displayed.
11. Number of main switch operation after detection
The number of times the main switch was turned on between the malfunction detection and code reading is displayed.
12. Number of occurrences
The number of malfunction occurrences between the malfunction detection and code reading is displayed.

FUEL INJECTION SYSTEM

EAS27460

TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the multi-function meter display. Check and service the items or components that are the probable cause of the malfunction following the order given.

After the check and service of the malfunctioning part has been completed, reset the multi-function meter display according to the reinstatement method.

Fault code No.:

Code number displayed on the multi-function meter when the engine failed to work normally. Refer to "Self-Diagnostic Function table".

Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 8-5.

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.	—
Indicated	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of crankshaft position sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between crankshaft position sensor coupler and ECU coupler. green/yellow–green/yellow Between crankshaft position sensor coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.

FUEL INJECTION SYSTEM

Fault code No.		12	
Item		Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	
4	Installed condition of crankshaft position sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective crankshaft position sensor.	Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 7-163. Replace if defective.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in ECU.	Replace the ECU.	

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		03	
Indicated		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	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of intake air pressure sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.

FUEL INJECTION SYSTEM

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
4	Wire harness continuity.	<p>Open or short circuit → Replace the wire harness.</p> <p>Between intake air pressure sensor coupler and ECU coupler. pink/white–pink/white</p> <p>Between intake air pressure sensor coupler and joint coupler. blue–blue</p> <p>black/blue–black/blue</p> <p>Between joint coupler and ECU coupler. blue–blue</p> <p>black/blue–black/blue</p>	<p>Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.</p>
5	Installed condition of intake air pressure sensor. Check for looseness or pinching.	<p>Improperly installed sensor → Reinstall or replace the sensor.</p>	<p>Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.</p>
6	Defective intake air pressure sensor.	<p>Execute the diagnostic mode. (Code No. 03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated.</p> <p>At sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 1000 m (3300 ft) above sea level: Approx. 90 kPa (675.1 mmHg, 26.6 inHg) 2000 m (6700 ft) above sea level: Approx. 80 kPa (600.0 mmHg, 23.6 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg)</p> <p>When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Check the intake air pressure sensor. Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 7-168.</p>	<p>Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.</p>
7	Malfunction in ECU.	<p>Replace the ECU.</p>	

FUEL INJECTION SYSTEM

TIP

If fault code numbers "13" and "14" are both indicated, take the actions specified for fault code number "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.	03		
Indicated	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	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Condition of intake air pressure sensor hose. Check the intake air pressure sensor hose condition.	Clogged or detached hose → Repair or replace the sensor hose.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. 03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. At sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 1000 m (3300 ft) above sea level: Approx. 90 kPa (675.1 mmHg, 26.6 inHg) 2000 m (6700 ft) above sea level: Approx. 80 kPa (600.0 mmHg, 23.6 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Check the intake air pressure sensor. Replace if defective. Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 7-168.	

FUEL INJECTION SYSTEM

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		01	
Indicated		Throttle position sensor signal <ul style="list-style-type: none"> • 14–20 (fully closed position) • 92–102 (fully open position) 	
Procedure		<ul style="list-style-type: none"> • Check with throttle valves fully closed. • Check with throttle valves fully open. 	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of throttle position sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between throttle position sensor coupler and ECU coupler. yellow–yellow Between throttle position sensor coupler and joint coupler. blue–blue black/blue–black/blue Between joint coupler and ECU coupler. blue–blue black/blue–black/blue	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of throttle position sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or adjust the sensor. Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 6-10.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.

FUEL INJECTION SYSTEM

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
5	Defective throttle position sensor.	<p>Check throttle position sensor signal.</p> <p>Execute the diagnostic mode. (Code No. 01)</p> <p>When the throttle valves are fully closed: A value of 14–20 is indicated.</p> <p>When throttle valves are fully open: A value of 92–102 is indicated.</p> <p>An indicated value is out of the specified range → Replace the throttle position sensor.</p>	<p>Turn the main switch to “ON”. Fault code number is not displayed → Service is finished.</p> <p>Fault code number is displayed → Go to item 6.</p>
6	Malfunction in ECU.	Replace the ECU.	

Fault code No.		19	
Item		Sidestand switch: a break or disconnection of the blue/black lead of the ECU (engine control unit) is detected.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		20	
Indicated		<p>Sidestand switch</p> <ul style="list-style-type: none"> • “ON” (sidestand retracted) • “OFF” (sidestand extended) 	
Procedure		Extend and retract the sidestand (with the transmission in gear).	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	<p>Connection of sidestand switch coupler.</p> <p>Check the locking condition of the coupler.</p> <p>Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>Turn the main switch to “ON”, and then extend and retract the sidestand.</p> <p>Fault code number is not displayed → Service is finished.</p> <p>Fault code number is displayed → Go to item 2.</p>
2	<p>Connection of ECU coupler.</p> <p>Check the locking condition of the coupler.</p> <p>Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>Turn the main switch to “ON”, and then extend and retract the sidestand.</p> <p>Fault code number is not displayed → Service is finished.</p> <p>Fault code number is displayed → Go to item 3.</p>

FUEL INJECTION SYSTEM

Fault code No.		19	
Item		Sidestand switch: a break or disconnection of the blue/black lead of the ECU (engine control unit) is detected.	
3	Connection of main switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON", and then extend and retract the sidestand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Connection of relay unit coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON", and then extend and retract the sidestand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between sidestand switch coupler and relay unit coupler. blue/green–blue/green Between relay unit and ECU coupler. blue/yellow–blue/black	Turn the main switch to "ON", and then extend and retract the sidestand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Defective sidestand switch.	Execute the diagnostic mode. (Code No. 20) Shift the transmission into gear. Sidestand retracted: "ON" Sidestand extended: "OFF" Replace if defective.	Turn the main switch to "ON", and then extend and retract the sidestand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.
7	Malfunction in ECU.	Replace the ECU.	

Fault code No.		22	
Item		Intake air temperature sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		05	
Indicated		Displays the air temperature.	
Procedure		Compare the actually measured intake air temperature with the indicated value.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		22	
Item		Intake air temperature sensor: open or short circuit detected.	
1	Connection of intake air temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between intake air temperature sensor coupler and ECU coupler. brown/white–brown/white Between intake air temperature sensor coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Installed condition of intake air temperature sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.

FUEL INJECTION SYSTEM

Fault code No.		22	
Item		Intake air temperature sensor: open or short circuit detected.	
6	Defective intake air temperature sensor.	Execute the diagnostic mode. (Code No. 05) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature. → Check the intake air temperature sensor. Replace if defective. Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 7-168.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.
7	Malfunction in ECU.	Replace the ECU.	

Fault code No.		24	
Item		O₂ sensor: no normal signals are received from the O₂ sensor.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Indicated		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Installed condition of O ₂ sensor.	Improperly installed sensor → Reinstall or replace the sensor.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of O ₂ sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.

FUEL INJECTION SYSTEM

Fault code No.	24		
Item	O₂ sensor: no normal signals are received from the O₂ sensor.		
3	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between O ₂ sensor coupler and ECU coupler. gray/white–gray/white gray/green–gray/green Between O ₂ sensor coupler and joint coupler. red/white–red/white black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue red/white–red/white	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Check fuel pressure.	Refer to “CHECKING THE PRESSURE REGULATOR OPERATION” on page 6-9.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Defective O ₂ sensor.	Check the O ₂ sensor. Replace if defective. Refer to “ENGINE REMOVAL” on page 5-3.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.
7	Malfunction in ECU.	Replace the ECU.	

Fault code No.	28	
Item	Engine temperature sensor: open or short circuit detected.	
Fail-safe system	Able to start engine	
	Able to drive vehicle	
Diagnostic code No.	11	
Indicated	Displays the engine temperature.	
Procedure	Make sure that the display is close to the ambient temperature during cold starting.	

FUEL INJECTION SYSTEM

Fault code No.		28	
Item		Engine temperature sensor: open or short circuit detected.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of engine temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between engine temperature sensor coupler and ECU coupler. brown–brown Between engine temperature sensor coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of engine temperature sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective engine temperature sensor.	Execute the diagnostic mode. (Code No. 11) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature → Check the engine temperature sensor. Replace if defective. Refer to "CHECKING THE ENGINE TEMPERATURE SENSOR" on page 7-167.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in ECU.	Replace the ECU.	

FUEL INJECTION SYSTEM

TIP

If fault code numbers "28" and "37" are both indicated, take the actions specified for fault code number "28" first.

Fault code No.	30		
Item	Latch up detected.		
Fail-safe system	Unable to start engine		
	Unable to drive vehicle		
Diagnostic code No.	08		
Indicated	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 45 degrees.		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	The vehicle has overturned.	Raise the vehicle upright.	Turn the main switch to "ON", then to "OFF", and then back to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Installed condition of lean angle sensor.	Check the installed direction and condition of the sensor.	Turn the main switch to "ON", then to "OFF", and then back to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Defective lean angle sensor.	Execute the diagnostic mode. (Code No. 08) An indicated value is out of the specified range → Replace the lean angle sensor.	Turn the main switch to "ON", then to "OFF", and then back to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Malfunction in ECU.	Replace the ECU.	

Fault code No.	33		
Item	Front cylinder ignition coil: open or short circuit detected in the primary lead of the front cylinder 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.	30		
Actuation	Actuates the front cylinder ignition coil five times at one-second intervals. The "CHECK" indicator and " " on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated.		

FUEL INJECTION SYSTEM

Fault code No.		33	
Item		Front cylinder ignition coil: open or short circuit detected in the primary lead of the front cylinder ignition coil.	
Procedure		Check that a spark is generated five times. • Connect an ignition checker.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of front cylinder ignition coil coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between front cylinder ignition coil coupler and ECU coupler. orange–orange	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of front cylinder ignition coil. Check for looseness or pinching.	Improperly installed ignition coil → Reinstall or replace the ignition coil.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective front cylinder ignition coil.	Measure the primary coil resistance of the front cylinder ignition coil. Replace if out of specification. Refer to “CHECKING THE IGNITION COILS” on page 7-162.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in ECU.	Execute the diagnostic mode. (Code No. 30) No spark → Replace the ECU.	

FUEL INJECTION SYSTEM

Fault code No.	34		
Item	Rear cylinder ignition coil: open or short circuit detected in the primary lead of the rear cylinder 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.	31		
Actuation	Actuates the rear cylinder ignition coil five times at one-second intervals. The "CHECK" indicator and " " on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated.		
Procedure	Check that a spark is generated five times. • Connect an ignition checker.		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of rear cylinder ignition coil coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between rear cylinder ignition coil coupler and ECU coupler. gray/red–gray/red	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of rear cylinder ignition coil. Check for looseness or pinching.	Improperly installed ignition coil → Reinstall or replace the ignition coil.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective rear cylinder ignition coil.	Measure the primary coil resistance of the rear cylinder ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 7-162.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.

FUEL INJECTION SYSTEM

Fault code No.		34	
Item		Rear cylinder ignition coil: open or short circuit detected in the primary lead of the rear cylinder ignition coil.	
6	Malfunction in ECU.	Execute the diagnostic mode. (Code No. 31) No spark → Replace the ECU.	

Fault code No.		37	
Item	A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).	
	B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		54	
Actuation		Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 4 seconds each time. The "CHECK" indicator and " " on the Yamaha diagnostic tool screen comes on during the operation.	
Procedure		The ISC unit vibrates when the ISC valve operates.	


Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 54) Fully closes the ISC (idle speed control) valve, and then fully opens the valve.	ISC operating sound is heard → Go to item 2. ISC operating sound is not heard → Go to item 2 in section B for the defective ISC (idle speed control) unit.
2	Incorrect speed sensor signal.	Check the speed sensor. Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value does not increase → Go to fault code No. 42.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Throttle valve does not fully close.	Check the throttle body assembly. Refer to "THROTTLE BODIES" on page 6-6. Check the throttle grip free play. Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-26.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.

FUEL INJECTION SYSTEM

Fault code No.		37	
Item		A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).
		B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).
4	ISC valve is not moving correctly.	Replace the throttle body assembly.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in ECU.	Replace the ECU.	

TIP

- Do not remove the ISC (idle speed control) valve.
- If fault code numbers “37” and “46” are both indicated, take the actions specified for fault code number “46” first.
- If fault code numbers “37” and “42” are both indicated, take the actions specified for fault code number “42” first.

Fault code No.		37			
Item		A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).		
		B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).		
Fail-safe system		Able to start engine			
		Able to drive vehicle			
Diagnostic code No.		54			
Actuation		Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 4 seconds each time. The “CHECK” indicator and “  Procedure		The ISC unit vibrates when the ISC valve operates.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion		
1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 54) Fully closes the ISC (idle speed control) valve, and then fully opens the valve.	ISC operating sound is heard → Go to item 2 in section A for the component other than ISC (idle speed control) unit is defective. ISC operating sound is not heard → Go to item 2.		

FUEL INJECTION SYSTEM



Fault code No.		37	
Item	A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).	
	B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).	
2	Connection of ISC (idle speed control) coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item 8 and delete the fault code. ISC operating sound is not heard → Go to item 3.
3	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item 8 and delete the fault code. ISC operating sound is not heard → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between ISC (idle speed control) coupler and ECU coupler. red/green–red/green pink/blue–pink/blue white/green–white/green brown–brown Between ISC (idle speed control) coupler and relay unit coupler. red/black–red/black red/black–red/black	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item 8 and delete the fault code. ISC operating sound is not heard → Go to item 5.
5	Installed condition of ISC (idle speed control). Check for looseness or pinching.	Improperly installed ISC (idle speed control) → Reinstall the ISC (idle speed control).	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item 8 and delete the fault code. ISC operating sound is not heard → Go to item 6.
6	ISC valve is not moving correctly.	Replace the throttle body assembly.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item 8 and delete the fault code. ISC operating sound is not heard → Go to item 7.
7	Malfunction in ECU.	Replace the ECU.	

FUEL INJECTION SYSTEM

Fault code No.		37	
Item	A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).	
	B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).	
8	Delete the fault code.		Start the engine and let it idle for approximately 10 seconds. Check that the fault code number is not displayed.

TIP

- Do not remove the ISC (idle speed control) valve.
- If fault code numbers “37” and “46” are both indicated, take the actions specified for fault code number “46” first.
- If fault code numbers “37” and “42” are both indicated, take the actions specified for fault code number “42” first.

Fault code No.		39	
Item		Injector: open or short circuit detected.	
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.		36, 37	
36	Actuation	Actuates the front cylinder injector five times at one-second intervals. The “CHECK” indicator and “  ” on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	
	Procedure	Check that front cylinder injector is actuated five times by listening for the operating sound.	
37	Actuation	Actuates the rear cylinder injector five times at one-second intervals. The “CHECK” indicator and “  ” on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	
	Procedure	Check that rear cylinder injector is actuated five times by listening for the operating sound.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Identify the malfunctioning injector.	Execute the diagnostic mode. (Code Nos. 36, 37) Identify the injector that does not produce an operating sound. Perform the following procedures for the defective injector. Refer to “CHECKING THE FUEL INJECTORS” on page 7-169.	—

FUEL INJECTION SYSTEM

Fault code No.		39	
Item		Injector: open or short circuit detected.	
2	Connection of front cylinder injector and/or rear cylinder injector coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code Nos. 36, 37) No operating sound → Go to item 3. Operating sound → Go to item 7.
3	Defective injector front, and/or rear injector.	Measure the injector resistance. Replace if out of specification. Refer to "CHECKING THE FUEL INJECTORS" on page 7-169.	Execute the diagnostic mode. (Code Nos. 36, 37) No operating sound → Go to item 4. Operating sound → Go to item 7.
4	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code Nos. 36, 37) No operating sound → Go to item 5. Operating sound → Go to item 7.
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between injector coupler and ECU coupler. Front cylinder injector gray–gray Rear cylinder injector green–green Between injector coupler and relay unit coupler. Front cylinder white–red/blue Rear cylinder white–red/blue	Execute the diagnostic mode. (Code Nos. 36, 37) No operating sound → Go to item 6. Operating sound → Go to item 7.
6	Malfunction in ECU.	Replace the ECU.	
7	Delete the fault code.		Start the engine and let it idle for approximately 5 seconds. Check that the fault code number is not displayed.

Fault code No.		41	
Item		Lean angle sensor: open or short circuit detected.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		08	

FUEL INJECTION SYSTEM

Fault code No.		41	
Item		Lean angle sensor: open or short circuit detected.	
Indicated		Lean angle sensor output voltage <ul style="list-style-type: none"> • 0.4–1.4 (upright) • 3.7–4.4 (overturned) 	
Procedure		Remove the lean angle sensor and incline it more than 45 degrees.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of lean angle sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”, then to “OFF”, and then back to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”, then to “OFF”, and then back to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between lean angle sensor coupler and ECU coupler. yellow/green–yellow/green Between lean angle sensor coupler and joint coupler. blue–blue black/blue–black/blue Between joint coupler and ECU coupler. blue–blue black/blue–black/blue	Turn the main switch to “ON”, then to “OFF”, and then back to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective lean angle sensor.	Execute the diagnostic mode. (Code No. 08) An indicated value is out of the specified range → Replace the lean angle sensor.	Turn the main switch to “ON”, then to “OFF”, and then back to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in ECU.	Replace the ECU.	

FUEL INJECTION SYSTEM

Fault code No.		42 (Except for ABS models)	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		07	
Indicated		Vehicle speed pulse 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.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: "ON"	Value does not increase → Go to item 2. Incorrect indication → Go to item 2 in section B for the neutral switch. Incorrect indication → Go to item 2 in section C for the clutch switch.
2	Connection of speed sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item 6 and delete the fault code. Value does not increase → Go to item 3.

FUEL INJECTION SYSTEM

Fault code No.		42 (Except for ABS models)	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
3	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item 6 and delete the fault code. Value does not increase → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between speed sensor coupler and ECU coupler. white/yellow–white/yellow Between speed sensor coupler and joint coupler. blue–blue black/blue–black/blue Between joint coupler and ECU coupler. blue–blue black/blue–black/blue	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item 6 and delete the fault code. Value does not increase → Go to item 5.
5	Malfunction in ECU.	Replace the ECU.	
6	Delete the fault code.		Turn the main switch to “ON”, and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (19 mph). Check that the fault code number is not displayed.

FUEL INJECTION SYSTEM

Fault code No.	42 (Except for ABS models)		
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
Fail-safe system	Able to start engine		
	Able to drive vehicle		
Diagnostic code No.	21		
Indicated	Neutral <ul style="list-style-type: none"> • "ON" (when the transmission is in neutral) • "OFF" (when the transmission is in gear or the clutch lever released) 		
Procedure	Shift the transmission.		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" When the transmission is in gear with the clutch lever squeezed and the sidestand is retracted: "ON"	Value does not increase → Go to item 2 in section A for the speed sensor. Incorrect indication → Go to item 2. Incorrect indication → Go to item 2 in section C for the clutch switch.
2	Connection of neutral switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item 9. Incorrect indication → Go to item 3.

FUEL INJECTION SYSTEM

Fault code No.		42 (Except for ABS models)	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
3	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item 9. Incorrect indication → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between neutral switch connector and sub-wire harness coupler. sky blue–sky blue Between sub-wire harness coupler and relay unit coupler. sky blue–sky blue Between relay unit coupler and ECU coupler. black/yellow–black/yellow	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item 9. Incorrect indication → Go to item 5.
5	Defective relay unit.	Check the relay unit. Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 7-161.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item 9. Incorrect indication → Go to item 6.
6	Defective neutral switch.	Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 7-151.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item 9. Incorrect indication → Go to item 7.

FUEL INJECTION SYSTEM

Fault code No.		42 (Except for ABS models)	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
7	Faulty shift drum (neutral detection area).	Malfunction → Replace the shift drum assembly. Refer to "TRANSMISSION" on page 5-80.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item 9. Incorrect indication → Go to item 8.
8	Malfunction in ECU.	Replace the ECU.	
9	Delete the fault code.		Turn the main switch to "ON", and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (19 mph). Check that the fault code number is not displayed.

Fault code No.		42 (Except for ABS models)	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		21	
Indicated		Neutral • "ON" (when the transmission is in neutral) • "OFF" (when the transmission is in gear or the clutch lever released)	
Procedure		Operate the transmission, clutch lever, and sidestand.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		42 (Except for ABS models)	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
1	Locate the malfunction.	<p>Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.</p> <p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF"</p> <p>When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: "ON"</p>	<p>Value does not increase → Go to item 2 in section A for the speed sensor.</p> <p>Incorrect indication → Go to item 2 in section B for the neutral switch.</p> <p>Incorrect indication → Go to item 2.</p>
2	Clutch lever adjustment.	Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-10.	<p>Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 3.</p>
3	Connection of clutch switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	<p>Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 4.</p>

FUEL INJECTION SYSTEM

Fault code No.		42 (Except for ABS models)	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
4	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 5.
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between clutch switch coupler and relay unit coupler. black/yellow–black/yellow blue/yellow–blue/yellow Between relay unit coupler and ECU coupler. black/yellow–black/yellow	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 6.
6	Wire harness continuity.	Between clutch switch coupler and relay unit coupler. blue/yellow–black/yellow When the clutch lever is released: open circuit When the clutch lever is squeezed: short circuit Open or short circuit → Replace the clutch switch.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 7.
7	Defective clutch switch.	Check the clutch switch. Replace if defective. Refer to "CHECKING THE SWITCHES" on page 7-151.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 8.

FUEL INJECTION SYSTEM

Fault code No.		42 (Except for ABS models)	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
8	Malfunction in ECU.	Replace the ECU.	
9	Delete the fault code.		Turn the main switch to "ON", and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (19 mph). Check that the fault code number is not displayed.

Fault code No.		42 (For ABS models)	
Item	A	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		07	
Indicated		Vehicle speed pulse 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.	

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: "ON"	Value does not increase → Go to item 2. Incorrect indication → Go to item 2 in section B for the neutral switch. Incorrect indication → Go to item 2 in section C for the clutch switch.

FUEL INJECTION SYSTEM

Fault code No.		42 (For ABS models)	
Item	A	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
2	Connection of rear wheel sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → Go to item 3.
3	Connection of ABS ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → Go to item 4.
4	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → Go to item 5.
5	Wire harness continuity or defective rear wheel sensor.	Open or short circuit → Replace the wire harness. Between rear wheel sensor coupler and ABS ECU coupler. white–white white/red–white/red Defective rear wheel sensor → Replace.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → Go to item 6.

FUEL INJECTION SYSTEM

Fault code No.		42 (For ABS models)	
Item	A	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
6	Malfunction in ECU.	Replace the ECU.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → Go to item 7.
7	Malfunction in ABS ECU.	Replace the ABS ECU.	Go to item 8 and delete the fault code.
8	Delete the fault code.		Turn the main switch to "ON", and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (19 mph). Check that the fault code number is not displayed.

Fault code No.		42 (For ABS models)	
Item	A	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		21	
Indicated		Neutral • "ON" (when the transmission is in neutral) • "OFF" (when the transmission is in gear or the clutch lever released)	
Procedure		Shift the transmission.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		42 (For ABS models)	
Item	A	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
1	Locate the malfunction.	<p>Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.</p> <p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF"</p> <p>When the transmission is in gear with the clutch lever squeezed and the sidestand is retracted: "ON"</p>	<p>Value does not increase → Go to item 2 in section A for the rear wheel sensor.</p> <p>Incorrect indication → Go to item 2.</p> <p>Incorrect indication → Go to item 2 in section C for the clutch switch.</p>
2	<p>Connection of neutral switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item 9. Incorrect indication → Go to item 3.</p>
3	<p>Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item 9. Incorrect indication → Go to item 4.</p>

FUEL INJECTION SYSTEM

Fault code No.		42 (For ABS models)	
Item	A	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
4	Wire harness continuity.	<p>Open or short circuit → Replace the wire harness.</p> <p>Between neutral switch connector and sub-wire harness coupler. sky blue–sky blue</p> <p>Between sub-wire harness coupler and relay unit coupler. sky blue–sky blue</p> <p>Between relay unit coupler and ECU coupler. black/yellow–black/yellow</p>	<p>Execute the diagnostic mode. (Code No. 21)</p> <p>When the transmission is in neutral: “ON”</p> <p>When the transmission is in gear with the clutch lever released: “OFF”</p> <p>Correct indication → Go to item 9.</p> <p>Incorrect indication → Go to item 5.</p>
5	Defective relay unit.	<p>Check the relay unit.</p> <p>Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 7-161.</p>	<p>Execute the diagnostic mode. (Code No. 21)</p> <p>When the transmission is in neutral: “ON”</p> <p>When the transmission is in gear with the clutch lever released: “OFF”</p> <p>Correct indication → Go to item 9.</p> <p>Incorrect indication → Go to item 6.</p>
6	Defective neutral switch.	<p>Check the neutral switch.</p> <p>Refer to “CHECKING THE SWITCHES” on page 7-151.</p>	<p>Execute the diagnostic mode. (Code No. 21)</p> <p>When the transmission is in neutral: “ON”</p> <p>When the transmission is in gear with the clutch lever released: “OFF”</p> <p>Correct indication → Go to item 9.</p> <p>Incorrect indication → Go to item 7.</p>
7	Faulty shift drum (neutral detection area).	<p>Malfunction → Replace the shift drum assembly.</p> <p>Refer to “TRANSMISSION” on page 5-80.</p>	<p>Execute the diagnostic mode. (Code No. 21)</p> <p>When the transmission is in neutral: “ON”</p> <p>When the transmission is in gear with the clutch lever released: “OFF”</p> <p>Correct indication → Go to item 9.</p> <p>Incorrect indication → Go to item 8.</p>
8	Malfunction in ECU.	Replace the ECU.	

FUEL INJECTION SYSTEM

Fault code No.		42 (For ABS models)	
Item	A	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
9	Delete the fault code.		Turn the main switch to "ON", and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (19 mph). Check that the fault code number is not displayed.

Fault code No.		42 (For ABS models)	
Item	A	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		21	
Indicated		Neutral <ul style="list-style-type: none"> • "ON" (when the transmission is in neutral) • "OFF" (when the transmission is in gear or the clutch lever released) 	
Procedure		Operate the transmission, clutch lever, and sidestand.	

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction.	<p>Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.</p> <p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF"</p> <p>When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: "ON"</p>	<p>Value does not increase → Go to item 2 in section A for the rear wheel sensor.</p> <p>Incorrect indication → Go to item 2 in section B for the neutral switch.</p> <p>Incorrect indication → Go to item 2.</p>

FUEL INJECTION SYSTEM




Fault code No.		42 (For ABS models)	
Item	A	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
	B	Neutral switch: open or short circuit is detected.	
	C	Clutch switch: open or short circuit is detected.	
2	Clutch lever adjustment.	Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-10.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 3.
3	Connection of clutch switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 4.
4	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 5.
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between clutch switch coupler and relay unit coupler. black/yellow–black/yellow blue/yellow–blue/yellow Between relay unit coupler and ECU coupler. black/yellow–black/yellow	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 6.

FUEL INJECTION SYSTEM

Fault code No.		42 (For ABS models)	
Item	A		Rear wheel sensor: no normal signals are received from the rear wheel sensor.
	B		Neutral switch: open or short circuit is detected.
	C		Clutch switch: open or short circuit is detected.
6	Wire harness continuity.	Between clutch switch coupler and relay unit coupler. blue/yellow–black/yellow When the clutch lever is released: open circuit When the clutch lever is squeezed: short circuit Open or short circuit → Replace the clutch switch.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: “OFF” When the clutch lever is squeezed: “ON” Correct indication→ Go to item 9. Incorrect indication → Go to item 7.
7	Defective clutch switch.	Check the clutch switch. Replace if defective. Refer to “CHECKING THE SWITCHES” on page 7-151.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: “OFF” When the clutch lever is squeezed: “ON” Correct indication→ Go to item 9. Incorrect indication → Go to item 8.
8	Malfunction in ECU.	Replace the ECU.	
9	Delete the fault code.		Turn the main switch to “ON”, and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (19 mph). Check that the fault code number is not displayed.

Fault code No.		43	
Item		Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		09, 50	
Indicated		Fuel system voltage (battery voltage) Approximately 12.0	

FUEL INJECTION SYSTEM

Fault code No.		43	
Item		Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	
09	Procedure	Set the engine stop switch to “○”, and then compare the actually measured battery voltage with the display value. (If the actually measured battery voltage is low, recharge the battery.)	
50	Actuation	<p>Actuates the relay unit (fuel pump relay) five times at one-second intervals.</p> <p>The “CHECK” indicator and “” on the Yamaha diagnostic tool screen come on each time the relay is actuated.</p> <p>(When the relay is on, the “CHECK” indicator and “” on the Yamaha diagnostic tool screen go off. When the relay is off, the “CHECK” indicator and “” on the Yamaha diagnostic tool screen come on.)</p>	
	Procedure	Check that the relay unit is actuated five times by listening for the operating sound.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of relay unit coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between relay unit coupler and ECU coupler. red/blue–red/blue Between starter relay coupler and relay unit coupler. red/black–red/black Between starter relay coupler and battery. red–red	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective relay unit.	Execute the diagnostic mode. (Code No. 50) No operating sound → Replace the relay unit.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.

FUEL INJECTION SYSTEM

Fault code No.		43	
Item		Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	
5	Defective relay unit.	Execute the diagnostic mode. (Code No. 09) Fuel system voltage is below 3 V → Replace the relay unit.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in ECU.	Replace the ECU.	

Fault code No.		44	
Item		EEPROM fault code number: an error is detected while reading or writing on EEPROM.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		60	
Indicated		The self diagnostic code 44 detected EEPROM errors are indicated. If there are multiple errors, they are indicated in 2 seconds intervals. 00 indication: Normal status	
Procedure		—	

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 60) 01 indication: Go to item 2 02 indication: Go to item 3	—
2	“01” is indicated in diagnostic mode (code No. 60). 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 3-9. After this adjustment is made, the memory is not recovered when the main switch is turned to “OFF”.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Repeat item 1. If the same number is indicated, go to item 4.
3	“02” is indicated in diagnostic mode (code No. 60). 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 3-9. After this adjustment is made, the memory is not recovered when the main switch is turned to “OFF”.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Repeat item 1. If the same number is indicated, go to item 4.
4	Malfunction in ECU.	Replace the ECU.	

FUEL INJECTION SYSTEM

Fault code No.	46		
Item	Charging voltage is abnormal.		
Fail-safe system	Able to start engine		
	Able to drive vehicle		
Diagnostic code No.	—		
Indicated	—		
Procedure	—		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in charging system.	Check the charging system. Refer to "CHARGING SYSTEM" on page 7-17. Defective rectifier/regulator or AC magneto → Replace. Defective connection in the charging system circuit → Properly connect or replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Repeat the maintenance job.

Fault code No.	50		
Item	Faulty ECU (engine control unit) memory. (When this malfunction is detected in the ECU, the fault code number might not appear.)		
Fail-safe system	Unable to start engine		
	Unable to drive vehicle		
Diagnostic code No.	—		
Indicated	—		
Procedure	—		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in ECU.	Replace the ECU.	Turn the main switch to "ON". Check that the fault code number is not displayed.

Fault code No.	Er-1		
Item	ECU (engine control unit) internal malfunction (output signal error): signals cannot be transmitted between the ECU and the multi-function meter.		
Fail-safe system	Able to start engine		
	Able to drive vehicle		
Diagnostic code No.	—		
Indicated	—		
Procedure	—		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		Er-1	
Item		ECU (engine control unit) internal malfunction (output signal error): signals cannot be transmitted between the ECU and the multi-function meter.	
1	Connection of meter assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between meter coupler and ECU coupler. yellow/blue–yellow/blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in ECU.	Replace the ECU.	

Fault code No.		Er-2	
Item		ECU (engine control unit) 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.		—	
Indicated		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of meter assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.

FUEL INJECTION SYSTEM

Fault code No.		Er-2	
Item		ECU (engine control unit) internal malfunction (output signal error): no signals are received from the ECU within the specified duration.	
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between meter coupler and ECU coupler. yellow/blue–yellow/blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in ECU.	Replace the ECU.	

Fault code No.		Er-3	
Item		ECU (engine control unit) 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.		—	
Indicated		—	
Procedure		—	

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of meter assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.

FUEL INJECTION SYSTEM

Fault code No.		Er-3	
Item		ECU (engine control unit) internal malfunction (output signal error): data from the ECU cannot be received correctly.	
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between meter coupler and ECU coupler. yellow/blue–yellow/blue	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in ECU.	Replace the ECU.	

Fault code No.		Er-4	
Item		ECU (engine control unit) 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.		—	
Indicated		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of meter assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between meter coupler and ECU coupler. yellow/blue–yellow/blue	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.

FUEL INJECTION SYSTEM

Fault code No.		Er-4	
Item		ECU (engine control unit) internal malfunction (input signal error): non-registered data has been received from the meter.	
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in ECU.	Replace the ECU.	

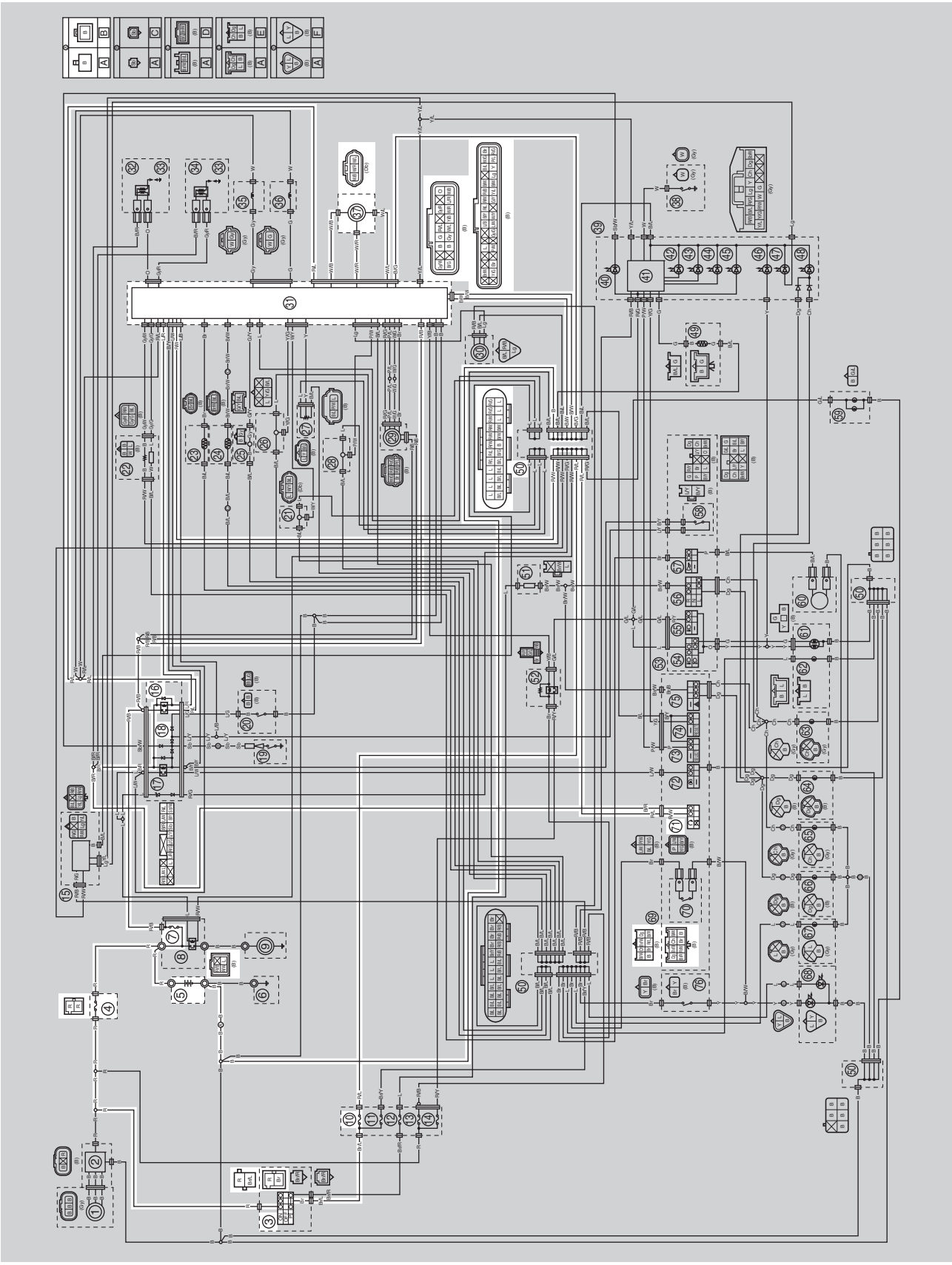
FUEL INJECTION SYSTEM

EAS27550

FUEL PUMP SYSTEM

EAS1XC1051

CIRCUIT DIAGRAM (except for ABS models)



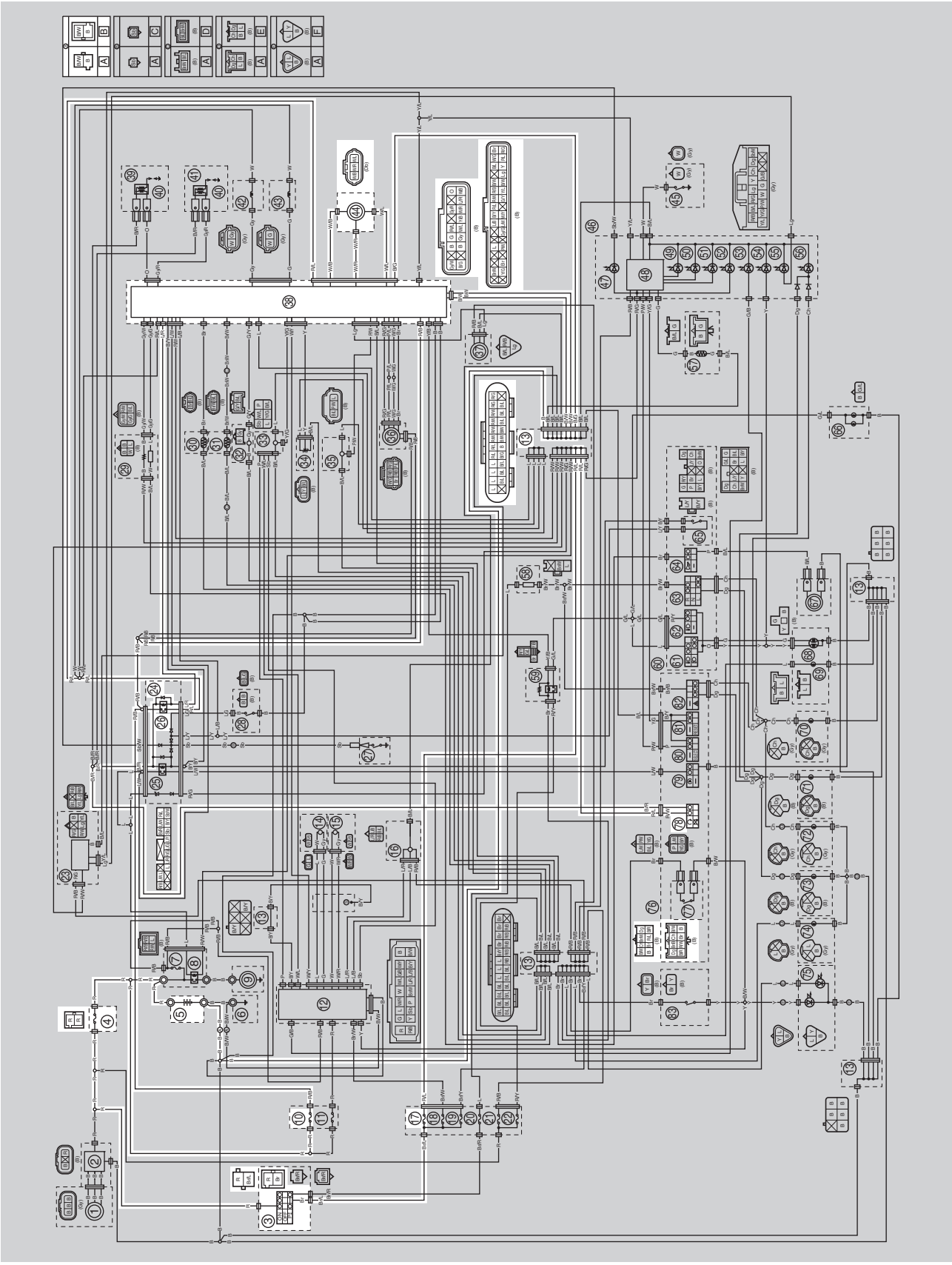
FUEL PUMP SYSTEM

- 3. Main switch
- 4. Main fuse
- 5. Battery
- 7. Fuel injection system fuse
- 10. Ignition fuse
- 16. Relay unit
- 18. Fuel pump relay
- 31. ECU (engine control unit)
- 37. Fuel pump
- 50. Joint coupler
- 71. Engine stop switch
- A. Wire harness
- B. Negative battery sub-wire harness

FUEL PUMP SYSTEM

EAS1XC1052

CIRCUIT DIAGRAM (for ABS models)



FUEL PUMP SYSTEM

- 3. Main switch
- 4. Main fuse
- 5. Battery
- 10. Fuel injection system fuse
- 13. Joint coupler
- 17. Ignition fuse
- 24. Relay unit
- 26. Fuel pump relay
- 38. ECU (engine control unit)
- 44. Fuel pump
- 78. Engine stop switch
- A. Wire harness
- B. Negative battery sub-wire harness

EAS27570

TROUBLESHOOTING

The fuel pump fails to operate.

TIP

• Before troubleshooting, remove the following part(s):

1. Left side cover
2. Rider seat
3. Fuel tank

<p>1. Check the fuses. (Main, ignition and fuel injection system) Refer to "CHECKING THE FUSES" on page 7-155.</p>	<p>NG →</p>	<p>Replace the fuse(s).</p>
<p>OK ↓</p>		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-156.</p>	<p>NG →</p>	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
<p>OK ↓</p>		
<p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-151.</p>	<p>NG →</p>	<p>Replace the main switch/immobilizer unit.</p>
<p>OK ↓</p>		
<p>4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 7-151.</p>	<p>NG →</p>	<ul style="list-style-type: none"> • The engine stop switch is faulty. • Replace the right handlebar switch.
<p>OK ↓</p>		
<p>5. Check the relay unit (fuel pump relay). Refer to "CHECKING THE RELAYS" on page 7-159.</p>	<p>NG →</p>	<p>Replace the relay unit.</p>
<p>OK ↓</p>		
<p>6. Check the fuel pump. Refer to "CHECKING THE FUEL PUMP BODY" on page 6-3.</p>	<p>NG →</p>	<p>Replace the fuel pump.</p>
<p>OK ↓</p>		
<p>7. Check the entire fuel pump system wiring. Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-91 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-93.</p>	<p>NG →</p>	<p>Properly connect or replace the wire harness.</p>
<p>OK ↓</p>		
<p>Replace the ECU.</p>		

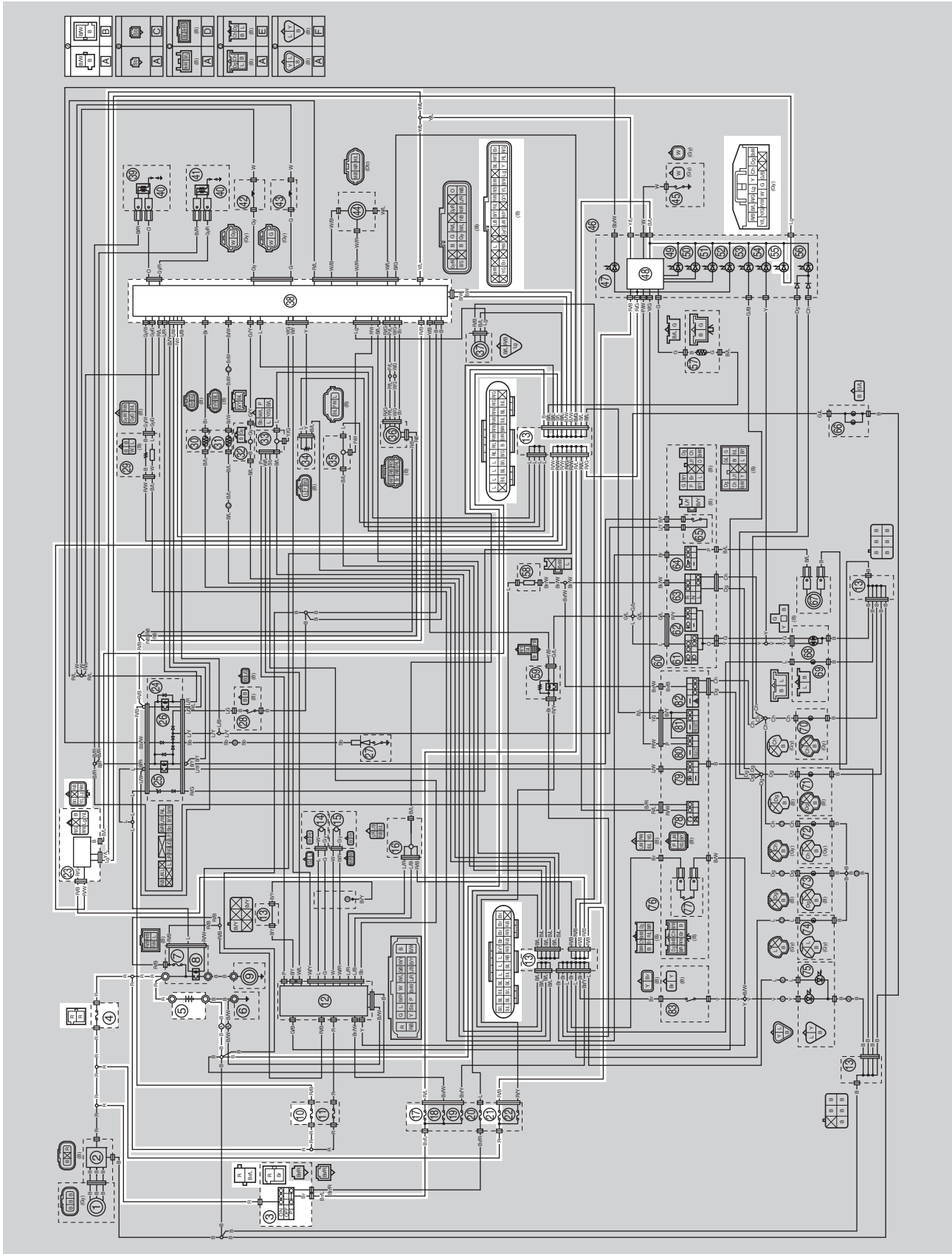
IMMOBILIZER SYSTEM

- 3. Main switch
- 4. Main fuse
- 5. Battery
- 7. Fuel injection system fuse
- 10. Ignition fuse
- 13. Backup fuse
- 15. Immobilizer unit
- 31. ECU (engine control unit)
- 41. Multi-function meter
- 47. Immobilizer system indicator light
- 50. Joint coupler
- A. Wire harness
- B. Negative battery sub-wire harness

IMMOBILIZER SYSTEM

EAS1XC1054

CIRCUIT DIAGRAM (for ABS models)



IMMOBILIZER SYSTEM

- 3. Main switch
- 4. Main fuse
- 5. Battery
- 10. Fuel injection system fuse
- 13. Joint coupler
- 17. Ignition fuse
- 21. Backup fuse
- 23. Immobilizer unit
- 38. ECU (engine control unit)
- 48. Multi-function meter
- 55. Immobilizer system indicator light
- A. Wire harness
- B. Negative battery sub-wire harness

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 (which is installed in the code re-registering key)
- 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 is 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 NOTICE.)

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 submerge 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.

IMMOBILIZER SYSTEM

	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 steering 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

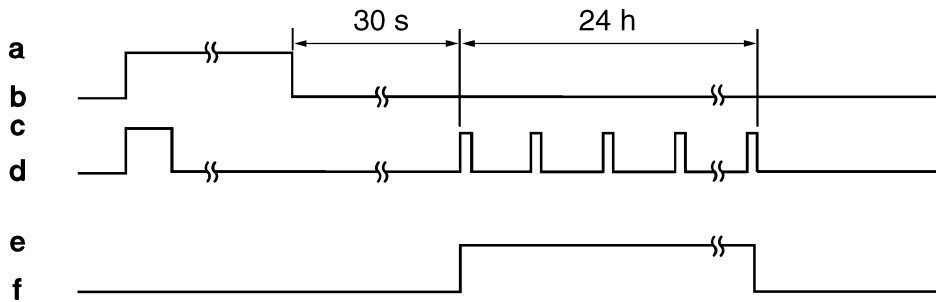
Check that the immobilizer system indicator light comes on for one second, then goes off. When the immobilizer system indicator light goes off, the code re-registering key has been registered.

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 7-106).

1. Check that the immobilizer system indicator light signals the standby mode.
2. Using the code re-registering key, turn the main switch to "ON", then "OFF", and then remove the key within 5 seconds.
3. Insert the first standard key to be registered into the main switch, then turn the key to "ON" within 5 seconds to activate the key registration mode.

TIP

The existing standard key code is erased from the memory when the key registration mode is activated. When the key registration mode is activated, the immobilizer system indicator light flashes rapidly.

4. While the indicator light is flashing, turn the main switch to "OFF", remove the key, and within 5 seconds, insert the second standard key to be registered into the main switch.

TIP

If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the registration mode is deactivated. If this occurs, the second standard key cannot be registered, and steps 2 to 4 need to be repeated to register both standard keys.

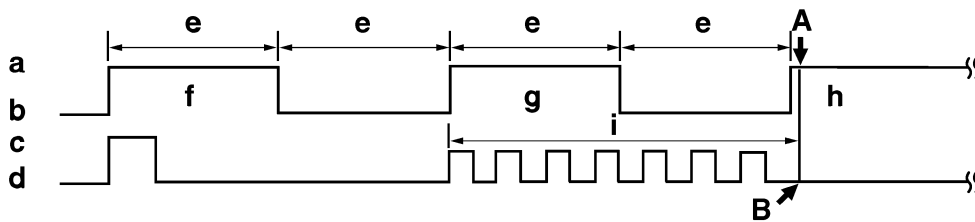
5. Turn the main switch to "ON".

TIP

When the indicator light goes off, the registration is complete.

6. Check that the engine can be started with the two registered standard keys.

Standard key registration



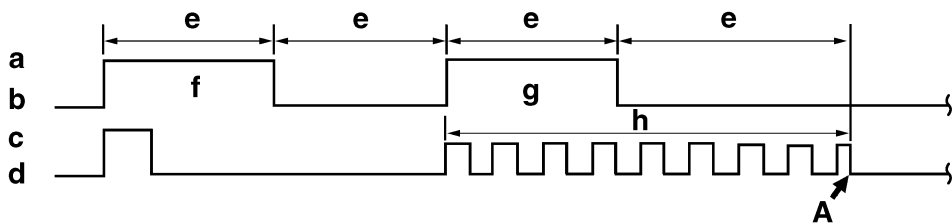
- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. First standard key
- h. Second standard key
- i. Registration mode
- A. Registration of the second standard key is complete.

B. Immobilizer system indicator light stops flashing when the registration of the second standard key is complete.

Voiding the standard key code:

If a standard key has been lost, it is possible to disable its use by re-registering the remaining standard key. Standard key registration erases the stored standard key code from the memory, thus disabling the lost standard key. To re-register, refer to "Standard key registration".

Standard key code voiding method



- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. Remaining standard key
- h. Registration mode
- A. If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the second standard key cannot be registered.

IMMOBILIZER SYSTEM

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, fuel injection system and backup)
Refer to "CHECKING THE FUSES" on page 7-155.

OK ↓

NG →

Replace the fuse(s).

2. Check the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-156.

OK ↓

NG →

- Clean the battery terminals.
- Recharge or replace the battery.

3. Check the main switch.
Refer to "CHECKING THE SWITCHES" on page 7-151.

OK ↓

NG →

Replace the main switch/immobilizer unit.

4. Check the entire immobilizer system wiring.
Refer to "CIRCUIT DIAGRAM (except for ABS models)" on page 7-97 and "CIRCUIT DIAGRAM (for ABS models)" on page 7-99.

OK ↓

NG →

Properly connect or repair the immobilizer system wiring.

- Check the condition each of the immobilizer system circuits.
- Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 7-106.

IMMOBILIZER SYSTEM

EAS27721

SELF-DIAGNOSIS FAULT CODE INDICATION

When a system malfunction occurs, the fault code number is indicated in the LCD display of meter assembly and the immobilizer system indicator light flashes at the same time. The pattern of flashing also shows the fault code.

Fault code	Part	Symptom	Cause	Action
51	IMMOBILIZER UNIT	Code cannot be transmitted between the key and the immobilizer unit.	<ol style="list-style-type: none"> 1. Radio wave interference caused by objects around the keys and antennas. 2. Immobilizer unit malfunction. 3. Key malfunction. 	<ol style="list-style-type: none"> 1. Keep magnets, metal objects, and other immobilizer system keys away from the keys and antennas. 2. Replace the main switch/immobilizer unit. 3. Replace the key.
52	IMMOBILIZER UNIT	Codes between the key and immobilizer unit do not match.	<ol style="list-style-type: none"> 1. Signal received from other transponder (failed to recognize code after ten consecutive attempts). 2. Signal received from unregistered standard key. 	<ol style="list-style-type: none"> 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.	<p>Noise interference or disconnected lead/cable.</p> <ol style="list-style-type: none"> 1. Interference due to radio wave noise. 2. Disconnected communication harness. 3. Immobilizer unit malfunction. 4. ECU malfunction. 	<ol style="list-style-type: none"> 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.	<p>Noise interference or disconnected lead/cable.</p> <ol style="list-style-type: none"> 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.) 	<ol style="list-style-type: none"> 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.
55	IMMOBILIZER UNIT	Key code registration malfunction.	Same standard key was attempted to be registered two consecutive times.	Register another standard key.

IMMOBILIZER SYSTEM

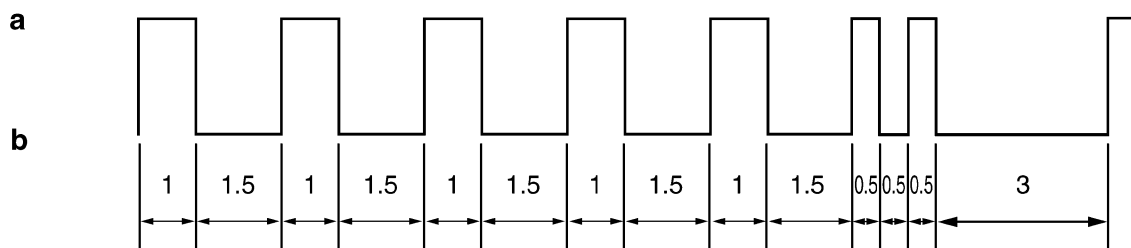
Fault code	Part	Symptom	Cause	Action
56	ECU	Unidentified code is received.	Noise interference or disconnected lead/cable.	<ol style="list-style-type: none"> 1. Check the wire harness and connector. 2. Replace the main switch/immobilizer unit. 3. Replace the ECU.

Immobilizer system indicator light fault code indication

Units of 10: Cycles of on for 1 second and off for 1.5 seconds.

Units of 1: Cycles of on for 0.5 second and off for 0.5 second.

Example: fault code 52



- a. Light on
- b. Light off

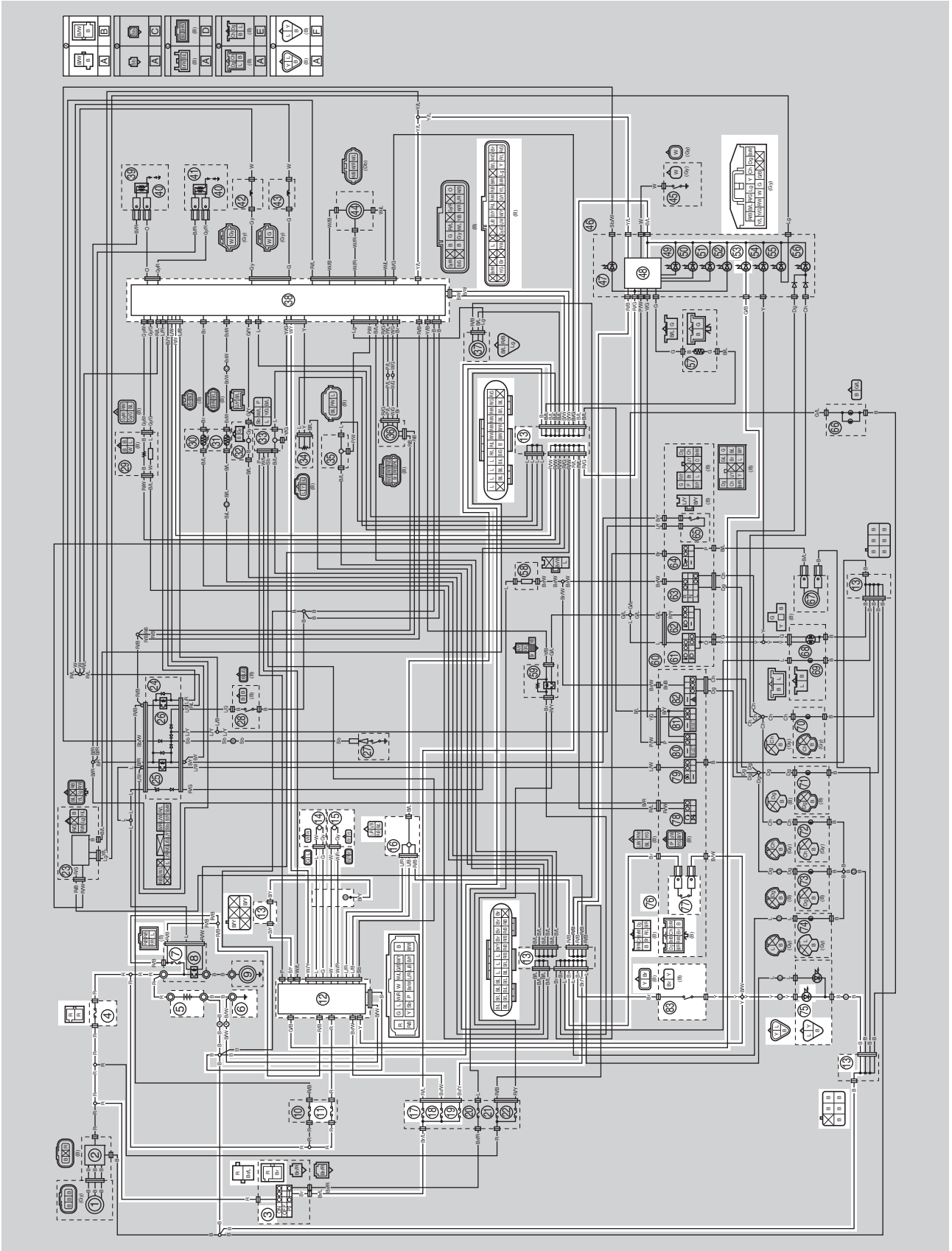
ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

EAS1XC1036

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

EAS27730

CIRCUIT DIAGRAM



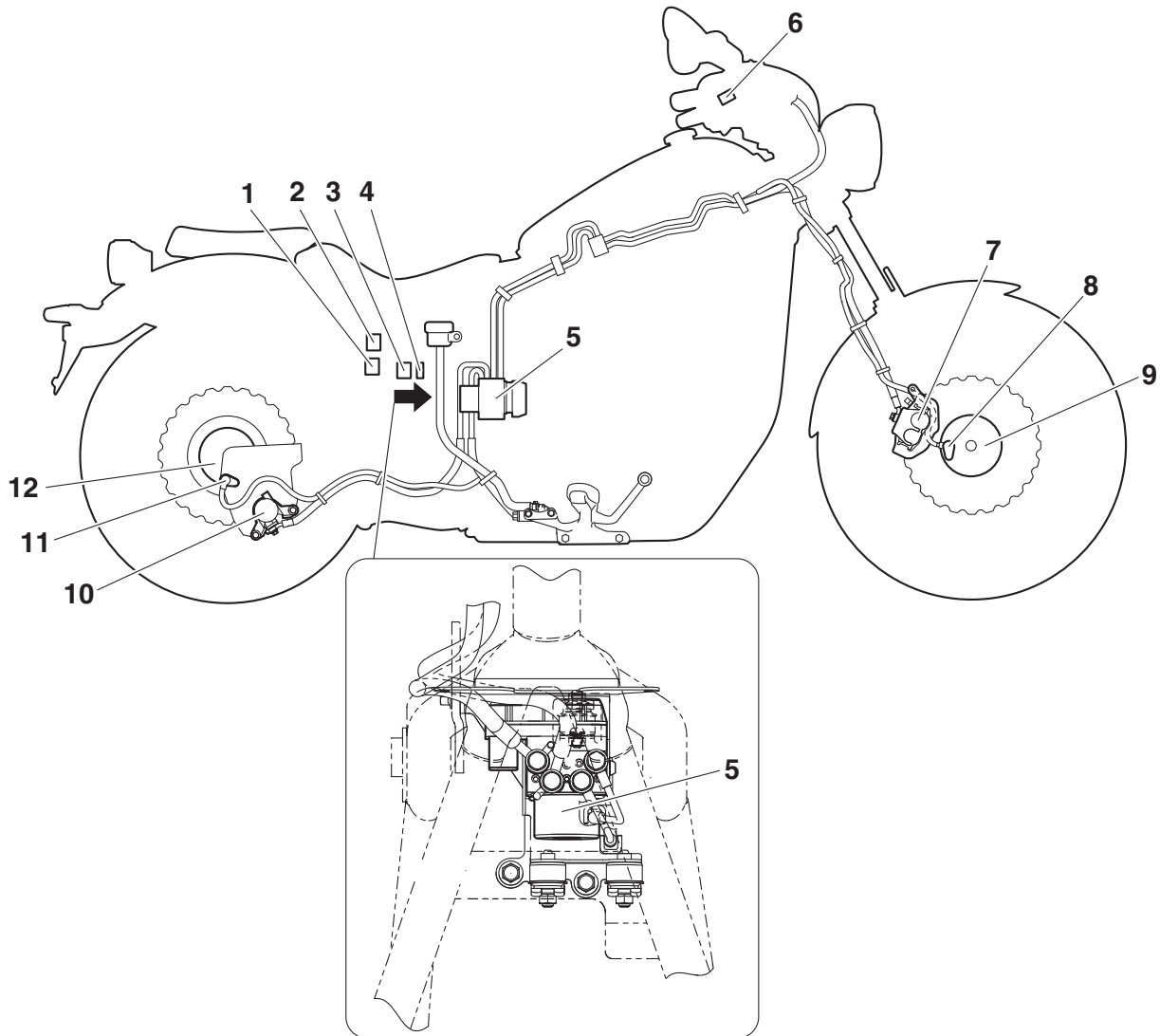
ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 7. ABS motor fuse
- 11. ABS solenoid fuse
- 12. ABS ECU (electronic control unit)
- 13. Joint coupler
- 14. Front wheel sensor
- 15. Rear wheel sensor
- 16. ABS test coupler
- 17. Ignition fuse
- 18. ABS ECU fuse
- 19. Signaling system fuse
- 38. ECU (engine control unit)
- 48. Multi-function meter
- 53. ABS warning light
- 75. Tail/brake light
- 76. Right handlebar switch
- 77. Front brake light switch
- 83. Rear brake light switch
- A. Wire harness
- B. Negative battery sub-wire harness
- F. Tail/brake light sub-wire harness

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

EAS27740

ABS COMPONENTS CHART



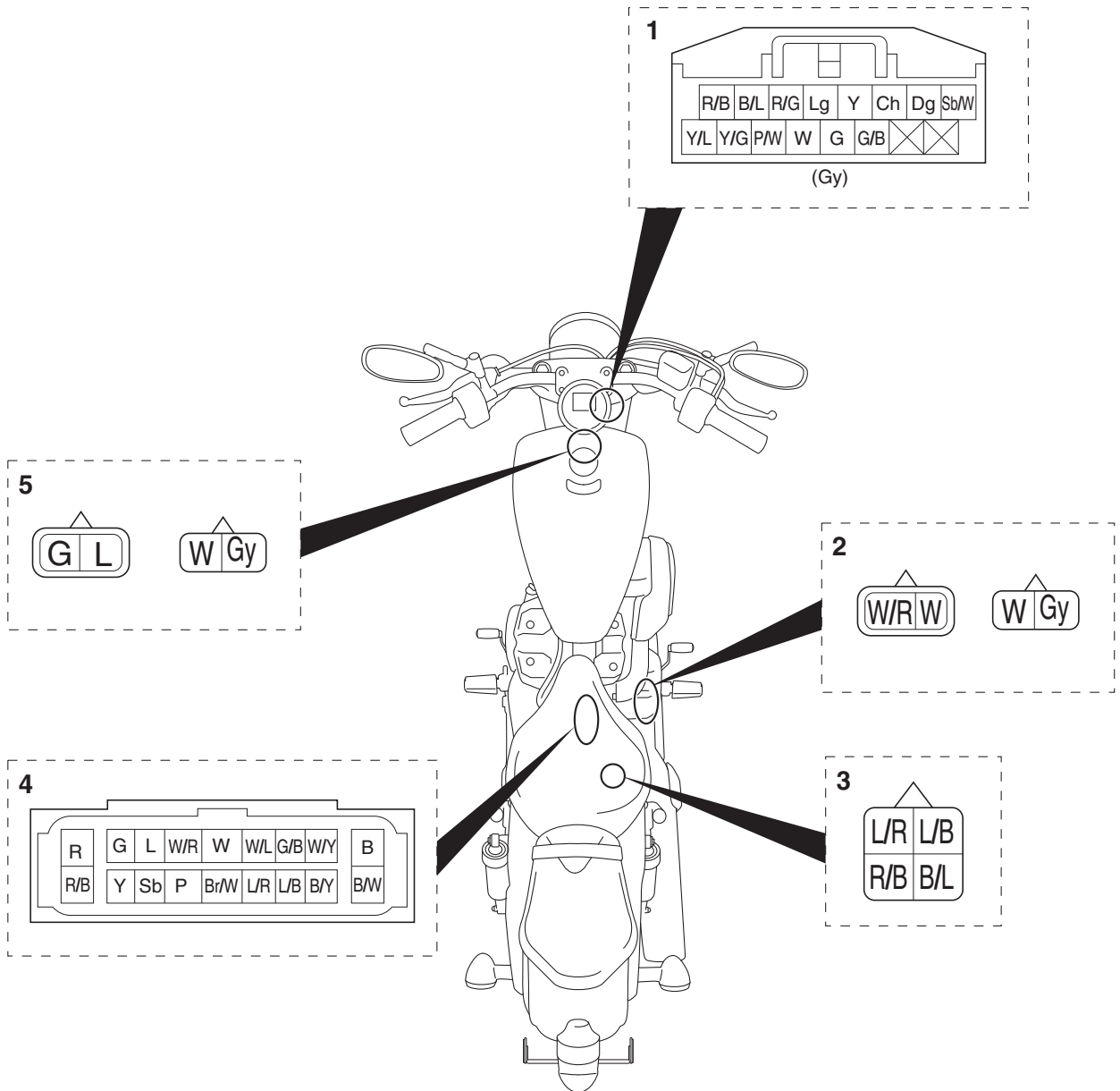
ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

1. ABS motor fuse
2. ABS test coupler
3. ABS ECU fuse
4. ABS solenoid fuse
5. Hydraulic unit assembly
6. ABS warning light
7. Front brake caliper
8. Front wheel sensor
9. Front wheel sensor rotor
10. Rear brake caliper
11. Rear wheel sensor
12. Rear wheel sensor rotor

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

EAS27750

ABS COUPLER LOCATION CHART



ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

1. Meter assembly coupler
2. Rear wheel sensor coupler
3. ABS test coupler
4. ABS ECU coupler
5. Front wheel sensor coupler

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

EAS27770

MAINTENANCE OF THE ABS ECU

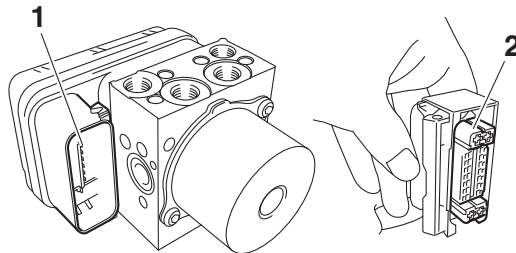
Checking the ABS ECU

1. Check:

- Terminals “1” of the ABS ECU
Cracks/damages → Replace the hydraulic unit assembly, brake hoses, and 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 using the Yamaha diagnostic tool. For information about using the Yamaha diagnostic tool, refer to “[B-2] DIAGNOSIS USING THE FAULT CODES” on page 7-119. For troubleshooting items other than the following items, follow the normal service method.

EWA1XC1001



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 “[C-1] FINAL CHECK” on page 7-145.)

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.
- The ABS self-diagnosis has not been completed.

The ABS self-diagnosis starts when the main switch is turned to “ON” and finishes when the vehicle has traveled at a speed of approximately 10 km/h (6 mph).

2. The ABS warning light comes on after the engine starts, and then goes off when the vehicle starts moving (traveling at a speed of approximately 10 km/h (6 mph)). → ABS operation is normal.

3. The ABS warning light flashes → ABS operation is normal.

- Refer to “BASIC INSTRUCTIONS FOR TROUBLESHOOTING” on page 7-116.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

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 fault codes recorded in the ABS ECU can be checked using the Yamaha diagnostic tool. When the service is finished, check the normal operation of the vehicle, and then delete the fault code(s). For information about deleting the fault codes, refer to “[B-3] DELETING THE FAULT CODES” on page 7-145. 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 to “ON”. During this test, a “clicking” noise can be heard from under the seat, and if the brake lever or brake pedal are even slightly applied, a vibration can be felt at the lever and pedal, 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 Yamaha diagnostic tool when the ABS ECU has entered the self-diagnosis mode.

Special precautions for handling and servicing a vehicle equipped with ABS

ECA1XC1001

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

EWA1XC1002

WARNING

- **Perform the troubleshooting [A] → [B] → [C] 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] Use the Yamaha diagnostic tool and determine the location of the malfunction and the cause from the recorded fault code.

Determine the cause of the malfunction from the condition and place where the malfunction occurred.

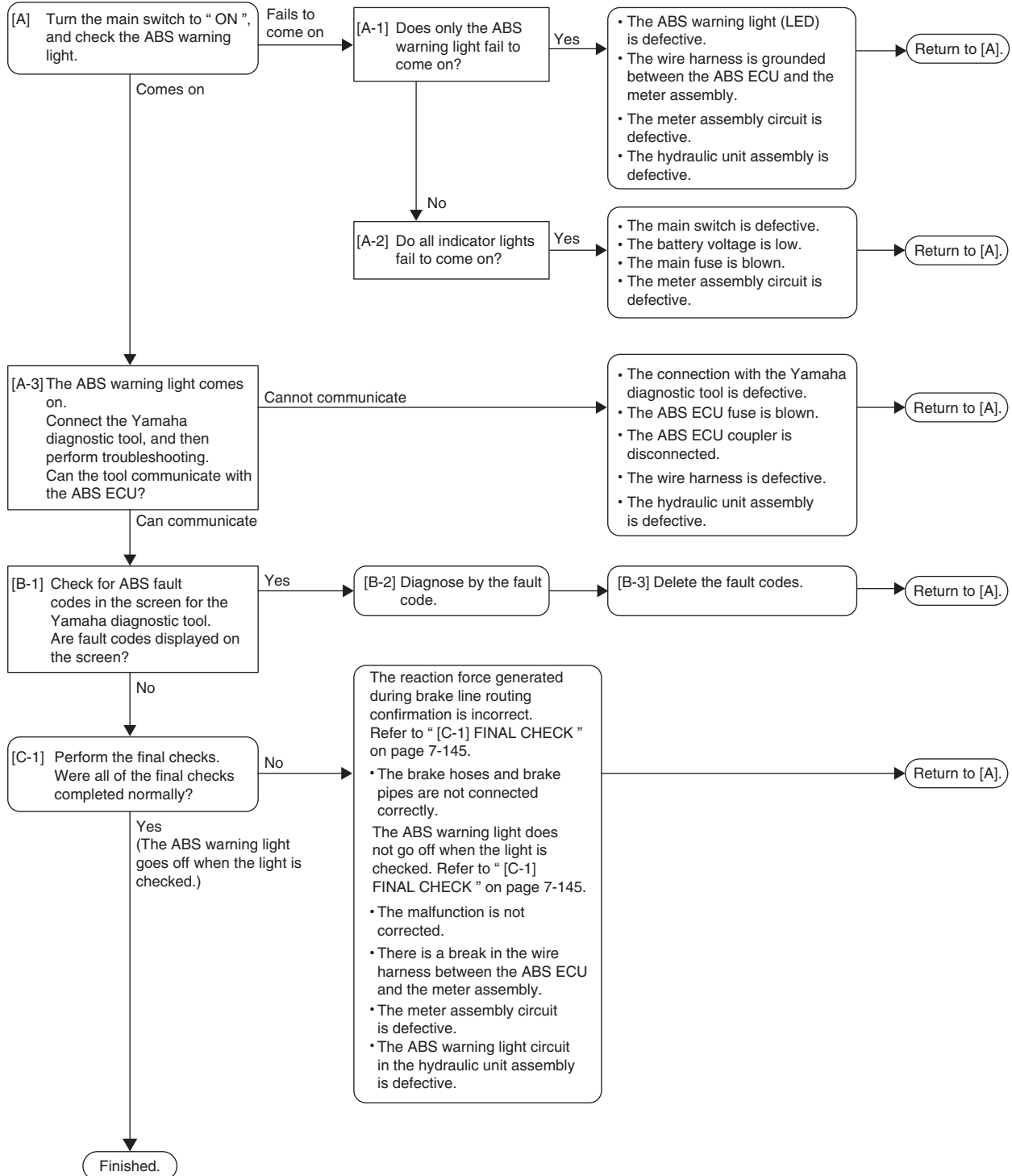
[C] Servicing the ABS

Execute the final check after disassembly and assembly.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

EAS27810

BASIC PROCESS FOR TROUBLESHOOTING



ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

EWA1XC1001



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 “[C-1] FINAL CHECK” on page 7-145.)

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.
 - Only the ABS warning light fails to come on. [A-1]
 - The ABS warning light and all other indicator lights fail to come on. [A-2]
2. The ABS warning light comes on. [A-3]

EAS1XC1005

[A-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON

1. Check for a short circuit to the ground between the green/black terminal of the ABS ECU coupler and green/black terminal of the meter assembly.
 - If there is short circuit to the ground, the wire harness is defective. Replace the wire 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.

EAS1XC1006

[A-2] THE ABS WARNING LIGHT AND ALL OTHER INDICATOR LIGHTS FAIL TO COME ON

1. Main switch
 - Check the main switch for continuity.
Refer to “CHECKING THE SWITCHES” on page 7-151.
 - 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 7-156.
 - 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 7-155.
 - If the main fuse is blown, replace the fuse.
4. Circuit
 - Check the meter assembly circuit.
Refer to “CIRCUIT DIAGRAM” on page 7-109.
 - If the meter assembly circuit is open, replace the wire harness.

EAS1XC1007

[A-3] THE ABS WARNING LIGHT COMES ON

Connect the Yamaha diagnostic tool to the ABS test coupler. If the Yamaha diagnostic tool cannot communicate with the vehicle, perform the following steps. For information about connecting the Yamaha diagnostic tool, refer to “[B-2] DIAGNOSIS USING THE FAULT CODES” on page 7-119.

1. Yamaha diagnostic tool
 - Check if the Yamaha diagnostic tool is connected correctly.
Refer to “[B-2] DIAGNOSIS USING THE FAULT CODES” on page 7-119
2. ABS ECU fuse
 - Check the ABS ECU fuse for continuity.
Refer to “CHECKING THE FUSES” on page 7-155.
 - If the ABS ECU fuse is blown, replace the fuse.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

3. ABS ECU coupler

- Check that the ABS ECU coupler is connected properly.
- Connect the couplers properly if necessary.

For information about connecting the ABS ECU coupler properly, refer to “INSTALLING THE HYDRAULIC UNIT ASSEMBLY” on page 4-64.

4. Wire harness

- There is a break in the wire harness between the main switch and the ABS ECU, between the ABS ECU and the battery.

Check for continuity between the brown/blue terminal of the main switch coupler and the brown/blue terminal of the ABS ECU fuse, and between the brown/white terminal of the ABS ECU fuse and the brown/white terminal of the ABS ECU coupler.

Check for continuity between the brown/white terminal of the ABS ECU coupler and the engine ground, and between the black terminal of the ABS ECU coupler and the battery.

If there is no continuity, the wire harness is defective. Replace the wire harness.

- There is a break in the wire harness between the ABS ECU coupler and the ABS test coupler.

Check for continuity between the blue/red terminal of the ABS ECU coupler and the blue/red terminal of the ABS test coupler.

Check for continuity between the blue/black terminal of the ABS ECU coupler and the blue/black terminal of the ABS test coupler.

If there is no continuity, the wire harness is defective. Replace the wire harness.

5. The hydraulic unit assembly is defective.

EAS1XC1008

[B-1] MALFUNCTION ARE CURRENTLY DETECTED

When the Yamaha diagnostic tool is connected to the ABS test coupler, the fault codes will be displayed on the computer screen.

- Fault code number is displayed. [B-2]
- Fault code number is not displayed. [C-1]

EAS1XC1009

[B-2] DIAGNOSIS USING THE FAULT CODES

This model uses the Yamaha diagnostic tool to identify malfunctions.

For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.

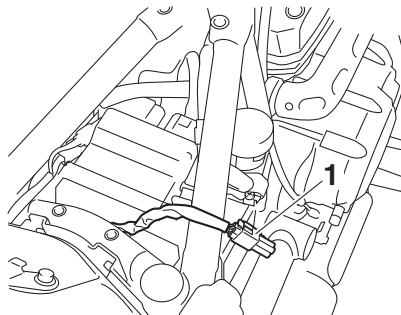


**Yamaha diagnostic tool
90890-03215**

Connecting the Yamaha diagnostic tool

Removing the left side cover and rider seat. Refer to “GENERAL CHASSIS” on page 4-1.

Removing the protective cap “1”, and then connect the Yamaha diagnostic tool to the ABS test coupler (4P).



ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

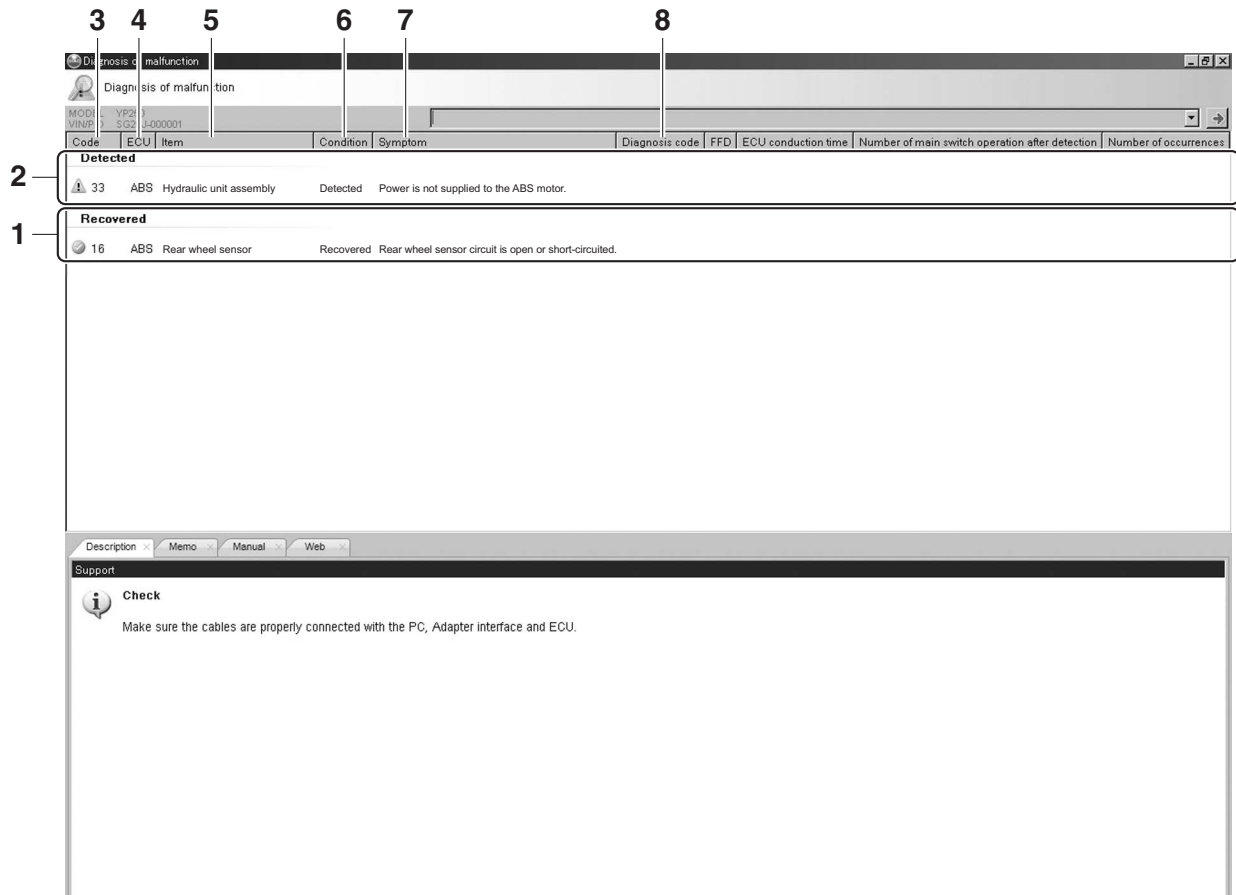
TIP

When the Yamaha diagnostic tool is connected to the vehicle, the operation of the multi-function meter and indicators will be different from the normal operation.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Operation of the Yamaha diagnostic tool (Fault diagnosis mode)

Malfunction results are displayed in the top part of the window area.



1. Recovered
The item list of the malfunction detected in the past (already recovered) are displayed.
2. Detected
The item list of the malfunction currently occurred are displayed.
3. Code
The following icons and the fault code numbers for the detected malfunctions are displayed.

A



B



- A. Detected malfunction
- B. Recovered malfunction

4. ECU
The types of the control units are displayed.
(e.g., FI, ABS)
5. Item
The item names of the detected malfunction are displayed.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

6. Condition

The current conditions are displayed. (Detected/Recovered)

7. Symptom

The symptoms of the detected malfunction are displayed.

8. Diagnosis code

The diagnosis codes related to the detected malfunction are displayed.

Fault code table

The details of the fault codes displayed using the Yamaha diagnostic tool are shown in the following table. Refer to this table when checking the vehicle.

Delete the fault codes when the service is finished. [B-3]

TIP

- Before inspecting the check points, terminate the communication between the Yamaha diagnostic tool and the vehicle, and then turn the main switch to "OFF".
- Record all of the fault codes displayed and inspect the check points.

Fault code No.	Item	Symptom	Check point
11* 25*	Front wheel sensor (intermittent pulses or no pulses)	Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
12	Rear wheel sensor (intermittent pulses or no pulses)	Rear wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor
13* 26*	Front wheel sensor (abnormal pulse period)	Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	Item	Symptom	Check point
14* 27*	Rear wheel sensor (abnormal pulse period)	Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor
15	Front wheel sensor (open or short circuit)	Open or short circuit is detected in the front wheel sensor.	<ul style="list-style-type: none"> • Defective coupler between the front wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly • Defective front wheel sensor or hydraulic unit assembly
16	Rear wheel sensor (open or short circuit)	Open or short circuit is detected in the rear wheel sensor.	<ul style="list-style-type: none"> • Defective coupler between the rear wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly • Defective rear wheel sensor or hydraulic unit assembly
17* 45*	Front wheel sensor (missing pulses)	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	Item	Symptom	Check point
18* 46*	Rear wheel sensor (missing pulses)	Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor
21	Hydraulic unit assembly (defective solenoid drive circuit)	Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.	<ul style="list-style-type: none"> • Defective hydraulic unit assembly
24	Brake light switch or tail/brake light	Brake light signal is not received properly while the vehicle is traveling. (Brake light circuit, or front or rear brake light switch circuit)	<ul style="list-style-type: none"> • Defective signaling system (tail/brake light or brake light switch) • Defective coupler between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly • Open or short circuit in the wire harness between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly • Defective hydraulic unit assembly
31	Hydraulic unit assembly (abnormal ABS solenoid power supply)	Power is not supplied to the solenoid circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Blown ABS solenoid fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly
32	Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)	Short circuit is detected in the solenoid power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Defective hydraulic unit assembly

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	Item	Symptom	Check point
33	Hydraulic unit assembly (abnormal ABS motor power supply)	Power is not supplied to the motor circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Blown ABS motor fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly
34	Hydraulic unit assembly (short circuit in ABS motor power supply circuit)	Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Defective hydraulic unit assembly
41	Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	<ul style="list-style-type: none"> • Pulses from the front wheel sensor are received intermittently while the vehicle is traveling. • Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure. 	<ul style="list-style-type: none"> • Incorrect installation of the front wheel sensor • Incorrect rotation of the front wheel • Front brake dragging • Defective hydraulic unit assembly
42 47	Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	<ul style="list-style-type: none"> • Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. (For fault code No. 42) • Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure. 	<ul style="list-style-type: none"> • Incorrect installation of the rear wheel sensor (for fault code No. 42) • Incorrect rotation of the rear wheel • Rear brake dragging • Defective hydraulic unit assembly
43	Front wheel sensor (missing pulses)	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	Item	Symptom	Check point
44	Rear wheel sensor (missing pulses)	Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor
51 52	<ul style="list-style-type: none"> • Vehicle system power supply (voltage of ABS ECU power supply is high) (for fault code No. 51) • Vehicle system power supply (voltage of wheel sensor power supply is high) (for fault code No. 52) 	<ul style="list-style-type: none"> • Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high. (For fault code No. 51) • Power voltage supplied to the wheel sensor is too high. (For fault code No. 52) 	<ul style="list-style-type: none"> • Defective battery • Disconnected battery terminal • Defective charging system
53	Vehicle system power supply (voltage of ABS ECU power supply is low)	Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too low.	<ul style="list-style-type: none"> • Defective battery • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective charging system
54	Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)	Abnormality is detected in the solenoid or motor power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Defective battery • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective charging system • Defective hydraulic unit assembly
55	Hydraulic unit assembly (defective ABS ECU)	Abnormal data is detected in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Defective hydraulic unit assembly

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	Item	Symptom	Check point
56	Hydraulic unit assembly (abnormal internal power supply)	Abnormality is detected in the power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Defective hydraulic unit assembly
63	Front wheel sensor power supply (voltage of power supply is low)	Power voltage supplied from the ABS ECU to the front wheel sensor is too low.	<ul style="list-style-type: none"> • Short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly • Defective front wheel sensor • Defective hydraulic unit assembly
64	Rear wheel sensor power supply (voltage of power supply is low)	Power voltage supplied from the ABS ECU to the rear wheel sensor is too low.	<ul style="list-style-type: none"> • Short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly • Defective rear wheel sensor • Defective hydraulic unit assembly

* The fault code number varies according to the vehicle conditions. For details, refer to the "Troubleshooting details".

Troubleshooting details

Fault code No.	11 25	
Item	Front wheel sensor (intermittent pulses or no pulses)	
Symptom	Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)	
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-13.
3	Defective sensor rotor or incorrect installation of the 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 (for ABS models)" on page 4-14.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.		11 25
Item		Front wheel sensor (intermittent pulses or no pulses)
Symptom		Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)
Order	Item/components and probable cause	Check or maintenance job
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR (for ABS models)" on page 4-14.

TIP

With the front wheel stopped, the rear wheel was rotated for longer than about 20 seconds (fault code No. 11) or for longer than about 2 seconds (fault code No. 25).

Fault code No.		12
Item		Rear wheel sensor (intermittent pulses or no pulses)
Symptom		Rear wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the rear wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the rear wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-25.
3	Defective sensor rotor or incorrect installation of the 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 (for ABS models)" on page 4-26.
4	Defective rear wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR (for ABS models)" on page 4-26.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	13 26	
Item	Front wheel sensor (abnormal pulse period)	
Symptom	Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-13.
3	Defective sensor rotor or incorrect installation of the 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 (for ABS models)" on page 4-14.
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR (for ABS models)" on page 4-14.

TIP

- If the front brake ABS operates continuously for 20 seconds or more, fault code No. 26 will be recorded. If the front brake ABS operates continuously for 36 seconds or more, fault code No. 13 will be recorded.
- Vehicle possibly ridden on uneven roads.

Fault code No.	14 27	
Item	Rear wheel sensor (abnormal pulse period)	
Symptom	Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the rear wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the rear wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-25.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	14 27	
Item	Rear wheel sensor (abnormal pulse period)	
Symptom	Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	
Order	Item/components and probable cause	Check or maintenance job
3	Defective sensor rotor or incorrect installation of the 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 (for ABS models)" on page 4-26.
4	Defective rear wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR (for ABS models)" on page 4-26.

TIP

- If the rear brake ABS operates continuously for 20 seconds or more, fault code No. 27 will be recorded. If the rear brake ABS operates continuously for 36 seconds or more, fault code No. 14 will be recorded.
- Vehicle possibly ridden on uneven roads.

Fault code No.	15	
Item	Front wheel sensor (open or short circuit)	
Symptom	Open or short circuit is detected in the front wheel sensor.	
Order	Item/components and probable cause	Check or maintenance job
1	Defective coupler between the front wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> • 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. <p>TIP</p> <p>Turn the main switch to "OFF" before disconnecting or connecting a coupler.</p>

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	15	
Item	Front wheel sensor (open or short circuit)	
Symptom	Open or short circuit is detected in the front wheel sensor.	
Order	Item/components and probable cause	Check or maintenance job
2	Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> • Check for continuity between the blue terminal “1” and the blue terminal “4” and between the green terminal “2” and the green terminal “5”. • If there is no continuity, the wire harness is defective. Replace the wire harness. • Check that there is no short circuit between the blue terminal “1” and the green terminal “2” and between the blue terminal “4” and the green terminal “5”. • If there is short circuit, the wire harness is defective. Replace the wire harness. • Check that there is no short circuit between the black/yellow terminal “3” and the blue terminal “4” and between the black/yellow terminal “3” and the green terminal “5”. • If there is short circuit, the wire harness is defective. Replace the wire harness. <div style="text-align: center;"> </div> <p>6. ABS ECU 7. Wheel sensor</p>
3	Defective front wheel sensor or hydraulic unit assembly	<p>If the above items were performed and no malfunctions were found, the wheel sensor or hydraulic unit assembly is defective. Replace the wheel sensor or hydraulic unit assembly.</p> <p>Refer to “FRONT WHEEL” on page 4-10 and “ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)” on page 4-61.</p>

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	16	
Item	Rear wheel sensor (open or short circuit)	
Symptom	Open or short circuit is detected in the rear wheel sensor.	
Order	Item/components and probable cause	Check or maintenance job
1	Defective coupler between the rear wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> • 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. <p>TIP _____</p> <p>Turn the main switch to “OFF” before disconnecting or connecting a coupler.</p>
2	Open or short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> • Check for continuity between the white/red terminal “1” and the white/red terminal “4” and between the white terminal “2” and the white terminal “5”. • If there is no continuity, the wire harness is defective. Replace the wire harness. • Check that there is no short circuit between the white/red terminal “1” and the white terminal “2” and between the white/red terminal “4” and the white terminal “5”. • If there is continuity, the wire harness is defective. Replace the wire harness. • Check that there is no short circuit between the black/yellow terminal “3” and the white/red terminal “4” and between the black/yellow terminal “3” and the white terminal “5”. • If there is short circuit, the wire harness is defective. Replace the wire harness. <div style="text-align: center; margin: 10px 0;"> </div> <p>6. ABS ECU 7. Wheel sensor</p>
3	Defective rear wheel sensor or hydraulic unit assembly	<p>If the above items were performed and no malfunctions were found, the wheel sensor or hydraulic unit assembly is defective. Replace the wheel sensor or hydraulic unit assembly.</p> <p>Refer to “REAR WHEEL” on page 4-19 and “ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)” on page 4-61.</p>

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	17 45	
Item	Front wheel sensor (missing pulses)	
Symptom	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-13.
3	Defective sensor rotor or incorrect installation of the 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 (for ABS models)" on page 4-14.
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR (for ABS models)" on page 4-14.

TIP

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mph) or more, fault code No. 17 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mph) or less, fault code No. 45 will be recorded first and fault code No. 17 will be recorded if the condition continues.

Fault code No.	18 46	
Item	Rear wheel sensor (missing pulses)	
Symptom	Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the rear wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the rear wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-25.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	18 46	
Item	Rear wheel sensor (missing pulses)	
Symptom	Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	
Order	Item/components and probable cause	Check or maintenance job
3	Defective sensor rotor or incorrect installation of the 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 (for ABS models)" on page 4-26.
4	Defective rear wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR (for ABS models)" on page 4-26.

TIP

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mph) or more, fault code No. 18 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mph) or less, fault code No. 46 will be recorded first and fault code No. 18 will be recorded if the condition continues.

Fault code No.	21	
Item	Hydraulic unit assembly (defective solenoid drive circuit)	
Symptom	Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.	
Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)" on page 4-61.

Fault code No.	24	
Item	Brake light switch or tail/brake light	
Symptom	Brake light signal is not received properly while the vehicle is traveling (brake light circuit, or front or rear brake light switch circuit).	
Order	Item/components and probable cause	Check or maintenance job
1	Defective signaling system (tail/brake light or brake light switch)	Check the tail/brake light and brake light switches. Refer to "CHECKING THE SWITCHES" on page 7-151.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.		24
Item		Brake light switch or tail/brake light
Symptom		Brake light signal is not received properly while the vehicle is traveling (brake light circuit, or front or rear brake light switch circuit).
Order	Item/components and probable cause	Check or maintenance job
2	Defective coupler between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly	<ul style="list-style-type: none"> • Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.
3	Open or short circuit in the wire harness between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly	<ul style="list-style-type: none"> • Between ABS ECU coupler and front brake light switch coupler. (yellow–black/white) • Between ABS ECU coupler and rear brake light switch coupler. (yellow–yellow)
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)” on page 4-61.

Fault code No.		31
Item		Hydraulic unit assembly (abnormal ABS solenoid power supply)
Symptom		Power is not supplied to the solenoid circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	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 7-155.
2	Defective coupler between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. <p>TIP _____</p> <p>Turn the main switch to “OFF” before disconnecting or connecting a coupler.</p>
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> • Replace if there is an open or short circuit. • Between ABS ECU coupler and ABS solenoid fuse. (red–red)

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.		31
Item		Hydraulic unit assembly (abnormal ABS solenoid power supply)
Symptom		Power is not supplied to the solenoid circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)" on page 4-61.

Fault code No.		32
Item		Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)
Symptom		Short circuit is detected in the solenoid power supply circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)" on page 4-61.

Fault code No.		33
Item		Hydraulic unit assembly (abnormal ABS motor power supply)
Symptom		Power is not supplied to the motor circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	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 7-155.
2	Defective coupler between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> • 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.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.		33
Item		Hydraulic unit assembly (abnormal ABS motor power supply)
Symptom		Power is not supplied to the motor circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> • Replace if there is an open or short circuit. • Between ABS ECU coupler and starter relay coupler (ABS motor fuse). (red/black–red/black) • Between ABS ECU coupler and ground. (black–black)
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)” on page 4-61.

Fault code No.		34
Item		Hydraulic unit assembly (short circuit in ABS motor power supply circuit)
Symptom		Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)” on page 4-61.

Fault code No.		41
Item		Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)
Symptom		<ul style="list-style-type: none"> • Pulses from the front wheel sensor are received intermittently while the vehicle is traveling. • Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.
Order	Item/components and probable cause	Check or maintenance job
1	Incorrect installation of the front wheel sensor	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE FRONT WHEEL” on page 4-13.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.		41
Item		Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)
Symptom		<ul style="list-style-type: none"> • Pulses from the front wheel sensor are received intermittently while the vehicle is traveling. • Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.
Order	Item/components and probable cause	Check or maintenance job
2	Incorrect rotation of the front wheel	Check that there is no brake disc drag on the front wheel and make sure that it rotates smoothly. Refer to "CHECKING THE FRONT WHEEL" on page 4-13 and "CHECKING THE FRONT BRAKE DISC" on page 4-39.
3	Front brake dragging	Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake lever is operated and that the pressure decreases when the lever is released. Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-39.
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)" on page 4-61.

Fault code No.		42 47
Item		Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)
Symptom		<ul style="list-style-type: none"> • Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. (For fault code No. 42) • Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.
Order	Item/components and probable cause	Check or maintenance job
1	Incorrect installation of the rear wheel sensor (for fault code No. 42)	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-25.
2	Incorrect rotation of the rear wheel	Check that there is no brake disc drag on the wheel and make sure that it rotates smoothly. Refer to "CHECKING THE REAR WHEEL" on page 4-25.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.		42 47
Item		Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)
Symptom		<ul style="list-style-type: none"> • Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. (For fault code No. 42) • Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.
Order	Item/components and probable cause	Check or maintenance job
3	Rear brake dragging	Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake pedal is operated and that the pressure decreases when the pedal is released. Refer to "CHECKING THE REAR BRAKE DISC" on page 4-55.
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)" on page 4-61.

Fault code No.		43
Item		Front wheel sensor (missing pulses)
Symptom		Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-13.
3	Defective sensor rotor or incorrect installation of the 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 (for ABS models)" on page 4-14.
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR (for ABS models)" on page 4-14.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.		44
Item		Rear wheel sensor (missing pulses)
Symptom		Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the rear wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the rear wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-25.
3	Defective sensor rotor or incorrect installation of the 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 (for ABS models)" on page 4-26.
4	Defective rear wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR (for ABS models)" on page 4-26.

Fault code No.		51 52
Item		<ul style="list-style-type: none"> • Vehicle system power supply (voltage of ABS ECU power supply is high) (for fault code No. 51) • Vehicle system power supply (voltage of wheel sensor power supply is high) (for fault code No. 52)
Symptom		<ul style="list-style-type: none"> • Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high. (For fault code No. 51) • Power voltage supplied to the wheel sensor is too high. (For fault code No. 52)
Order	Item/components and probable cause	Check or maintenance job
1	Defective battery	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-156.
2	Disconnected battery terminal	Check the connection. Replace or reconnect the terminal if necessary.
3	Defective charging system	Check the charging system. Refer to "CHARGING SYSTEM" on page 7-17.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.		53
Item		Vehicle system power supply (voltage of ABS ECU power supply is low)
Symptom		Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too low.
Order	Item/components and probable cause	Check or maintenance job
1	Defective battery	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-156.
2	Defective coupler between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> • 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 the wire harness between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> • Replace if there is an open or short circuit. • Between ABS ECU coupler and ABS ECU fuse. (brown/white–brown/white)
4	Defective charging system	Check the charging system. Refer to "CHARGING SYSTEM" on page 7-17.

Fault code No.		54
Item		Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)
Symptom		Abnormality is detected in the solenoid or motor power supply circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective battery	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-156.
2	Defective coupler between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> • 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.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.		54
Item		Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)
Symptom		Abnormality is detected in the solenoid or motor power supply circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> • Replace if there is an open or short circuit. • Between ABS ECU coupler and starter relay coupler (ABS motor fuse). (red/black–red/black) • Between ABS ECU coupler and ABS solenoid fuse. (red–red)
4	Defective charging system	Check the charging system. Refer to “CHARGING SYSTEM” on page 7-17.
5	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)” on page 4-61.

Fault code No.		55
Item		Hydraulic unit assembly (defective ABS ECU)
Symptom		Abnormal data is detected in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)” on page 4-61.

Fault code No.		56
Item		Hydraulic unit assembly (abnormal internal power supply)
Symptom		Abnormality is detected in the power supply circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)” on page 4-61.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

Fault code No.	63	
Item	Front wheel sensor power supply (voltage of power supply is low)	
Symptom	Power voltage supplied from the ABS ECU to the front wheel sensor is too low.	
Order	Item/components and probable cause	Check or maintenance job
1	Short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> • 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 black/yellow terminal “3” and the blue terminal “1”. • If there is a short circuit, the wire harness is defective. Replace the wire harness. <div style="text-align: center;"> </div> <p style="text-align: center;">4. ABS ECU 5. Wheel sensor</p>
2	Defective front wheel sensor	<ul style="list-style-type: none"> • Check that there is no short circuit between the gray terminal “1” and the white terminal “2”. • If there is a short circuit, the wheel sensor is defective. Repair or replace the wheel sensor. <div style="text-align: center;"> </div> <p style="text-align: center;">3. ABS ECU 4. Wheel sensor</p>
3	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)” on page 4-61.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

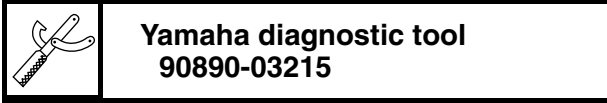
Fault code No.	64	
Item	Rear wheel sensor power supply (voltage of power supply is low)	
Symptom	Power voltage supplied from the ABS ECU to the rear wheel sensor is too low.	
Order	Item/components and probable cause	Check or maintenance job
1	Short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> • Check that there is no short circuit between the white terminal “1” and the white/red terminal “2”. • Check that there is no short circuit between the black/yellow terminal “3” and the white terminal “1”. • If there is a short circuit, the wire harness is defective. Replace the wire harness. <div style="text-align: center;"> </div> <p style="text-align: center;">4. ABS ECU 5. Wheel sensor</p>
2	Defective rear wheel sensor	<ul style="list-style-type: none"> • Check that there is no short circuit between the gray terminal “1” and the white terminal “2”. • If there is a short circuit, the wheel sensor is defective. Repair or replace the wheel sensor. <div style="text-align: center;"> </div> <p style="text-align: center;">3. ABS ECU 4. Wheel sensor</p>
3	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)” on page 4-61.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

EAS1XC1010

[B-3] DELETING THE FAULT CODES

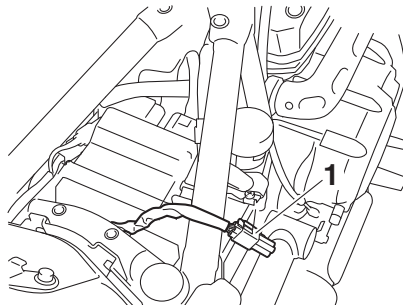
To delete the fault codes, use the Yamaha diagnostic tool. For information about deleting the fault codes, refer to the operation manual of the Yamaha diagnostic tool.



After the deletion procedure is finished, make sure that all of the fault codes displayed using the Yamaha diagnostic tool have been deleted.

Connecting the Yamaha diagnostic tool

Remove the protective cap "1", and then connect the Yamaha diagnostic tool to the ABS test coupler (4P).



EAS1XC1011

[C-1] FINAL CHECK

Check the vehicle and finish the service according to the following procedures. If the procedures are not completed normally, start the procedures over from the beginning.

Checking procedures

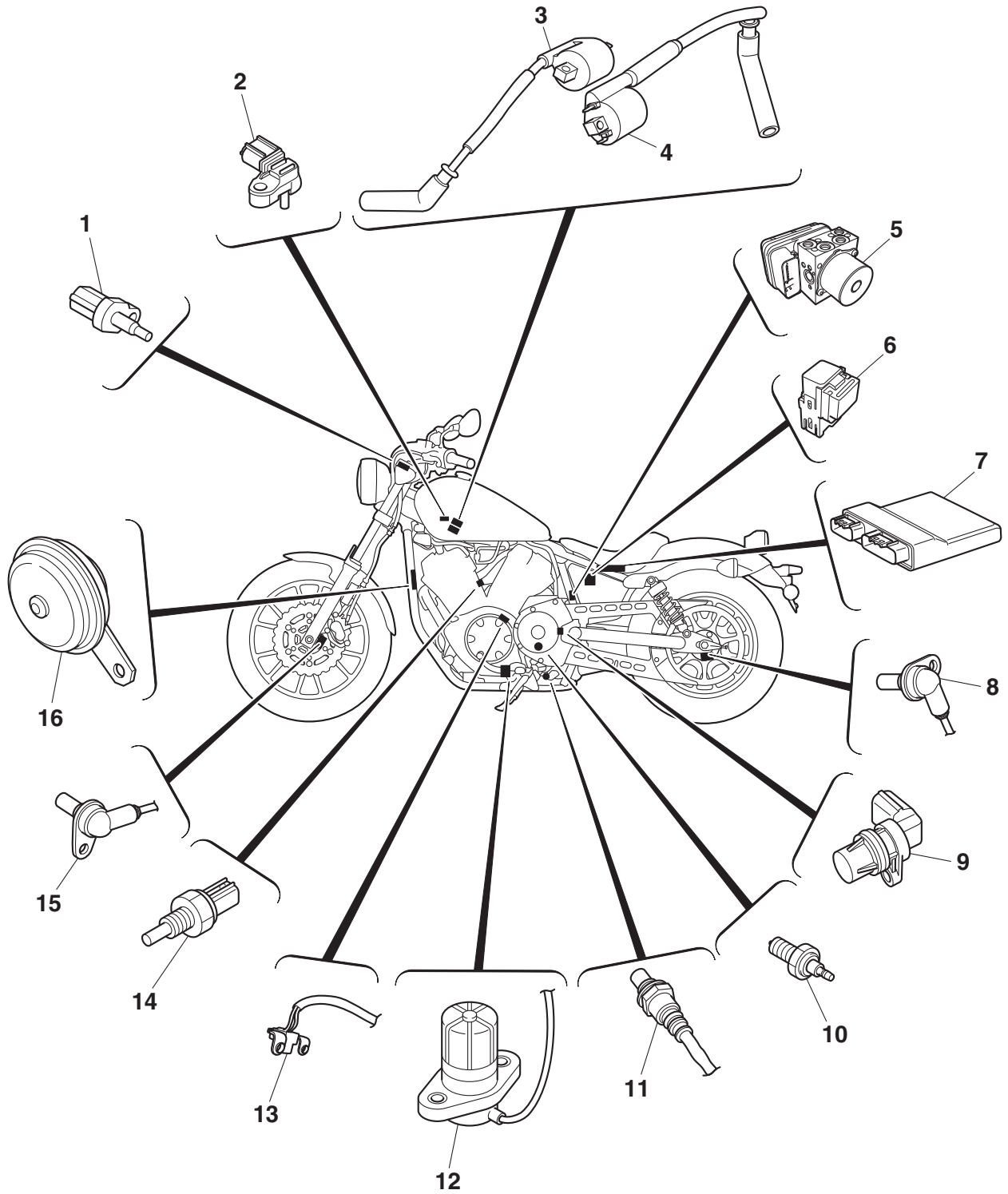
1. Check the brake fluid level in the brake master cylinder reservoir and brake fluid reservoir.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-11.
2. Check the wheel sensors for proper installation.
Refer to "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISC)" on page 4-17 and "INSTALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
3. Perform brake line routing confirmation. If the reaction force is incorrect, the brake hoses and brake pipes are not connected correctly.
Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-67.
4. Delete the fault codes.
Refer to "[B-3] DELETING THE FAULT CODES" on page 7-145.
5. Checking the ABS warning light.
If the ABS warning light does not go off, the following are the probable causes.
 - The malfunction is not corrected.
 - 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/black terminal of the ABS ECU coupler and the green/black terminal of the meter assembly coupler.
If there is no continuity, the wire harness is defective. Replace the wire harness.
 - The meter assembly circuit is defective.
 - The ABS warning light circuit in the hydraulic unit assembly is defective.Refer to "CHECKING THE ABS WARNING LIGHT" on page 4-70.

ABS (ANTI-LOCK BRAKE SYSTEM) (for ABS models)

ELECTRICAL COMPONENTS

EAS27970

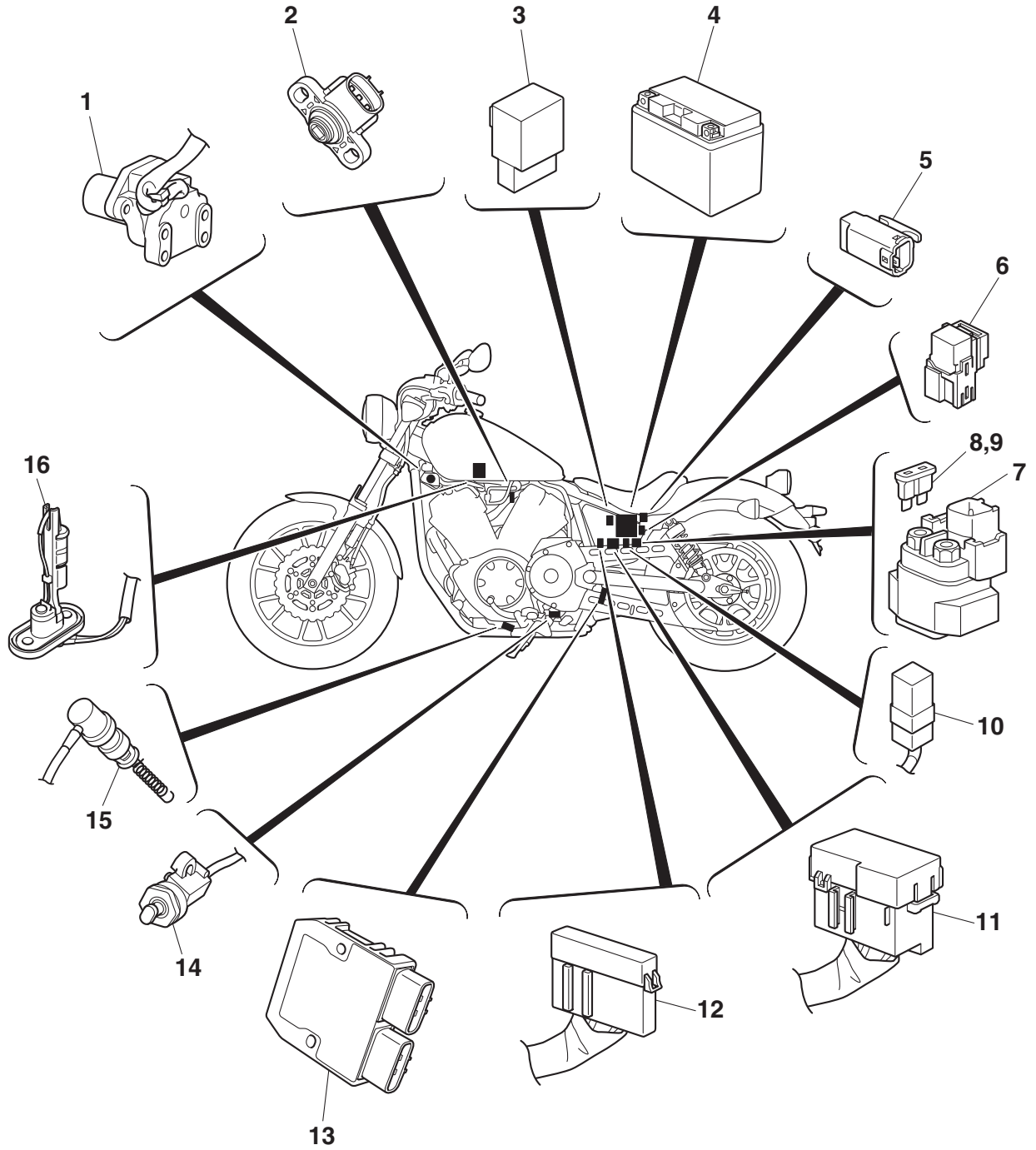
ELECTRICAL COMPONENTS



ELECTRICAL COMPONENTS

1. Intake air temperature sensor
2. Intake air pressure sensor
3. Front cylinder ignition coil
4. Rear cylinder ignition coil
5. ABS ECU (electronic control unit) (for ABS models)
6. Turn signal/hazard relay
7. ECU (engine control unit)
8. Rear wheel sensor (for ABS models)
9. Speed sensor (except for ABS models)
10. Neutral switch
11. O₂ sensor
12. Oil level switch
13. Crankshaft position sensor
14. Engine temperature sensor
15. Front wheel sensor (for ABS models)
16. Horn

ELECTRICAL COMPONENTS



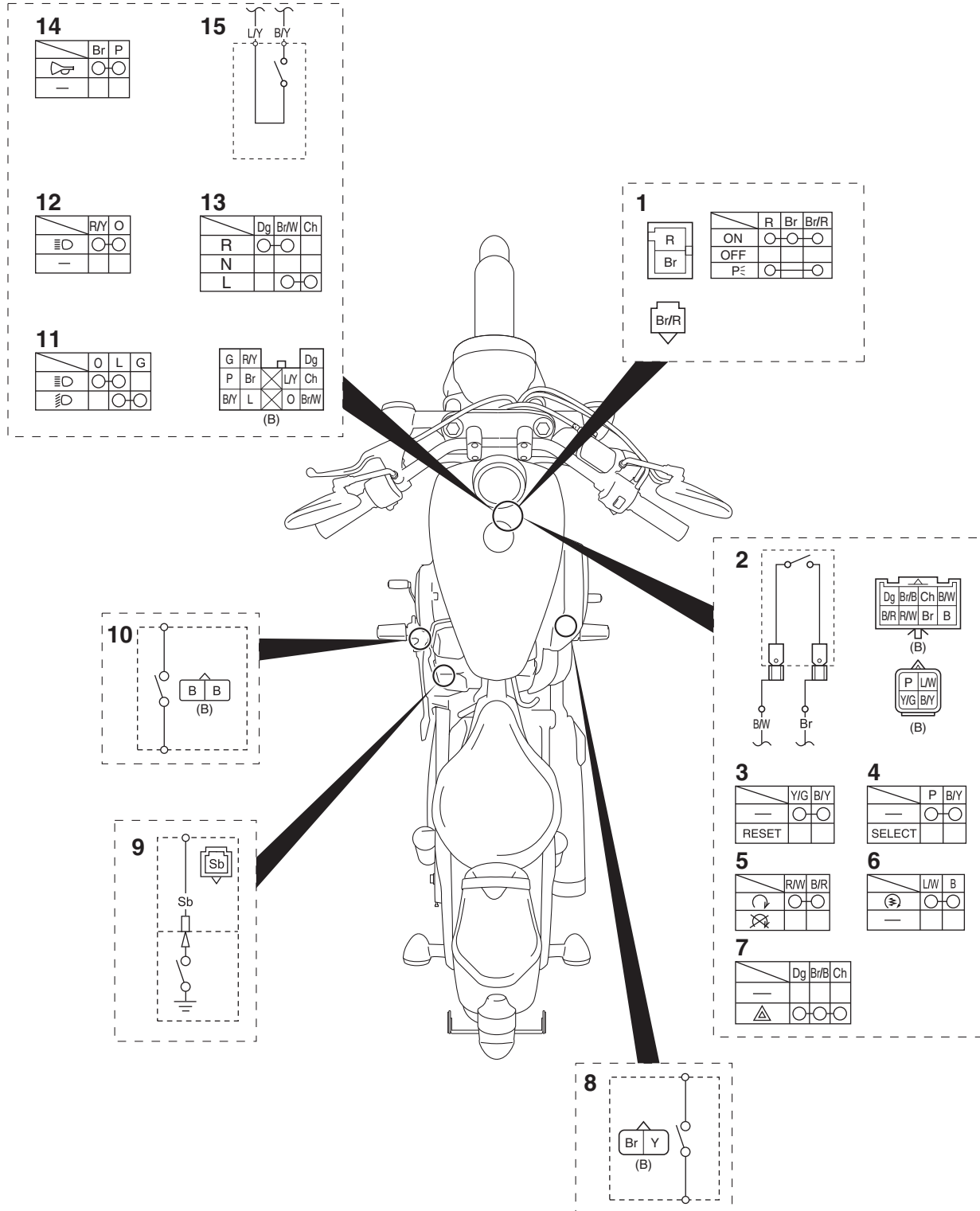
ELECTRICAL COMPONENTS

1. Main switch/immobilizer unit
2. Throttle position sensor
3. Relay unit
4. Battery
5. Lean angle sensor
6. Headlight relay
7. Starter relay
8. ABS motor fuse (for ABS models)
9. Fuel injection system fuse (except for ABS models)
10. Main fuse
11. Fuse box 1
12. Fuse box 2 (for ABS models)
13. Rectifier/regulator
14. Sidestand switch
15. Rear brake light switch
16. Fuel sender

ELECTRICAL COMPONENTS

EAS27980

CHECKING THE SWITCHES



ELECTRICAL COMPONENTS

1. Main switch
2. Front brake light switch
3. Reset switch
4. Select switch
5. Engine stop switch
6. Start switch
7. Hazard switch
8. Rear brake light switch
9. Neutral switch
10. Sidestand switch
11. Dimmer switch
12. Pass switch
13. Turn signal switch
14. Horn switch
15. Clutch switch

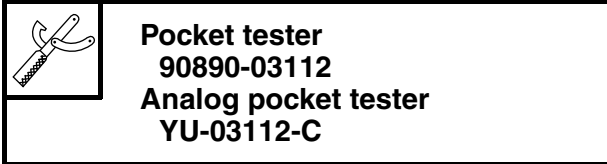
ELECTRICAL COMPONENTS

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

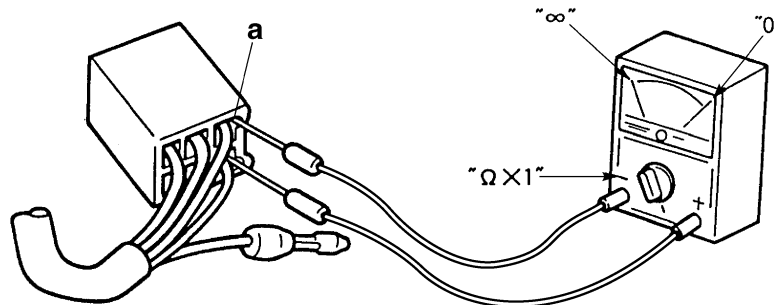
NOTICE

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.



TIP

- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.
- When checking for continuity, switch back and forth between the switch positions a few times.

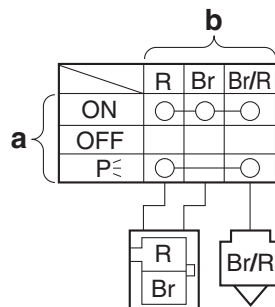


The switches and their terminal connections are illustrated as in the following example of the main switch.

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 and brown/red when the switch is set to "ON" and between red and brown/red when the switch is set to "P≤".



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.

- 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 indicates no continuity, replace the bulb socket.

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:
 - Left side cover
 - Tool box
 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.

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	40 A	1
Headlight	20 A	1
Ignition	15 A	1
Fuel injection system	10 A	1
Signaling system	7.5 A	1
Backup	7.5 A	1
Hazard lighting	15 A	1
ABS motor (for ABS models)	30 A	1
ABS solenoid (for ABS models)	15 A	1
ABS ECU (for ABS models)	7.5 A	1
Spare (for ABS models)	30 A	1
Spare	20 A	1
Spare	15 A	1
Spare	10 A	1
Spare	7.5 A	1

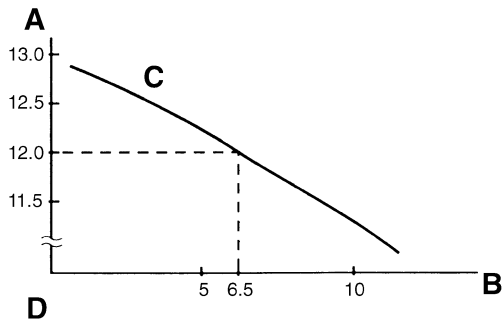
EWA13310

WARNING

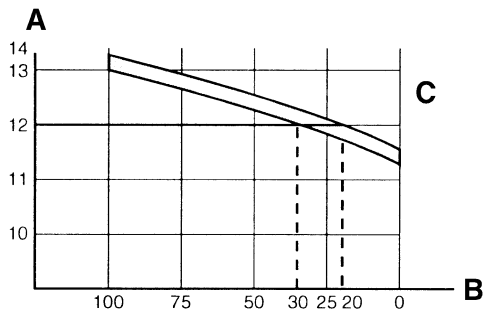
Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

4. Install:
 - Tool box
 - Left side cover
 Refer to “GENERAL CHASSIS” on page 4-1.

ELECTRICAL COMPONENTS



- 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)



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

EWA13300



WARNING

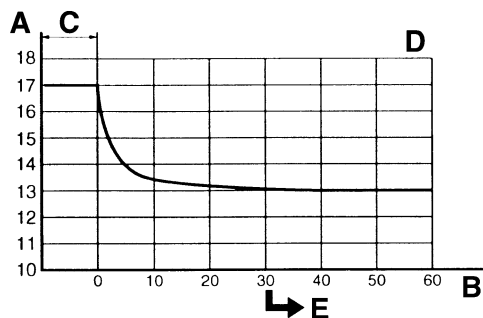
Do not quick charge a battery.

ECA1TP1004

NOTICE

- Never remove the VRLA (Valve Regulated Lead Acid) battery sealing caps.
- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.

- When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative battery lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of an VRLA (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.



Charging method using a variable-current (voltage) charger

- Measure the open-circuit voltage prior to charging.

ELECTRICAL COMPONENTS

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 overcharged.

- 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 adjusting dial to 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.



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 to 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.



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

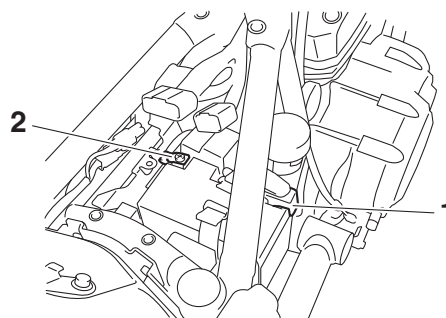
TIP

Route the positive battery lead under the negative battery lead, making sure not to route it on top of the relay unit.

ECA1TP1005

NOTICE

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



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

ELECTRICAL COMPONENTS



Recommended lubricant
Dielectric grease

10. Install:


- Battery cover
- ECU bracket
- Rider seat
- Left side cover

Refer to "GENERAL CHASSIS" on page 4-1.

EAS28040

CHECKING THE RELAYS

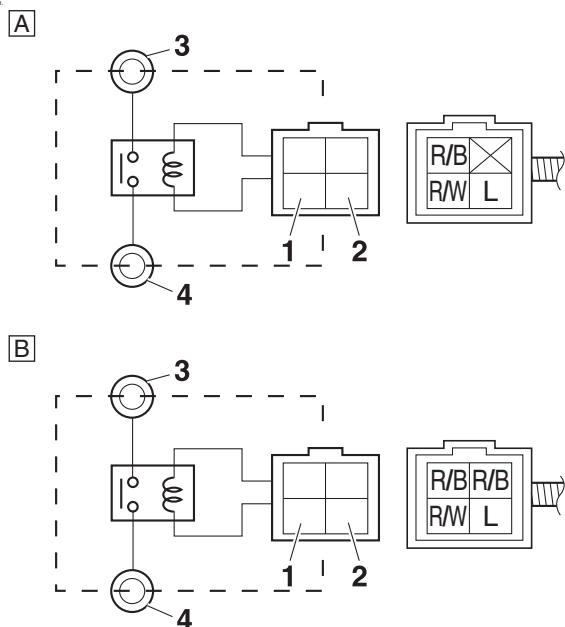
Check each relay for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.




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

1. Disconnect the relay from the wire harness.
2. Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the relay terminal as shown. Check the relay operation. Out of specification → Replace.

Starter relay

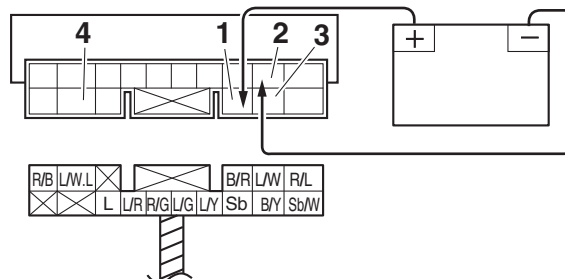


- A. Except for ABS models
B. For ABS models
1. Positive battery terminal
 2. Negative battery terminal
 3. Positive tester probe
 4. Negative tester probe



Result
Continuity
(between "3" and "4")

Relay unit (starting circuit cut-off relay)

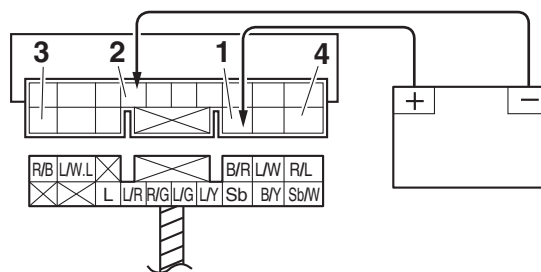


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



Result
Continuity
(between "3" and "4")

Relay unit (fuel pump relay)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



Result
Continuity
(between "3" and "4")

ELECTRICAL COMPONENTS


EAS1TP1063

CHECKING THE RELAY UNIT (DIODE)

Relay unit (diode)

1. Check:

- Relay unit (diode)
Out of specification → Replace.

	<p>Pocket tester 90890-03112</p> <p>Analog pocket tester YU-03112-C</p>
---	---

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 → black/yellow “2”

No continuity

Positive tester probe → black/yellow “2”

Negative tester probe → sky blue “1”

Continuity

Positive tester probe → sky blue “1”

Negative tester probe → 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

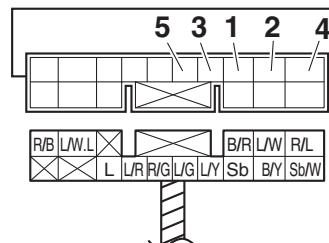
Positive tester probe → blue/green “5”

Negative tester probe → blue/yellow “3”

No continuity

Positive tester probe → blue/yellow “3”

Negative tester probe → blue/green “5”



- Disconnect the relay unit from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the relay unit terminals as shown.

ELECTRICAL COMPONENTS


- c. Check the relay unit (diode) for continuity.
- d. Check the relay unit (diode) for no continuity.



EAS1TP1005

CHECKING THE IGNITION SPARK GAP

1. Check:
 - Ignition spark gap
Out of specification → Perform the ignition system troubleshooting, starting with step 5. Refer to “TROUBLESHOOTING” on page 7-6.




Minimum ignition spark gap
6.0 mm (0.24 in)

TIP

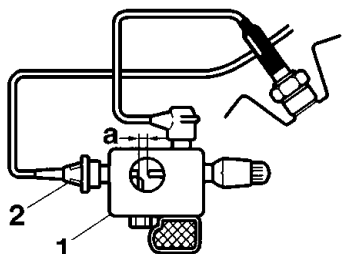
If the ignition spark gap is within specification, the ignition system circuit is operating normally.



- a. Disconnect the spark plug cap from the spark plug.
- b. Connect the ignition checker “1” as shown.



Ignition checker
90890-06754
Oppama pet-4000 spark checker
YM-34487



2. Spark plug cap
- c. Turn the main switch to “ON” and set the engine stop switch to “○”.
- d. Measure the ignition spark gap “a”.
- e. Crank the engine by pushing the start switch “⊕” and gradually increase the spark gap until a misfire occurs.



EAS28070

CHECKING THE SPARK PLUG CAPS

The following procedure applies to all of the spark plug caps.


1. Check:
 - Spark plug cap resistance
Out of specification → Replace.



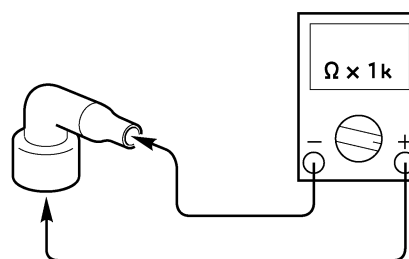
Resistance
7.5–12.5 kΩ



- a. Remove the spark plug cap from the spark plug lead.
- b. Connect the pocket tester ($\Omega \times 1k$) to the spark plug cap as shown.



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



- c. Measure the spark plug cap resistance.




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
2.16–2.64 Ω

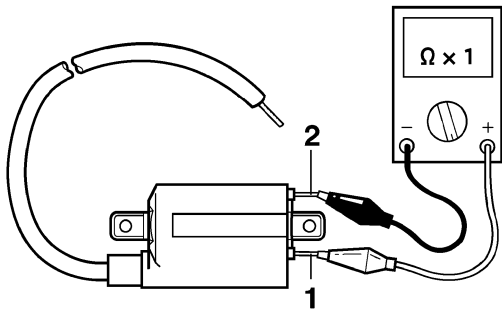


- a. Disconnect the ignition coil connectors from the ignition coil terminals.
- b. Connect the pocket tester ($\Omega \times 1$) to the ignition coil as shown.



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

- Positive tester probe → black/red “1”
- Negative tester probe → orange or gray/red “2”



c. Measure the primary coil resistance.

2. Check:

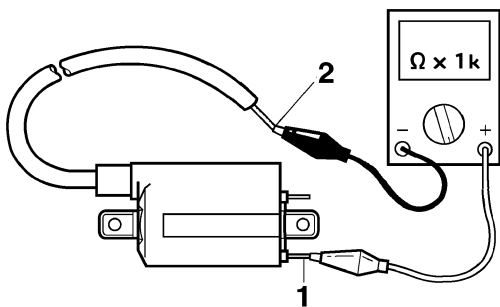
- Secondary coil resistance
Out of specification → Replace.

	Secondary coil resistance 8.64–12.96 kΩ
--	---

- a. Disconnect the spark plug cap from the ignition coil.
b. Connect the pocket tester ($\Omega \times 1 \text{ k}$) to the ignition coil as shown.

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

- Positive tester probe → black/red “1”
- Negative tester probe → spark plug lead “2”



c. Measure the secondary coil resistance.

EAS28120
CHECKING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:

- Crankshaft position sensor coupler (from the wire harness)

2. Check:

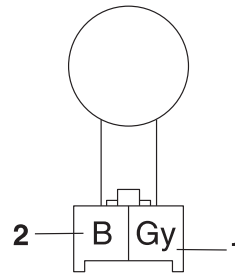
- Crankshaft position sensor resistance
Out of specification → Replace the crankshaft position sensor/stator assembly.

	Crankshaft position sensor resistance 248–372 Ω
--	---

- a. Connect the pocket tester ($\Omega \times 100$) 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.

EAS28130
CHECKING THE LEAN ANGLE SENSOR

1. Remove:

- Lean angle sensor

2. Check:

- Lean angle sensor output voltage
Out of specification → Replace.

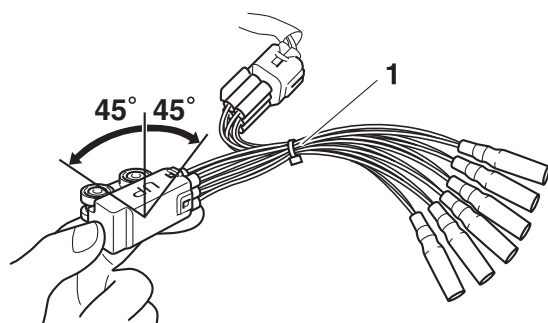
	Lean angle sensor output voltage Less than 45° 0.4–1.4 V More than 45° 3.7–4.4 V
--	---

- 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)



- Turn the main switch to “ON”.
- Turn the lean angle sensor to 45°.
- Measure the lean angle sensor output voltage.

EAS1TP1006

CHECKING THE STARTER MOTOR OPERATION

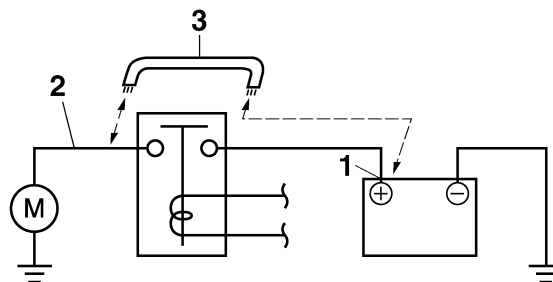
- Check:
 - Starter motor operation
Does not operate → Perform the electric starting system troubleshooting, starting with step 4.
Refer to “TROUBLESHOOTING” on page 7-6.

- 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.



- Check the starter motor operation.

EAS28150

CHECKING THE STATOR COIL

- Disconnect:
 - Stator coil coupler (from the wire harness)
- Check:
 - Stator coil resistance
Out of specification → Replace the crankshaft position sensor/stator assembly.



Stator coil resistance
0.128–0.192 Ω

- Connect the pocket tester ($\Omega \times 1$) to the stator coil coupler as shown.

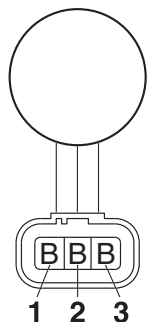


Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → black “1”
- Negative tester probe → black “2”

- Positive tester probe → black “1”
- Negative tester probe → black “3”

- Positive tester probe → black “2”
- Negative tester probe → black “3”



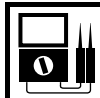
b. Measure the stator coil resistance.



EAS28170

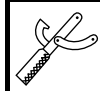
CHECKING THE RECTIFIER/REGULATOR

1. Check:
 - Charging voltage
Out of specification → Replace the rectifier/regulator.



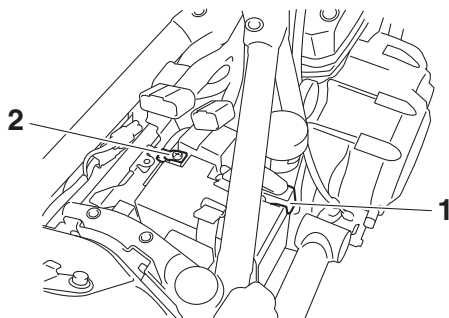
Charging voltage
14 V at 5000 r/min

- a. Attach the engine tachometer to the spark plug lead of the front cylinder.
- b. Connect the pocket tester (DC 20 V) to the battery terminals as shown.



Digital tachometer
90890-06760
YU-39951-B
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → positive battery terminal "1"
- Negative tester probe → negative battery terminal "2"



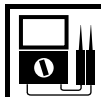
- c. Start the engine and operate it run at approximately 5000 r/min.
- d. Measure the charging voltage.



EAS1TP1008

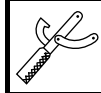
CHECKING THE OIL LEVEL SWITCH

1. Drain:
 - Engine oil
2. Remove:
 - Oil level switch
(from the crankcase)
3. Check:
 - Oil level switch resistance
Out of specification → Replace the oil level switch.



Oil level switch
Maximum level position resistance
484–536 Ω
Minimum level position resistance
114–126 Ω

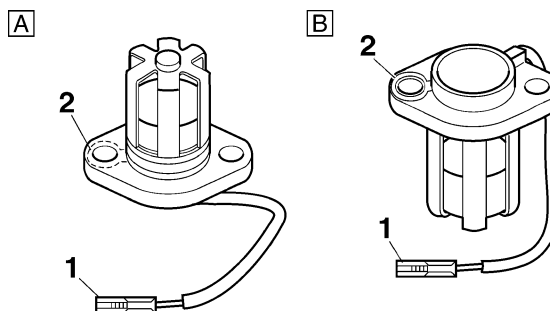
- a. Connect the pocket tester ($\Omega \times 100$) to the oil level switch terminal as shown.



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

- Minimum level position "A"
- Positive tester probe → connector (white) "1"
 - Negative tester probe → body ground "2"

- Maximum level position "B"
- Positive tester probe → connector (white) "1"
 - Negative tester probe → body ground "2"




- b. Measure the oil level switch resistance.



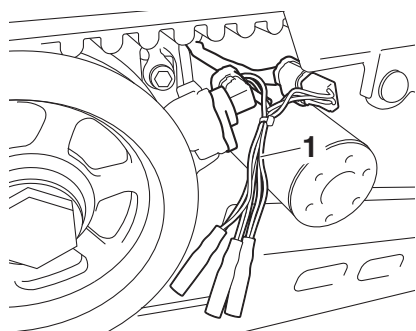
ELECTRICAL COMPONENTS

- b. Connect the pocket tester (DC 20 V) to the speed sensor coupler (wire harness side) as shown.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C
Test harness S- pressure sensor (3P)
90890-03207
YU-03207

- Positive tester probe → white/yellow (wire harness color)
- Negative tester probe → black/blue (wire harness color)



- c. Set the main switch to "ON".
d. Elevate the rear wheel and slowly rotate it.
e. Measure the voltage of white/yellow and black/blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.

EAS28260

CHECKING THE ENGINE TEMPERATURE SENSOR

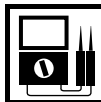
1. Remove:
- Engine temperature sensor

EWA1TP1023

WARNING

- Handle the engine temperature sensor with special care.
- Never subject the engine temperature sensor to strong shocks. If the engine temperature sensor is dropped, replace it.

2. Check:
- Engine temperature sensor resistance
Out of specification → Replace.



Engine temperature sensor resistance

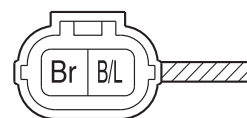
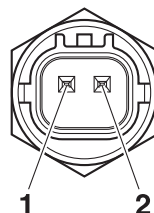
2.63–2.78 k Ω at 20 °C (68 °F)
210–221 Ω at 100 °C (212 °F)

- a. Connect the pocket tester ($\Omega \times 1$ k) to the engine temperature sensor as shown.



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

- Positive tester probe → black/blue "1"
- Negative tester probe → brown "2"



- b. Measure the engine temperature sensor resistance.

3. Install

- Engine temperature sensor

EAS28300

CHECKING THE THROTTLE POSITION SENSOR

1. Remove:
- Throttle position sensor (from the throttle body)
2. Check:
- Throttle position sensor maximum resistance
Out of specification → Replace the throttle position sensor.



Resistance

3.08–5.72 k Ω (L-B/L)(at idle)

- a. Connect the pocket tester ($\Omega \times 1$ k) to the throttle position sensor terminals as shown.



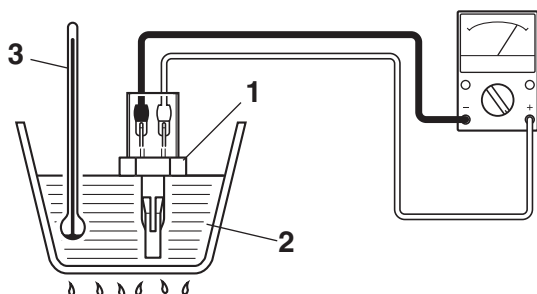
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- 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, and then let it cool down to the specified temperature.
 e. Measure the intake air temperature sensor resistance.



EAS1TP1012

CHECKING THE FUEL INJECTORS

The following procedure applies to all off the fuel injectors.

1. Check:
 - Fuel injector resistance
 Out of specification → Replace the fuel injector.



Resistance
12.0 Ω

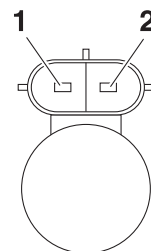


- a. Disconnect the fuel injector coupler from wire harness.
- b. Connect the pocket tester ($\Omega \times 1$) to the fuel injector terminals as shown.



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

- Positive tester probe
 Injector terminal “1”
- Negative tester probe
 Injector terminal “2”



- c. Measure the fuel injector resistance.



TROUBLESHOOTING

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EAS28450

TROUBLESHOOTING

EAS28460

GENERAL INFORMATION

TIP

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAS28470

STARTING FAILURES

Engine

1. Cylinder(s) and cylinder head(s)
 - Loose spark plug
 - Loose cylinder head or cylinder
 - Damaged cylinder head gasket
 - Damaged cylinder gasket
 - Worn or damaged cylinder
 - Incorrect valve clearance
 - Improperly sealed valve
 - Incorrect valve-to-valve-seat contact
 - Incorrect valve timing
 - Faulty valve spring
 - Seized valve
2. Piston(s) and piston ring(s)
 - Improperly installed piston ring
 - Damaged, worn or fatigued piston ring
 - Seized piston ring
 - Seized or damaged piston
3. Air filter
 - Improperly installed air filter
 - Clogged air filter element
4. Crankcase and crankshaft
 - Improperly assembled crankcase
 - Seized crankshaft

Fuel system

1. Fuel tank
 - Empty fuel tank
 - Clogged fuel filter
 - Clogged fuel tank breather hose
 - Clogged rollover valve
 - Deteriorated or contaminated fuel
2. Fuel pump
 - Faulty fuel pump
 - Faulty relay unit (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
 - Faulty spark plug cap
4. Ignition coil(s)
 - Cracked or broken ignition coil body
 - Broken or shorted primary or secondary coils
 - Faulty spark plug lead
5. Ignition system
 - Faulty ECU
 - Faulty crankshaft position sensor
 - Broken generator rotor Woodruff 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 relay unit (starting circuit cut-off relay)
 - Faulty starter clutch

EAS28490

INCORRECT ENGINE IDLING SPEED

Engine

1. Cylinder(s) and cylinder head(s)
 - Incorrect valve clearance
 - Damaged valve train components
2. Air filter
 - Clogged air filter element

Fuel system

1. Throttle body(-ies)
 - Damaged or loose throttle body joint
 - Improperly synchronized throttle bodies
 - Improper throttle grip free play
 - Flooded throttle body

Electrical system

1. Battery
 - Discharged battery
 - Faulty battery
2. Spark plug(s)
 - Incorrect spark plug gap
 - Incorrect spark plug heat range
 - Fouled spark plug
 - Worn or damaged electrode
 - Worn or damaged insulator
 - Faulty spark plug cap
3. Ignition coil(s)
 - Broken or shorted primary or secondary coils
 - Faulty spark plug lead
 - Cracked or broken ignition coil
4. Ignition system
 - Faulty ECU
 - Faulty crankshaft position sensor
 - Broken generator rotor Woodruff key

EAS28510

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURES" on page 8-1.

Engine

1. Air filter
 - Clogged air filter element

Fuel system

1. Fuel pump
 - Faulty fuel pump

EAS28530

FAULTY GEAR SHIFTING

Shifting is difficult

Refer to "Clutch drags".

EAS28540

SHIFT PEDAL DOES NOT MOVE

Shift shaft

- Improperly adjusted shift rod
- Bent shift shaft

Shift drum and shift forks

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

Transmission

- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

EAS28550

JUMPS OUT OF GEAR

Shift shaft

- Incorrect shift pedal position
- Improperly returned stopper lever

Shift forks

- Worn shift fork

Shift drum

- Incorrect axial play
- Worn shift drum groove

Transmission

- Worn gear dog

EAS28560

FAULTY CLUTCH

Clutch slips

1. Clutch
 - Improperly assembled clutch
 - Improperly adjusted clutch cable
 - Loose or fatigued clutch spring
 - Worn friction plate
 - Worn clutch plate
2. Engine oil
 - Incorrect oil level
 - Incorrect oil viscosity (low)
 - Deteriorated oil

Clutch drags

1. Clutch
 - Unevenly tensioned clutch springs
 - Warped pressure plate
 - Bent clutch plate
 - Swollen friction plate
 - Bent clutch 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

EAS28600

OVERHEATING

Engine

1. Cylinder head(s) and piston(s)
 - Heavy carbon buildup
2. Engine oil
 - Incorrect oil level

- Incorrect oil viscosity
- Inferior oil quality

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

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

EAS28650

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
 - 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 switch)
- Burnt-out headlight bulb

Headlight bulb burnt out

- Wrong headlight bulb
- Faulty battery

- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Headlight bulb life expired

Tail/brake light does not come on

- Faulty brake light switch
- Too many electrical accessories
- Incorrect connection
- Faulty tail/brake light

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 flashes 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 flashes 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

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS1TP1035

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Self-diagnostic function table

Fault code No.	Item	Reference pages
12	Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	7-48
13	Intake air pressure sensor: open or short circuit detected.	7-49
14	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	7-51
15	Throttle position sensor: open or short circuit detected.	7-52
19	Sidestand switch: a break or disconnection of the blue/black lead of the ECU (engine control unit) is detected.	7-53
22	Intake air temperature sensor: open or short circuit detected.	7-54
24	O ₂ sensor: no normal signals are received from the O ₂ sensor.	7-56
28	Engine temperature sensor: open or short circuit detected.	7-57
30	Latch up detected.	7-59
33	Front cylinder ignition coil: open or short circuit detected in the primary lead of the front cylinder ignition coil.	7-59
34	Rear cylinder ignition coil: open or short circuit detected in the primary lead of the rear cylinder ignition coil.	7-61
37	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).	7-62
	Defective ISC (idle speed control) unit (ISC operating sound is not heard).	7-63
39	Injector: open or short circuit detected.	7-65
41	Lean angle sensor: open or short circuit detected.	7-66
42 (Except for ABS models)	Speed sensor: no normal signals are received from the speed sensor.	7-68
	Neutral switch: open or short circuit is detected.	7-70
	Clutch switch: open or short circuit is detected.	7-72
42 (For ABS models)	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	7-75
	Neutral switch: open or short circuit is detected.	7-77
	Clutch switch: open or short circuit is detected.	7-80
43	Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	7-82
44	EEPROM fault code number: an error is detected while reading or writing on EEPROM.	7-84
46	Charging voltage is abnormal.	7-85
50	Faulty ECU (engine control unit) memory. (When this malfunction is detected in the ECU, the fault code number might not appear.)	7-85
51	Immobilizer unit: Code cannot be transmitted between the key and the immobilizer unit.	7-106

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Fault code No.	Item	Reference pages
52	Immobilizer unit: Codes between the key and immobilizer unit do not match.	7-106
53	Immobilizer unit: Codes cannot be transmitted between the ECU and the immobilizer unit.	7-106
54	Immobilizer unit: Codes transmitted between the ECU and the immobilizer unit do not match.	7-106
55	Immobilizer unit: Key code registration malfunction.	7-106
56	ECU: Unidentified code is received.	7-106
70	Engine idling stop	—

Communication error with the meter

Fault code No.	Item	Reference pages
Er-1	ECU (engine control unit) internal malfunction (output signal error): signals cannot be transmitted between the ECU and the multi-function meter.	7-85
Er-2	ECU (engine control unit) internal malfunction (output signal error): no signals are received from the ECU within the specified duration.	7-86
Er-3	ECU (engine control unit) internal malfunction (output signal error): data from the ECU cannot be received correctly.	7-87
Er-4	ECU (engine control unit) internal malfunction (input signal error): non-registered data has been received from the meter.	7-88

Diagnostic code: sensor operation table

TIP

The diagnostic code numbers cannot be displayed on the multi-function meter. To display the diagnostic code numbers, use the Yamaha diagnostic tool.

Diagnostic code No.	Item	Display	Procedure
01	Throttle position sensor signal <ul style="list-style-type: none"> • Fully closed position • Fully open position 	14–20 92–102	Check with throttle valves fully closed. Check with throttle valves fully open.
02	Atmospheric pressure	Displays the atmospheric pressure.	Compare the actually measured atmospheric pressure with the display value.
03	Intake air pressure	Displays the intake air pressure.	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.)

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Display	Procedure
05	Air temperature	Displays the air temperature.	Compare the actually measured air temperature with the display value.
07 (Except for ABS models)	Vehicle speed pulses	0–999	Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
07 (For ABS models)	Rear wheel vehicle speed pulses	Rear wheel speed pulse 0–999	Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
08	Lean angle sensor • Upright • Overturned	Lean angle sensor output voltage 0.4–1.4 3.7–4.4	Remove the lean angle sensor and incline it more than 45 degrees.
09	Fuel system voltage (battery voltage)	Approximately 12.0	Set the engine stop switch to “○”, and then compare the actually measured battery voltage with the display value. (If the actually measured battery voltage is low, recharge the battery.)
11	Engine temperature	Displays the engine temperature.	Compare the actually measured engine temperature with the display value.
20	Sidestand switch • Stand retracted • Stand extended	ON OFF	Extend and retract the sidestand (with the transmission in gear).

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Display	Procedure
21	Neutral switch and clutch switch <ul style="list-style-type: none"> • Transmission is in neutral • Transmission is in gear or the clutch lever released • Clutch lever is squeezed with the transmission in gear and when the side-stand is retracted • Clutch lever is squeezed with the transmission in gear and when the side-stand is extended 	ON OFF ON OFF	Operate the transmission, clutch lever, and side-stand.
60	EEPROM fault code display <ul style="list-style-type: none"> • No history • History exists 	00 <ul style="list-style-type: none"> • No malfunctions detected (If the self-diagnosis fault code 44 is indicated, the ECU is defective.) 01 or 02 (Cylinder fault code) <ul style="list-style-type: none"> • (If both cylinders are defective, the display alternates every two seconds.) 	— —
61	Malfunction history code display <ul style="list-style-type: none"> • No history • History exists 	00 <p>Fault codes 12–70</p> <ul style="list-style-type: none"> • (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.)	— —

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Display	Procedure
62	Malfunction history code erasure <ul style="list-style-type: none"> • No history • History exists 	00 <ul style="list-style-type: none"> • 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 "○".
63	Malfunction code reinstatement (for fault code No. 24 only) <ul style="list-style-type: none"> • No malfunction code • Malfunction code exists 	00 Fault code 24	— To reinstate, set the engine stop switch from "⊗" to "○".
70	Control number	0–254 [-]	—

Diagnostic code: actuator operation table

Diagnostic code No.	Item	Actuation	Procedure
30	Front cylinder ignition coil	Actuates the front cylinder ignition coil five times at one-second intervals. The "CHECK" indicator and "⊗" on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated.	Check that a spark is generated five times. <ul style="list-style-type: none"> • Connect an ignition checker.
31	Rear cylinder ignition coil	Actuates the rear cylinder ignition coil five times at one-second intervals. The "CHECK" indicator and "⊗" on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated.	Check that a spark is generated five times. <ul style="list-style-type: none"> • Connect an ignition checker.
36	Front cylinder injector	Actuates the front cylinder injector five times at one-second intervals. The "CHECK" indicator and "⊗" on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	Check that the front cylinder injector is actuated five times by listening for the operating sound.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Actuation	Procedure
37	Rear cylinder injector	Actuates the rear cylinder injector five times at one-second intervals. The "CHECK" indicator and " " on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	Check that the rear cylinder injector is actuated five times by listening for the operating sound.
50	Relay unit (fuel pump relay)	Actuates the relay unit (fuel pump relay) five times at one-second intervals. The "CHECK" indicator and " " on the Yamaha diagnostic tool screen come on each time the relay is actuated. (When the relay is on, the "CHECK" indicator and " " on the Yamaha diagnostic tool screen go off. When the relay is off, the "CHECK" indicator and " " on the Yamaha diagnostic tool screen come on.)	Check that the relay unit (fuel pump relay) is actuated five times by listening for the operating sound.
52	Headlight relay	Actuates the headlight relay five times at five-second intervals. The "CHECK" indicator and " " on the Yamaha diagnostic tool screen come on each time the relay is actuated.	Check that the headlight relay is actuated five times by listening for the operating sound.
54	ISC valve	Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 4 seconds each time. The "CHECK" indicator and " " on the Yamaha diagnostic tool screen come on during the operation.	The ISC unit vibrates when the ISC valve operates.

WIRING DIAGRAM**XVS950CU/XVS950CUE (except for ABS models) 2014**

1. AC magneto
2. Rectifier/regulator
3. Main switch
4. Main fuse
5. Battery
6. Engine ground
7. Fuel injection system fuse
8. Starter relay
9. Starter motor
10. Ignition fuse
11. Signaling system fuse
12. Hazard lighting fuse
13. Backup fuse
14. Headlight fuse
15. Immobilizer unit
16. Relay unit
17. Starting circuit cut-off relay
18. Fuel pump relay
19. Neutral switch
20. Sidestand switch
21. Speed sensor
22. O₂ sensor
23. Engine temperature sensor
24. Intake air temperature sensor
25. Crankshaft position sensor
26. Lean angle sensor
27. Throttle position sensor
28. Intake air pressure sensor
29. ISC (idle speed control) unit
30. Yamaha diagnostic tool coupler
31. ECU (engine control unit)
32. Front cylinder ignition coil
33. Spark plug
34. Rear cylinder ignition coil
35. Front cylinder injector
36. Rear cylinder injector
37. Fuel pump
38. Oil level switch
39. Meter assembly
40. Neutral indicator light
41. Multi-function meter
42. Engine trouble warning light
43. Oil level warning light
44. Fuel level warning light
45. Meter light
46. High beam indicator light
47. Immobilizer system indicator light
48. Turn signal indicator light
49. Fuel sender
50. Joint coupler
51. Turn signal/hazard relay
52. Headlight relay
53. Left handlebar switch
54. Dimmer switch
55. Pass switch

56. Turn signal switch
57. Horn switch
58. Clutch switch
59. Passing light (OPTION)
60. Horn
61. Headlight
62. Auxiliary light
63. Front left turn signal light
64. Front right turn signal light
65. Rear left turn signal light
66. Rear right turn signal light
67. License plate light
68. Tail/brake light
69. Right handlebar switch
70. Front brake light switch
71. Engine stop switch
72. Start switch
73. Select switch
74. Reset switch
75. Hazard switch
76. Rear brake light switch
- A. Wire harness
- B. Negative battery sub-wire harness
- C. Neutral switch sub-wire harness
- D. Intake air temperature sensor sub-wire harness
- E. Rear turn signal light and license plate light sub-wire harness
- F. Tail/brake light sub-wire harness

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/B	Brown/Black
Br/L	Brown/Blue
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W/B	White/Black
W/G	White/Green
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W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue

WIRING DIAGRAM**XVS950CU (for ABS models)****2014**

1. AC magneto
2. Rectifier/regulator
3. Main switch
4. Main fuse
5. Battery
6. Engine ground
7. ABS motor fuse
8. Starter relay
9. Starter motor
10. Fuel injection system fuse
11. ABS solenoid fuse
12. ABS ECU (electronic control unit)
13. Joint coupler
14. Front wheel sensor
15. Rear wheel sensor
16. ABS test coupler
17. Ignition fuse
18. ABS ECU fuse
19. Signaling system fuse
20. Hazard lighting fuse
21. Backup fuse
22. Headlight fuse
23. Immobilizer unit
24. Relay unit
25. Starting circuit cut-off relay
26. Fuel pump relay
27. Neutral switch
28. Sidestand switch
29. O₂ sensor
30. Engine temperature sensor
31. Intake air temperature sensor
32. Crankshaft position sensor
33. Lean angle sensor
34. Throttle position sensor
35. Intake air pressure sensor
36. ISC (idle speed control) unit
37. Yamaha diagnostic tool coupler
38. ECU (engine control unit)
39. Front cylinder ignition coil
40. Spark plug
41. Rear cylinder ignition coil
42. Front cylinder injector
43. Rear cylinder injector
44. Fuel pump
45. Oil level switch
46. Meter assembly
47. Neutral indicator light
48. Multi-function meter
49. Engine trouble warning light
50. Oil level warning light
51. Fuel level warning light
52. Meter light
53. ABS warning light
54. High beam indicator light

55. Immobilizer system indicator light

56. Turn signal indicator light
57. Fuel sender
58. Turn signal/hazard relay
59. Headlight relay
60. Left handlebar switch
61. Dimmer switch
62. Pass switch
63. Turn signal switch
64. Horn switch
65. Clutch switch
66. Passing light (OPTION)
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80. Select switch
81. Reset switch
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L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
P/L	Pink/Blue
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/G	White/Green
W/L	White/Blue
W/R	White/Red
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue



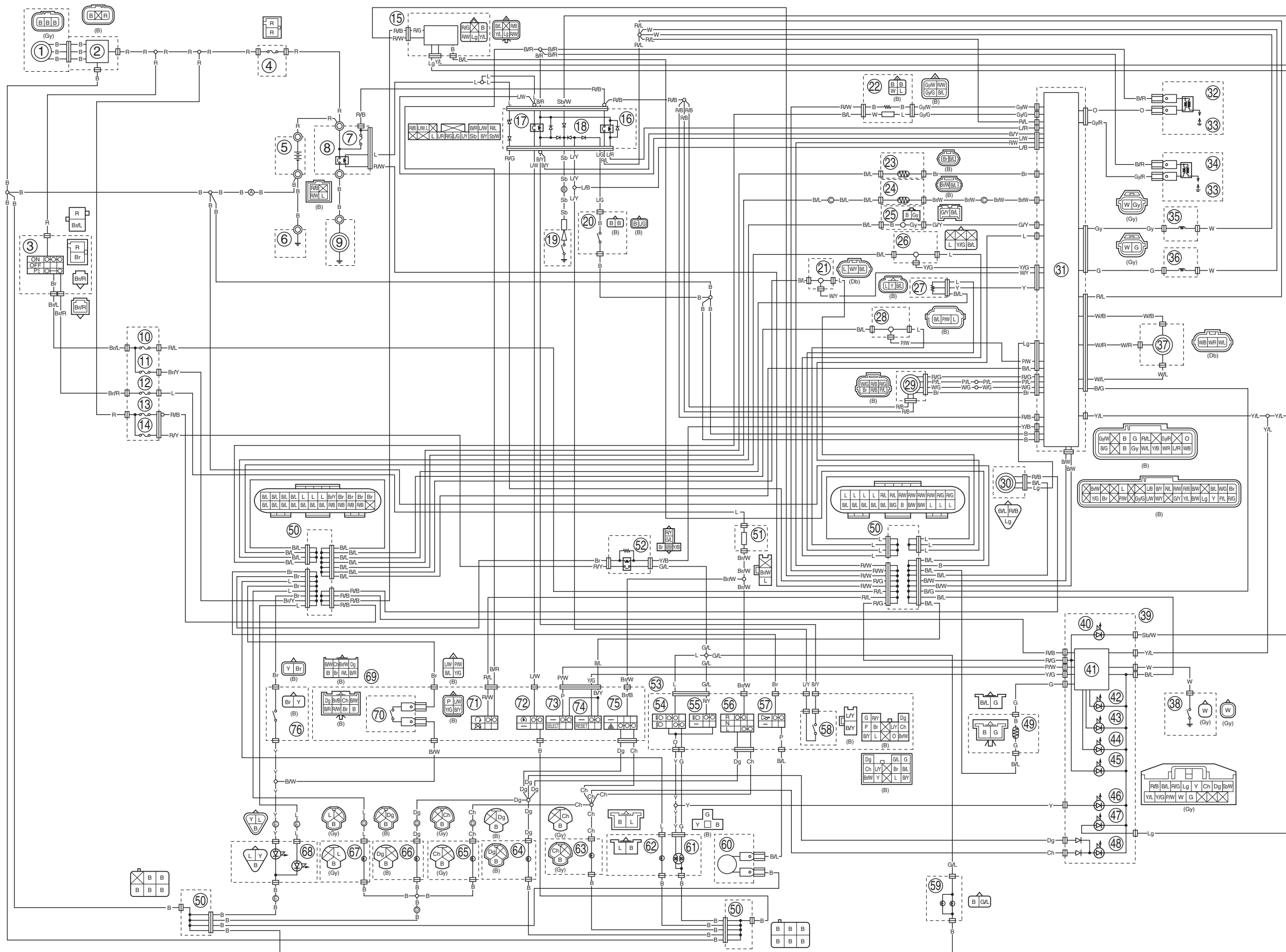
XVS950CU/XVS950CUE
 (except for ABS models) 2014
WIRING DIAGRAM

XVS950CU/XVS950CUE (sauf pour
 modèles équipés d'ABS) 2014
SCHEMA DE CÂBLAGE

XVS950CU/XVS950CUE
 (außer für Modelle mit ABS) 2014
SCHALTPLAN

XVS950CU/XVS950CUE
 (eccetto modelli ABS) 2014
SCHEMA ELETTRICO

XVS950CU/XVS950CUE
 (excepto modelos con ABS) 2014
DIAGRAMA ELÉCTRICO



XVS950CU/XVS950CUE
(except for ABS models) 2014
WIRING DIAGRAM

XVS950CU/XVS950CUE (sauf pour
modèles équipés d'ABS) 2014
SCHEMA DE CÂBLAGE

XVS950CU/XVS950CUE
(außer für Modelle mit ABS) 2014
SCHALTPLAN

XVS950CU/XVS950CUE
(eccetto modelli ABS) 2014
SCHEMA ELETTRICO

XVS950CU/XVS950CUE
(excepto modelos con ABS) 2014
DIAGRAMA ELÉCTRICO

