



YAMAHA

2013

SERVICE MANUAL

FJR1300A(D)

FJR

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EAS20040

**FJR1300A(D) 2013
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>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

3 →

4 →

5 →

6 →

Order	Job/Parts to remove	Q'ty	Remarks
	Rear balancer		Refer to "BALANCERS" on page 5-106.
1	Oil guide plate	1	
2	Clutch spring plate retainer	1	
3	Clutch spring plate	1	
4	Clutch spring plate seat	1	
5	Pressure plate	1	
6	Short clutch push rod	1	
7	Ball	1	
8	Long clutch push rod	1	
9	Friction plate 1	1	Inside diameter: 124 mm (4.88 in)
10	Clutch plate	7	
11	Friction plate 2	7	Inside diameter: 124 mm (4.88 in)
12	Lock washer	1	
13	Wire circlip	1	
14	Clutch plate	1	
15	Friction plate 3	1	Inside diameter: 135 mm (5.31 in)
16	Clutch damper spring	1	

5-44

CLUTCH

2 →

7 →

FR502/10
CHECKING THE FRICTION PLATES
The following procedure applies to all of the friction plates.

1. Check:
 - Clutch plate
 - Friction plate
 - Friction plate thickness
2. Measure:
 - Clutch plate warpage
 - Friction plate thickness

Damage/wear → Replace the clutch plates as a set.
Out of specification → Replace the friction plates as a set.

TIP
Measure the friction plate at four places.

<p>Friction plate 1, 3 thickness 2.90–3.10 mm (0.114–0.122 in) Wear limit 2.80 mm (0.110 in)</p>	<p>Clutch plate thickness 1.90–2.10 mm (0.075–0.083 in) Warpage limit 0.10 mm (0.0039 in)</p>
---	--

FR502/10
CHECKING THE CLUTCH SPRING PLATE

1. Check:
 - Clutch spring plate retainer
 - Clutch spring plate seat
2. Check:
 - Clutch spring plate seat
3. Measure:
 - Clutch spring free height

Damage → Replace.
Out of specification → Replace the clutch spring plate.

<p>Clutch spring height 6.78 mm (0.27 in) Minimum height 6.44 mm (0.25 in)</p>

FR502/10
CHECKING THE CLUTCH PLATES
The following procedure applies to all of the clutch plates.

A. Friction plate 1, 3
B. Friction plate 2

5-50

SYMBOLS

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

TIP

The following symbols are not relevant to every vehicle.









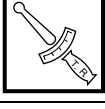









SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Serviceable with engine mounted		Gear oil
	Filling fluid		Molybdenum disulfide oil
	Lubricant		Brake fluid
	Special tool		Wheel bearing grease
	Tightening torque		Lithium-soap-based grease
	Wear limit, clearance		Molybdenum disulfide grease
	Engine speed		Silicone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

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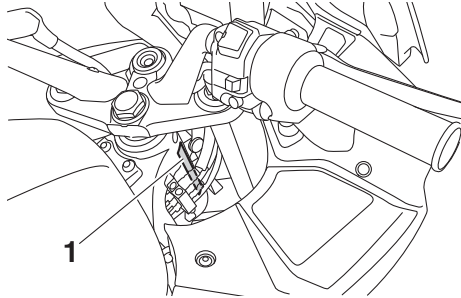
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IDENTIFICATION

EAS20140

VEHICLE IDENTIFICATION NUMBER

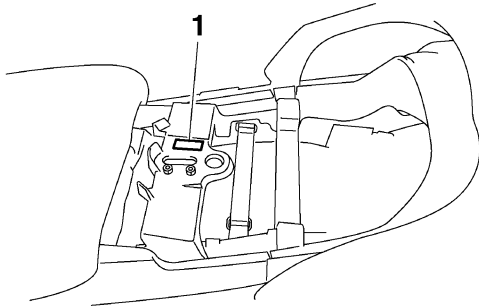
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



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MODEL LABEL

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



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FEATURES

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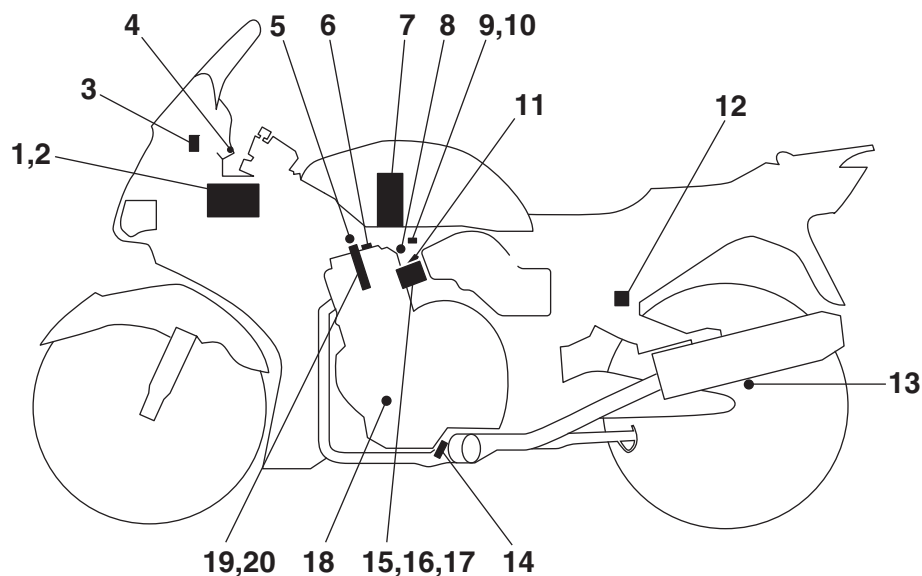
OUTLINE OF THE FI SYSTEM

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. Furthermore, the air induction system (AI system) has been placed under computer control together with the FI system in order to realize cleaner exhaust gases.



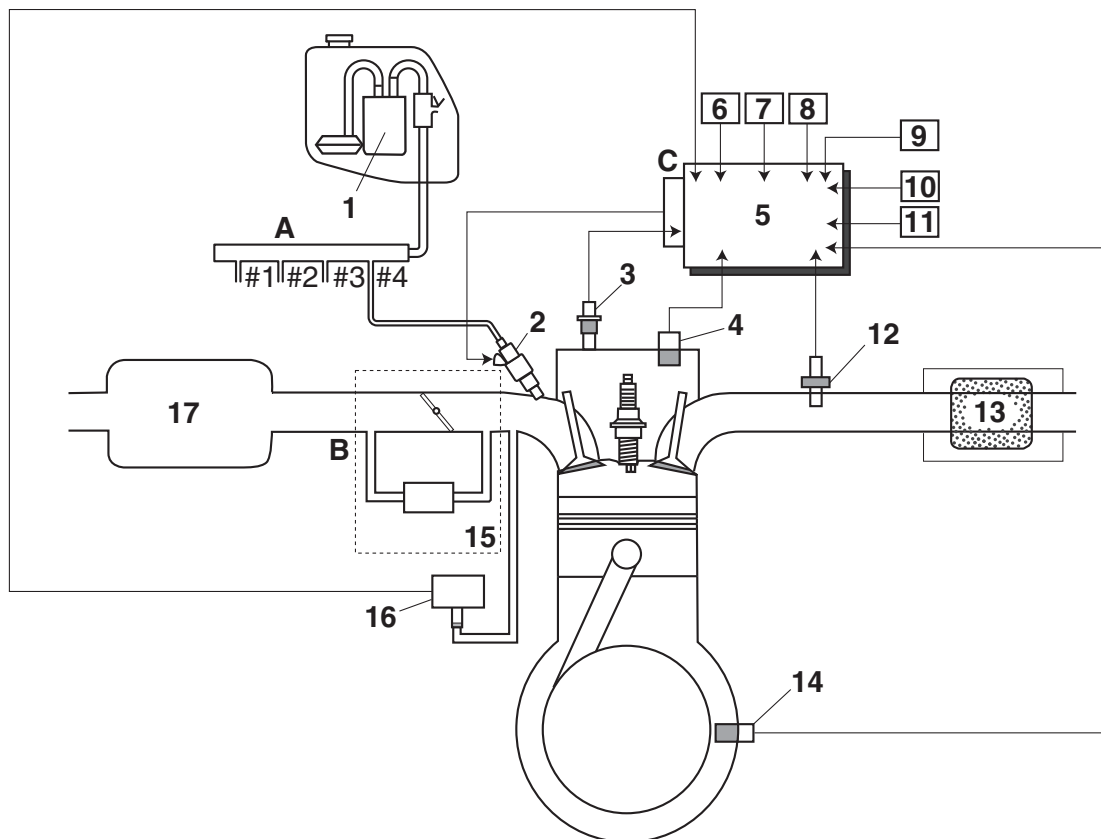
- | | |
|-----------------------------------|---------------------------------|
| 1. ECU (engine control unit) | 11. Injectors |
| 2. Battery | 12. Lean angle sensor |
| 3. Air temperature sensor | 13. Rear wheel sensor |
| 4. Engine trouble warning light | 14. O ₂ sensor |
| 5. Coolant temperature sensor | 15. Throttle position sensor |
| 6. Cylinder identification sensor | 16. Accelerator position sensor |
| 7. Fuel pump | 17. Throttle servo motor |
| 8. Air induction system solenoid | 18. Crankshaft position sensor |
| 9. Intake air pressure sensor | 19. Spark plugs |
| 10. Atmospheric pressure sensor | 20. Ignition coils |

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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 324 kPa (3.24 kg/cm², 47.0 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, accelerator position sensor, coolant temperature sensor, cylinder identification sensor, lean angle sensor, crankshaft position sensor, intake air pressure sensor, atmospheric pressure sensor, air temperature sensor, rear wheel sensor 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.



- | | |
|-----------------------------------|--------------------------------|
| 1. Fuel pump | 13. Catalytic converter |
| 2. Injector | 14. Crankshaft position sensor |
| 3. Coolant temperature sensor | 15. Throttle body |
| 4. Cylinder identification sensor | 16. Intake air pressure sensor |
| 5. ECU (engine control unit) | 17. Air filter case |
| 6. Throttle position sensor | A. Fuel system |
| 7. Accelerator position sensor | B. Air system |
| 8. Atmospheric pressure sensor | C. Control system |
| 9. Rear wheel sensor | |
| 10. Lean angle sensor | |
| 11. Air temperature sensor | |
| 12. O ₂ sensor | |

EAS1MC1081

YCC-T (Yamaha Chip Controlled Throttle)

Mechanism characteristics

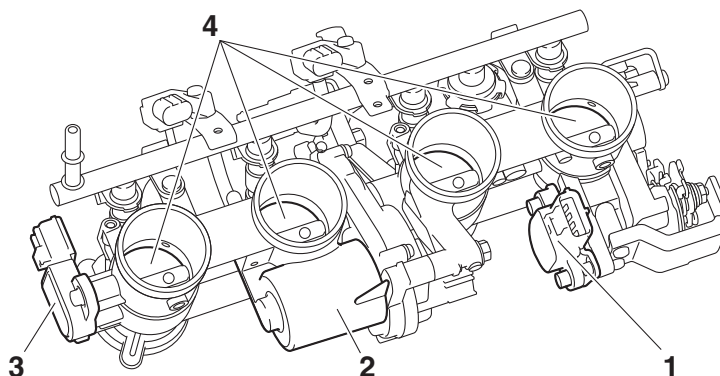
Yamaha developed the YCC-T system employing the most advanced electronic control technologies. Electronic control throttle systems have been used on automobiles, but Yamaha has developed a faster, more compact system specifically for the needs of a sports motorcycle. The Yamaha-developed system has a high-speed calculating capacity that produces computations of running conditions every 1/1000th of a second.

The YCC-T system is designed to respond to the throttle action of the rider by having the ECU instantaneously calculate the ideal throttle valve opening and generate signals to operate the motor-driven throttle valves and thus actively control the intake air volume.

The ECU contains two CPUs with a capacity about five times that of conventional units, making it possible for the system to respond extremely quickly to the slightest adjustments made by the rider. In particular, optimized control of the throttle valve opening provides the optimum volume of intake air for easy-to-use torque, even in a high-revving engine.

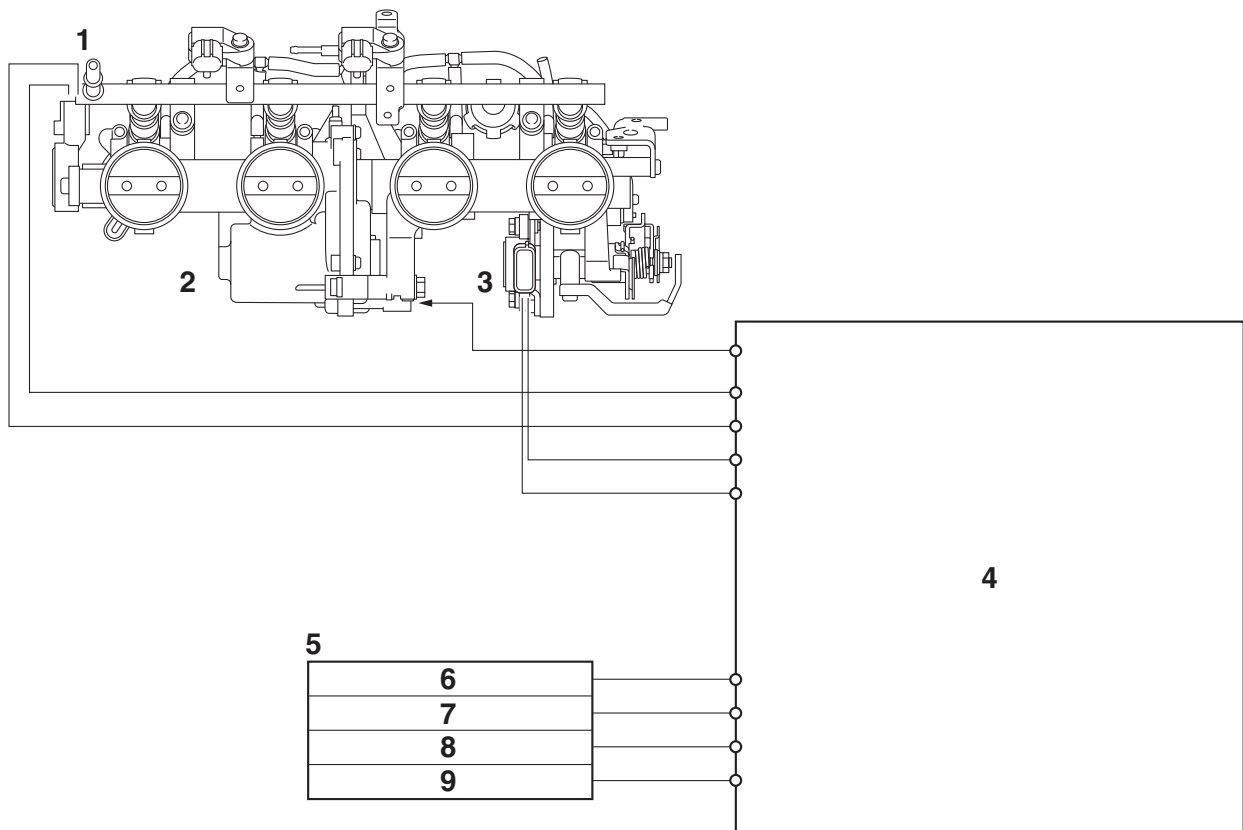
Aims and advantages of using YCC-T

- Increased engine power
By shortening the air intake path, higher engine speed is possible → Increased engine power.
- Improved driveability
Air intake volume is controlled according to the operating conditions → Improved throttle response to meet engine requirement.
Driving force is controlled at the optimal level according to the transmission gear position and engine speed → Improved throttle control.
- Engine braking control
Due to the throttle control, optimal engine braking is made possible.
- Simplified idle speed control (ISC) mechanism
The bypass mechanism and ISC actuator are eliminated → A simple mechanism is used to maintain a steady idle speed.
- Reduced weight
Compared to using a sub-throttle mechanism, weight is reduced.



1. Accelerator position sensor
2. Throttle servo motor
3. Throttle position sensor
4. Throttle valves

YCC-T system outline

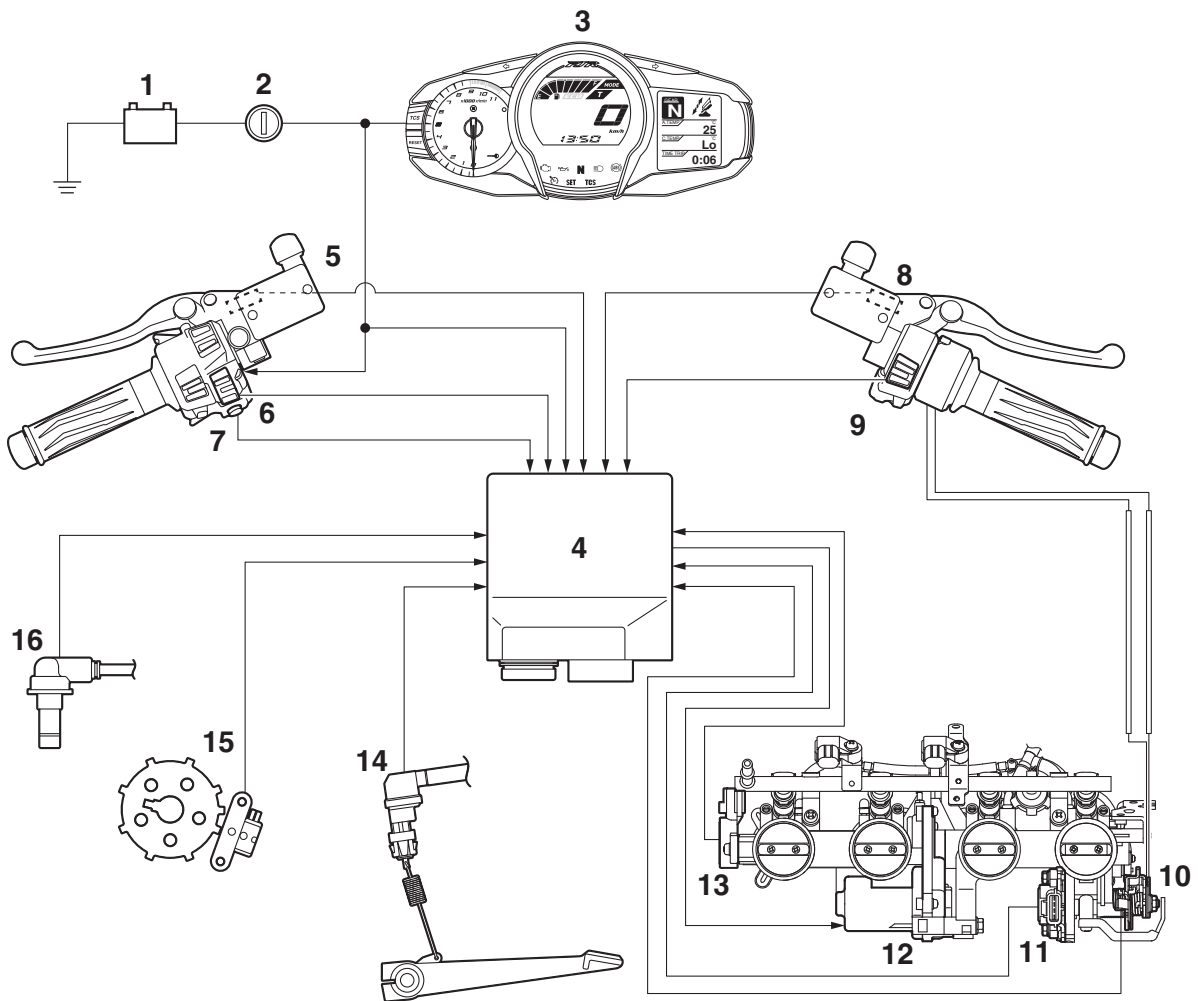


1. Throttle position sensor
2. Throttle servo motor
3. Accelerator position sensor
4. ECU (engine control unit)
5. Sensor input
6. Gear position switch
7. Crankshaft position sensor
8. Rear wheel sensor
9. Coolant temperature sensor

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OUTLINE OF THE CRUISE CONTROL SYSTEM

This model is equipped with a cruise control system designed to maintain a set cruising speed. Because the vehicle is equipped with the YCC-T system, the cruise control system can be controlled electronically. Based on the signals that are received from the sensors and switches, the ECU calculates the required throttle valve opening and operates the throttle servo motor to control the throttle valves. Because the system allows the rider to maintain a set cruising speed without operating the throttle, the system reduces the burden of maintaining a constant speed during long-distance touring. In addition, the cruise control system is equipped with a self-diagnosis function.




1. Battery
2. Main switch
3. Meter assembly
4. ECU (engine control unit)
5. Clutch switch
6. Cruise control setting switch
7. Cruise control power switch
8. Front brake light switch
9. Start/engine stop switch
10. Grip cancel switch
11. Accelerator position sensor
12. Throttle servo motor
13. Throttle position sensor
14. Rear brake light switch



15. Crankshaft position sensor
16. Rear wheel sensor

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WARNING

- **Improper use of the cruise control system may result in loss of control, which could lead to an accident. Do not activate the cruise control system in heavy traffic, poor weather conditions, or among winding, slippery, hilly, rough or gravel roads.**
- **When traveling uphill or downhill, the cruise control system may not be able to maintain the set cruising speed.**
- **To prevent accidentally activating the cruise control system, turn it off when not in use. Make sure that the cruise control system indicator light “” is off.**

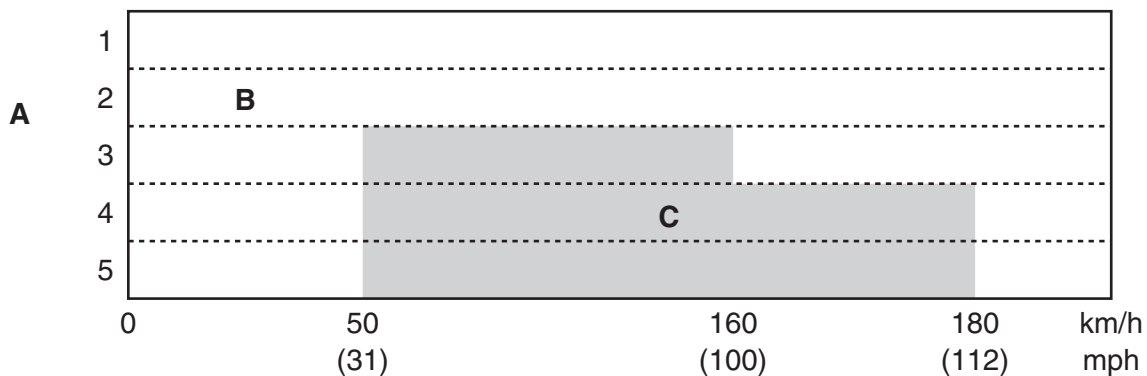
Activating and setting the cruise control system

1. Push the cruise control power switch “” located on the left handlebar. The cruise control system indicator light “” will come on.
2. Push the “SET-” side of the cruise control setting switch to activate the cruise control system. Your current traveling speed will become the set cruising speed. The cruise control setting indicator light “SET” will come on.

TIP

The cruise control system operates only when riding in 3rd gear at speeds between about 50 km/h (31 mph) and 160 km/h (100 mph), or 4th or 5th gear at speeds between about 50 km/h (31 mph) and 180 km/h (112 mph).

Operating range of cruise control system



- A. Gear position
- B. Cruising speed cannot be set
- C. Cruising speed can be set

Adjusting the set cruising speed

While the cruise control system is operating, push the “RES+” side of the cruise control setting switch to increase the set cruising speed or the “SET-” side to decrease the set speed.


TIP

- Pushing the setting switch once will change the speed in increments of approximately 2.0 km/h (1.2 mph). Holding the “RES+” or “SET-” side of the cruise control setting switch down will increase or decrease the speed continuously until the switch is released.
- The traveling speed can also be increased manually using the throttle. While the speed is being increased manually or after the traveling speed has increased 4 km/h or higher than the set cruising speed, a new cruising speed can be set by pushing the “SET-” side of the switch. If a new cruising speed has not been set, the vehicle will automatically decelerate to the previously set cruising speed when the throttle grip returns to the fully closed position.

Deactivating the cruise control system

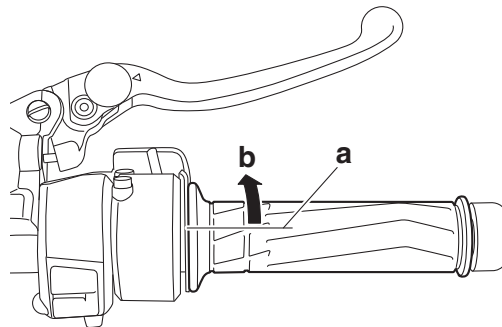
Perform one of the following operations to cancel the set cruising speed. The cruise control setting indicator light “SET” will go off.

- Turn the throttle grip past the closed position in the deceleration direction.
- Apply the front or rear brake.
- Apply the clutch lever.

Push the power switch to turn off the cruise control system. The cruise control system indicator light “” and the cruise control setting indicator light “SET” will go off.

TIP

Traveling speed decreases as soon as the cruise control system is deactivated; unless the throttle grip is turned.



- a. Closed position
- b. Cruise control cancel direction

Using the resume function

Push the “RES+” side of the cruise control setting switch to reactivate the cruise control system. The traveling speed will return to the previously set cruising speed. The cruise control setting indicator light “SET” will come on.

If the “SET-” side of the cruise control setting switch is pushed during the resume operation, the current traveling speed will be set as the new cruising speed.

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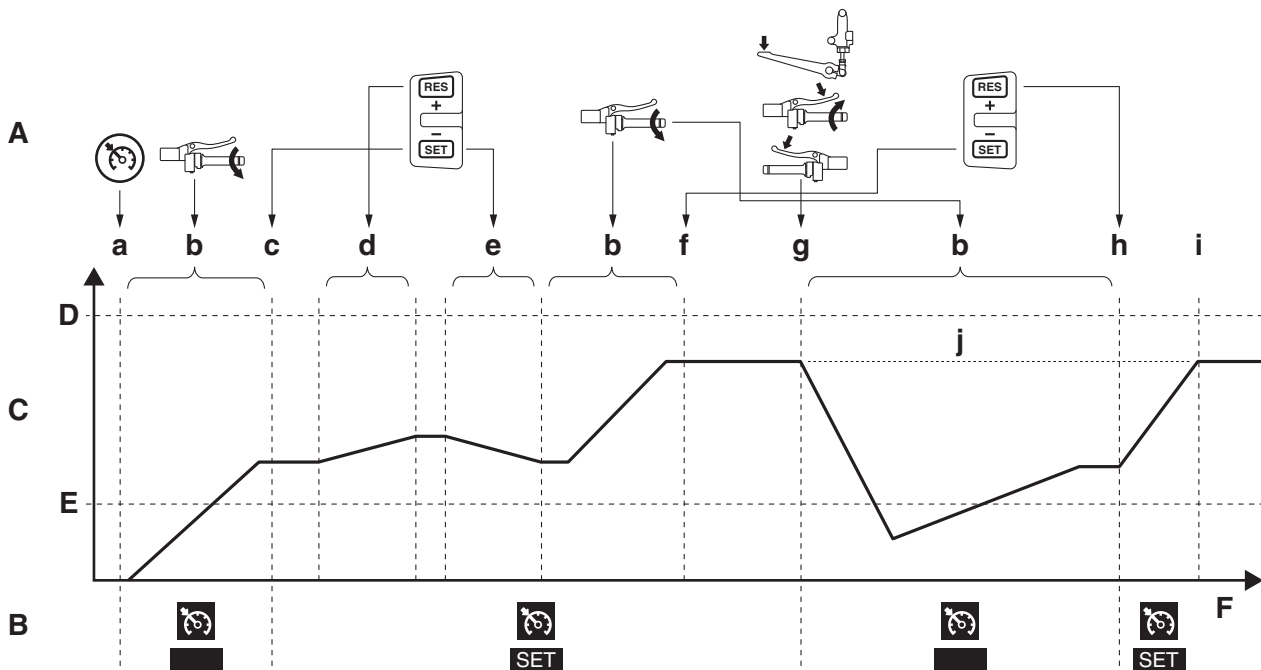


It is dangerous to use the resume function when the previously set cruising speed is too high for current conditions.

TIP

- The resume function operates when riding in 3rd gear at speeds between about 50 km/h (31 mph) and 160 km/h (100 mph), or 4th or 5th gear at speeds between about 50 km/h (31 mph) and 180 km/h (112 mph).
 - Pushing the power switch while the system is operating will turn the system off completely and erase the previously set cruising speed. You will not be able to use the resume function until a new cruising speed has been set.
-

Operation chart



- A. Operation
- B. Indication
- C. Speed
- D. 180 km/h (112 mph)
- E. 50 km/h (31 mph)
- F. Time



- a. Cruise control power switch “” “ON”
- b. Manual acceleration
- c. Push the “SET-” side of the cruise control setting switch
- d. Currently set cruising speed increases
- e. Currently set cruising speed decreases
- f. New cruising speed is set
- g. Currently set cruising speed is canceled
- h. Resume operation starts
- i. Resume operation finishes
- j. Currently set cruising speed

Automatic deactivation of the cruise control system

The cruise control system for this model is electronically controlled and is linked with the other control systems. The cruise control system will automatically become deactivated under the following conditions:

- The cruise control system is not able to maintain the set cruising speed. (If the traveling speed decreases by approximately 10 km/h (6 mph) or more than the set cruising speed)
- The traction control system is turned on and has been activated. (Traction control system indicator/warning light flashes)
- Traction control system is turned off and wheel slip or wheel spin is detected. (The changes in the vehicle speed signals exceed a preset value.)
- The start/engine stop switch is set to the “” position.
- The engine stalls.
- The sidestand is extended.

FEATURES

Automatic deactivation condition	Vehicle condition for detection	Multi-function meter indication
Unable to maintain the set cruising speed	Cruise control system is turned on and cruising speed is set	Cruise control system indicator light “  ” goes off and cruise control setting indicator light “SET” flashes for 4 seconds
Traction control system is engaged		
Wheel slip or wheel spin is detected		
Start/engine stop switch is set to the “  ” position	Cruise control system is turned on	
Engine stalls		
Sidestand is extended		

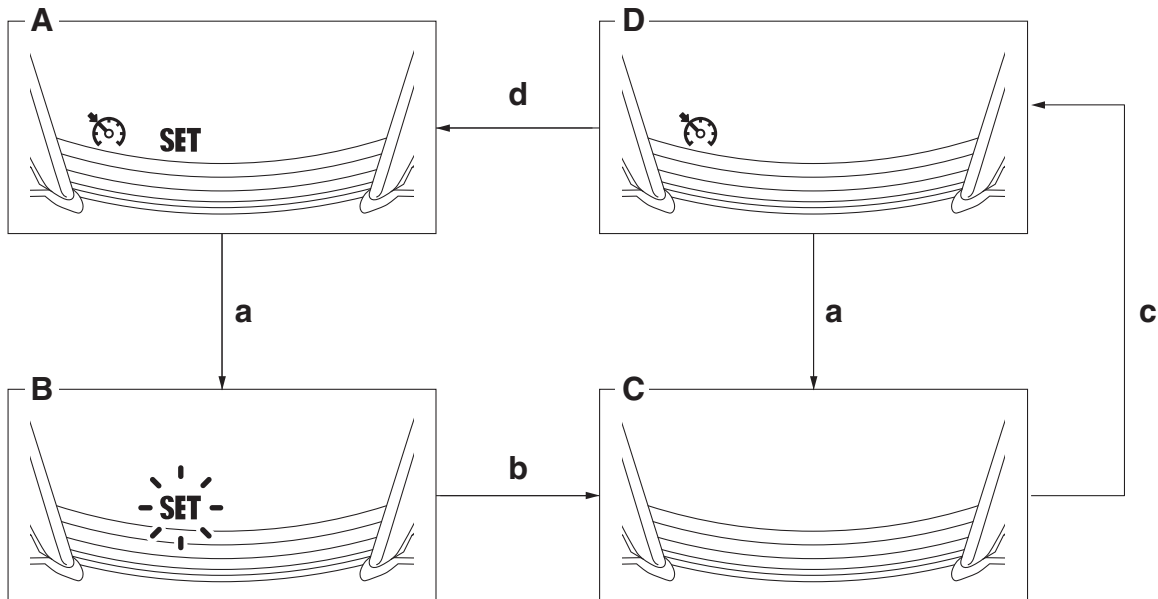
Because the automatic deactivation of the cruise control system is stored in the memory of the ECU, the deactivation can be checked using the Yamaha diagnostic tool.



TIP

In some cases, the cruise control system may not be able to maintain the set cruising speed when the vehicle is traveling uphill or downhill.

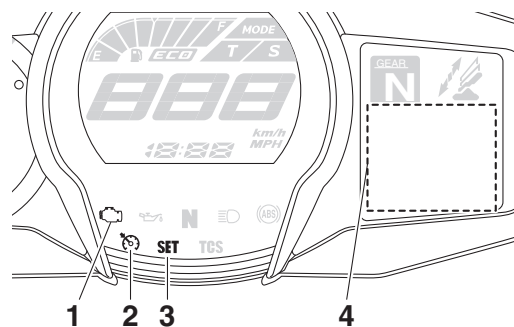
- When the vehicle is traveling uphill, the actual traveling speed may become lower than the set cruising speed. If this occurs, accelerate to the desired traveling speed using the throttle.
- When the vehicle is traveling downhill, the actual traveling speed may become higher than the set cruising speed. If this occurs, the setting switch cannot be used to adjust the set cruising speed. To reduce the traveling speed, apply the brakes. When the brakes are applied, the cruise control system will become deactivated.
- If the cruise control system turns off automatically while the cruising speed is not set, the cruise control setting indicator light “SET” will not flash.

Meter displays during cruise control system operation



- A. Cruise control system is activated (cruising speed is set)
- B. Cruise control system is turned off (cruise control system indicator light “
 - a. Condition for automatically deactivating cruise control system is detected
 - b. 4 seconds elapse (during this time, input from the cruise control power switch “

Self-diagnosis device



- 1. Engine trouble warning light “


The cruise control system will also become deactivated when an irregularity with any of the vehicle systems is detected. The cruise control setting indicator light “SET” will go off and the cruise control system indicator light “

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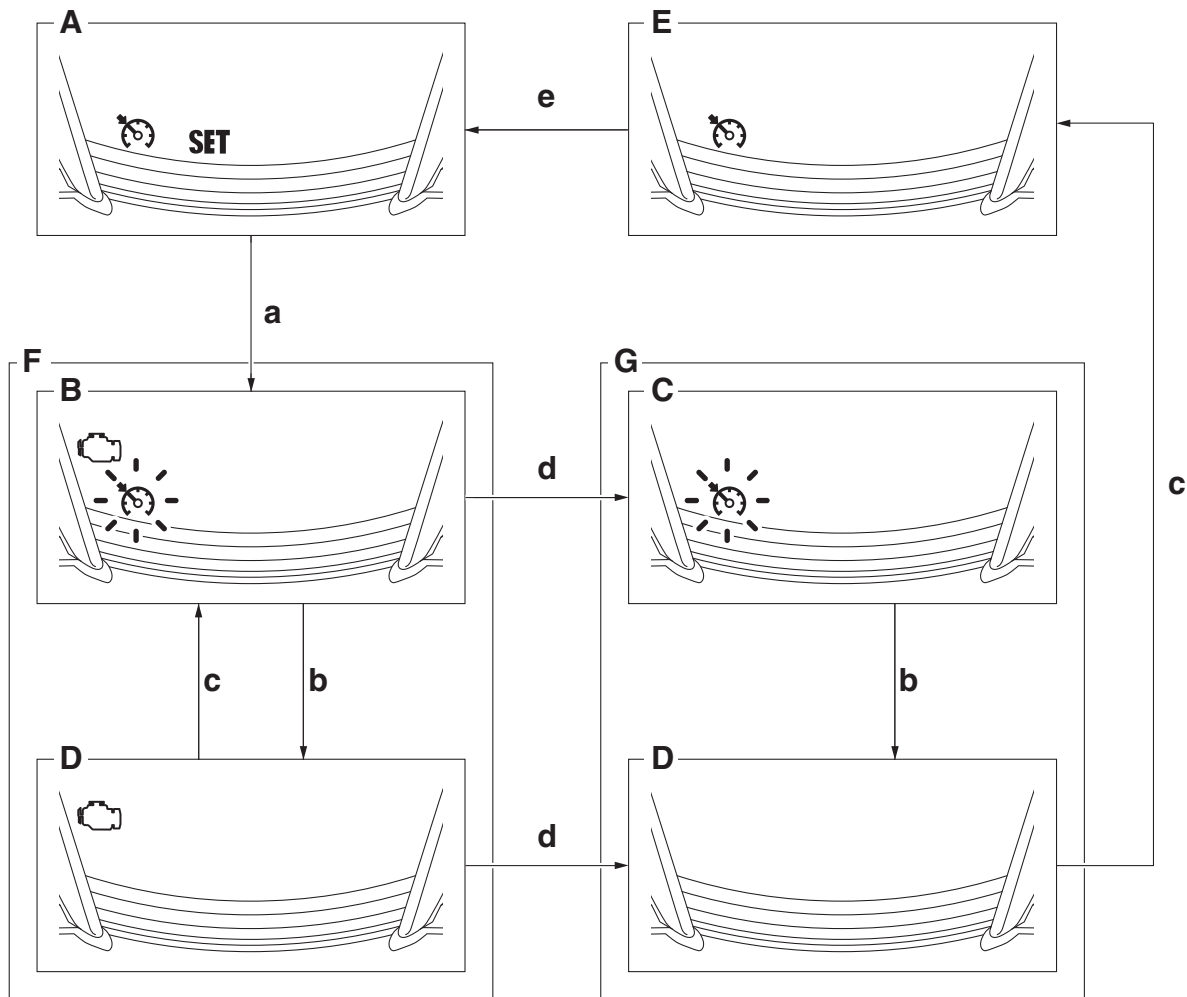
NOTICE



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

TIP

- If the cruise control system turned off because a malfunction was detected by the FI self-diagnosis, the cruise control power switch “

Meter displays during cruise control system operation



- A. Cruise control system is activated (cruising speed is set)
- B. Cruise control system is turned off (engine trouble warning light “
 - a. Malfunction occurs
 - b. Cruise control power switch “

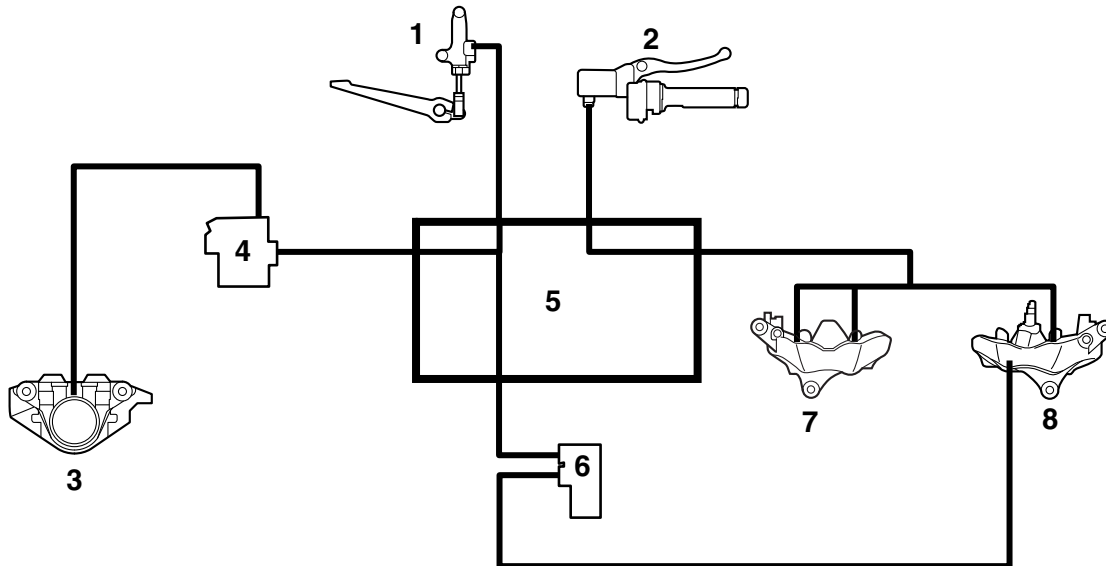
1-12

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OUTLINE OF THE UNIFIED BRAKE SYSTEM

The Yamaha unified brake system is a system that operates one set of pistons in the front brakes together with the rear brake when the brake pedal is depressed. Compared to conventional brake systems, the ability to slow the vehicle using the simple operation of the brake pedal is improved.

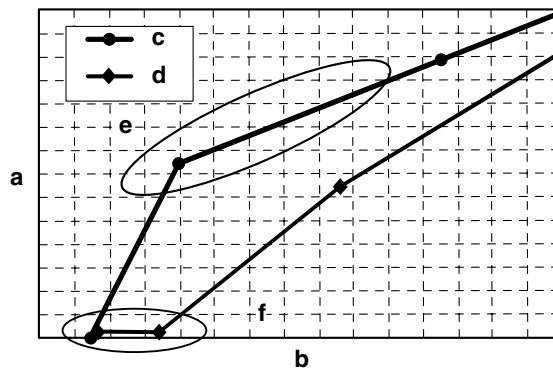
Unified brake system block diagram



- | | |
|--------------------------------------|------------------------------|
| 1. Rear brake master cylinder | 6. Metering valve |
| 2. Front brake master cylinder | 7. Left front brake caliper |
| 3. Rear brake caliper | 8. Right front brake caliper |
| 4. Proportioning valve | |
| 5. Hydraulic unit assembly (ABS ECU) | |

When the brake lever is squeezed, both sets of pistons in the left front brake caliper are operated, but only one set of pistons in the right front brake caliper is operated. When the brake pedal is depressed, the rear brake caliper and one set of pistons in the right front brake caliper are operated. The brake line from the rear brake master cylinder is split at the hydraulic unit to transmit brake fluid pressure to both the rear brake caliper and part of the right front brake caliper in the unified brake system. The brake fluid pressure transmitted to the rear brake caliper and part of the right front brake caliper is controlled by the proportioning valve and metering valve respectively. The operation of these two valves ensures that the braking feeling of conventional brakes is maintained when a small amount of force is applied to the brake pedal, such as when making U-turns, and prevents early locking of the rear wheel when a large amount of force is applied.

Brake pedal input force and braking force at each wheel



- a. Brake force
- b. Brake pedal force
- c. Rear brake force
- d. Front brake force (unified brake system)
- e. Proportioning valve operation
- f. Metering valve operation

Metering valve

This valve prevents the brake fluid pressure that is transmitted to the right front brake caliper from increasing until the pressure exceeds a set level. Only the rear brake caliper is operated when there is an extremely low amount of brake pedal input.

Proportioning valve

This valve reduces the increase in brake fluid pressure that is transmitted to the rear brake caliper when the pressure exceeds a set level. The increase in brake fluid pressure to the rear brake caliper is controlled when there is a high amount of brake pedal input.

EC3P61017

NOTICE

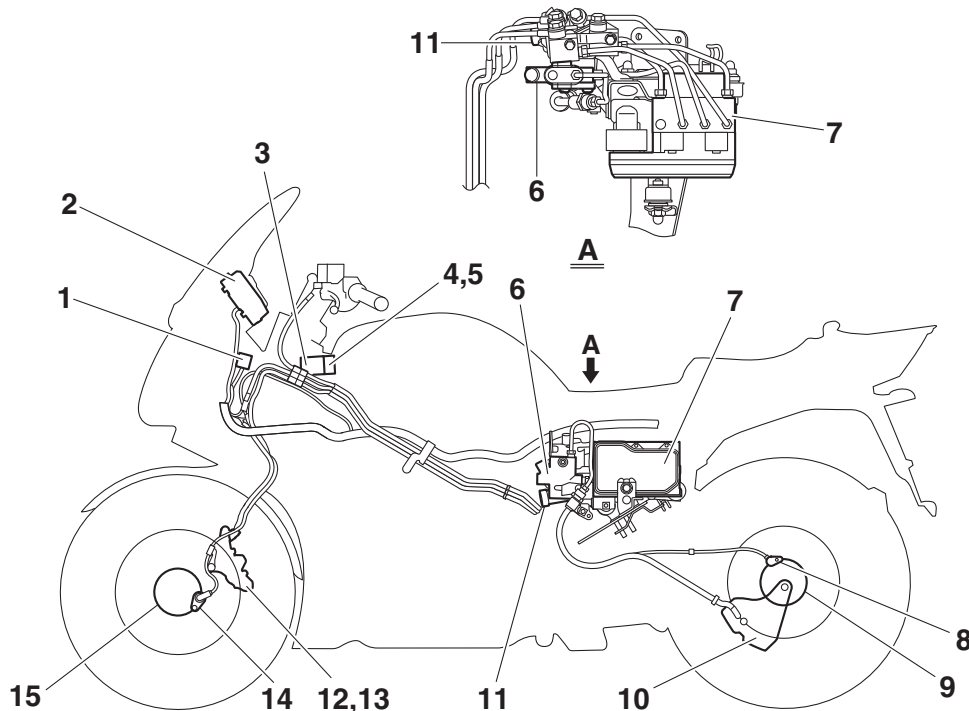
- The unified brake system is a system to assist the brake operation. However, both the brake lever and the brake pedal must be operated for maximum braking effect.
- Because the balance between the right front brake caliper and the rear brake caliper in the unified brake system is determined mechanically, be sure to use the specified brake pads.
- Each set of brake pads should be checked individually and replaced if necessary.

ET3P61019

OUTLINE OF THE ABS

1. The Yamaha ABS (anti-lock brake system) features an electronic control system, which acts on the front and rear brakes independently. However, one set of pistons in the right front brake caliper is operated together with the rear brake and this set of pistons is operated only if the force used to depress the brake pedal exceeds a preset level.
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 test coupler | 9. Rear wheel sensor rotor |
| 2. ABS warning light | 10. Rear brake caliper |
| 3. ABS ECU fuse | 11. Metering valve |
| 4. ABS solenoid fuse | 12. Left front brake caliper |
| 5. ABS motor fuse | 13. Right front brake caliper (partially operated together with the rear brake) |
| 6. Proportioning valve | 14. Front wheel sensor |
| 7. Hydraulic unit assembly (ABS ECU) | 15. Front wheel sensor rotor |
| 8. Rear wheel sensor | |

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. However, part of the front brake is operated together with 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.

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

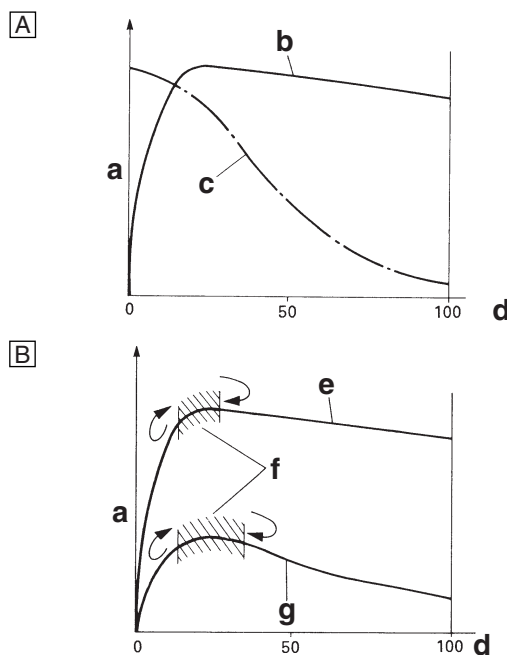
0%: There is no slipping between the wheel and the road surface. The chassis speed is equal to the wheel speed.

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".



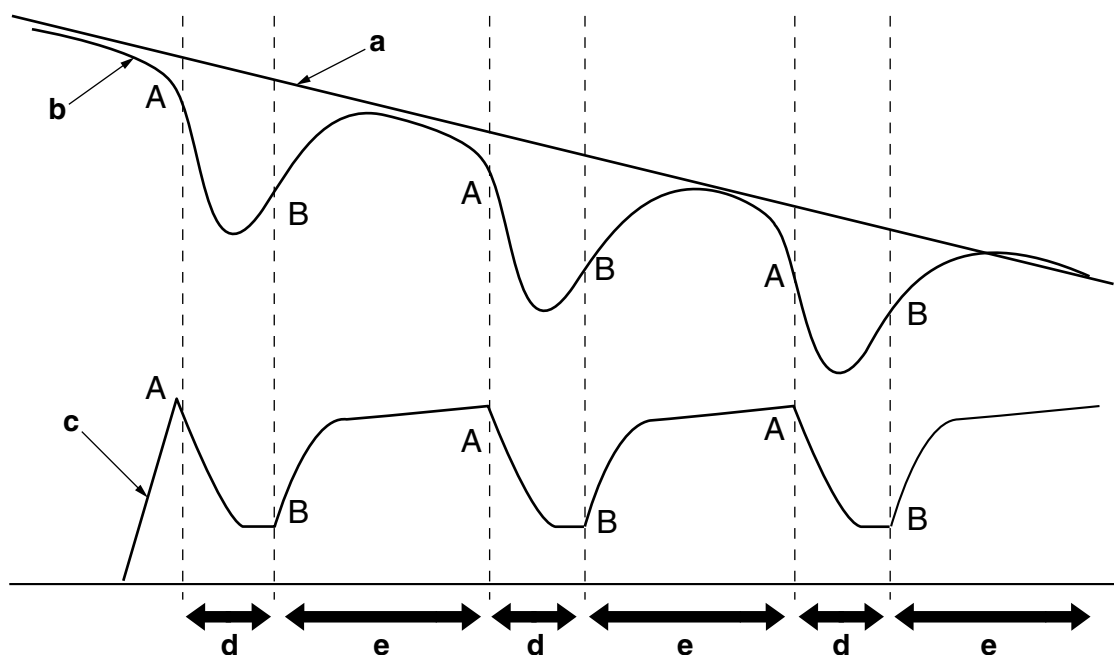
- | | |
|---|-------------------------------|
| a. Friction force between the tire and road surface | d. Slip ratio (%) |
| b. Brake force | e. Less slippery road surface |
| c. Side force | f. Controlling zone |
| | g. Slippery road surface |

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.

EW3P61003

⚠ WARNING

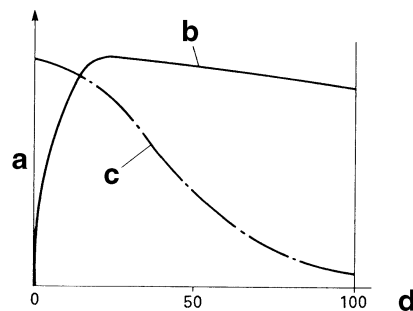
The braking of the vehicle, even in the worst case, is principally executed when the vehicle is advancing straight ahead. During a turn, sudden braking is liable to cause a loss of traction of the tires. Even in vehicles equipped with ABS, overturning of the vehicle cannot be prevented if it is braked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

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

EWA13870

⚠ WARNING

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



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

Electronic ABS features

The Yamaha ABS (anti-lock brake system) has been developed with the most advanced electronic technology.

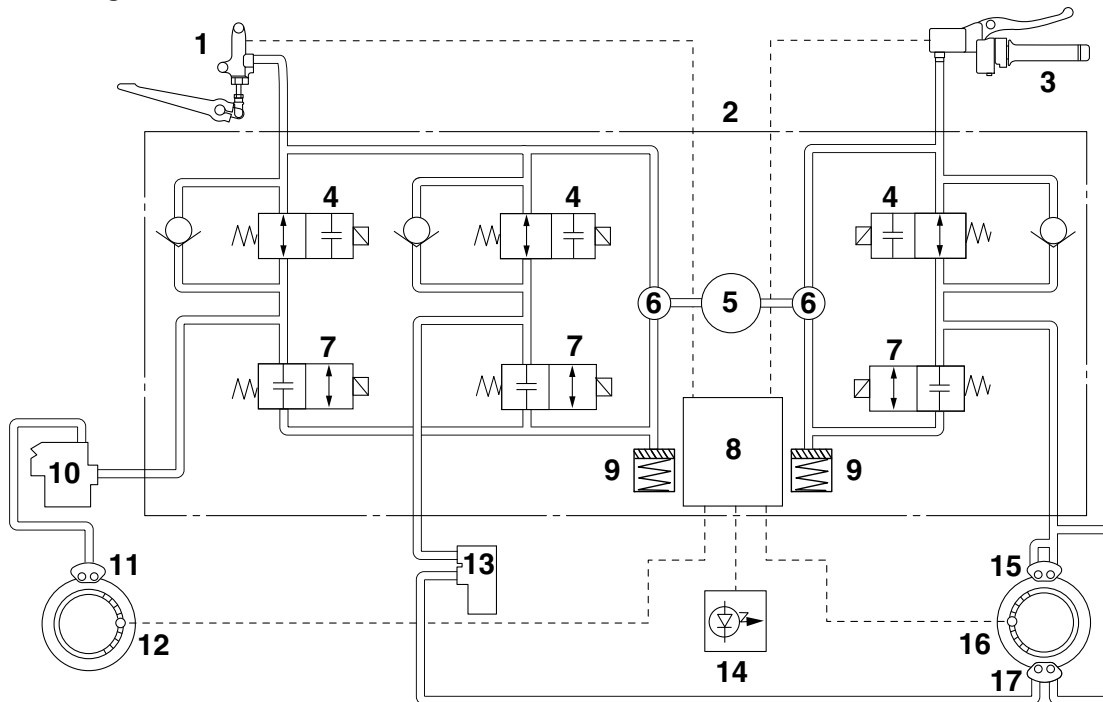
The ABS control is processed with good response under various vehicle travel conditions.

The ABS also includes a highly developed self-diagnosis function. The ABS detects any problem condition and allows normal braking even if the ABS is not operating properly.

When this occurs, the ABS warning light in the multi-function meter center display comes on.

The ABS stores the fault codes in the memory of the ABS ECU for easy problem identification and troubleshooting.

ABS block diagram



- | | |
|--------------------------------|-------------------------------|
| 1. Rear brake master cylinder | 10. Proportioning valve |
| 2. Hydraulic unit assembly | 11. Rear brake caliper |
| 3. Front brake master cylinder | 12. Rear wheel sensor |
| 4. Inlet solenoid valve | 13. Metering valve |
| 5. ABS motor | 14. ABS warning light |
| 6. Hydraulic pump | 15. Left front brake caliper |
| 7. Outlet solenoid valve | 16. Front wheel sensor |
| 8. ABS ECU | 17. Right front brake caliper |
| 9. Buffer chamber | |

ET3P61051

ABS COMPONENT FUNCTIONS

Wheel sensors and wheel sensor rotors

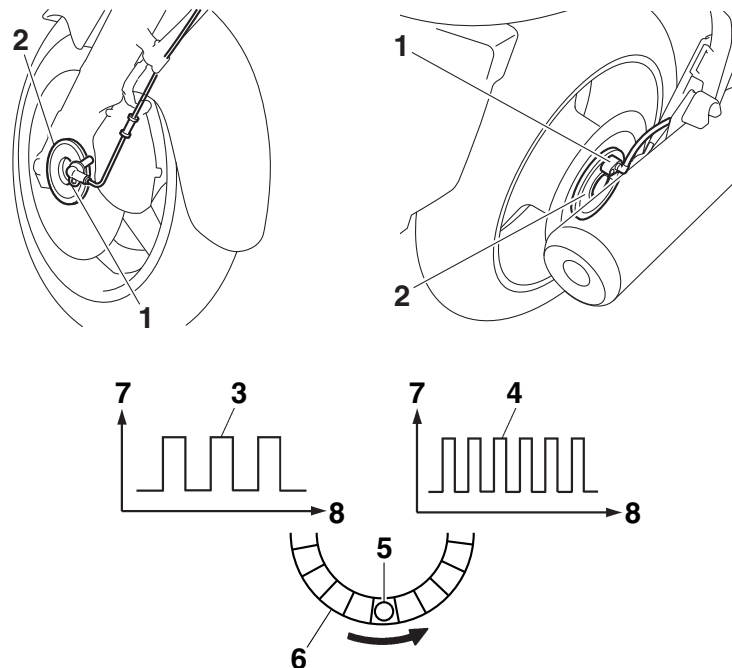
Wheel sensors “1” detect the wheel rotation speed and transmit the wheel rotation signal to the ABS ECU.

Each wheel sensor contains a Hall IC. The wheel sensors are installed in the sensor housing for each wheel.

Sensor rotors “2” are installed on the inner side of the front and rear wheel hubs and rotate with the wheels.

The front and rear sensor rotors each have 84 magnetic poles (42 pairs) and are installed close to the wheel sensors. As the sensor rotor rotates, the Hall element in the Hall IC installed in the wheel sensor generates pulses. The pulse frequency, which is proportional to the magnetic flux density, is converted into a wave in the Hall IC so that it can be output.

The ABS ECU calculates the wheel rotation speed by detecting the pulse frequency.



- 3. At low speed
- 4. At high speed
- 5. Wheel sensor
- 6. Wheel sensor rotor

- 7. Voltage
- 8. Time


ABS warning light

The ABS warning light “1” comes on to warn the rider if a malfunction in the ABS occurs.

When the main switch is turned to “ON”, the ABS warning light comes on 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 approximately 6–10 km/h (4–6 mph).

TIP

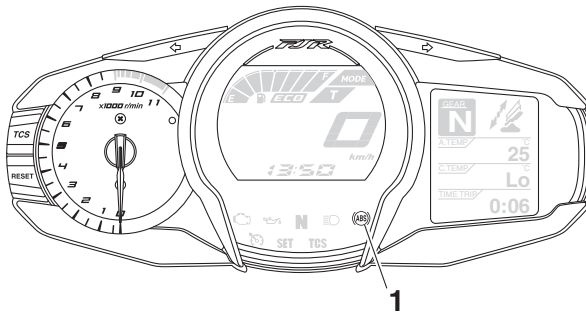
- If the brakes are applied (a brake light switch is on) while the vehicle is being ridden, it may take longer for the ABS warning light to go off.
- After all checks and servicing are completed, the ABS warning light will go off when the vehicle is ridden or pushed at a speed of 7 km/h (4 mph) or faster.

To check the ABS electrical circuit, the ABS warning light comes on while the “” side of the start/engine stop switch is being pushed.

ECA1MC1011

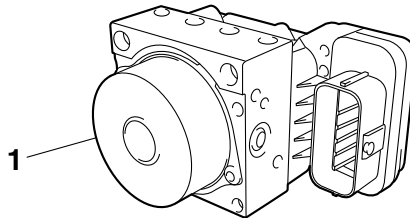
NOTICE

If the rear wheel is raced with the vehicle on the centerstand, the ABS warning light may flash or come on. If this occurs, turn the main switch to “OFF”, then back to “ON”. The ABS operation is normal if the ABS warning light 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**

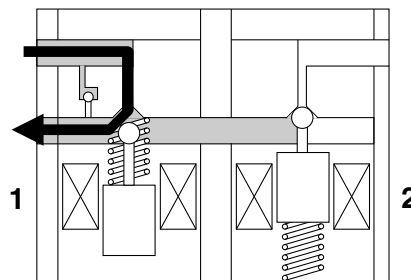
The hydraulic unit assembly “1” is composed of hydraulic control valves (each with a outlet solenoid valve and inlet solenoid valve), buffer chambers, hydraulic pumps, an ABS motor, and ABS ECU. The hydraulic unit adjusts the front and rear wheel brake fluid pressure to control the wheel speed according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



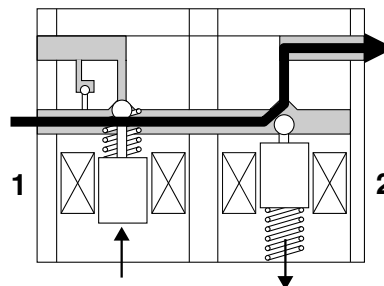
• **Hydraulic control valve**

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.

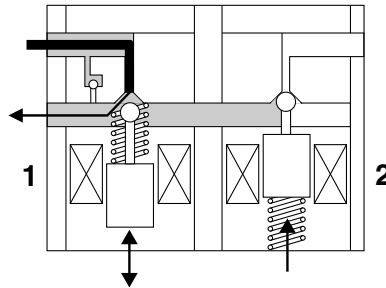
1. When the brakes are operated normally, the inlet solenoid valve “1” is open and the outlet solenoid valve “2” is closed. The brake line between the brake master cylinder and brake caliper is open.



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.

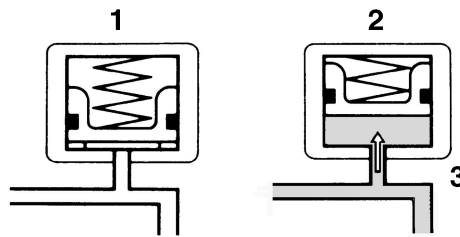


3. When the ABS ECU sends a signal to stop reducing the hydraulic pressure, the outlet solenoid valve "2" closes and the brake fluid is pressurized again. The inlet solenoid valve "1" controls the hydraulic pressure difference between the brake fluid in the upper brake lines (brake master cylinder side)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



- **Buffer chamber**

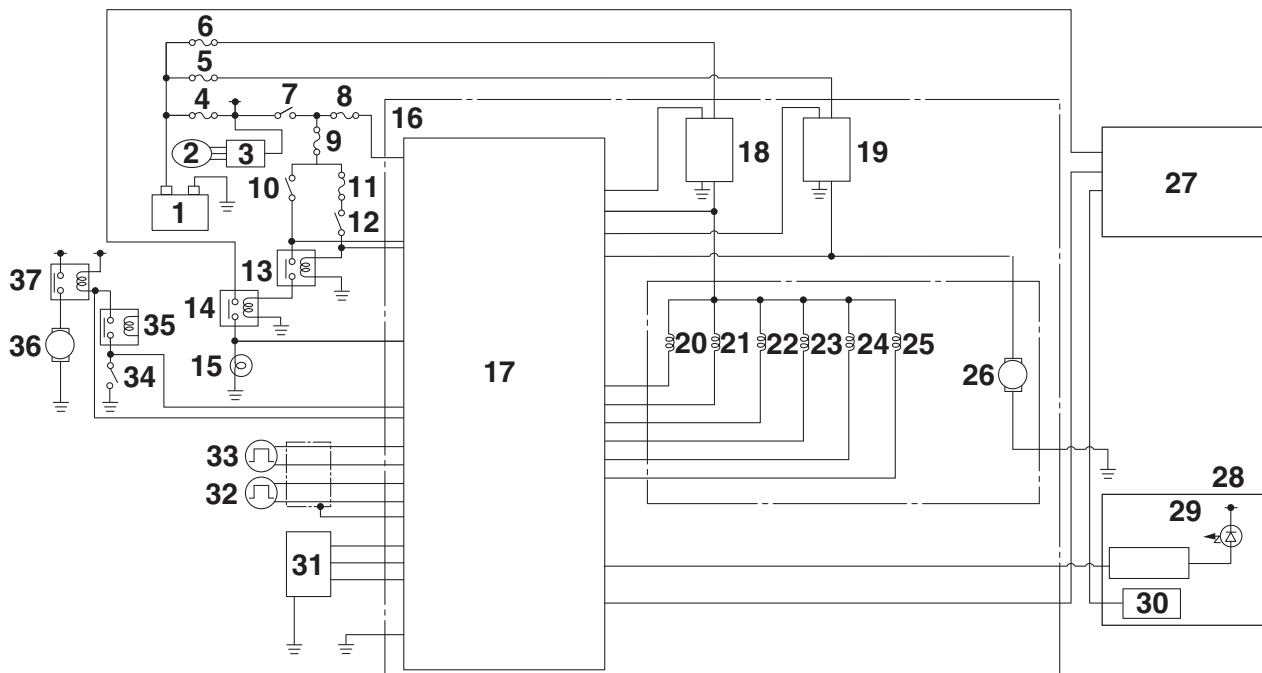
The buffer chamber accumulates the brake fluid that is depressurized while the ABS is operating.



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 | 20. Front brake inlet solenoid |
| 2. AC magneto | 21. Front brake outlet solenoid |
| 3. Rectifier/regulator | 22. Rear brake inlet solenoid |
| 4. Main fuse | 23. Rear brake outlet solenoid |
| 5. ABS motor fuse | 24. Unified brake system inlet solenoid |
| 6. ABS solenoid fuse | 25. Unified brake system outlet solenoid |
| 7. Main switch | 26. ABS motor |
| 8. ABS ECU fuse | 27. ECU (engine control unit) |
| 9. Signaling system fuse | 28. Meter assembly |
| 10. Front brake light switch | 29. ABS warning light |
| 11. Brake light fuse | 30. Speedometer |
| 12. Rear brake light switch | 31. ABS test coupler |
| 13. Brake switch relay | 32. Rear wheel sensor |
| 14. Brake light relay | 33. Front wheel sensor |
| 15. Tail/brake light | 34. Start switch |
| 16. Hydraulic unit assembly | 35. Starting circuit cut-off relay |
| 17. ABS ECU | 36. Starter motor |
| 18. Solenoid relay | 37. Starter relay |
| 19. ABS motor relay | |

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

ABS control operation

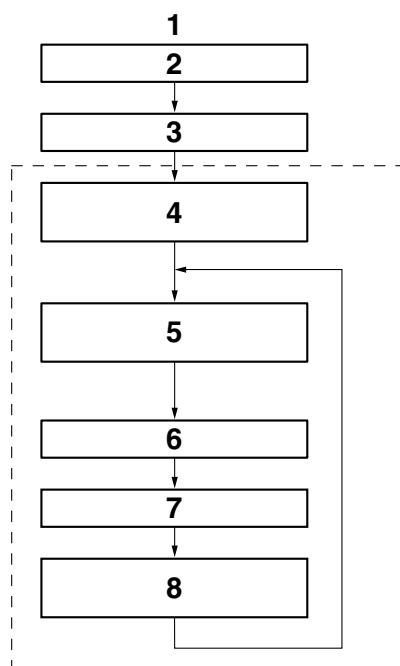
The ABS control operation performed in the ABS ECU is divided into the following two parts.

- Hydraulic control
- Self-diagnosis

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

TIP

- Some types of malfunctions are not recorded in the memory of the ABS ECU (e.g., a blown ABS ECU fuse).
- The ABS performs a self-diagnosis test for a few seconds each time the vehicle first starts off after the main switch was turned on. During this test, a “clicking” noise can be heard from under the seat, and if the 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

ET3P61052

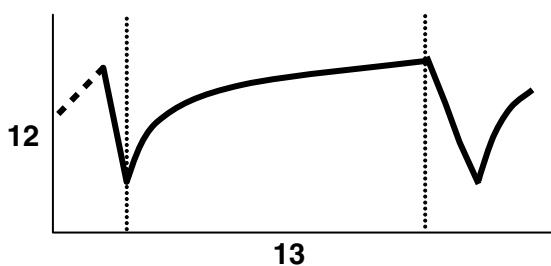
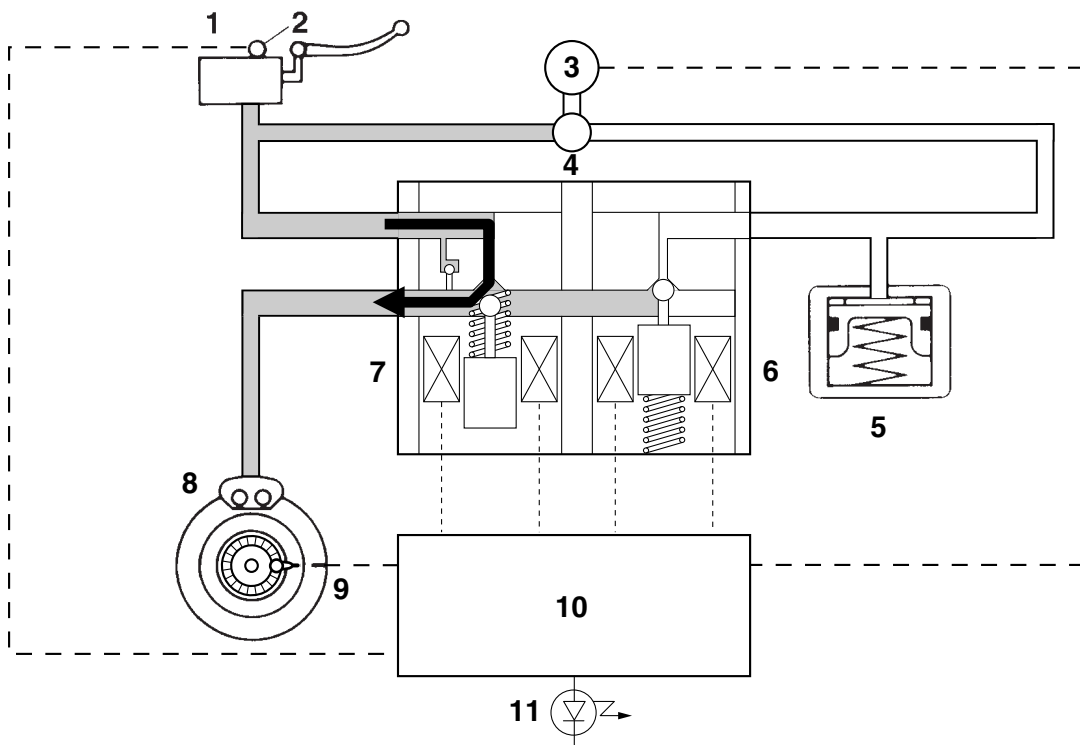
ABS OPERATION

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

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.



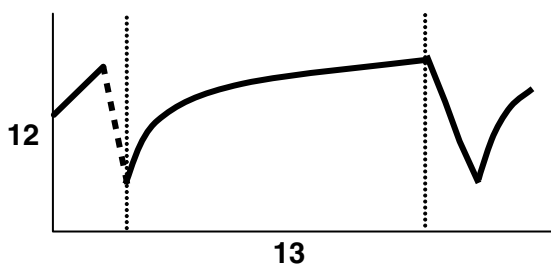
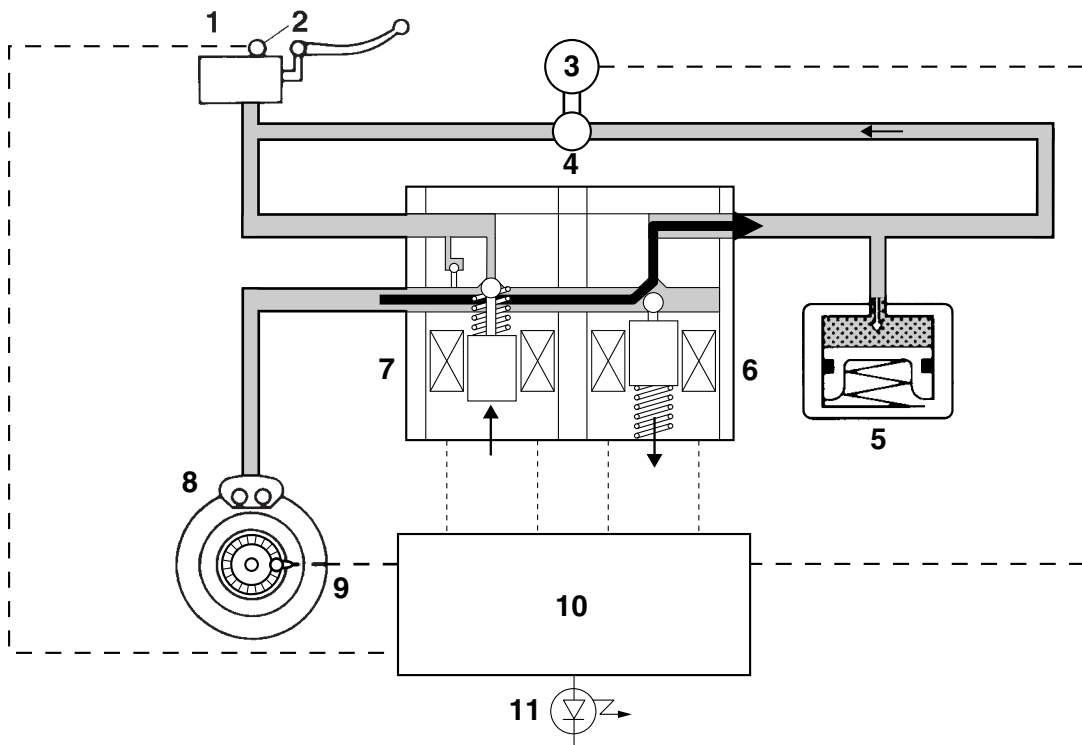
- | | |
|--------------------------|--------------------------|
| 1. Brake master cylinder | 12. Brake fluid pressure |
| 2. Brake light switch | 13. Time |
| 3. ABS motor | |
| 4. Hydraulic pump | |
| 5. Buffer chamber | |
| 6. Outlet solenoid valve | |
| 7. Inlet solenoid valve | |
| 8. Brake caliper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

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.

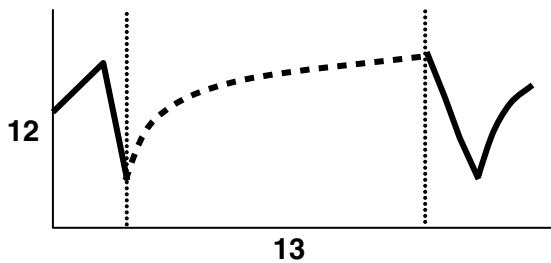
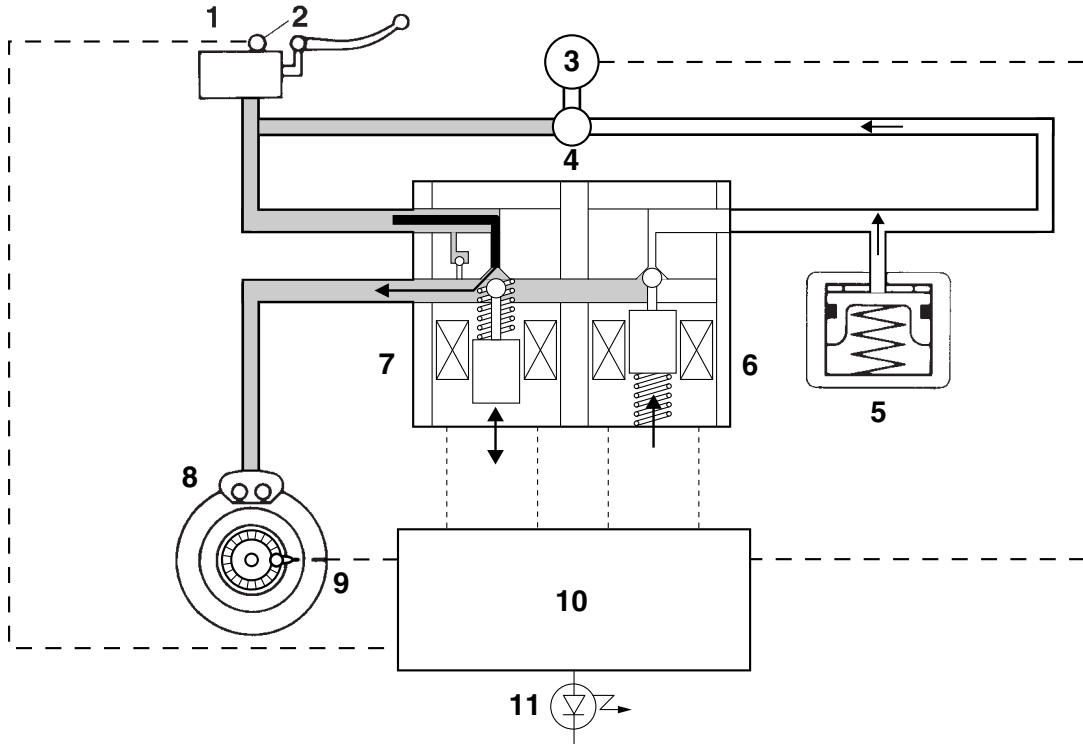
The brake fluid stored in the buffer chamber is pumped back to the brake master cylinder by the hydraulic pump linked to the ABS motor.



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.



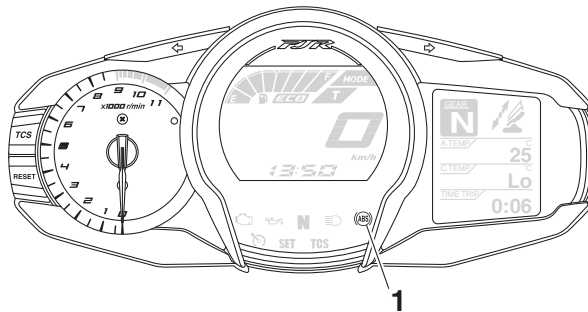
1. Brake master cylinder
2. Brake light switch
3. ABS motor
4. Hydraulic pump
5. Buffer chamber
6. Outlet solenoid valve
7. Inlet solenoid valve
8. Brake caliper
9. Wheel sensor
10. ABS ECU
11. ABS warning light
12. Brake fluid pressure
13. Time

ET3P61053

ABS SELF-DIAGNOSIS FUNCTION

ABS warning light

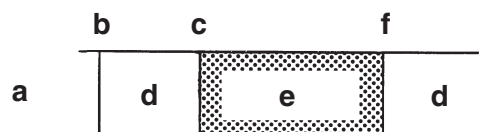
The ABS warning light “1” comes on when a malfunction is detected by the ABS self-diagnosis. It is located in the multi-function meter center display.



Instances when the ABS warning light comes on

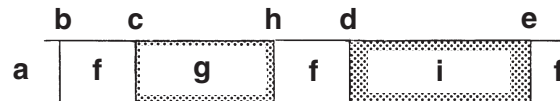
1. The ABS warning light comes on when the main switch is turned to “ON”.

The ABS warning light remains on while the ABS is performing a self-diagnosis, then goes off if there are no problems. The ABS self-diagnosis starts when the main switch is turned to “ON” and finishes when the vehicle is ridden at a speed of approximately 10 km/h (6 mph). (Refer to “ABS warning light” on page 1-20.)



- a. ABS warning light
- b. Main switch “OFF”
- c. Main switch “ON”
- d. Goes off
- e. Comes on
- f. ABS self-diagnosis finishes when the vehicle is ridden at a speed of approximately 10 km/h (6 mph) (Refer to “ABS warning light” on page 1-20.)

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



- a. ABS warning light
- b. Main switch “OFF”
- c. Main switch “ON”
- d. Start switch “ON”
- e. Start switch “OFF”
- f. Goes off
- g. Comes on
- h. ABS self-diagnosis finishes when the vehicle is ridden at a speed of approximately 10 km/h (6 mph) (Refer to “ABS warning light” on page 1-20.)
- i. Comes on while the “⊗” side of the start/engine stop switch is being pushed

3. The ABS warning light comes on while riding.

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



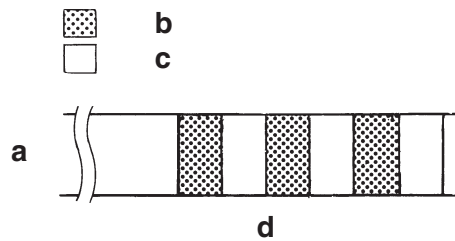
- a. ABS warning light
- b. Comes on

4. The ABS warning light flashes while riding.

If the ABS warning light flashes while riding, there is no problem with the function of the ABS. However, the ABS ECU input has unstable factors. (For details, refer to “ABS TROUBLESHOOTING OUTLINE” on page 8-131.)

TIP

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



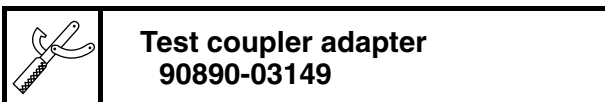
- a. ABS warning light
- b. Comes on
- c. Goes off

d. Unstable ABS ECU input

5. The ABS warning light “1” flashes and a fault code “2” is indicated on the multi-function meter right display when the test coupler adapter “3” is connected to the ABS test coupler “4” for troubleshooting the ABS.

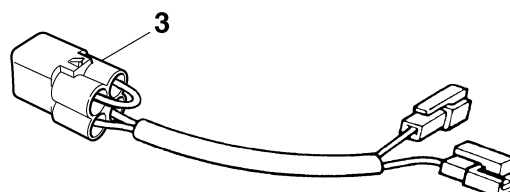
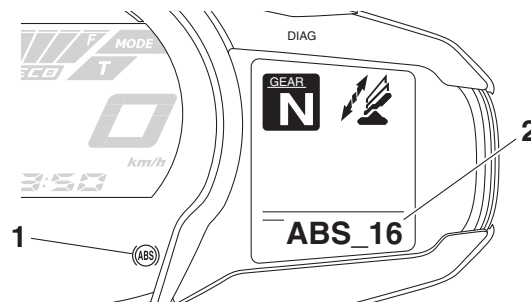
The ABS test coupler can be accessed by removing the right upper inner panel.

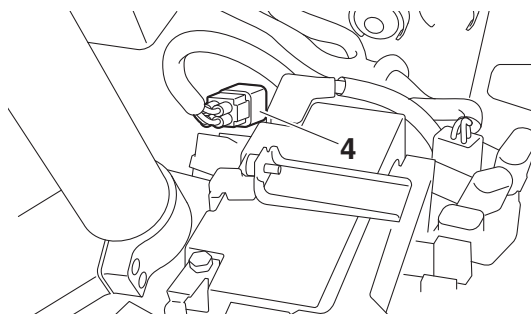
When the test coupler adapter is connected to the ABS test coupler, the ABS warning light starts flashing and the multi-function meter right display indicates all the fault codes recorded in the ABS ECU.



TIP

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





ET3P61054

ABS WARNING LIGHT AND OPERATION

ABS and UBS function

EWA1MC1024



- 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.
 - The ABS and UBS are 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 and UBS do 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.
-

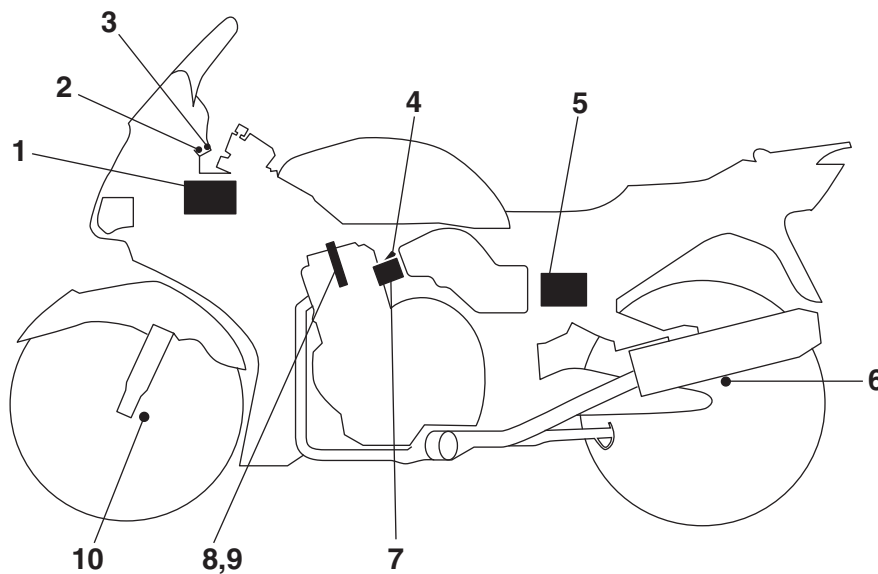
EAS1MC1082

OUTLINE OF THE TCS (Traction Control System)

The traction control system controls excessive spinning (slipping) of the rear wheel when accelerating on slippery surfaces, such as unpaved or wet roads.

The ECU monitors the front and rear wheel speeds using the signals from the front and rear wheel sensors, and detects rear wheel slipping according to the difference between the wheel speeds. If the slipping exceeds the preset value, the ECU controls the slipping using integrated control of the ignition timing, fuel cut-off, and throttle valve opening of the YCC-T system.

TCS (Traction control system) layout

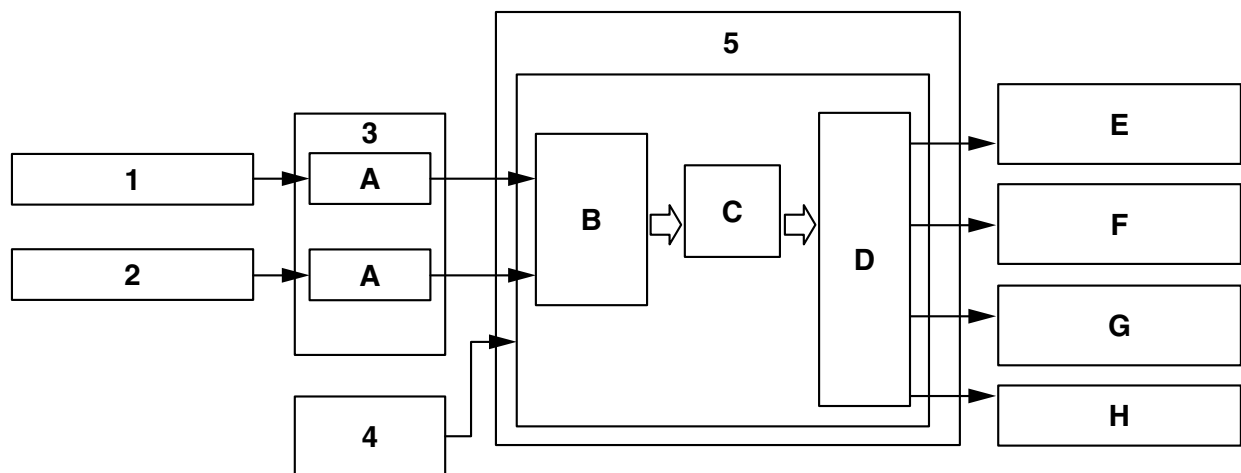


- | | |
|--|-------------------------|
| 1. ECU (engine control unit) | 6. Rear wheel sensor |
| 2. "TCS" button | 7. Throttle servo motor |
| 3. Traction control system indicator/warning light | 8. Spark plugs |
| 4. Injectors | 9. Ignition coils |
| 5. ABS ECU (electronic control unit) | 10. Front wheel sensor |

TCS (Traction control system) block diagram

The signals from the front and rear wheel sensors are sent to the ECU through the ABS ECU, and the ECU calculates the amount of slip according to the difference between the detected front and rear wheel speeds.

If the amount of slip exceeds the preset value, the ECU controls the ignition timing, fuel cut-off, and throttle valve opening of the YCC-T system so that the amount of slip is less than the preset value. The traction control system indicator/warning light in the multi-function meter center display flashes when the traction control system has activated.



1. Front wheel sensor
2. Rear wheel sensor
3. ABS ECU (electronic control unit)
4. "TCS" button
5. ECU (engine control unit)

- A. Signal conversion
- B. Slip amount calculation
- C. Exceeds preset value
- D. Actuator control
- E. Fuel cut-off
- F. Ignition timing (retarded)
- G. Traction control system indicator/warning light (flashes)
- H. YCC-T motor throttle valve opening (decreased)

TCS (Traction control system) function

The traction control system helps maintain traction when accelerating on slippery surfaces, such as unpaved or wet roads. If sensors detect that the rear wheel is starting to slip (uncontrolled spinning), the traction control system assists by regulating engine power as needed until traction is restored. The traction control system indicator/warning light flashes to let the rider know that traction control has engaged.

TIP

The rider may also notice slight changes in engine and exhaust sounds when the traction control system is engaged.

EWA1MC1025



The traction control system is not a substitute for riding appropriately for the conditions. Traction control cannot prevent loss of traction due to excessive speed when entering turns, when accelerating hard at a sharp lean angle, or while braking, and cannot prevent front wheel slipping. As with any motorcycle, approach surfaces that may be slippery with caution and avoid especially slippery surfaces.

When the main switch is turned to "ON", the traction control system automatically turns on. The traction control system can be turned on or off manually only when the main switch is in the "ON" position and the motorcycle is stopped.

To turn off the traction control system, push the "TCS" button on the meter assembly for at least 2 seconds. The traction control system indicator/warning light will come on. To turn on the traction control system, push the "TCS" button again. The traction control system indicator/warning light will go off.

TIP

Turn the traction control system off to help free the rear wheel if the motorcycle gets stuck in mud, sand, or other soft surfaces.

ECA1MC1014

NOTICE

Use only the specified tires. Using different sized tires will prevent the traction control system from controlling tire rotation accurately.

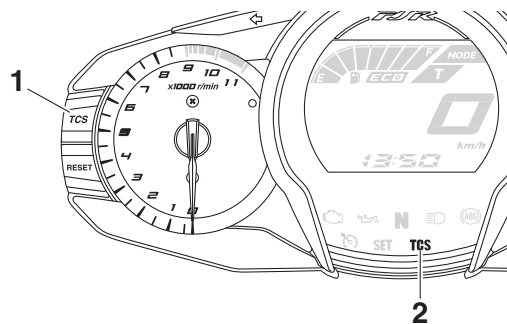
Setting the traction control system

EWA1MC1026

WARNING

Be sure to stop the vehicle before making any setting changes to the traction control system. Changing settings while riding can distract the operator and increase the risk of an accident.

To turn off the traction control system, push the “TCS” button on the meter assembly for at least 2 seconds. The traction control system indicator/warning light will come on. To turn on the traction control system, push the “TCS” button again. The traction control system indicator/warning light will go off.



1. “TCS” button
2. Traction control system indicator/warning light
“TCS”

Resetting

The traction control system will be disabled in the following condition:

- The rear wheel is rotated with the centerstand down and the main switch in the “ON” position.
- Either the front wheel or rear wheel comes off the ground while riding.
- Excessive rear wheel spinning

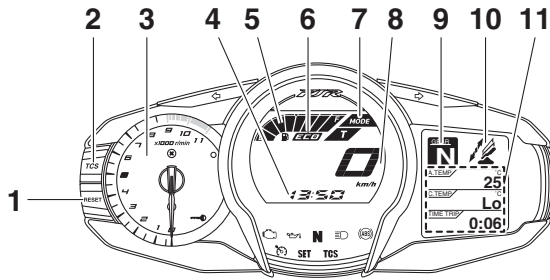
If the traction control system has been disabled, both the traction control system indicator/warning light and the engine trouble warning light come on.

To reset the traction control system:

Turn the main switch to “OFF”. Wait at least one second, then turn the main switch back to “ON”. The traction control system indicator/warning light should go off and the system will be enabled. The engine trouble warning light should go off after the motorcycle reaches at least 20 km/h (12 mph). If the traction control system indicator/warning light and/or engine trouble warning light still remain on after resetting, check the fuel injection system (Refer to “FUEL INJECTION SYSTEM” on page 8-33).

EAS1MC1030

MULTI-FUNCTION METER UNIT



1. "RESET" button
2. "TCS" button
3. Tachometer
4. Clock
5. Fuel meter
6. Eco indicator "ECO"
7. Drive mode display
8. Speedometer
9. Transmission gear display
10. Function display
11. Information display

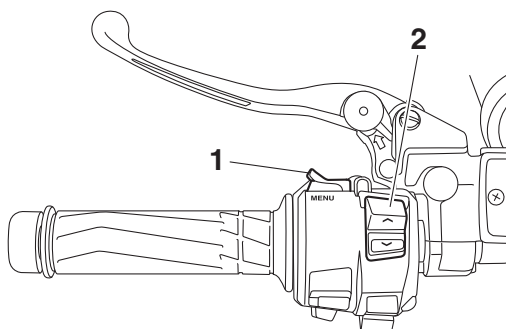
EWA1MC1008

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.

TIP

The select switch " \wedge/\vee " and the menu switch "MENU" are located on the left handlebar. These switches allow you to control or change the settings of the multi-function meter unit.



1. Menu switch "MENU"
2. Select switch " \wedge/\vee "

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

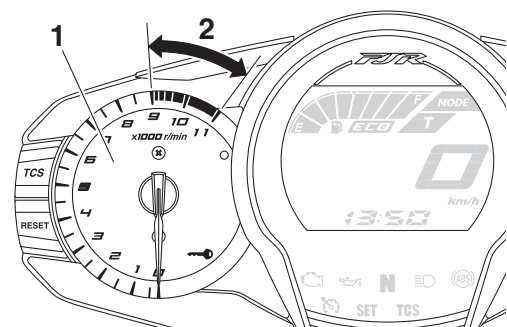
- a speedometer
- a tachometer

- a clock
- a fuel meter
- a transmission gear display
- a drive mode display (which shows the selected drive mode)
- a function display (which shows the selected function)
- an information display (which shows various information, such as the odometer reading)
- a setting mode display (which allows you to set, select, or reset the items shown in the information display)
- a self-diagnosis device

TIP

- Be sure to turn the main switch to "ON" before using the select switch " \wedge/\vee ", menu switch "MENU", "RESET" button and "TCS" button.
- For the UK only: To switch the meter displays between kilometers and miles.

Tachometer



1. Tachometer
2. Tachometer red zone

The electric tachometer allows the rider to monitor the engine speed and keep it within the ideal power range.

When the main switch is turned to "ON", the tachometer needle sweeps once across the r/min range and then returns to zero r/min in order to test the electrical circuit.

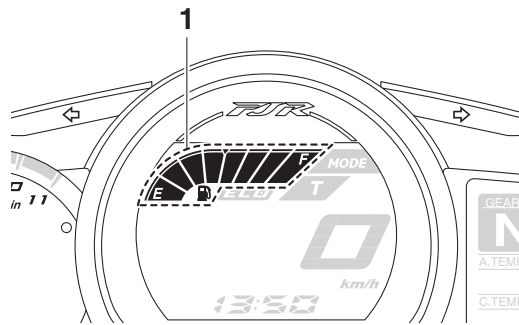
ECA1MC1007

NOTICE

Do not operate the engine in the tachometer red zone.

Red zone: 9000 r/min and above

Fuel meter



1. Fuel meter

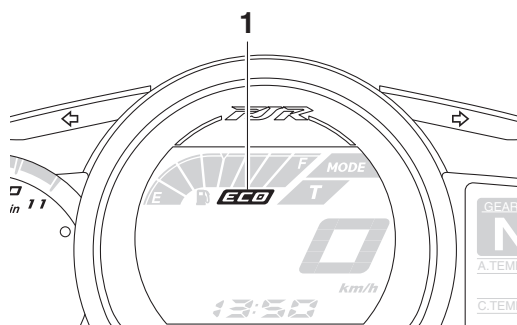
The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the fuel meter disappear towards “E” (Empty) as the fuel level decreases. When the last segment starts flashing, refuel as soon as possible.

When the main switch is turned to “ON”, all display segments come on once in order to test the electrical circuit.

TIP

This fuel meter is equipped with a self-diagnosis system. If a problem is detected in the electrical circuit, all display segments start flashing. If this occurs, check the electrical circuit. Refer to “CHECKING THE FUEL METER/FUEL LEVEL WARNING LIGHT” on page 8-185.

Eco indicator



1. Eco indicator “ECO”

This indicator comes on when the vehicle is being operated in an environmentally friendly, fuel-efficient manner. The indicator goes off when the vehicle is stopped.

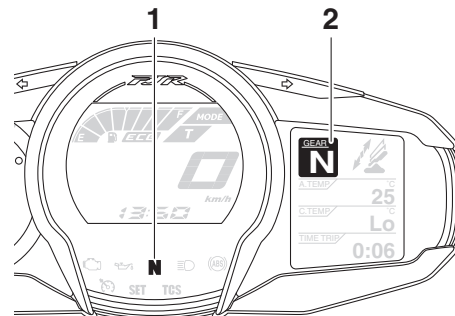
TIP

Consider the following tips to reduce fuel consumption:

- Avoid high engine speeds during acceleration.
- Travel at a constant speed.

- Select the transmission gear that is appropriate for the vehicle speed.

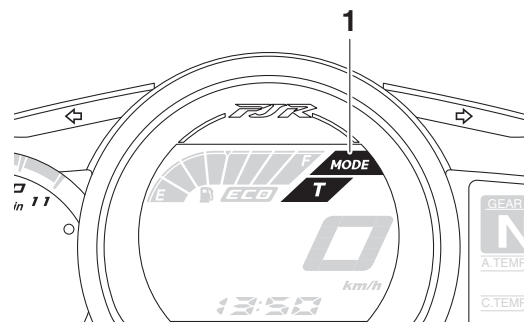
Transmission gear display



1. Neutral indicator light “N”
2. Transmission gear display

This display shows the selected gear. The neutral position is indicated by “N” and by the neutral indicator light “N”.

Drive mode display

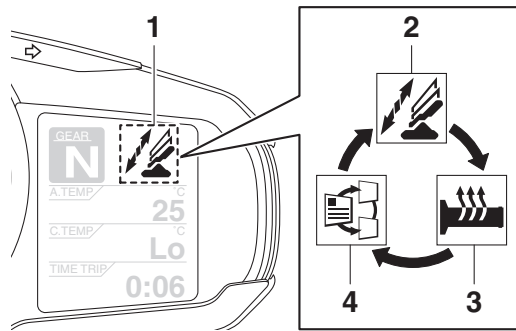


1. Drive mode display

This display indicates which drive mode has been selected: Touring mode “T” or sports mode “S”. For more details on the modes and on how to select them.

Refer to “D-mode (drive mode)”.

Function display



1. Function display
2. Windshield adjusting function
3. Grip warmer adjusting function
4. Information display selection function

Push the menu switch “MENU” to switch the display between the windshield adjusting function, grip warmer adjusting function, and information display selection function.

Adjusting the windshield position

To move the windshield up, push the “^” side of the select switch. To move the windshield down, push the “v” side of the select switch.

Adjusting the grip warmer

This vehicle is equipped with grip warmers, which can only be used when the engine is running. There are 4 grip warmer settings.

Setting	Display
Off	
Low	
Middle	
High	

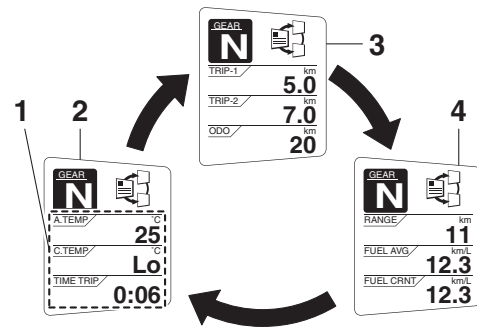
To increase the grip warmer temperature, push the “^” side of the select switch. To decrease the grip warmer temperature, push the “v” side of the select switch.

ECA1MC1008

NOTICE

- Be sure to wear gloves when using the grip warmers.
- If the ambient temperature is 20 °C (68 °F) or higher, do not set the grip warmer to the high setting.
- If the handlebar grip or throttle grip becomes worn or damaged, stop using the grip warmers and replace the grips.

Selecting the information display



1. Information display
2. Display-1
3. Display-2
4. Display-3

There are 3 information displays. The selected information display can be switched by pushing the select switch.

The following items are shown in the information displays:

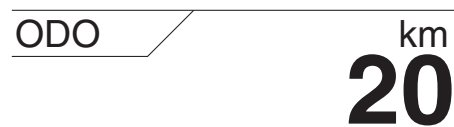
- an odometer display
- tripmeter displays
- a fuel reserve tripmeter display
- an estimated traveling range display
- an elapsed time display
- an ambient temperature display
- a coolant temperature display
- an average fuel consumption display
- an instantaneous fuel consumption display

The items shown in each information display can be selected.

To set or select the items shown.

Refer to “Setting mode”.

Odometer display:



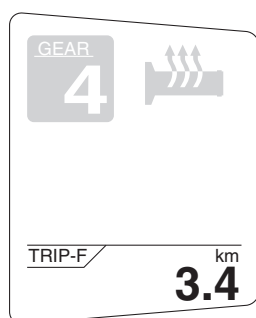
Tripmeter displays:

TRIP-1 km
5.0

TRIP-2 km
7.0

“TRIP-1” and “TRIP-2” show the distance traveled since they were last set to zero.

When approximately 5.5 L (1.45 US gal, 1.21 Imp.gal) of fuel remains in the fuel tank, the last segment of the fuel meter starts flashing. In addition, the information display will automatically change to the fuel reserve tripmeter mode “TRIP-F” and start counting the distance traveled from that point.



In that case, pushing the select switch switches the display between the various information displays in the following order;

TRIP-F → Display-1 → Display-2 →

Display-3 → TRIP-F

To reset a tripmeter, push the select switch to select the information display that contains the tripmeter. Push the “RESET” button briefly so that the tripmeter flashes, and then push the “RESET” button again for at least 2 seconds while the tripmeter is flashing. 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).

Estimated traveling range display:

RANGE km
11

The distance that can be traveled with the remaining fuel in the fuel tank under the current riding conditions is shown.

Elapsed time display:

TIME TRIP 0:06

The time that has elapsed since the main switch was turned to “ON” is shown. The maximum time that can be shown is 99:59.

This display is automatically reset when the main switch is turned to “OFF”.

TIP

There are also “TIME-2” and “TIME-3” elapsed time displays, but they cannot be set to the information display. Refer to “Setting mode”.

Ambient temperature display:

A.TEMP °C
25

This display shows the ambient temperature from -9°C to 50°C in 1°C increments. The temperature displayed may vary from the ambient temperature.

TIP

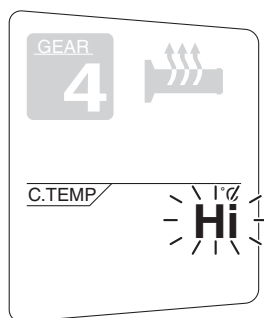
- -9°C will be displayed even if the ambient temperature falls below -9°C .
- 50°C will be displayed even if the ambient temperature climbs above 50°C .
- The accuracy of the temperature reading may be affected when riding slowly [approximately under 20 km/h (12.5 mph)] or when stopped at traffic signals, railroad crossings, etc.

Coolant temperature display:



The coolant temperature display indicates the temperature of the coolant. The coolant temperature varies with changes in the weather and engine load.

If the message "Hi" flashes, stop the vehicle, then stop the engine, and let the engine cool.



TIP

The selected information display cannot be switched while the message "Hi" is flashing.

ECA1MC1009

NOTICE

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

Average fuel consumption display:



The average fuel consumption display modes "km/L", "L/100km" or "MPG" (for the UK only) show the average fuel consumption since the display was last reset.

- The "km/L" display shows the average distance that can be traveled on 1.0 L of fuel.
- The "L/100km" display shows the average amount of fuel necessary to travel 100 km.
- For the UK only: The "MPG" display shows the average distance that can be traveled on 1.0 Imp.gal of fuel.

To reset the average fuel consumption display, push the select switch to select the information display that contains the average fuel consumption display. Push the "RESET" button briefly so that the average fuel consumption display flashes, and then push the "RESET" button again for at least 2 seconds while the display is flashing.

TIP

After resetting the average fuel consumption display, "_ _ ." will be shown for that display until the vehicle has traveled 1 km (0.6 mi).

Instantaneous fuel consumption display:



The instantaneous fuel consumption display modes "km/L", "L/100km" or "MPG" (for the UK only) show the fuel consumption under the current riding conditions.

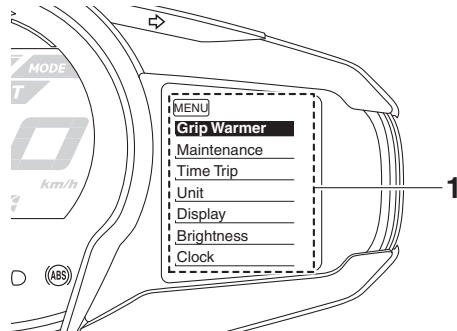
- The "km/L" display shows the distance that can be traveled on 1.0 L of fuel.

- The “L/100km” display shows the amount of fuel necessary to travel 100 km.
- For the UK only: The “MPG” display shows the distance that can be traveled on 1.0 Imp.gal of fuel.

TIP

If traveling at speeds under 10 km/h, “_ _ . _” will be displayed.

Setting mode



1. Setting mode display

TIP

- The transmission must be in neutral and the vehicle must be stopped to change settings in this mode.
- Shifting the transmission into gear and starting off, or turning the main switch to “OFF”, saves all settings made, then exits the setting mode.

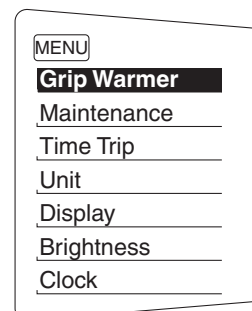
Push and hold the menu switch “MENU” for at least 2 seconds to enter the setting mode. To exit the setting mode and return to the normal display, push and hold the menu switch “MENU” again for at least 2 seconds.

Display	Description
“Grip Warmer”	This function allows you to set the low, middle, and high settings to 10 temperature levels.
“Maintenance”	This function allows you to set the oil change interval (distance traveled) and 2 other maintenance intervals. This function can also be reset.

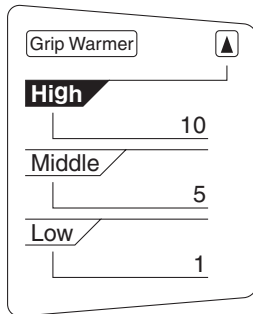
“Time Trip”	This function allows you to check and reset the “TIME-2” and “TIME-3” functions. These time trips show the total elapsed time that the main switch has been in the “ON” position. When the main switch is turned to “OFF”, the trip times stop counting but are not reset. The maximum time that can be shown is 99:59.
“Unit”	This function allows you to switch the fuel consumption units between “L/100km” and “km/L”. For the UK only: This function allows you to switch the display units between kilometers and miles. When kilometers are selected, the fuel consumption units can be switched between “L/100km” and “km/L”.
“Display”	This function allows you to change the items shown in 3 information displays.
“Brightness”	This function allows you to adjust the brightness of the multi-function meter unit panel to suit the outside lighting conditions.
“Clock”	This function allows you to set the clock.
“All Reset”	This function allows you to reset all items, except the odometer and the clock.

Adjusting the temperature levels of the grip warmer settings

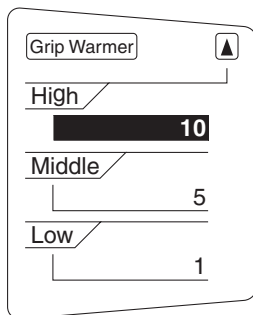
1. Use the select switch to highlight “Grip Warmer”.



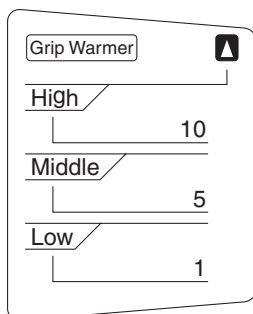
2. Push the menu switch "MENU". The grip warmer setting display will be shown and "High" will flash in the display.



3. Push the menu switch "MENU". The temperature level for the high setting will start flashing. Use the select switch to set the temperature level, and then push the menu switch "MENU". "High" will start flashing.



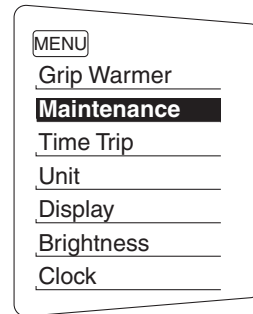
4. Use the select switch to highlight "Middle" or "Low", and then change the setting using the same procedure that was used for the high setting.
5. When you are finished changing the settings, use the select switch to highlight "▲", and then push the menu switch "MENU" to return to the setting mode menu.



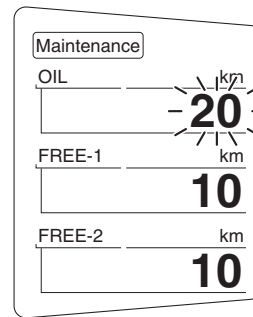
TIP _____
The setting can be set to 10 temperature levels.

Resetting the maintenance counters

1. Use the select switch to highlight "Maintenance".



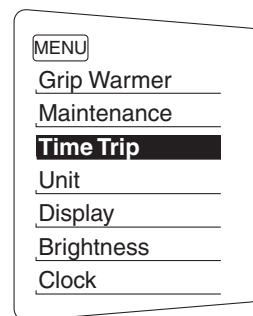
2. Push the menu switch "MENU", and then push the "RESET" button to select the item to reset.



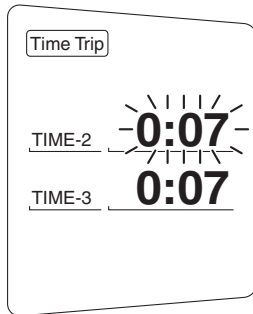
3. While the selected item is flashing, push the "RESET" button for at least 2 seconds.
4. Push the menu switch "MENU" to return to the setting mode menu.

Checking and resetting TIME-2 and TIME-3

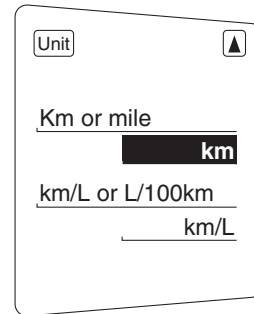
1. Use the select switch to highlight "Time Trip".



2. Push the menu switch "MENU" to display "TIME-2" and "TIME-3". To reset a time trip, push the "RESET" button to select the item to reset.



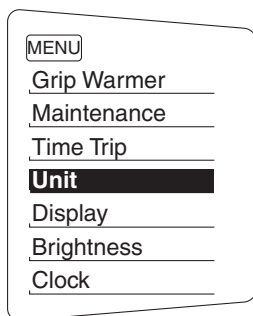
3. Push the menu switch "MENU". "km" or "mile" will flash in the display.
4. Use the select switch to select "km" or "mile", and then push the menu switch "MENU".



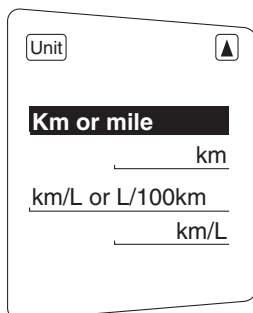
3. While the selected item is flashing, push the "RESET" button for at least 2 seconds.
4. Push the menu switch "MENU" to return to the setting mode menu.

Selecting the units

1. Use the select switch to highlight "Unit".



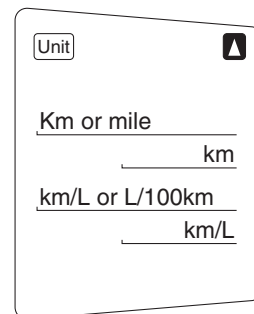
2. Push the menu switch "MENU". The unit setting display will be shown and "km or mile" (for the UK only) or "km/L or L/100km" (except for the UK) will flash in the display.



TIP

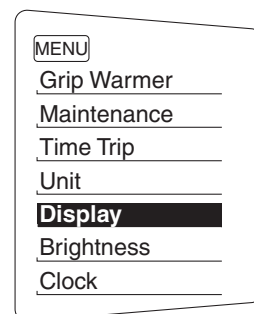
When "km" is selected, "L/100km" or "km/L" can be set as the fuel consumption units. To set the fuel consumption units, proceed as follows. If "mile" was selected, skip steps 5 and 6.

5. Use the select switch to select "km/L or L/100km".
6. Push the menu switch "MENU", use the select switch to select "L/100km" or "km/L", and then push the menu switch "MENU" again.
7. Use the select switch to highlight "▲", and then push the menu switch "MENU" to return to the setting mode menu.



Selecting the display items

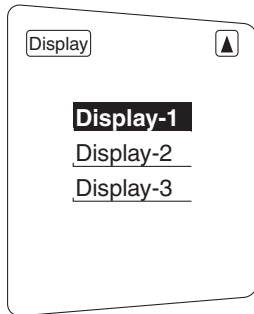
1. Use the select switch to highlight "Display".



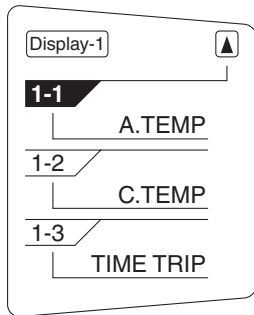
TIP

- For the UK: Continue with the following steps.
- Except for the UK: Skip steps 3-5.

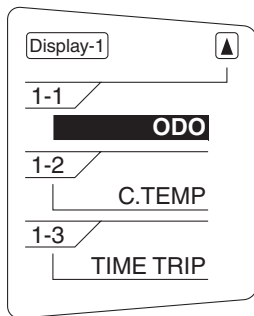
2. Push the menu switch "MENU", use the select switch to highlight the display to change, and then push the menu switch "MENU" again.



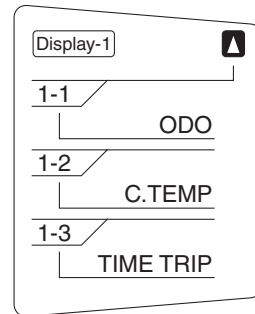
3. Use the select switch to highlight the item to change, and then push the menu switch "MENU".



4. Use the select switch to select the item to show, and then push the menu switch "MENU".



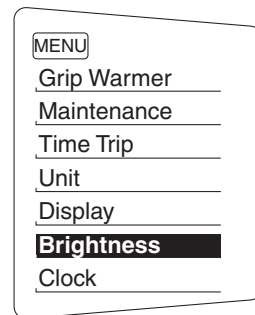
5. When you are finished changing the settings, use the select switch to highlight "ODO", and then push the menu switch "MENU" to return to the previous display.



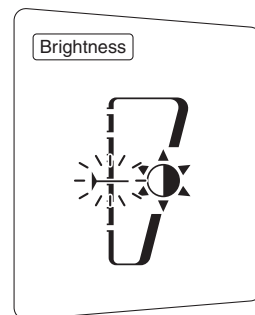
6. Use the select switch to highlight "ODO", and then push the menu switch "MENU" to return to the setting mode menu.

Adjusting the meter panel brightness

1. Use the select switch to highlight "Brightness".

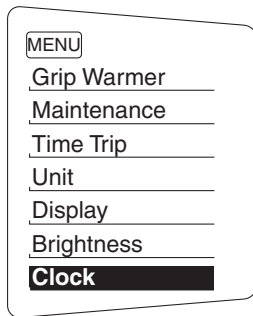


2. Push the menu switch "MENU".
3. Use the select switch to select the desired brightness level, and then push the menu switch "MENU" to return to the setting mode menu.

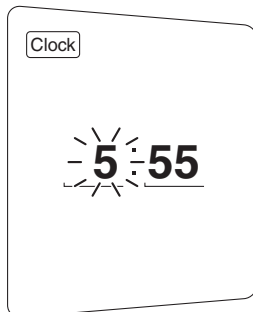


Setting the clock

1. Use the select switch to highlight "Clock".



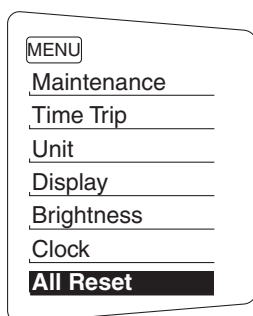
2. Push the menu switch "MENU".
3. When the hour digits start flashing, use the select switch to set the hours.



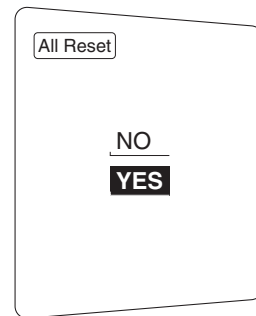
4. Push the menu switch "MENU", and the minute digits start flashing.
5. Use the select switch to set the minutes.
6. Push the menu switch "MENU" to return to the setting mode menu.

Resetting all of the display items

1. Use the select switch to highlight "All Reset".



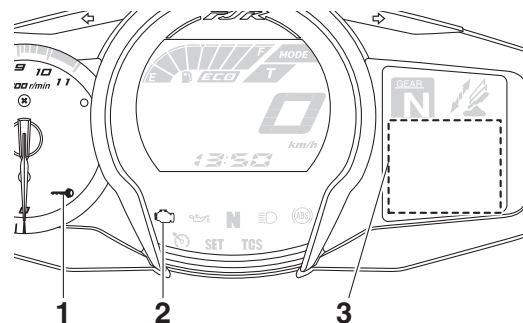
2. Push the menu switch "MENU".
3. Use the select switch to highlight "YES", and then push the menu switch "MENU".



TIP

The odometer and the clock cannot be reset.

Self-diagnosis device



1. Immobilizer system indicator light "⚡"
2. Engine trouble warning light "🔧"
3. Fault code display

This model is equipped with a self-diagnosis device for various electrical circuits. If a problem is detected in any of those circuits, the engine trouble warning light will come on and the information display will indicate a fault code.

If the information display indicates any fault codes, note the code number, and then check the fuel injection system. (Refer to "FUEL INJECTION SYSTEM" on page 8-33.)

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 information display will indicate a fault code when the main switch is turned to "ON".

TIP

If the information display indicates fault code 52, this could be caused by transponder interference. If this error 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 8-115.)

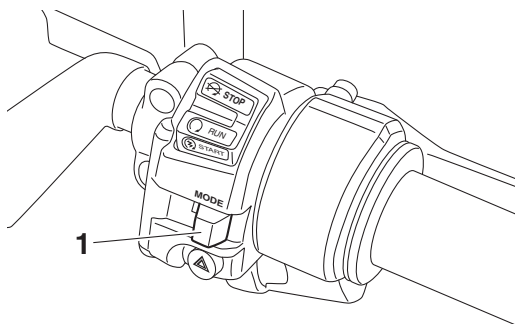
ECA1MC1010

NOTICE

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

D-mode (Drive mode)

D-mode is an electronically controlled engine performance system with two mode selections (touring mode "T" and sports mode "S"). Push the drive mode switch "MODE" to switch between modes.



1. Drive mode switch "MODE"

TIP

Before using D-mode, make sure you understand its operation along with the operation of the drive mode switch.

Touring mode "T"

The touring mode "T" is suitable for various riding conditions.

This mode allows the rider to enjoy smooth drivability from the low-speed range to the high-speed range.

Sports mode "S"

This mode offers a sportier engine response in the low- to mid-speed range compared to the touring mode.

Drive mode switch "MODE"

EWA1MC1022

WARNING

Do not change the D-mode while the vehicle is moving.

Using this switch changes the drive mode to touring mode "T" or sports mode "S".

The throttle grip must be completely closed in order to change the drive mode.

The selected mode is shown on the drive mode display.

The drive mode cannot be changed while the cruise control system is operating.

EAS20180

IMPORTANT INFORMATION

EAS20190

PREPARATION FOR REMOVAL AND DISASSEMBLY

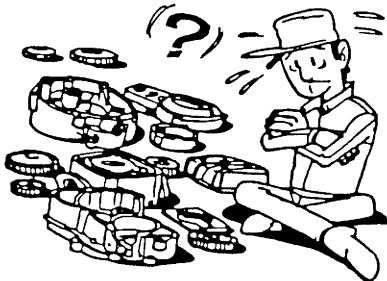
1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.



2. Use only the proper tools and cleaning equipment.

Refer to "SPECIAL TOOLS" on page 1-53.

3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.

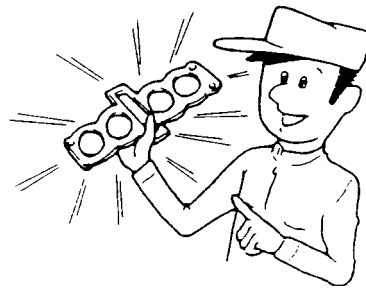


4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EAS20200

REPLACEMENT PARTS

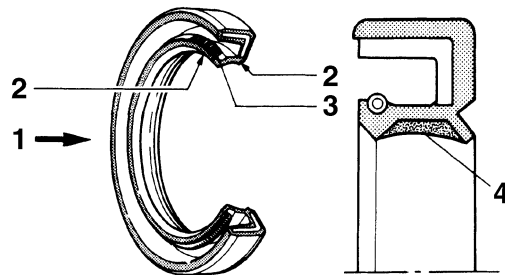
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



EAS20210

GASKETS, OIL SEALS AND O-RINGS

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

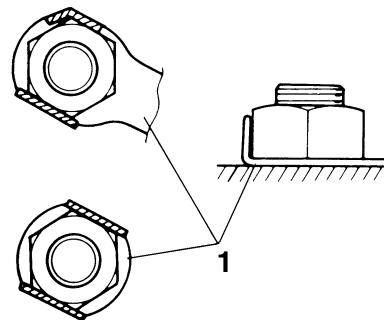


1. Oil
2. Lip
3. Spring
4. Grease

EAS20220

LOCK WASHERS/PLATES AND COTTER PINS

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



EAS20230

BEARINGS AND OIL SEALS

Install bearings "1" and oil seals "2" so that the manufacturer's marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

ECA13300

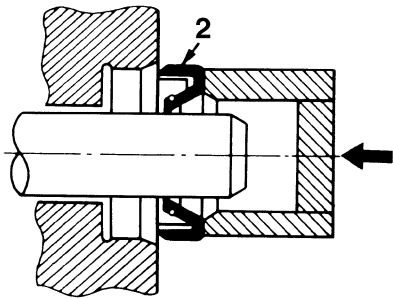
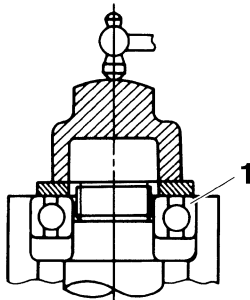
NOTICE

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

EAS1MC1085

RUBBER PARTS

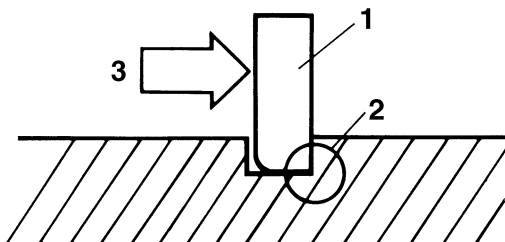
Check rubber parts for deterioration during inspection. Some of the rubber parts are sensitive to gasoline, flammable oil, grease, etc. Do not allow any items other than the specified one to contact the parts.



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

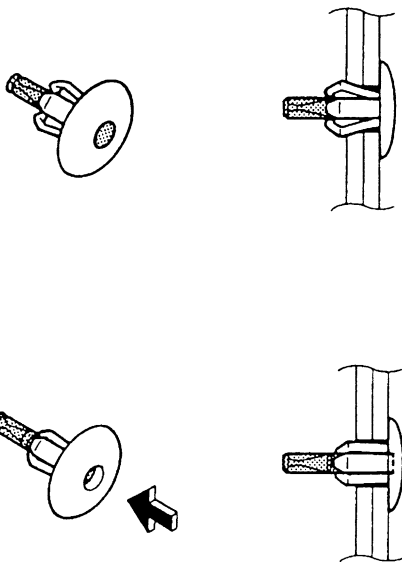
QUICK FASTENERS

Rivet type

1. Remove:
 - Quick fastener

TIP

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

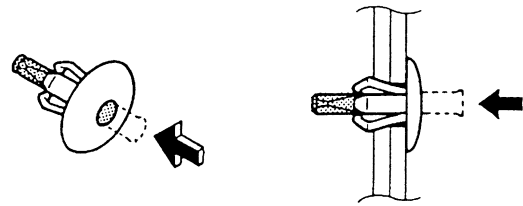
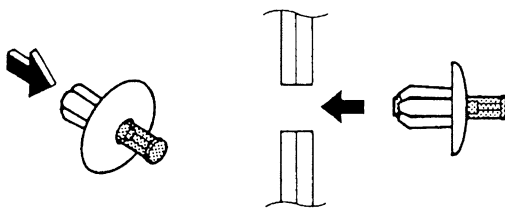


2. Install:

- 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.

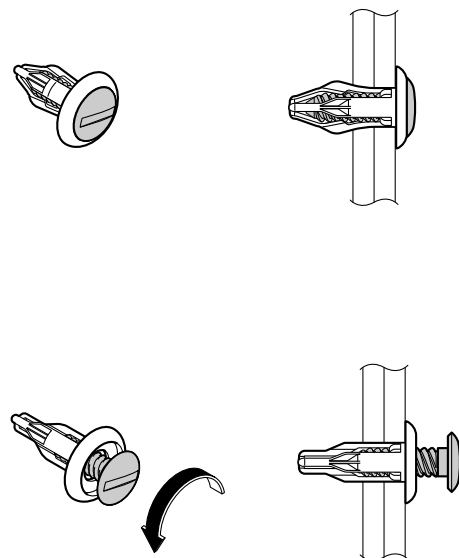


Screw type

1. Remove:
 - Quick fastener

TIP

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

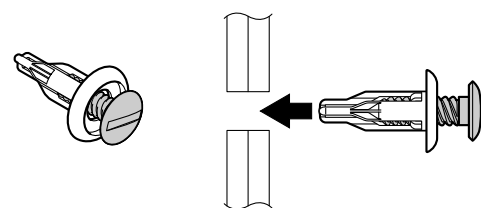


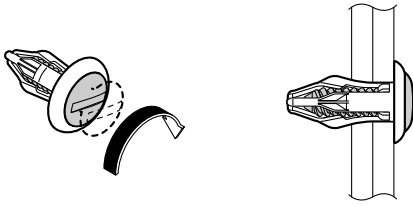
2. Install:

- Quick fastener

TIP

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





EAS30402

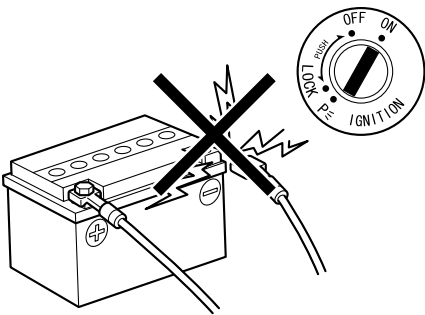
ELECTRICAL SYSTEM

Electrical parts handling

ECA16600

NOTICE

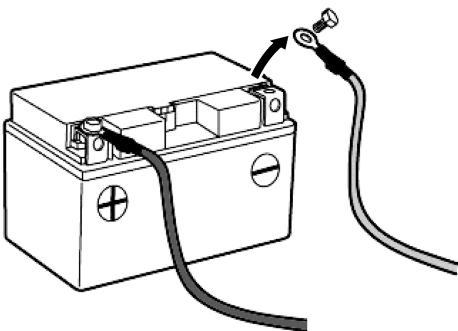
Never disconnect a battery lead while the engine is running; otherwise, the electrical components could be damaged.



ECA16751

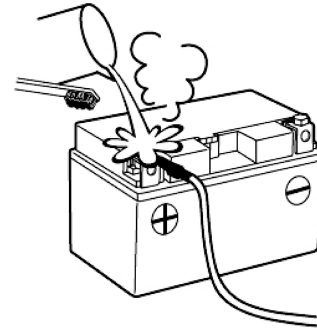
NOTICE

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

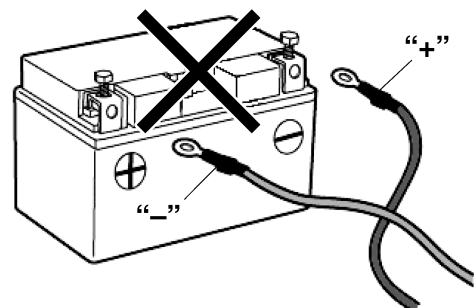
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



ECA16760

NOTICE

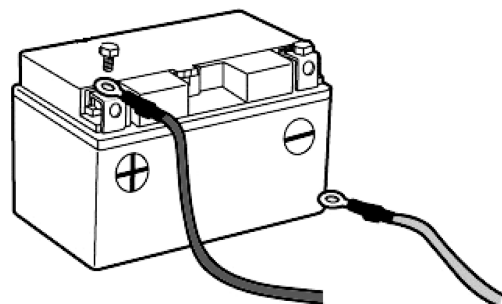
Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



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.

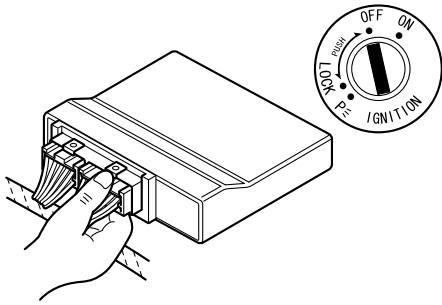


ECA16610

NOTICE

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

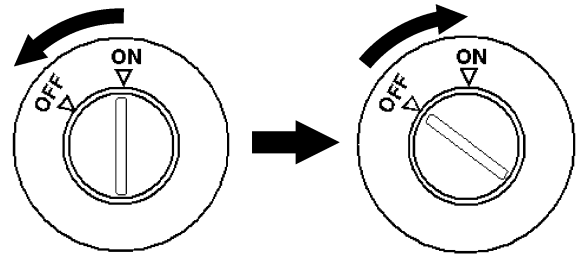
BASIC SERVICE INFORMATION



ECA16620

NOTICE

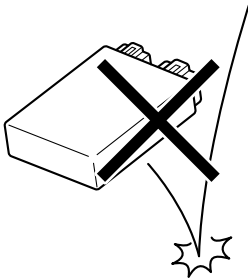
Handle electrical components with special care, and do not subject them to strong shocks.



Checking the electrical system

TIP

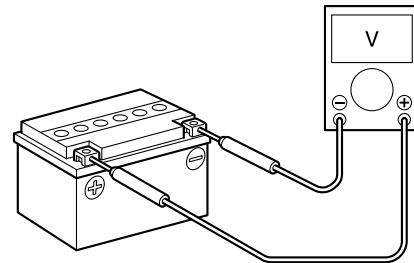
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA16630

NOTICE

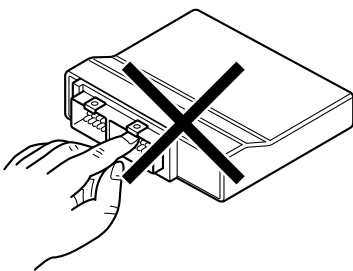
Electrical components are very sensitive to and can be damaged by static electricity. Therefore, never touch the terminals and be sure to keep the contacts clean.



ECA14371

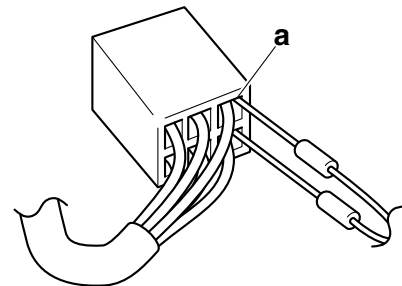
NOTICE

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

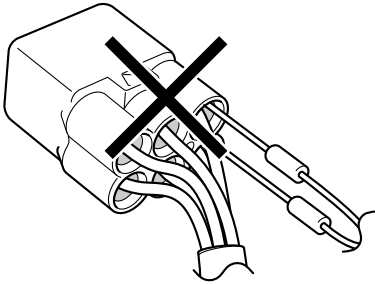
When resetting the ECU by turning the main switch to "OFF", be sure to wait approximately 5 seconds before turning the main switch back to "ON".



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.

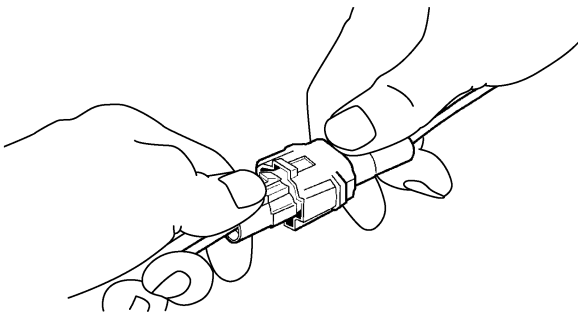
1. Disconnect:

- Lead
- Coupler
- Connector

ECA16780

NOTICE

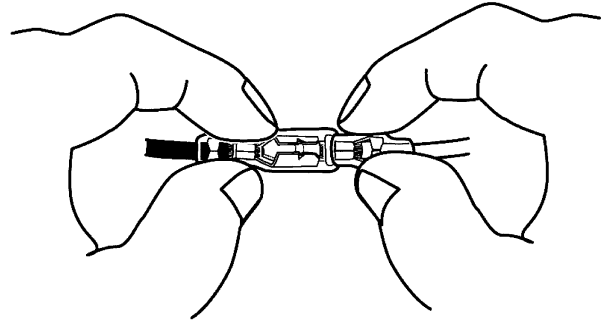
- When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.
- There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.



ECA16790

NOTICE

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

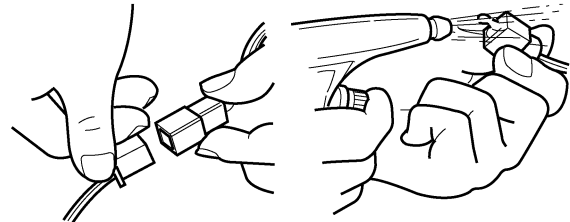


2. Check:

- Lead
- Coupler
- Connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.

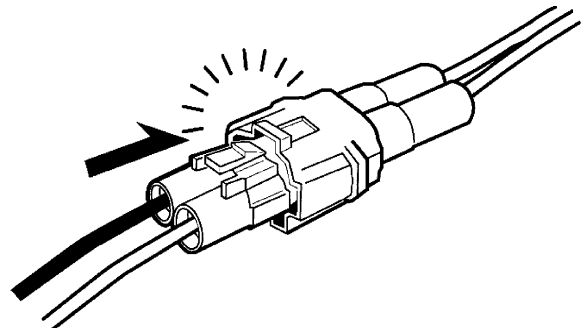


3. Connect:

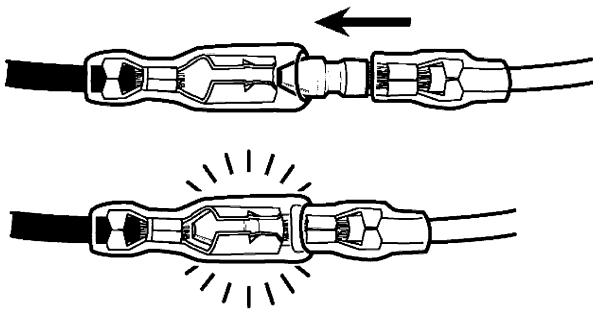
- Lead
- Coupler
- Connector

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



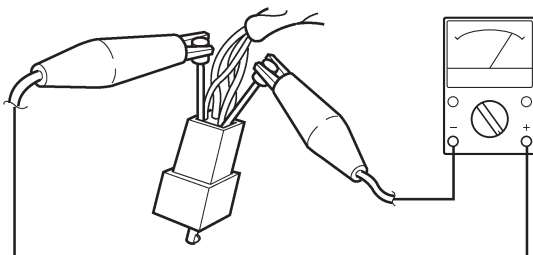
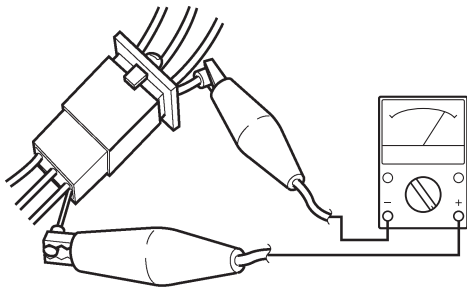
4. Check:

- Continuity
(with the pocket tester)



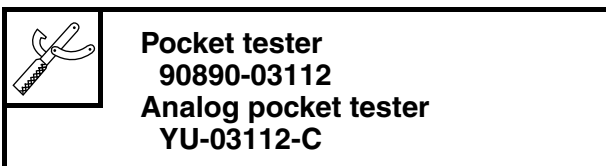
TIP

- 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



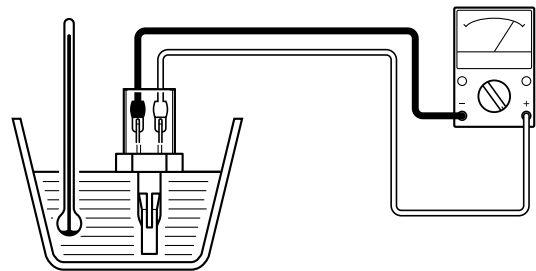
TIP

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)




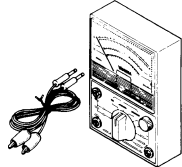

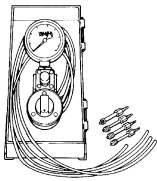

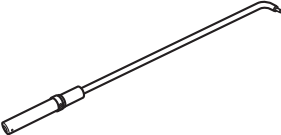
EAS20260

SPECIAL TOOLS

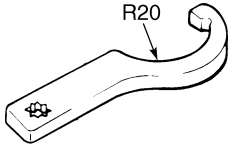
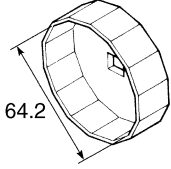
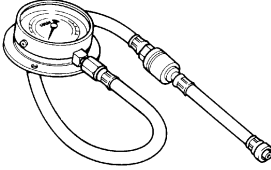
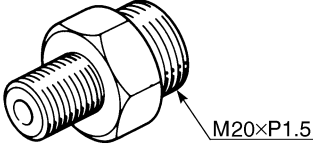
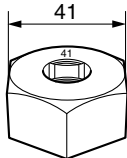
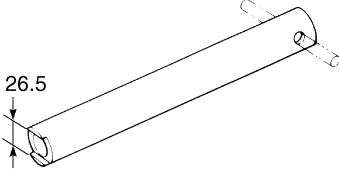
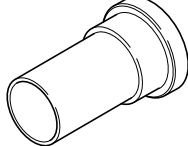
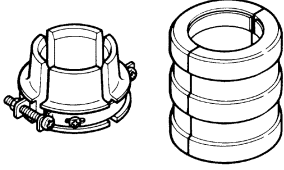
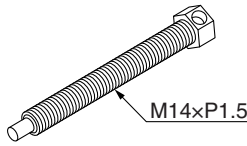
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

TIP

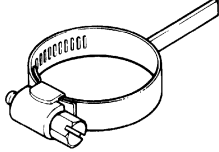
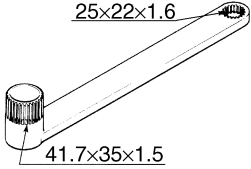
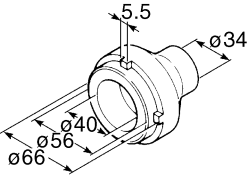

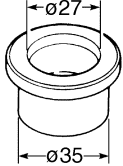

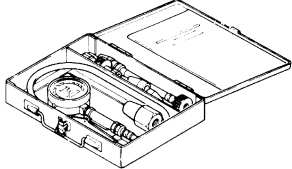
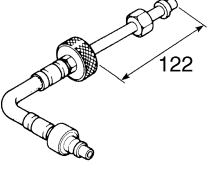
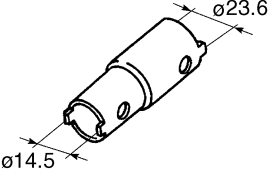
- For U.S.A. and Canada, use part number starting with "YM-", "YU-", or "ACC-".
- For others, use part number starting with "90890-".

Tool name/Tool No.	Illustration	Reference pages
Test coupler adapter 90890-03149		1-30, 4-72, 4-74
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-52, 5-41, 8-159, 8-171, 8-172, 8-173, 8-177, 8-180, 8-181, 8-182, 8-183, 8-184, 8-185, 8-187, 8-188, 8-189, 8-191, 8-192, 8-193
Valve lapper 90890-04101 Valve lapping tool YM-A8998		3-6
Vacuum gauge 90890-03094 Vacuummate YU-44456	90890-03094  YU-44456 	3-8
Carburetor angle driver 2 90890-03173		3-9

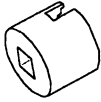
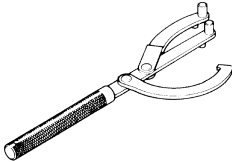
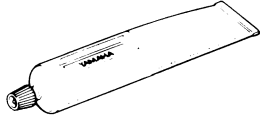
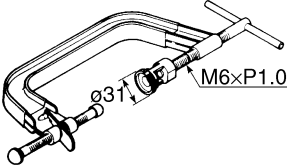
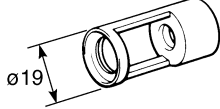
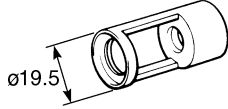
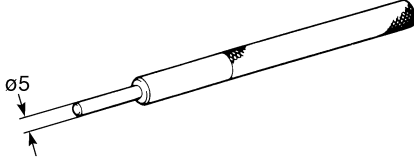
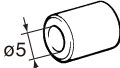
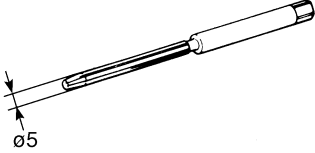
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-19, 4-96
Oil filter wrench 90890-01426 YU-38411		3-24
Oil pressure gauge set 90890-03120		3-26
Oil pressure adapter B 90890-03124		3-26
Hexagon wrench (41) 90890-01525 YM-01525		4-33, 4-35
Damper rod holder 90890-01447 YM-01447		4-88, 4-89
Slide metal installer 90890-01508 YM-01508		4-90
Fork seal driver 90890-01502 Fork seal driver (48) YM-A0948		4-90, 4-91
Ring gear fix bolt (M14) 90890-01524 YM-01524		4-112

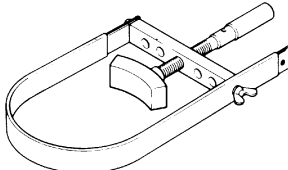
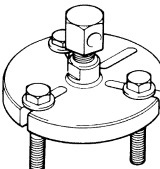
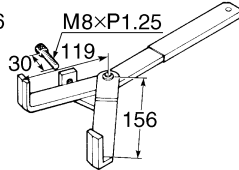
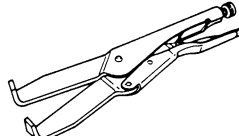
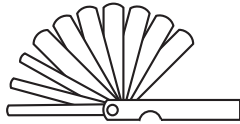
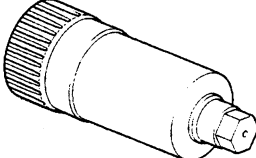
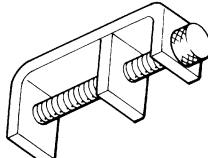
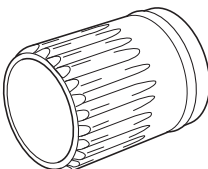
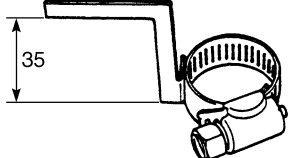
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Final gear backlash band 90890-01511 Middle drive gear lash tool YM-01230		4-113
Coupling gear/middle shaft tool 90890-01229 Gear holder YM-01229		4-115, 4-118
Bearing retainer wrench 90890-04050 Pinion bearing retainer & remover YM-04050		4-115, 4-118
Fork seal driver weight 90890-01184 Replacement hammer YM-A9409-7		4-120
Fork seal driver attachment 90890-01186 Replacement 27 mm YM-A9409-1		4-120
Oil seal installing tool 90890-01512 YM-01512		4-120
Compression gauge 90890-03081 Engine compression tester YU-33223		5-1
Extension 90890-04136		5-1
Pivot shaft wrench 90890-01471 Frame spanner socket YM-01471		5-8, 5-9

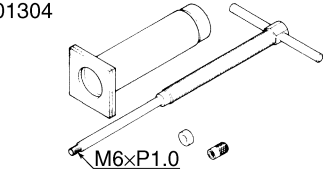
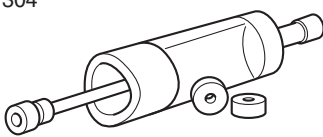
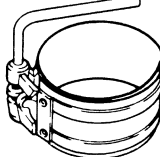
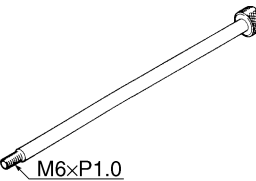
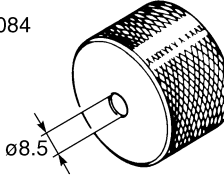
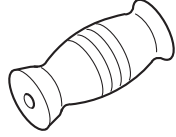
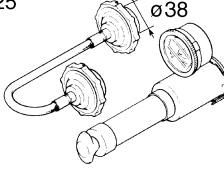
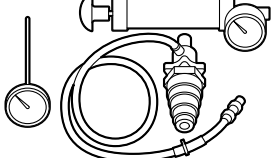
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Pivot shaft wrench adapter 90890-01476		5-8, 5-9
Rotor holding tool 90890-01235 Universal magneto & rotor holder YU-01235		5-13, 5-16
Yamaha bond No. 1215 90890-85505 (Three Bond No.1215®)		5-18, 5-34, 5-37, 5-82, 6-13
Valve spring compressor 90890-04019 YM-04019		5-24, 5-29
Valve spring compressor attachment 90890-04114 Valve spring compressor adapter 19.5 mm YM-04114	<p>90890-04114</p>  <p>$\phi 19$</p> <p>YM-04114</p>  <p>$\phi 19.5$</p>	5-24, 5-29
Valve guide remover ($\phi 5$) 90890-04097 Valve guide remover (5.0 mm) YM-04097		5-26
Valve guide installer ($\phi 5$) 90890-04098 Valve guide installer (5.0 mm) YM-04098		5-26
Valve guide reamer ($\phi 5$) 90890-04099 Valve guide reamer (5.0 mm) YM-04099		5-26

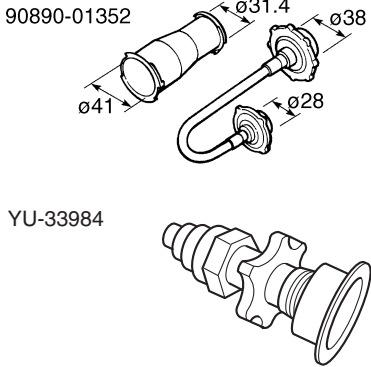
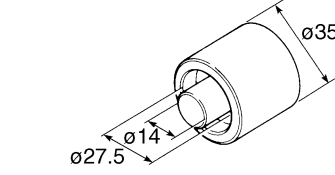
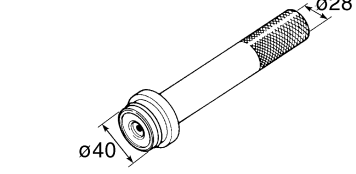
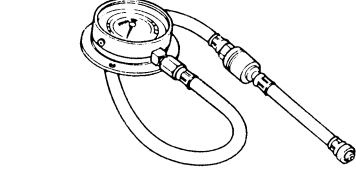
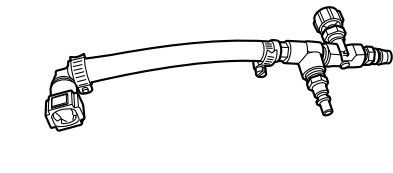
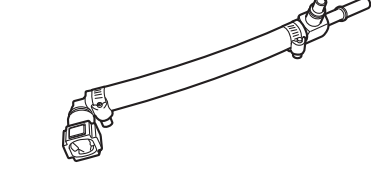
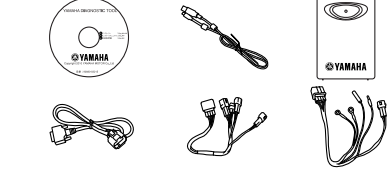
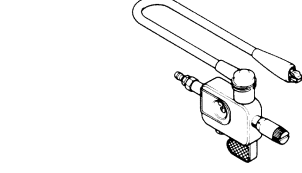
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-33, 5-34, 5-37
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-33
Universal clutch holder 90890-04086 YM-91042	<p>90890-04086</p>  <p>YM-91042</p> 	5-49, 5-52
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		5-50
Bearing retainer wrench 90890-04137 Middle drive shaft bearing retainer wrench YM-04137		5-69, 5-71
Damper spring compressor 90890-04090 Middle drive gear damper spring compressor YM-33286		5-69, 5-70
Bearing retainer wrench 90890-04140 Middle drive shaft bearing retainer wrench YM-04140		5-70
Gear lash measurement tool 90890-01467 YM-01467		5-73

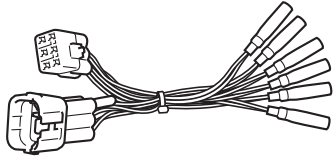
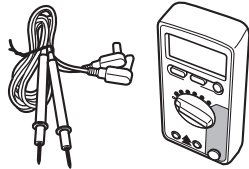
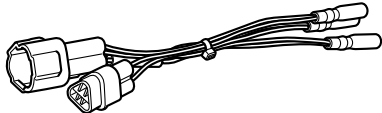
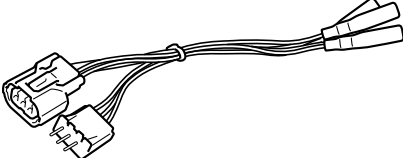
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-86
Piston ring compressor 90890-05158 YM-08037		5-91
Slide hammer bolt 90890-01083 Slide hammer bolt 6 mm YU-01083-1		5-102
Weight 90890-01084 YU-01083-3	90890-01084  YU-01083-3 	5-102
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A	90890-01325  YU-24460-A 	6-3

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984		6-3
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A		6-13
Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058		6-13
Pressure gauge 90890-03153 YU-03153		7-10
Fuel injector pressure adapter 90890-03210 YU-03210		7-10
Fuel pressure adapter 90890-03176 YM-03176		7-10
Yamaha diagnostic tool 90890-03215		8-38
Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487		8-182

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Test harness-lean angle sensor (6P) 90890-03209 YU-03209		8-183
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		8-184, 8-190
Test harness- speed sensor (3P) 90890-03208 YU-03208		8-189
Test harness S- pressure sensor (3P) 90890-03207 YU-03207		8-190

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GENERAL SPECIFICATIONS

EAS20280

GENERAL SPECIFICATIONS

Model

Model	1MC1 (Europe except (F)) 1MC2 (B) (F) 1MC6 (AUS)
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Dimensions

Overall length	2230 mm (87.8 in)
Overall width	750 mm (29.5 in)
Overall height	1325/1455 mm (52.2/57.3 in)
Seat height	805/825 mm (31.7/32.5 in)
Wheelbase	1545 mm (60.8 in)
Ground clearance	130 mm (5.12 in)
Minimum turning radius	3100 mm (122.0 in)

Weight

Curb weight	289 kg (637 lb)
Maximum load	215 kg (474 lb)

ENGINE SPECIFICATIONS

EAS20290

ENGINE SPECIFICATIONS

Engine

Engine type	Liquid cooled 4-stroke, DOHC
Displacement	1298.0 cm ³
Cylinder arrangement	Inline 4-cylinder
Bore × stroke	79.0 × 66.2 mm (3.11 × 2.61 in)
Compression ratio	10.80 : 1
Standard compression pressure (at sea level)	1600 kPa/400 r/min (16.0 kgf/cm ² /400 r/min, 227.6 psi/400 r/min)
Minimum-maximum	1390–1790 kPa (13.9–17.9 kgf/cm ² , 197.7–254.6 psi)
Starting system	Electric starter

Fuel

Recommended fuel	Regular unleaded gasoline only (Europe) Unleaded gasoline only (AUS)
Fuel tank capacity	25.0 L (6.61 US gal, 5.50 Imp.gal)
Fuel reserve amount	5.5 L (1.45 US gal, 1.21 Imp.gal)

Engine oil

Lubrication system	Wet sump
Recommended brand	YAMALUBE
Type	SAE 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	
Total amount	4.90 L (5.18 US qt, 4.31 Imp.qt)
Without oil filter cartridge replacement	3.80 L (4.02 US qt, 3.34 Imp.qt)
With oil filter cartridge replacement	4.00 L (4.23 US qt, 3.52 Imp.qt)
Oil pressure	30.0 kPa/1050 r/min (0.30 kgf/cm ² /1050 r/min, 4.4 psi/1050 r/min) at oil temperature of 85.0 °C (185.0 °F)

Final gear oil

Type	Shaft drive gear oil (Part No.: 9079E-SH002-00)
Quantity	0.20 L (0.21 US qt, 0.18 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 0.12 mm (0.0047 in)
Limit	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.09–0.15 mm (0.0035–0.0059 in)
Limit	0.22 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.06–0.11 mm (0.0024–0.0043 in)
Limit	0.18 mm (0.0071 in)

ENGINE SPECIFICATIONS

Bypass valve opening pressure	78.4–117.6 kPa (0.78–1.18 kgf/cm ² , 11.4–17.1 psi)
Relief valve operating pressure	480.0–560.0 kPa (4.80–5.60 kgf/cm ² , 69.6–81.2 psi)

Cooling system

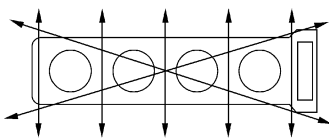
Radiator capacity (including all routes)	2.60 L (2.75 US qt, 2.29 Imp.qt)
Radiator capacity	0.65 L (0.69 US qt, 0.57 Imp.qt)
Coolant reservoir capacity (up to the maximum level mark)	0.25 L (0.26 US qt, 0.22 Imp.qt)
Radiator cap opening pressure	93.3–122.7 kPa (0.93–1.23 kgf/cm ² , 13.5–17.8 psi)
Valve relief pressure	4.9 kPa (0.05 kgf/cm ² , 0.7 psi)
Thermostat	
Valve opening temperature	69.0–73.0 °C (156.20–163.40 °F)
Valve full open temperature	85.0 °C (185.0 °F)
Valve lift (full open)	8.0 mm (0.31 in)
Radiator core	
Width	360.0 mm (14.17 in)
Height	273.8 mm (10.78 in)
Depth	22.0 mm (0.87 in)
Water pump	
Water pump type	Single suction centrifugal pump
Reduction ratio	75/48 × 25/28 (1.395)
Impeller shaft tilt limit	0.15 mm (0.006 in)

Spark plug(s)

Manufacturer/model	NGK/CPR8EA-9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)

Cylinder head

Combustion chamber volume	23.03 cm ³ (1.41 cu.in)
Warpage limit	0.10 mm (0.0039 in)



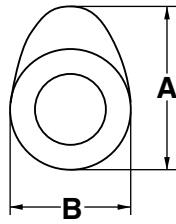
Camshaft

Drive system	Chain drive (right)
Camshaft cap inside diameter	24.500–24.521 mm (0.9646–0.9654 in)
Camshaft journal diameter	24.459–24.472 mm (0.9630–0.9635 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Camshaft lobe dimensions	
Intake A	33.050–33.150 mm (1.3012–1.3051 in)
Limit	32.050 mm (1.2618 in)
Intake B	24.997–25.097 mm (0.9841–0.9881 in)
Limit	23.997 mm (0.9448 in)
Exhaust A	33.050–33.150 mm (1.3012–1.3051 in)
Limit	32.950 mm (1.2972 in)
Exhaust B	24.997–25.097 mm (0.9841–0.9881 in)

ENGINE SPECIFICATIONS

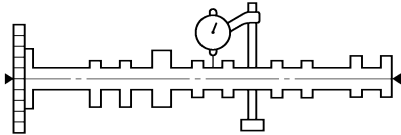
Limit

24.897 mm (0.9802 in)



Camshaft runout limit

0.030 mm (0.0012 in)



Timing chain

Tensioning system

Automatic

Valve, valve seat, valve guide

Valve clearance (cold)

Intake

0.15–0.22 mm (0.0059–0.0087 in)

Exhaust

0.18–0.25 mm (0.0071–0.0098 in)

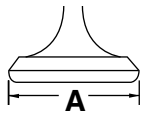
Valve dimensions

Valve head diameter A (intake)

29.90–30.10 mm (1.1772–1.1850 in)

Valve head diameter A (exhaust)

25.90–26.10 mm (1.0197–1.0276 in)

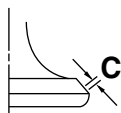


Valve seat width C (intake)

0.90–1.10 mm (0.0354–0.0433 in)

Valve seat width C (exhaust)

0.90–1.10 mm (0.0354–0.0433 in)

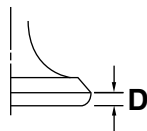


Valve margin thickness D (intake)

0.80–1.20 mm (0.0315–0.0472 in)

Valve margin thickness D (exhaust)

0.50–0.90 mm (0.0197–0.0354 in)



Valve stem diameter (intake)

4.975–4.990 mm (0.1959–0.1965 in)

Valve stem diameter (exhaust)

4.965–4.980 mm (0.1955–0.1961 in)

Valve guide inside diameter (intake)

5.000–5.012 mm (0.1969–0.1973 in)

Limit

5.050 mm (0.1988 in)

Valve guide inside diameter (exhaust)

5.000–5.012 mm (0.1969–0.1973 in)

Limit

5.050 mm (0.1988 in)

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

0.010–0.037 mm (0.0004–0.0015 in)

Limit

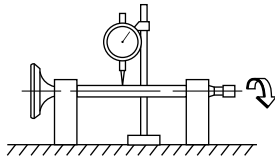
0.080 mm (0.0032 in)

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

0.020–0.047 mm (0.0008–0.0019 in)

ENGINE SPECIFICATIONS

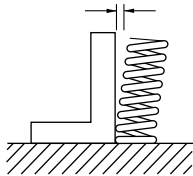
Limit	0.105 mm (0.0041 in)
Valve stem runout	0.010 mm (0.0004 in)



Cylinder head valve seat width (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Cylinder head valve seat width (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)

Valve spring

Free length (intake)	39.73 mm (1.56 in)
Limit	37.74 mm (1.49 in)
Free length (exhaust)	39.73 mm (1.56 in)
Limit	37.74 mm (1.49 in)
Installed length (intake)	33.00 mm (1.30 in)
Installed length (exhaust)	33.00 mm (1.30 in)
Spring rate K1 (intake)	21.85 N/mm (2.23 kgf/mm, 124.76 lbf/in)
Spring rate K2 (intake)	28.34 N/mm (2.89 kgf/mm, 161.82 lbf/in)
Spring rate K1 (exhaust)	21.85 N/mm (2.23 kgf/mm, 124.76 lbf/in)
Spring rate K2 (exhaust)	28.34 N/mm (2.89 kgf/mm, 161.82 lbf/in)
Installed compression spring force (intake)	136.00–158.00 N (13.87–16.11 kgf, 30.57–35.52 lbf)
Installed compression spring force (exhaust)	136.00–158.00 N (13.87–16.11 kgf, 30.57–35.52 lbf)
Spring tilt (intake)	2.5°/1.7 mm (2.5°/0.067 in)
Spring tilt (exhaust)	2.5°/1.7 mm (2.5°/0.067 in)



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

Cylinder

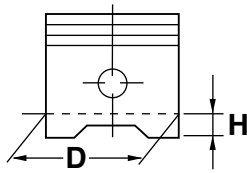
Bore	79.000–79.010 mm (3.1102–3.1106 in)
Taper limit	0.050 mm (0.0020 in)
Out of round limit	0.050 mm (0.0020 in)

Piston

Piston-to-cylinder clearance	0.020–0.045 mm (0.0008–0.0018 in)
Limit	0.150 mm (0.0059 in)
Diameter D	78.965–78.980 mm (3.1089–3.1094 in)

ENGINE SPECIFICATIONS

Height H 5.0 mm (0.20 in)



Offset 0.50 mm (0.0197 in)
 Offset direction Intake side
 Piston pin bore inside diameter 19.004–19.015 mm (0.7482–0.7486 in)
 Limit 19.045 mm (0.7498 in)
 Piston pin outside diameter 18.991–19.000 mm (0.7477–0.7480 in)
 Limit 18.971 mm (0.7469 in)
 Piston-pin-to-piston-pin-bore clearance 0.004–0.024 mm (0.00016–0.00094 in)

Piston ring

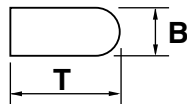
Top ring

Ring type

Barrel

Dimensions (B × T)

1.00 × 2.80 mm (0.04 × 0.11 in)



End gap (installed)

0.20–0.30 mm (0.0079–0.0118 in)

Limit

0.55 mm (0.0217 in)

Ring side clearance

0.030–0.070 mm (0.0012–0.0028 in)

Limit

0.120 mm (0.0047 in)

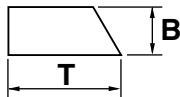
2nd ring

Ring type

Taper

Dimensions (B × T)

1.00 × 2.90 mm (0.04 × 0.11 in)



End gap (installed)

0.35–0.45 mm (0.0138–0.0177 in)

Limit

0.80 mm (0.0315 in)

Ring side clearance

0.020–0.060 mm (0.0008–0.0024 in)

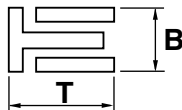
Limit

0.120 mm (0.0047 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

0.031–0.048 mm (0.0012–0.0019 in)

Bearing color code

1.Blue 2.Black 3.Brown 4.Green 5.Yellow 6.Pink

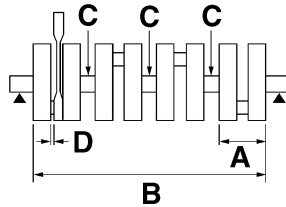
Small end inside diameter

19.005–19.018 mm (0.7482–0.7487 in)

ENGINE SPECIFICATIONS

Crankshaft

Width A	61.60–63.20 mm (2.425–2.488 in)
Width B	325.10–326.30 mm (12.80–12.85 in)
Runout limit C	0.030 mm (0.0012 in)
Big end side clearance D	0.160–0.262 mm (0.0063–0.0103 in)



Journal oil clearance	0.027–0.045 mm (0.0011–0.0018 in)
Bearing color code	2.Black 3.Brown 4.Green 5.Yellow 6.Pink 7.Red 8.White

Balancer

Balancer drive method	Gear
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Clutch

Clutch type	Wet, multiple-disc
Clutch release method	Hydraulic inner push
Friction plate 1, 3 thickness	2.90–3.10 mm (0.114–0.122 in)
Wear limit	2.80 mm (0.110 in)
Plate quantity	8 pcs
Friction plate 2 thickness	2.92–3.08 mm (0.115–0.121 in)
Plate quantity	1 pc
Wear limit	2.82 mm (0.111 in)
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	8 pcs
Warping limit	0.10 mm (0.0039 in)
Clutch spring height	6.78 mm (0.27 in)
Minimum height	6.44 mm (0.25 in)
Spring quantity	1 pc
Long clutch push rod bending limit	0.370 mm (0.0146 in)

Transmission

Transmission type	Constant mesh 5-speed
Primary reduction ratio	1.563 (75/48)
Final drive	Shaft
Secondary reduction ratio	2.698 (35/37 × 21/27 × 33/9)
Operation	Left foot operation
Gear ratio	
1st	2.529 (43/17)
2nd	1.773 (39/22)
3rd	1.348 (31/23)
4th	1.077 (28/26)
5th	0.929 (26/28)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)

ENGINE SPECIFICATIONS

Shifting mechanism

Shift mechanism type	Shift drum and guide bar
Shift fork guide bar bending limit	0.100 mm (0.0039 in)

Air filter

Air filter element	Dry element
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Fuel pump

Pump type	Electrical
Maximum consumption amperage	6.0 A

Fuel injector

Model/quantity	0990/4
Resistance	12.0 Ω

Throttle body

Type/quantity	42EHDW/1
ID mark	1MC1 00

Throttle position sensor

Resistance	1.20–2.80 k Ω
Output voltage (at idle)	0.63–0.73 V

Accelerator position sensor

Resistance	1.08–2.52 k Ω
Output voltage (at idle)	0.63–0.73 V

Fuel injection sensor

Crankshaft position sensor resistance	421–569 Ω
Cylinder identification sensor output voltage (ON)	More than 4.8 V
Cylinder identification sensor output voltage (OFF)	Less than 0.8 V
Intake air pressure sensor output voltage	3.57–3.71 V
Atmospheric pressure sensor output voltage	3.57–3.71 V
Air temperature sensor resistance	5.4–6.6 k Ω at 0 °C (32.0 °F) 290–390 Ω at 80.0 °C (176.0 °F)
Coolant temperature sensor resistance	2.32–2.59 k Ω at 20.0 °C (68.0 °F) 310–326 Ω at 80.0 °C (176.0 °F)

Idling condition

Engine idling speed	1000–1100 r/min
Intake vacuum	33.3 kPa (250 mmHg, 9.8 inHg)
Water temperature	90.0–110.0 °C (194.0–230.0 °F)
Oil temperature	75.0–95.0 °C (167.0–203.0 °F)
Fuel line pressure (at idle)	300.0–390.0 kPa (3.00–3.90 kgf/cm ² , 43.5–56.6 psi)
Throttle grip free play	3.0–5.0 mm (0.12–0.20 in)

Air induction system

Solenoid resistance	20–24 Ω
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Shaft drive

Middle gear backlash	0.10–0.20 mm (0.0039–0.0079 in)
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ENGINE SPECIFICATIONS

Ring-gear-to-stopper-bolt clearance	0.30–0.60 mm (0.0118–0.0236 in)
Ring-gear-to-thrust-washer clearance	0.20 mm (0.0079 in)
Final gear backlash	0.22–0.45 mm (0.0087–0.0177 in)

CHASSIS SPECIFICATIONS

EAS20300

CHASSIS SPECIFICATIONS

Chassis

Frame type	Diamond
Caster angle	26.00°
Trail	109.0 mm (4.29 in)

Front wheel

Wheel type	Cast wheel
Rim size	17M/C × MT3.50
Rim material	Aluminum
Wheel travel	135.0 mm (5.31 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)

Rear wheel

Wheel type	Cast wheel
Rim size	17M/C × MT5.50
Rim material	Aluminum
Wheel travel	125.0 mm (4.92 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)

Front tire

Type	Tubeless
Size	120/70 ZR17M/C (58W)
Manufacturer/model	METZELER/Roadtec Z8 BRIDGESTONE/BT023F F
Wear limit (front)	1.6 mm (0.06 in) (Europe) 1.0 mm (0.04 in) (AUS)

Rear tire

Type	Tubeless
Size	180/55 ZR17M/C (73W)
Manufacturer/model	METZELER/Roadtec Z8 C BRIDGESTONE/BT023R F
Wear limit (rear)	1.6 mm (0.06 in) (Europe) 1.0 mm (0.04 in) (AUS)

Tire air pressure (measured on cold tires)

Loading condition	0–90 kg (0–198 lb)
Front	250 kPa (2.50 kgf/cm ² , 36 psi)
Rear	290 kPa (2.90 kgf/cm ² , 42 psi)
Loading condition	90–215 kg (198–474 lb)
Front	250 kPa (2.50 kgf/cm ² , 36 psi)
Rear	290 kPa (2.90 kgf/cm ² , 42 psi)
High-speed riding	
Front	250 kPa (2.50 kgf/cm ² , 36 psi)
Rear	290 kPa (2.90 kgf/cm ² , 42 psi)

Front brake

Type	Dual disc brake
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CHASSIS SPECIFICATIONS

Operation	Right hand operation
Front disc brake	
Disc outside diameter × thickness	320.0 × 4.5 mm (12.60 × 0.18 in)
Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc deflection limit	0.10 mm (0.0039 in)
Brake pad lining thickness (inner)	5.5 mm (0.22 in)
Limit	0.5 mm (0.02 in)
Brake pad lining thickness (outer)	5.5 mm (0.22 in)
Limit	0.5 mm (0.02 in)
Master cylinder inside diameter	15.00 mm (0.59 in)
Caliper cylinder inside diameter	30.23 mm × 4 (1.19 in × 4)
Caliper cylinder inside diameter (for unified brake)	33.96 mm × 2, 22.65 mm × 2 (1.34 in × 2, 0.89 in × 2)
Specified brake fluid	DOT 4
Rear brake	
Type	Single disc brake
Operation	Right foot operation
Brake pedal position	42.0 mm (1.65 in) (below the top of the rider footrest)
Rear disc brake	
Disc outside diameter × thickness	282.0 × 5.0 mm (11.10 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	6.3 mm (0.25 in)
Limit	0.8 mm (0.03 in)
Brake pad lining thickness (outer)	6.3 mm (0.25 in)
Limit	0.8 mm (0.03 in)
Master cylinder inside diameter	15.0 mm (0.59 in)
Caliper cylinder inside diameter	41.30 mm (1.63 in)
Specified brake fluid	DOT 4
Clutch	
Specified brake and clutch fluid	DOT 4
Master cylinder inside diameter	14.0 mm (0.55 in)
Release cylinder inside diameter	33.6 mm (1.32 in)
Steering	
Steering bearing type	Angular bearing
Center to lock angle (left)	34.0°
Center to lock angle (right)	34.0°
Front suspension	
Type	Telescopic fork
Spring/shock absorber type	Coil spring/oil damper
Front fork travel	135.0 mm (5.31 in)
Fork spring free length	345.0 mm (13.58 in)
Limit	340.0 mm (13.39 in)
Collar length	79.9 mm (3.15 in) (left side) 78.1 mm (3.07 in) (right side)
Fork spring installed length	322.8 mm (12.71 in)
Spring rate K1	8.30 N/mm (0.85 kgf/mm, 47.39 lbf/in)
Spring rate K2	10.00 N/mm (1.02 kgf/mm, 57.10 lbf/in)

CHASSIS SPECIFICATIONS

Spring stroke K1	0.0–67.5 mm (0.00–2.66 in)
Spring stroke K2	67.5–135.0 mm (2.66–5.31 in)
Inner tube outer diameter	48.0 mm (1.89 in)
Inner tube bending limit	0.2 mm (0.01 in)
Optional spring available	No
Recommended oil	Suspension oil M1 or equivalent
Quantity	716.0 cm ³ (24.21 US oz, 25.20 Imp.oz) (left side) 694.0 cm ³ (23.46 US oz, 24.43 Imp.oz) (right side)
Level	106.0 mm (4.17 in) (left side) 90.0 mm (3.54 in) (right side)
Spring preload adjusting positions	
Minimum (soft)	15.0 mm (0.59 in)
Standard	10.0 mm (0.39 in)
Maximum (hard)	0 mm (0 in)
Rebound damping adjusting positions	
Minimum	16 clicks out
Standard	12 clicks out
Maximum	1 click out
Compression damping adjusting positions	
Minimum	21 clicks out
Standard	11 clicks out
Maximum	1 click out

Rear suspension

Type	Swingarm (link suspension)
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	60.0 mm (2.36 in)
Spring free length	157.6 mm (6.20 in)
Spring installed length	145.9 mm (5.74 in)
Spring free length	67.8 mm (2.67 in)
Spring installed length	62.0 mm (1.26 in)
Soft	
Spring rate K1	171.00 N/mm (17.44 kgf/mm, 976.41 lbf/in)
Spring rate K2	342.00 N/mm (34.87 kgf/mm, 1952.82 lbf/in)
Spring stroke K1	0.0–42.0 mm (0.00–1.65 in)
Spring stroke K2	42.0–60.0 mm (1.65–2.36 in)
Hard	
Spring rate K1	171.00 N/mm (17.44 kgf/mm, 976.41 lbf/in)
Spring stroke K1	14.1–60.0 mm (0.56–2.36 in)
Optional spring available	No
Enclosed gas/air pressure (STD)	1200 kPa (12.0 kgf/cm ² , 170.7 psi)
Spring preload adjusting positions	
Rider only	SOFT
With passenger or cargo	HARD
Rebound damping adjusting positions	
Minimum	20 clicks out
Standard	12 clicks out
Maximum	3 clicks out

ELECTRICAL SPECIFICATIONS

EAS20310

ELECTRICAL SPECIFICATIONS

Voltage

System voltage 12 V

Ignition system

Ignition system TCI
Ignition timing (B.T.D.C.) 5.0°/1050 r/min

Engine control unit

Model/manufacture TBDFE3/DENSO (Europe except (F)) (AUS)
TBDFH3/DENSO (B) (F)

Ignition coil

Minimum ignition spark gap 6.0 mm (0.24 in)
Primary coil resistance 1.19–1.61 Ω
Secondary coil resistance 8.50–11.50 k Ω

AC magneto

Standard output 14.0 V, 590 W at 5000 r/min
Stator coil resistance 0.128–0.192 Ω

Voltage regulator

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

Battery

Model GT14B-4
Voltage, capacity 12 V, 12.0 Ah
Manufacturer GS YUASA
Ten hour rate amperage 1.20 A

Headlight

Bulb type Halogen bulb

Bulb voltage, wattage \times quantity

Headlight 12 V, 60.0 W/55.0 W \times 2
Auxiliary light LED
Tail/brake light 12 V, 5.0 W/21.0 W \times 2
Front turn signal light LED
Rear turn signal light 12 V, 21.0 W \times 2
License plate light 12 V, 5.0 W \times 1
Meter lighting LED

Indicator light

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

ELECTRICAL SPECIFICATIONS

Engine trouble warning light	LED
ABS warning light	LED
Cruise control system indicator light	LED
Cruise control setting indicator light	LED
Immobilizer system indicator light	LED
Traction control system indicator/warning light	LED

Electric starting system	
System type	Constant mesh

Starter motor	
Power output	0.80 kW
Armature coil resistance	0.024–0.030 Ω
Brush overall length	10.8 mm (0.43 in)
Limit	3.65 mm (0.14 in)
Brush spring force	5.28–7.92 N (538–808 gf, 19.01–28.51 oz)
Commutator diameter	24.5 mm (0.96 in)
Limit	23.5 mm (0.93 in)
Mica undercut (depth)	1.50 mm (0.06 in)

Starter relay	
Amperage	180.0 A
Coil resistance	4.18–4.62 Ω

Horn	
Horn type	Plane
Quantity	1 pc
Maximum amperage	3.0 A
Performance	105–118 dB/2 m (6.6 ft)

Turn signal/hazard function	
Built-in, self-canceling device	No
Turn signal blinking frequency	89–91 cycles/min

Fuel sender unit	
Sender unit resistance (full)	19.0–21.0 Ω
Sender unit resistance (empty)	139.0–141.0 Ω

Relay unit	
Coil resistance	180.0 Ω

Headlight relay (on/off)	
Coil resistance	96.0 Ω

Radiator fan	
Running rpm	4500 r/min

Fan motor relay	
Coil resistance	96.0 Ω

Grip warmer	
Grip warmer resistance (L)	1.21–1.48 Ω
Grip warmer resistance (R)	1.17–1.43 Ω

ELECTRICAL SPECIFICATIONS

Fuses

Main fuse	50.0 A
Cooling system fuse	30.0 A
Headlight fuse	25.0 A
Brake light fuse	1.0 A
Signaling system fuse	10.0 A
Ignition fuse	20.0 A
Radiator fan fuse	10.0 A × 2
Auxiliary DC jack fuse	3.0 A
Hazard lighting fuse	7.5 A
Fuel injection system fuse	15.0 A
ABS motor fuse	30.0 A
ABS solenoid fuse	20.0 A
ABS ECU fuse	7.5 A
Cruise control fuse	1.0 A
Windshield drive system fuse	20.0 A
Electronic throttle valve fuse	7.5 A
Backup fuse	7.5 A
Spare fuse	30.0 A × 2
Spare fuse	25.0 A
Spare fuse	20.0 A
Spare fuse	15.0 A
Spare fuse	10.0 A
Spare fuse	7.5 A
Spare fuse	3.0 A
Spare fuse	1.0 A

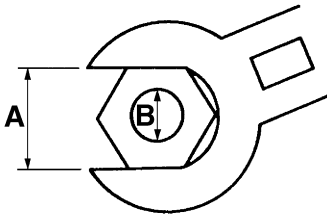
EAS20320

TIGHTENING TORQUES

EAS20330

GENERAL TIGHTENING TORQUE SPECIFICATIONS

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

















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

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















TIGHTENING TORQUES

EAS20340














ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Spark plug	M10	4	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Cylinder head bolt	M10	10	See TIP.	
Cylinder head bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Camshaft cap bolt	M6	20	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Cylinder head cover bolt	M6	8	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Cylinder head cover plate bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Cylinder identification sensor bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Engine oil check bolt	M8	1	15 Nm (1.5 m·kg, 11 ft·lb)	
Cylinder head stud bolt (exhaust pipe)	M8	8	15 Nm (1.5 m·kg, 11 ft·lb)	
Reed valve cover bolt	M6	6	14 Nm (1.4 m·kg, 10 ft·lb)	
Connecting rod nut	M8	8	See TIP.	
Generator rotor bolt	M12	1	130 Nm (13.0 m·kg, 94 ft·lb)	
Pickup rotor bolt	M10	1	65 Nm (6.5 m·kg, 47 ft·lb)	
Front balancer lever bolt	M8	1	14 Nm (1.4 m·kg, 10 ft·lb)	
Rear balancer lever bolt	M8	1	14 Nm (1.4 m·kg, 10 ft·lb)	
Front balancer shaft pinch bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Rear balancer shaft pinch bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Timing chain tensioner bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Timing chain tensioner cap bolt	M6	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Camshaft sprocket bolt	M7	4	24 Nm (2.4 m·kg, 17 ft·lb)	
Water pump assembly bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Water pump housing cover bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Coolant drain bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Water jacket joint bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Thermostat inlet pipe 1 bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Thermostat housing cover/radiator filler pipe bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Thermostat housing bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Oil cooler bolt	M6	4	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kg, 31 ft·lb)	
Oil strainer bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil pump bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil delivery pipe 2 bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil delivery pipe 3 bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil filter cartridge bolt	M20	1	70 Nm (7.0 m·kg, 50 ft·lb)	
Oil filter cartridge	M20	1	17 Nm (1.7 m·kg, 12 ft·lb)	


TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Oil pan bolt	M6	20	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil pump drive chain guide bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil pump housing cover bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil level switch bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Throttle cable holder bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Throttle body joint clamp screw	M5	8	3 Nm (0.3 m·kg, 2.2 ft·lb)	
Air filter case joint clamp screw	M4	4	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Air filter case and rear lower fuel tank bracket bolt	M6	2	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Fuel rail screw	M6	2	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Intake air pressure sensor screw	M5	1	3.5 Nm (0.35 m·kg, 2.5 ft·lb)	
Atmospheric pressure sensor screw	M5	1	3.5 Nm (0.35 m·kg, 2.5 ft·lb)	
Exhaust pipe assembly nut	M8	8	20 Nm (2.0 m·kg, 14 ft·lb)	
Exhaust pipe assembly and muffler bolt	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Exhaust pipe assembly bolt	M8	2	17 Nm (1.7 m·kg, 12 ft·lb)	
Muffler bolt	M10	2	25 Nm (2.5 m·kg, 18 ft·lb)	
Muffler protector bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Muffler protector clamp screw	—	1	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Crankcase bolt	M9	10	See TIP.	
Crankcase bolt (shoulder bolt)	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Crankcase bolt	M6	16	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Crankcase bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Crankcase bolt	M8	2	24 Nm (2.4 m·kg, 17 ft·lb)	
Crankcase blind plug	M10	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Lower crankcase plug bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Generator cover bolt	M6	11	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Clutch cover bolt	M6	10	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Middle gear case cover bolt	M6	9	See TIP.	
Pickup rotor cover bolt	M6	8	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Rear balancer cover bolt	M6	4	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil baffle plate 1 bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil baffle plate 2 bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil guide plate bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Damper cover bolt (middle gear case cover)	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil baffle plate 3 bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Upper crankcase plate bolt	M6	1	12 Nm (1.2 m·kg, 8.7 ft·lb)	

TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Upper crankcase damper bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Damper cover bolt (clutch cover)	M6	5	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Stator coil assembly lead holder bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Main gallery bolt	M20	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Starter clutch bolt	M8	3	32 Nm (3.2 m·kg, 23 ft·lb)	
Clutch boss nut	M20	1	90 Nm (9.0 m·kg, 65 ft·lb)	Use a lock washer.
Clutch spring bolt	M6	6	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Clutch release cylinder bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Clutch hose union bolt	M10	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Clutch release cylinder bleed screw	M8	1	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Main axle assembly screw	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	 Stake.
Middle drive pinion gear nut	M22	1	160 Nm (16.0 m·kg, 115 ft·lb)	 Use a lock washer.
Middle drive shaft bearing housing bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Bearing retainer (middle drive shaft)	M88	1	110 Nm (11.0 m·kg, 80 ft·lb)	Stake.
Middle driven pinion gear nut	M28	1	180 Nm (18.0 m·kg, 130 ft·lb)	 Stake.
Bearing retainer (middle driven shaft)	M68	1	110 Nm (11.0 m·kg, 80 ft·lb)	Stake.
Middle driven shaft bearing housing bolt	M8	3	25 Nm (2.5 m·kg, 18 ft·lb)	
Shift drum retainer bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Shift shaft spring stopper	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	
Stator coil assembly bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Gear position switch bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Crankshaft position sensor bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
O ₂ sensor	M18	1	45 Nm (4.5 m·kg, 32 ft·lb)	
Coolant temperature sensor	M12	1	22 Nm (2.2 m·kg, 16 ft·lb)	
Starter motor bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Throttle position sensor screw	M5	2	3.5 Nm (0.35 m·kg, 2.5 ft·lb)	
Accelerator position sensor bolt	M5	2	3.5 Nm (0.35 m·kg, 2.5 ft·lb)	
Radiator bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	

TIGHTENING TORQUES

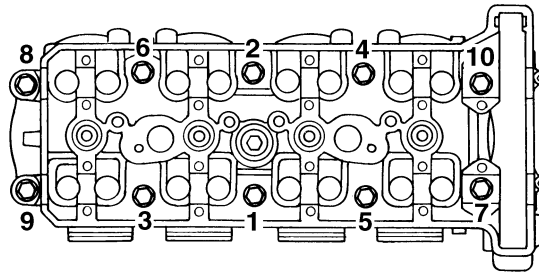
Item	Thread size	Q'ty	Tightening torque	Remarks
Radiator cover bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Radiator bracket bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Coolant reservoir bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Coolant reservoir bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	

TIP

Cylinder head bolt

Tighten the cylinder head bolts to 25 Nm (2.5 m·kg, 18 ft·lb) in the proper tightening sequence, loosen and retighten the bolts to 25 Nm (2.5 m·kg, 18 ft·lb) in the proper tightening sequence, and then tighten them further to reach the specified angle 175–185° in the proper tightening sequence.

Cylinder head tightening sequence:



TIP

Connecting rod nut

Tighten the connecting rod nuts to 20 Nm (2.0 m·kg, 14 ft·lb), and then tighten them further to reach the specified angle 115–125°.

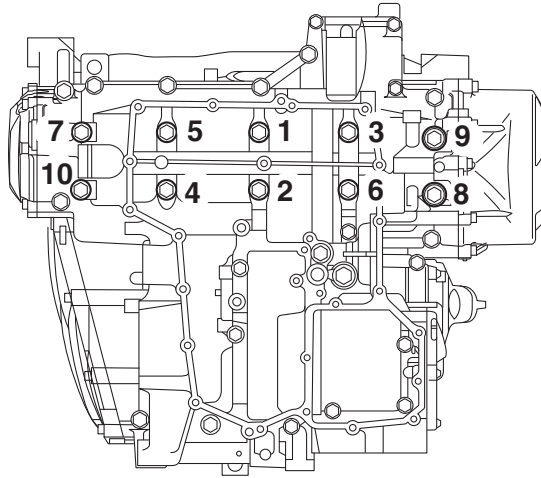
TIP

Crankcase bolt

Tighten the crankcase bolts to 20 Nm (2.0 m·kg, 14 ft·lb) in the proper tightening sequence, loosen and retighten the bolts to 20 Nm (2.0 m·kg, 14 ft·lb) in the proper tightening sequence, and then tighten them further to reach the specified angle 115–125° in the proper tightening sequence.

TIGHTENING TORQUES

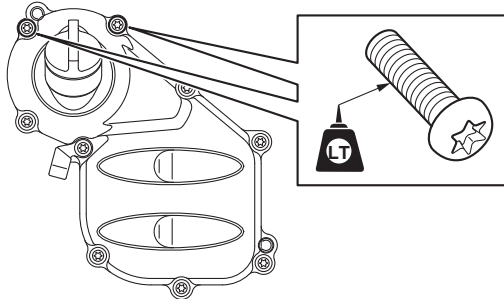
Crankcase tightening sequence:



TIP

Middle gear case cover bolt






Apply locking agent (LOCTITE®) only to the threads of the 2 upper middle gear case cover bolts, and then tighten all of the bolts to 12 Nm (1.2 m·kg, 8.7 ft·lb).






TIGHTENING TORQUES

EAS20350








CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Engine mounting bolt (right front lower side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting bolt (right front upper side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting bolt (left front lower side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting bolt (left front upper side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting nut (rear upper side)	M10	1	45 Nm (4.5 m·kg, 32 ft·lb)	
Spacer bolt	M16	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Engine mounting bolt (rear lower side)	M10	1	45 Nm (4.5 m·kg, 32 ft·lb)	
Engine bracket and engine bolt (left rear side)	M8	2	16 Nm (1.6 m·kg, 11 ft·lb)	
Engine bracket and frame bolt (left rear side)	M10	1	32 Nm (3.2 m·kg, 23 ft·lb)	
Engine bracket bolt (top)	M8	4	16 Nm (1.6 m·kg, 11 ft·lb)	
Engine bracket and engine bolt (top)	M10	2	37 Nm (3.7 m·kg, 27 ft·lb)	
Pinch bolt (front side)	M8	2	24 Nm (2.4 m·kg, 17 ft·lb)	
Pinch bolt (rear lower side)	M8	2	24 Nm (2.4 m·kg, 17 ft·lb)	
Main frame and rear frame bolt (upper side)	M8	4	28 Nm (2.8 m·kg, 20 ft·lb)	
Main frame and rear frame bolt (lower side)	M10	2	48 Nm (4.8 m·kg, 35 ft·lb)	
Rear frame and hydraulic unit bracket bolt	M6	4	11 Nm (1.1 m·kg, 8.0 ft·lb)	
Pivot shaft	M28	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Pivot shaft self-lock nut (right side)	M18	1	125 Nm (12.5 m·kg, 90 ft·lb)	
Pivot shaft nut (left side)	M28	1	115 Nm (11.5 m·kg, 85 ft·lb)	
Pivot shaft nut retainer bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Relay arm and frame nut	M10	1	40 Nm (4.0 m·kg, 29 ft·lb)	
Connecting arm and relay arm nut	M10	1	48 Nm (4.8 m·kg, 35 ft·lb)	
Connecting arm and swingarm nut	M10	1	48 Nm (4.8 m·kg, 35 ft·lb)	
Rear shock absorber assembly upper nut	M12	1	64 Nm (6.4 m·kg, 46 ft·lb)	
Rear shock absorber assembly lower nut	M10	1	40 Nm (4.0 m·kg, 29 ft·lb)	









TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Rear shock absorber spring pre-load adjusting lever nut	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Upper bracket pinch bolt	M8	2	26 Nm (2.6 m·kg, 19 ft·lb)	
Lower bracket pinch bolt	M8	4	23 Nm (2.3 m·kg, 17 ft·lb)	
Steering stem nut	M28	1	115 Nm (11.5 m·kg, 85 ft·lb)	
Lower ring nut	M30	1	See TIP.	
Immobilizer unit coupler cover holder bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Handlebar bolt	M8	2	23 Nm (2.3 m·kg, 17 ft·lb)	
Handlebar nut	M12	2	65 Nm (6.5 m·kg, 47 ft·lb)	
Clutch master cylinder holder bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Front brake master cylinder holder bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Front fork cap bolt locknut (right front fork leg)	M10	1	14 Nm (1.4 m·kg, 10 ft·lb)	
Front fork damper rod assembly bolt	M10	2	35 Nm (3.5 m·kg, 25 ft·lb)	
Front fork cap bolt	M45	2	25 Nm (2.5 m·kg, 18 ft·lb)	
Front fender bolt	M6	4	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Brake hose joint bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Lower bracket cover bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Windshield drive unit bracket and frame nut	M10	2	32 Nm (3.2 m·kg, 23 ft·lb)	
Electrical components board nut	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Windshield bracket and windshield drive unit bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rearview mirror nut	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Windshield drive unit nut	M6	9	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Windshield drive unit bracket and electrical components tray bracket bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Relay bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Side cover bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Grab bar bolt	M8	5	21 Nm (2.1 m·kg, 15 ft·lb)	
Center rear cowling bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel pump bolt	M5	6	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Front fuel tank bracket and frame bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Fuel tank and front fuel tank bracket bolt	M8	2	16 Nm (1.6 m·kg, 11 ft·lb)	
Fuel tank and rear upper fuel tank bracket bolt	M8	2	16 Nm (1.6 m·kg, 11 ft·lb)	

TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Rear upper fuel tank bracket and rear lower fuel tank bracket nut	M8	1	16 Nm (1.6 m·kg, 11 ft·lb)	
Rear lower fuel tank bracket and frame bolt	M6	4	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Fuel tank cap bolt	M5	3	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Storage compartment bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
T-bar bolt	M10	3	37 Nm (3.7 m·kg, 27 ft·lb)	
Rear fender bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Seat lock cable assembly nut	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front wheel axle bolt	M14	1	91 Nm (9.1 m·kg, 66 ft·lb)	
Front wheel axle pinch bolt	M8	4	See TIP.	
Front brake disc bolt	M6	12	18 Nm (1.8 m·kg, 13 ft·lb)	
Front wheel sensor bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front wheel sensor rotor bolt	M5	3	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Rear wheel axle nut	M18	1	125 Nm (12.5 m·kg, 90 ft·lb)	
Rear wheel axle pinch bolt	M8	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Rear brake disc bolt	M6	6	18 Nm (1.8 m·kg, 13 ft·lb)	
Rear wheel sensor bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear wheel sensor rotor bolt	M5	3	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Brake torque rod nut	M8	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear wheel dust cover screw	M5	3	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Rear wheel bearing retainer	M56	1	80 Nm (8.0 m·kg, 58 ft·lb)	 Left-hand thread.
Brake pipe union bolt	M10	4	30 Nm (3.0 m·kg, 22 ft·lb)	
Brake hose union bolt	M10	7	30 Nm (3.0 m·kg, 22 ft·lb)	
Brake pipe flare nut	M10	5	16 Nm (1.6 m·kg, 11 ft·lb)	
Brake pipe/joint assembly flare nut	M10	3	16 Nm (1.6 m·kg, 11 ft·lb)	
Brake pipe/joint assembly bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front brake caliper bolt	M10	4	40 Nm (4.0 m·kg, 29 ft·lb)	
Front brake hose holder bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front brake hose joint bolt	M6	1	See TIP.	
Front brake caliper bleed screw	M8	3	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Front brake pad bolt	M10	4	17 Nm (1.7 m·kg, 12 ft·lb)	
Rear brake caliper bolt	M10	2	27 Nm (2.7 m·kg, 19 ft·lb)	
Rear brake hose and rear wheel sensor lead holder bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake hose holder bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake caliper bleed screw	M7	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	

TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Hydraulic unit assembly cap nut	M8	3	16 Nm (1.6 m·kg, 11 ft·lb)	
Hydraulic unit assembly bracket and hydraulic unit assembly bolt	M6	5	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Metering valve bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Proportioning valve bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Sidestand nut	M10	1	58 Nm (5.8 m·kg, 42 ft·lb)	
Sidestand switch screw	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Centerstand nut	M10	4	55 Nm (5.5 m·kg, 40 ft·lb)	
Centerstand bracket nut	M10	2	55 Nm (5.5 m·kg, 40 ft·lb)	
Brake pedal pinch bolt	M6	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Right footrest assembly bolt	M8	2	28 Nm (2.8 m·kg, 20 ft·lb)	
Rear brake master cylinder bolt	M8	2	18 Nm (1.8 m·kg, 13 ft·lb)	
Rear brake master cylinder lock-nut	M8	1	16 Nm (1.6 m·kg, 11 ft·lb)	
Left footrest assembly bolt	M8	2	28 Nm (2.8 m·kg, 20 ft·lb)	
Left footrest assembly bolt	M10	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Left footrest assembly and side-stand bolt	M10	2	65 Nm (6.5 m·kg, 47 ft·lb)	
Passenger footrest and muffler bracket bolt	M8	4	28 Nm (2.8 m·kg, 20 ft·lb)	
Shift arm pinch bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Shift rod locknut	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Drive shaft dust cover bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Final gear oil drain bolt	M14	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Final gear oil filler bolt	M14	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Final drive assembly nut	M10	4	42 Nm (4.2 m·kg, 30 ft·lb)	
Final drive pinion gear bearing retainer	M65	1	110 Nm (11.0 m·kg, 80 ft·lb)	Left-hand thread
Coupling gear nut	M16	1	110 Nm (11.0 m·kg, 80 ft·lb)	Stake
Ring gear bearing housing bolt	M10	2	40 Nm (4.0 m·kg, 29 ft·lb)	
Ring gear bearing housing nut	M8	6	23 Nm (2.3 m·kg, 17 ft·lb)	
Final gear case stud bolt	M8	6	9 Nm (0.9 m·kg, 6.5 ft·lb)	
Ring gear bearing housing stopper bolt	M10	1	9 Nm (0.9 m·kg, 6.5 ft·lb)	 Left-hand thread
ECU cover bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Electrical components tray bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Battery holder bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Air guide bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Horn bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	

TIGHTENING TORQUES

TIP

Lower ring nut

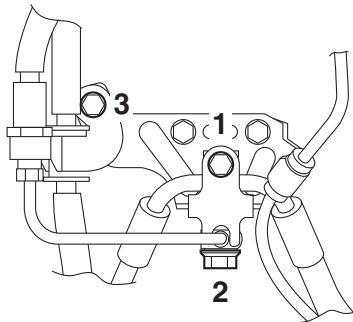
1. First, tighten the lower ring nut to approximately 52 Nm (5.2 m·kg, 37 ft·lb) with a torque wrench, then loosen the lower ring nut completely.
2. Retighten the lower ring nut to 18 Nm (1.8 m·kg, 13 ft·lb) with a torque wrench.

TIP

Brake hose joint bracket bolt

To install the front brake hose joint, tighten the bolts in the proper tightening sequence.

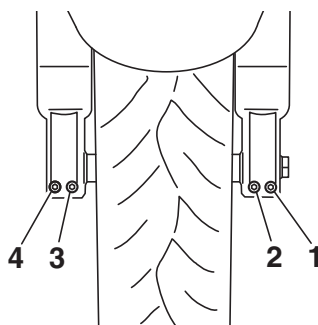
1. Tighten the bolts temporarily in the proper tightening sequence.
2. Tighten the union bolt "2" to 30 Nm (3.0 m·kg, 22 ft·lb) and the bolt "3" to 7 Nm (0.7 m·kg, 5.1 ft·lb).
3. Tighten the front brake hose joint bolt "1" to 7 Nm (0.7 m·kg, 5.1 ft·lb).



TIP

Front wheel axle pinch bolt

1. Insert the front wheel axle from the right side and tighten it with the front wheel axle bolt from the left side to 91 Nm (9.1 m·kg, 66 ft·lb).
2. In the order pinch bolt "2" → pinch bolt "1" → pinch bolt "2", tighten each bolt to 21 Nm (2.1 m·kg, 15 ft·lb) without performing temporary tightening.
3. Check that the right end of the front axle is flush with the front fork. If necessary, manually push the front axle or lightly tap it with a soft hammer until its end is flush with the front fork. However, if the surface of the front axle end is not parallel to the surface of the front fork, align a point on the outer edge of the axle with the fork, making sure that the axle does not protrude past the fork.
4. In the order pinch bolt "4" → pinch bolt "3" → pinch bolt "4", tighten each bolt to 21 Nm (2.1 m·kg, 15 ft·lb) without performing temporary tightening.




































LUBRICATION POINTS AND LUBRICANT TYPES

EAS20360

LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370

ENGINE

Lubrication point	Lubricant
Oil seal lips	
O-rings	
Bearings	
Crankshaft pins	
Piston surfaces	
Piston pins	
Connecting rod bolts and nuts	
Crankshaft journals	
Camshaft lobes	
Camshaft journals	
Balancer dampers, weights, gears and shafts	
Valve stems and stem end (intake and exhaust)	
Valve lifter surfaces	
Water pump impeller shaft	
Oil pump rotors (inner and outer) and oil pump shaft	
Oil pump drive sprocket	
Oil filter union bolt	
Oil nozzle (O-ring)	
Starter clutch idle gear inner surface	
Starter clutch and starter clutch gear	
Primary driven gear	
Push rods and ball	
Transmission gears (wheel and pinion) and collars	
Main axle and drive axle	
Shift drum	
Shift forks and shift fork guide bars	
Shift shaft	
Shift pedal bolt	
Damper drive cam and damper driven cam	
Middle driven gear	
Middle drive pinion gear	
Middle driven pinion gear	
Middle drive pinion gear nut	




























LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication point	Lubricant
Cylinder head cover mating surface	Three Bond 1541C®
Cylinder head cover gasket	Yamaha bond No.1215 (Three Bond No.1215®)
Crankcase mating surface	Yamaha bond No.1215 (Three Bond No.1215®)
Crankshaft position sensor lead grommet	Yamaha bond No.1215 (Three Bond No.1215®)
Stator coil assembly lead grommet	Yamaha bond No.1215 (Three Bond No.1215®)

LUBRICATION POINTS AND LUBRICANT TYPES

EAS20380

CHASSIS

Lubrication point	Lubricant
Steering bearings and upper bearing cover lip	
Lower bearing dust seal lip	
Front wheel oil seal lip	
Rear wheel oil seal lip	
Rear wheel drive hub mating surface	
Rear brake pedal pivoting point	
Footrest assembly pivoting point	
Passenger footrest pivoting point	
Shift pedal pivoting point	
Centerstand pivoting point and metal-to-metal moving parts	
Sidestand pivoting point and metal-to-metal moving parts	
Sidestand spring and spring bracket contact points	
Tube guide (throttle grip) inner surface and throttle cables	
Brake lever pivoting point and metal-to-metal moving parts	
Clutch lever pivoting point and metal-to-metal moving parts	
Swingarm bearing and oil seal lips	
Pivot shaft and pivot shaft thread	
Pivot shaft bearing	
Pivot shaft oil seal lip	
Relay arm bearing and oil seal lips	
Drive shaft spline (final drive pinion gear side)	
Drive shaft spline (universal joint side)	
Ring gear inner surface	
Thrust washer (ring gear)	
Bearing (ring gear)	
Bearing (final drive pinion gear)	
Right grip warmer lead (portion contained in throttle cable housing)	

LUBRICATION POINTS AND LUBRICANT TYPES

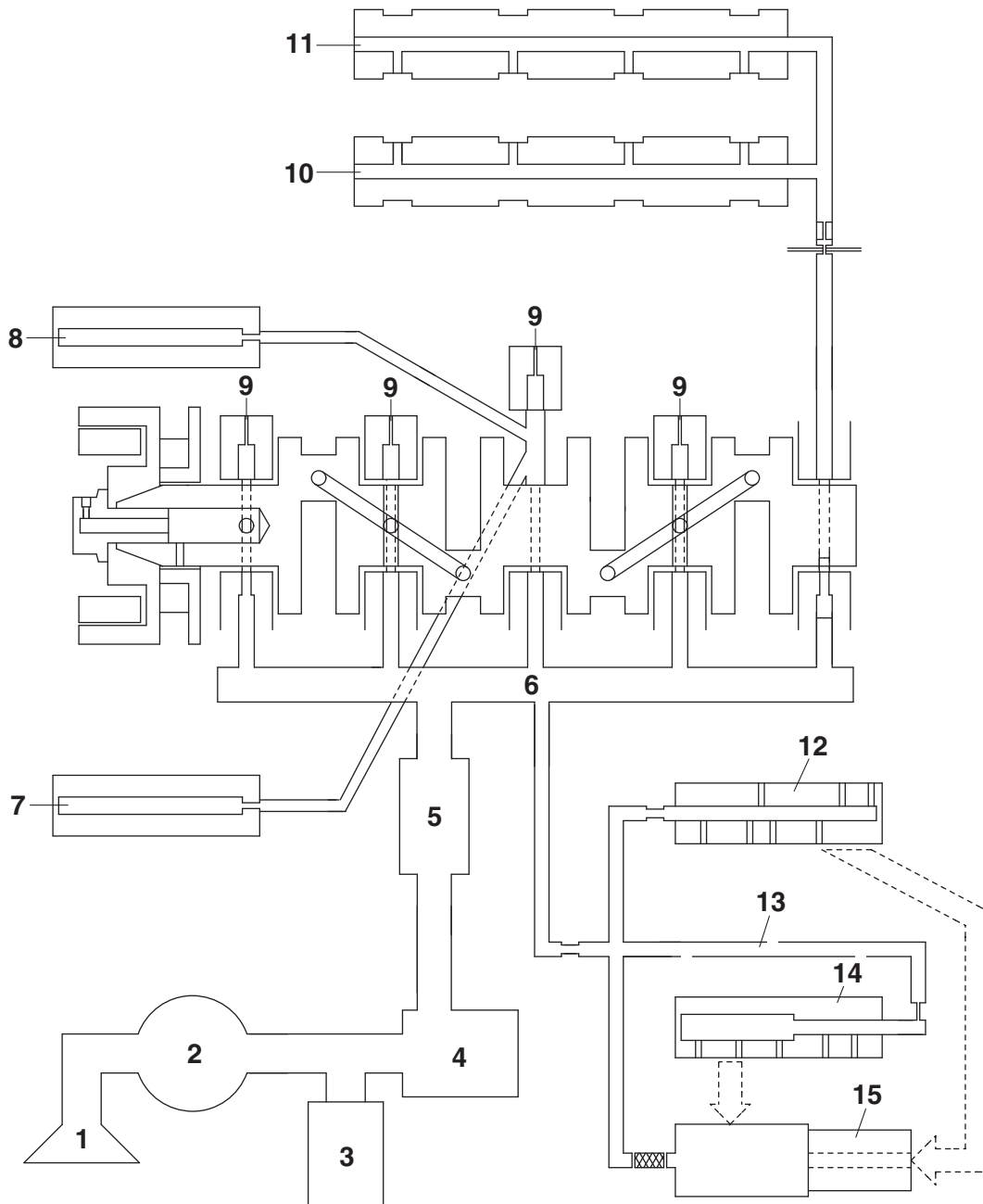
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20390

LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20400

ENGINE OIL LUBRICATION CHART



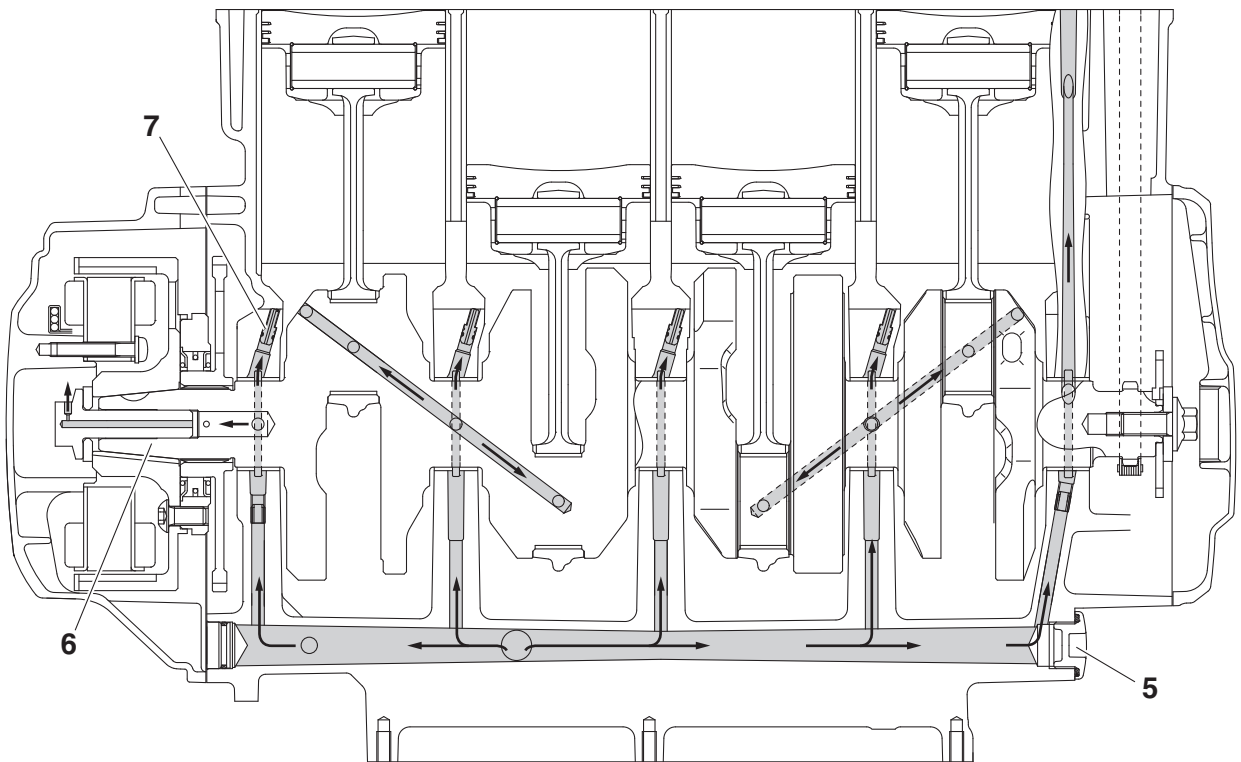
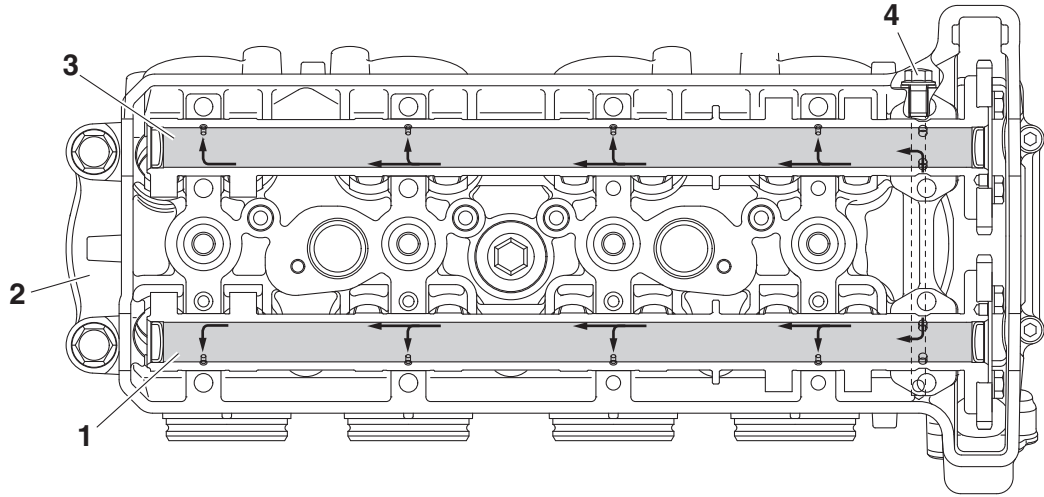
LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Oil strainer
2. Oil pump
3. Relief valve assembly
4. Oil filter cartridge
5. Oil cooler
6. Main gallery
7. Front balancer shaft
8. Rear balancer shaft
9. Oil nozzle
10. Intake camshaft
11. Exhaust camshaft
12. Main axle
13. Oil delivery pipe 1
14. Drive axle
15. Middle drive shaft assembly

LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20410

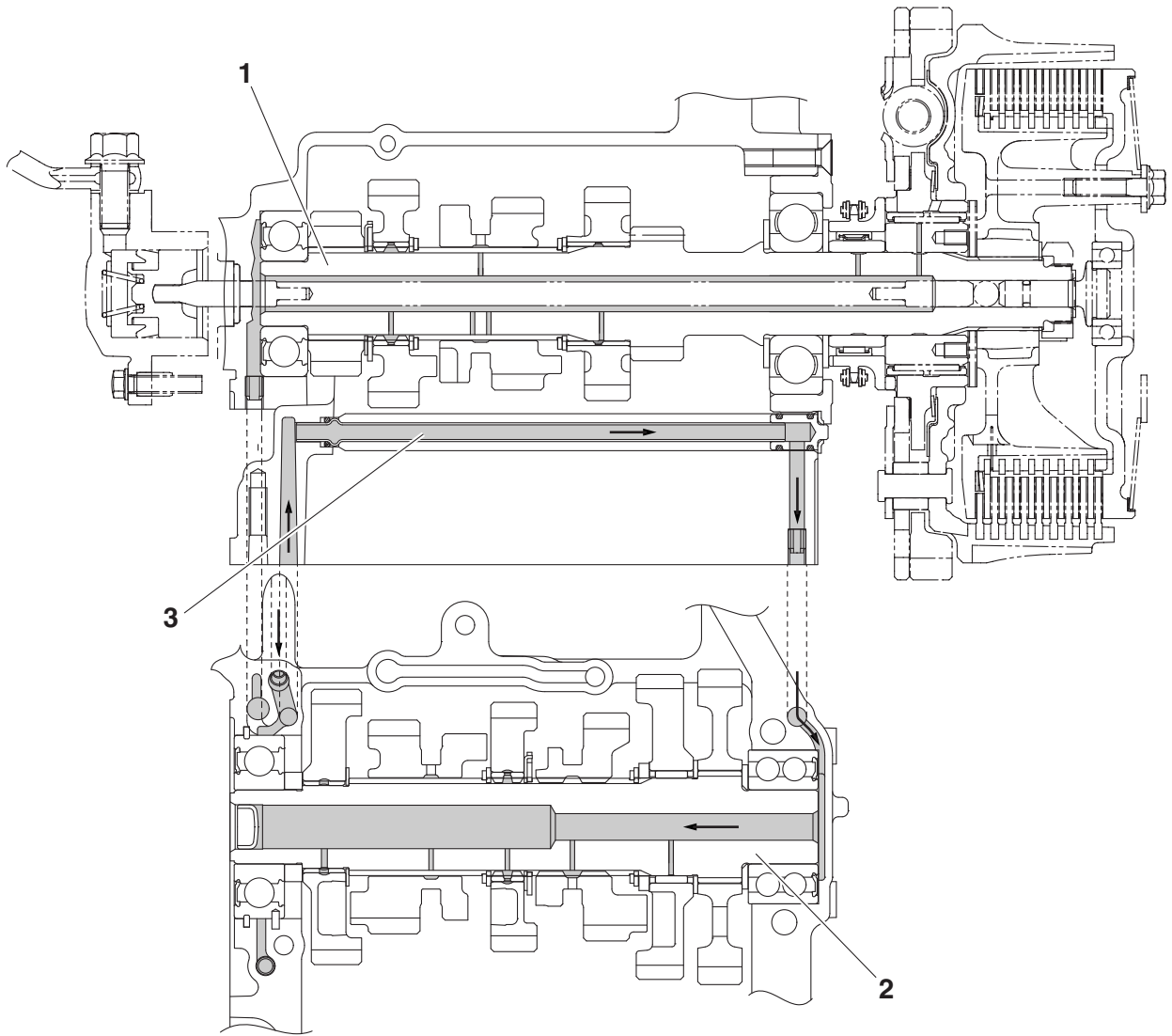
LUBRICATION DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Intake camshaft
2. Cylinder head
3. Exhaust camshaft
4. Oil check bolt
5. Main gallery bolt
6. Crankshaft
7. Oil nozzle

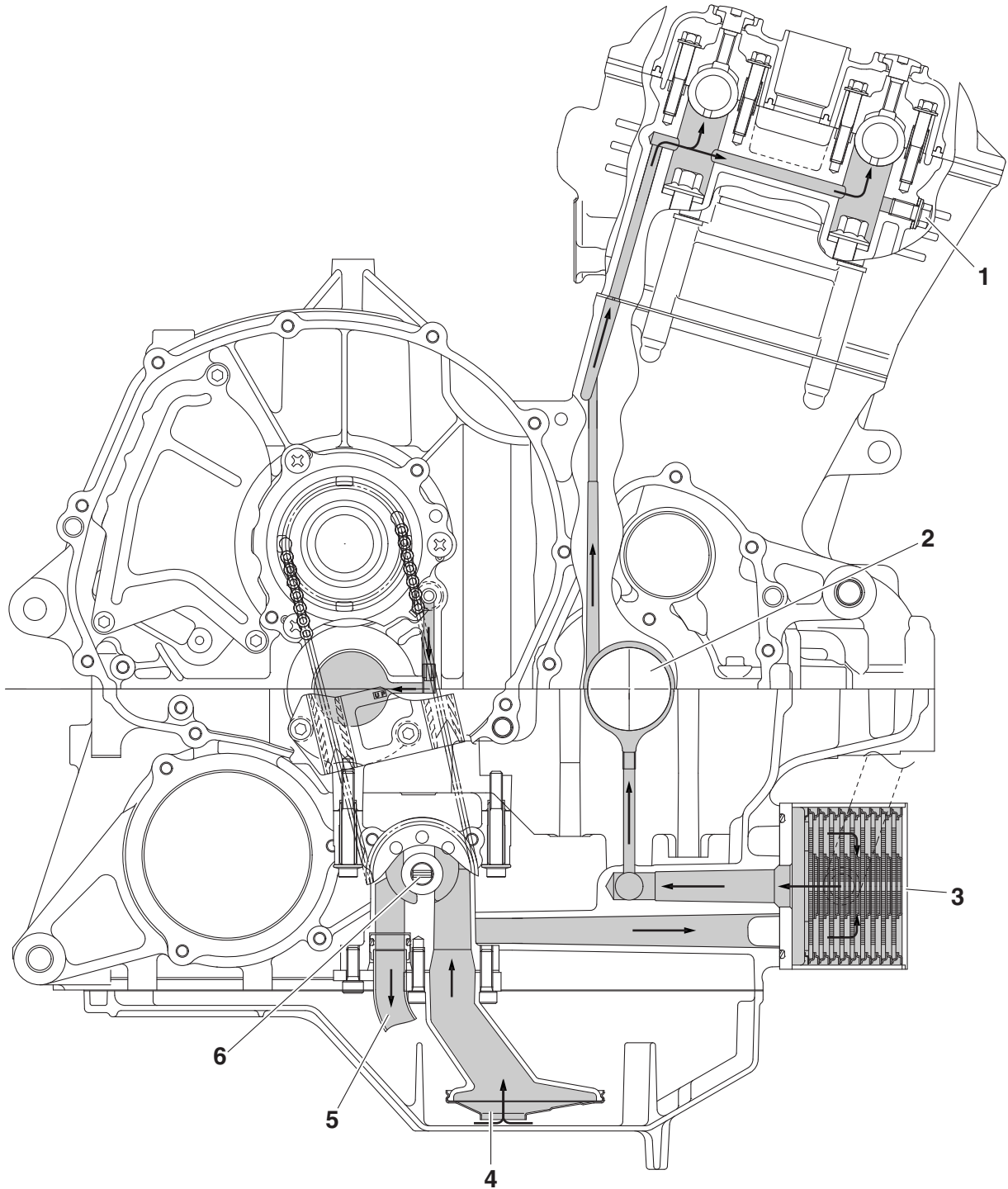
LUBRICATION SYSTEM CHART AND DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

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

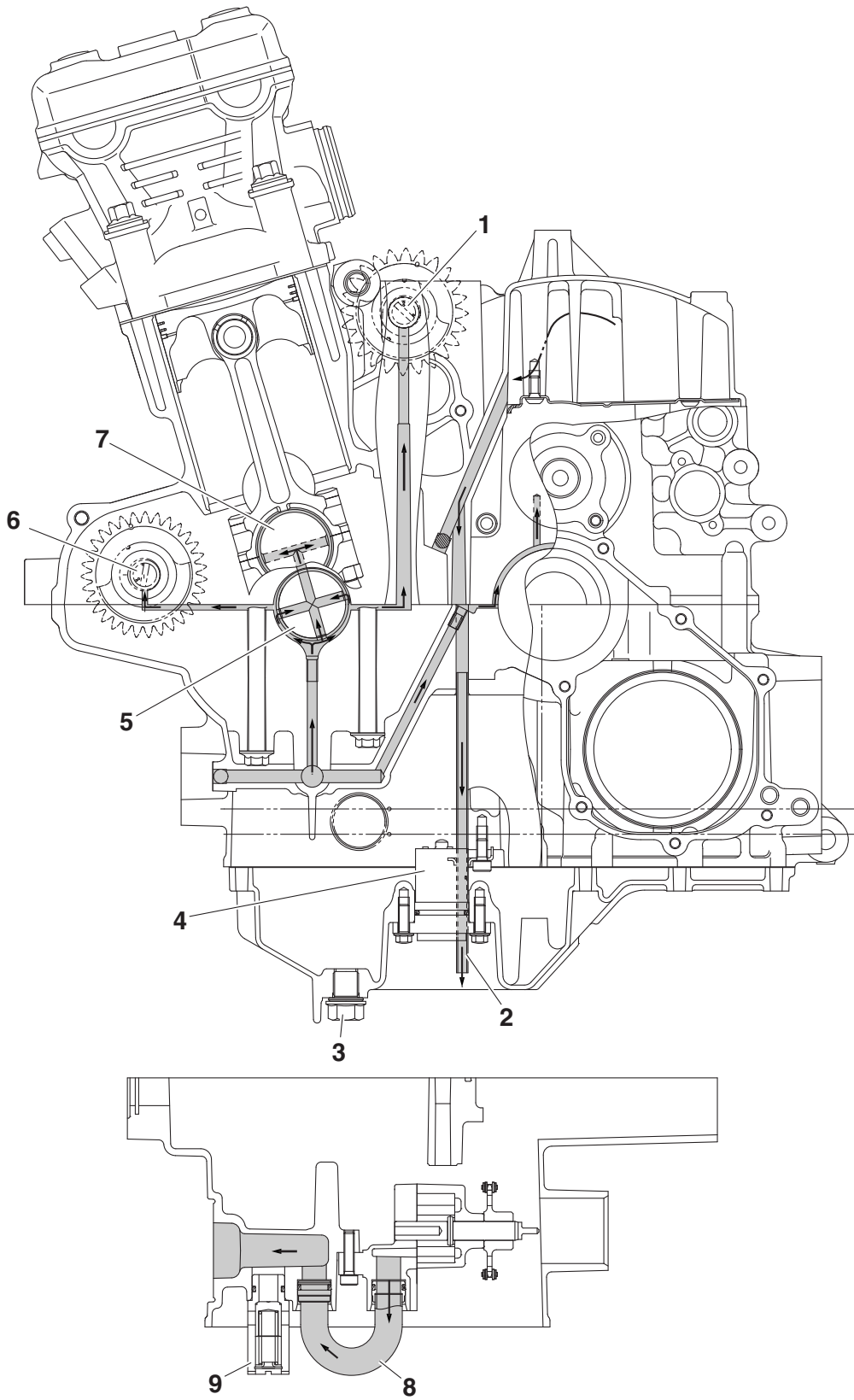
LUBRICATION SYSTEM CHART AND DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Oil check bolt
2. Crankshaft
3. Oil cooler
4. Oil strainer
5. Oil delivery pipe 3
6. Oil pump

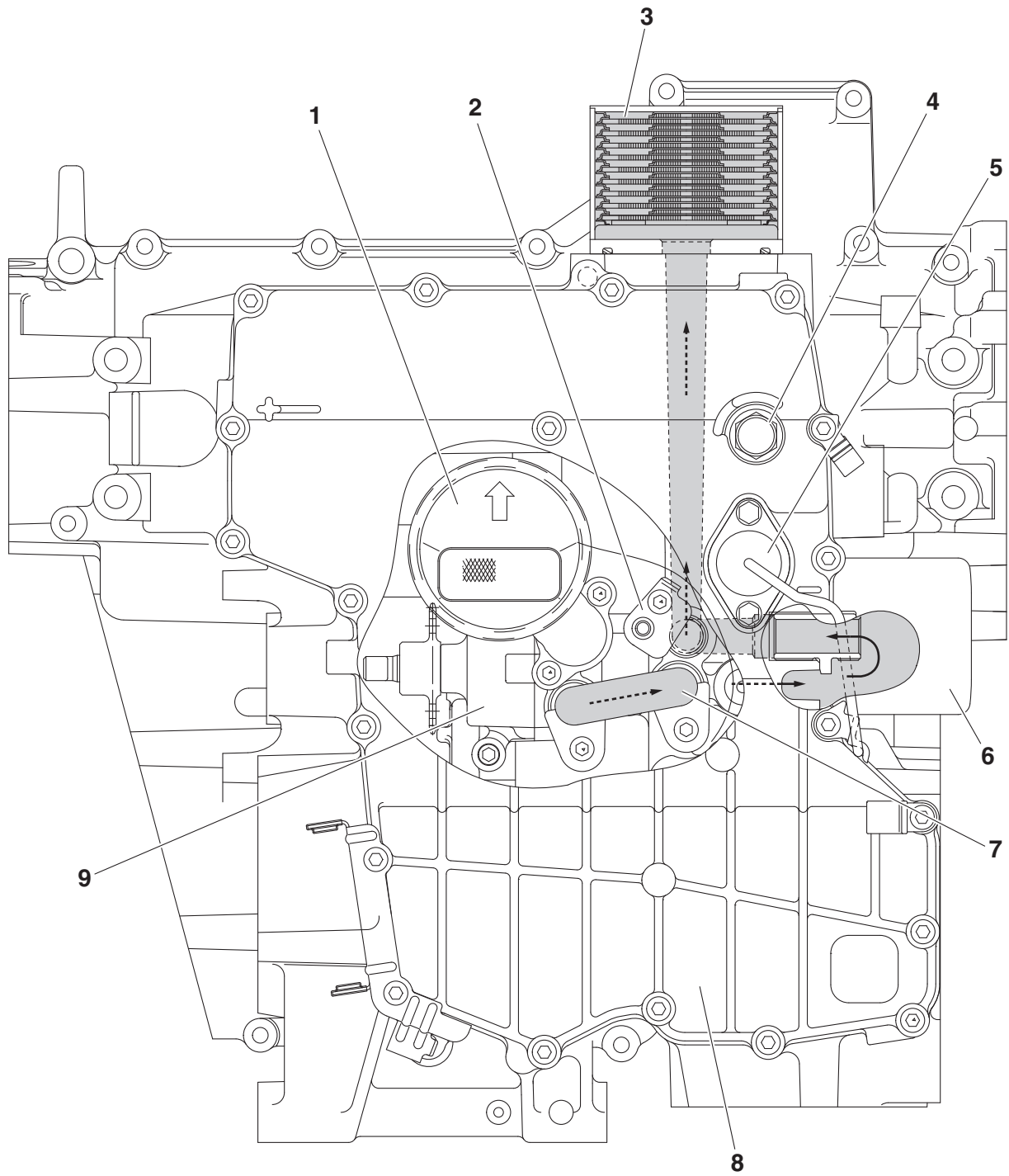
LUBRICATION SYSTEM CHART AND DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Rear balancer
2. Oil delivery pipe 2
3. Engine oil drain bolt
4. Oil level switch
5. Crankshaft
6. Front balancer
7. Crank pin
8. Oil delivery pipe 3
9. Relief valve assembly

LUBRICATION SYSTEM CHART AND DIAGRAMS



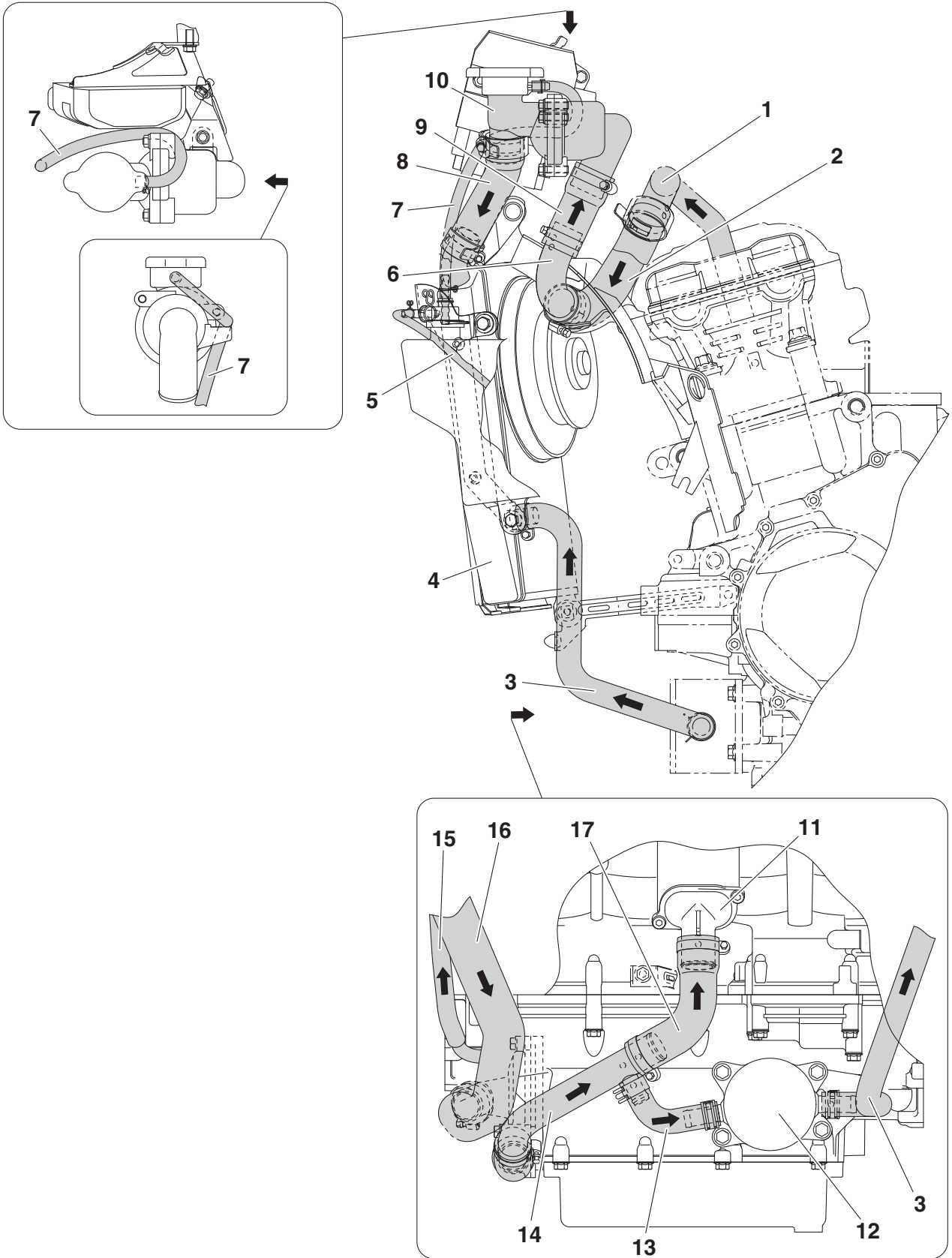
LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Oil strainer
2. Oil delivery pipe 2
3. Oil cooler
4. Engine oil drain bolt
5. Oil level switch
6. Oil filter cartridge
7. Oil delivery pipe 3
8. Oil pan
9. Oil pump

COOLING SYSTEM DIAGRAMS

EAS20420

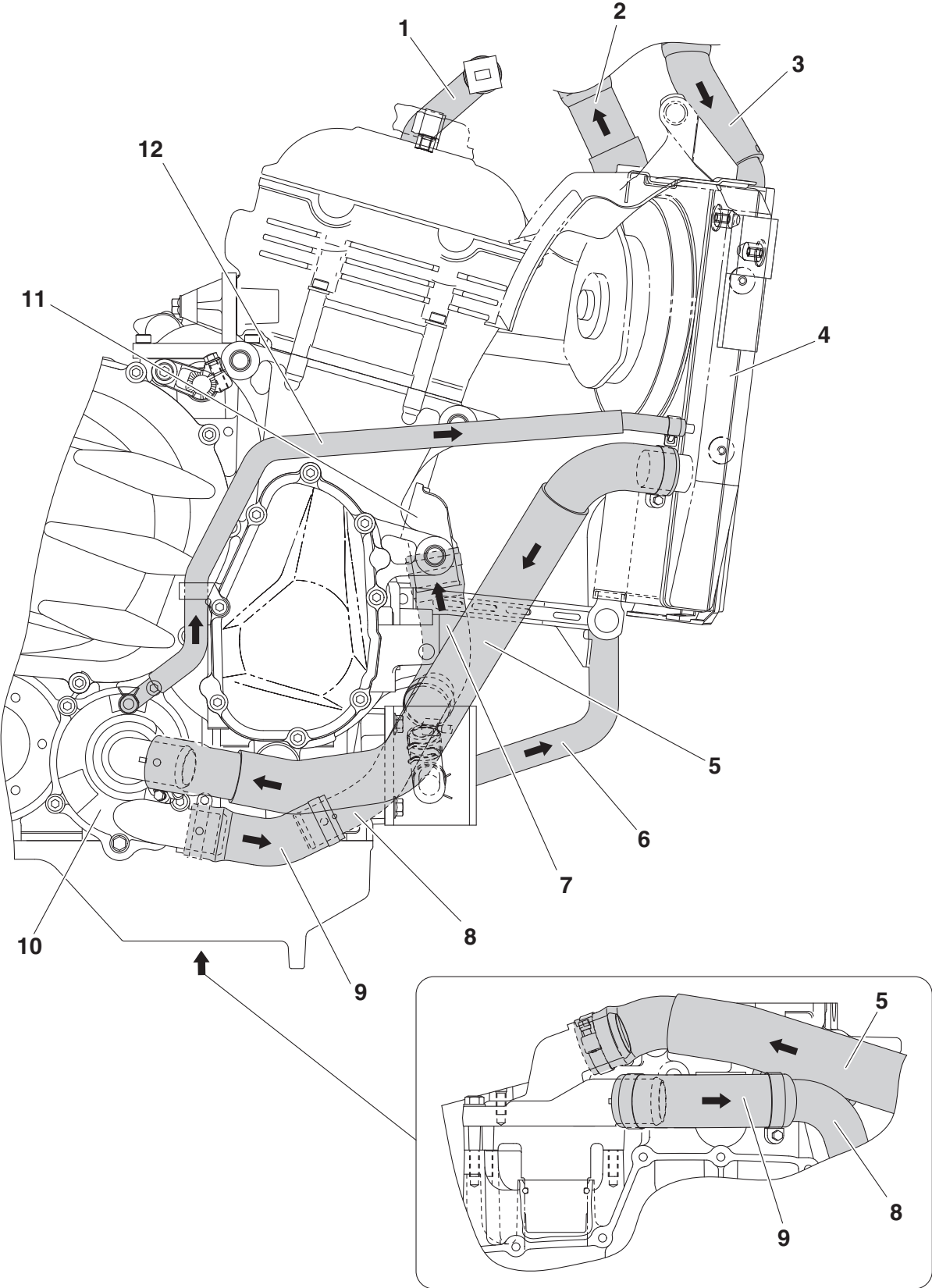
COOLING SYSTEM DIAGRAMS



COOLING SYSTEM DIAGRAMS

1. Thermostat inlet pipe 1
2. Thermostat inlet hose 1
3. Oil cooler outlet hose
4. Radiator
5. Coolant reservoir breather hose
6. Thermostat inlet pipe 2
7. Coolant reservoir hose
8. Radiator inlet hose
9. Thermostat inlet hose 2
10. Thermostat assembly
11. Water jacket joint
12. Oil cooler
13. Oil cooler inlet hose
14. Water pump outlet pipe
15. Water pump breather hose
16. Radiator outlet hose
17. Water jacket joint inlet hose

COOLING SYSTEM DIAGRAMS



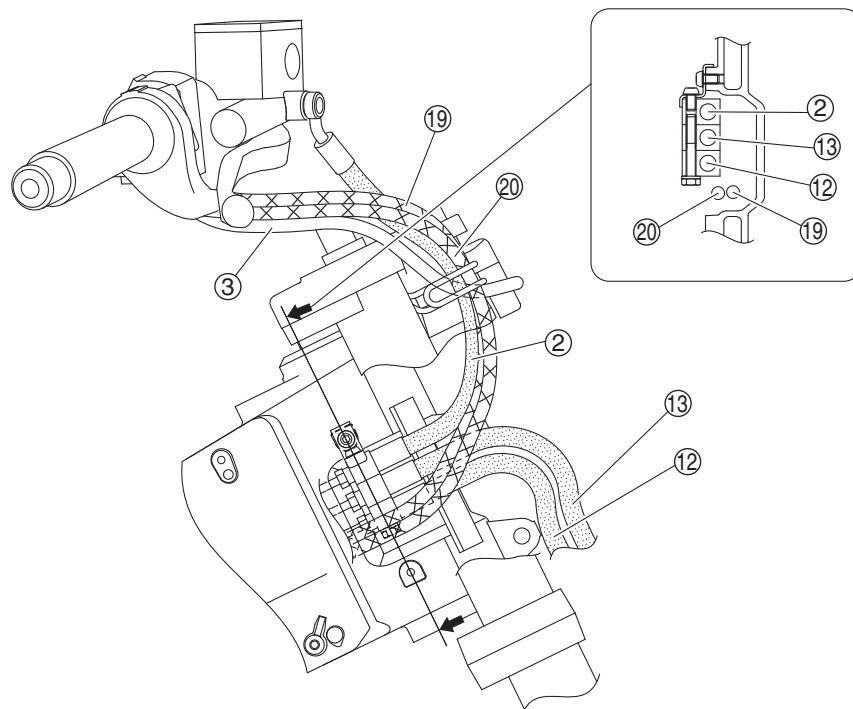
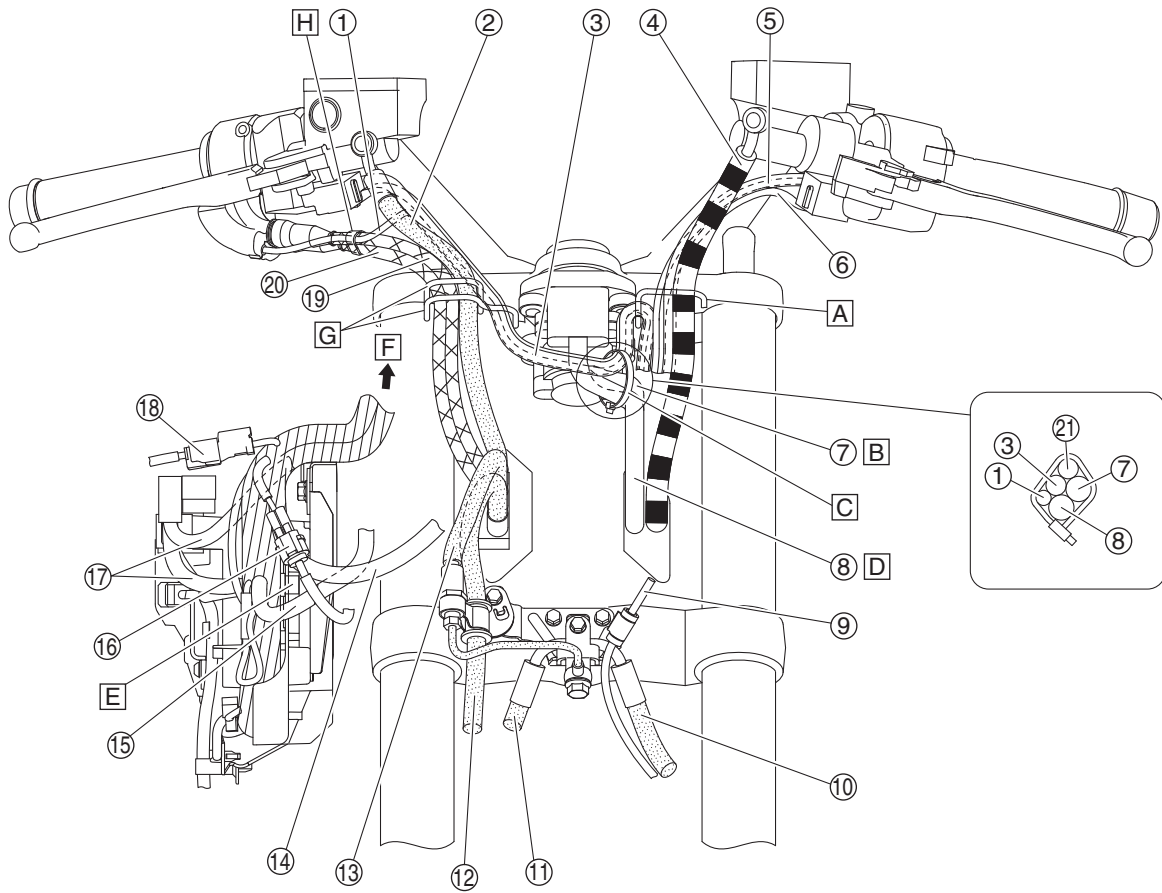
COOLING SYSTEM DIAGRAMS

1. Thermostat inlet pipe 1
2. Thermostat inlet hose 2
3. Radiator inlet hose
4. Radiator
5. Radiator outlet hose
6. Oil cooler outlet hose
7. Water jacket joint inlet hose
8. Water pump outlet pipe
9. Water pump outlet hose
10. Water pump
11. Water jacket joint
12. Water pump breather hose

EAS20430

CABLE ROUTING

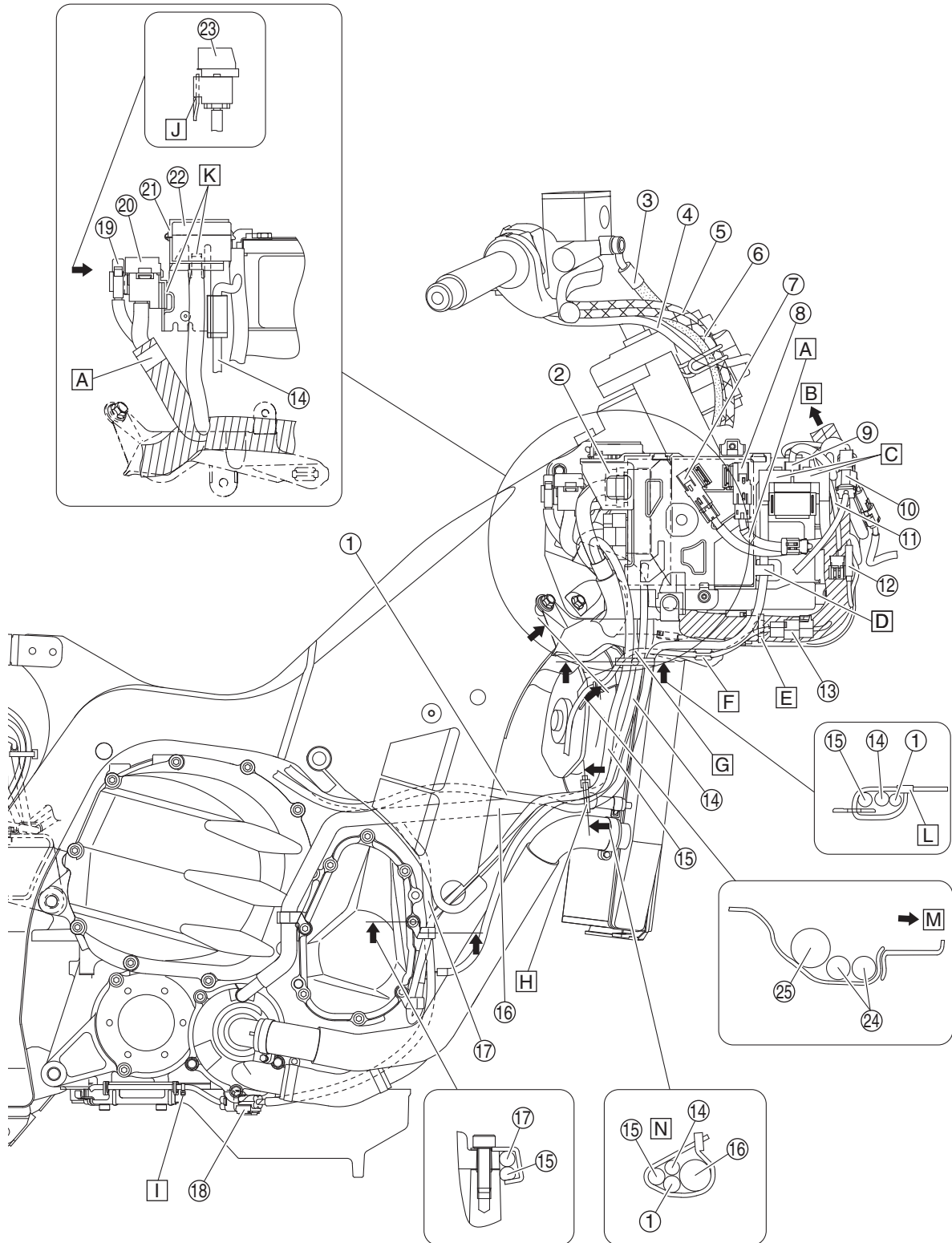
Handlebar (front view)



1. Right grip warmer lead
 2. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
 3. Right handlebar switch lead
 4. Clutch hose
 5. Left handlebar switch lead
 6. Clutch switch lead
 7. Main switch lead
 8. Immobilizer unit lead
 9. Front wheel sensor lead
 10. Brake hose (brake pipe/upper joint assembly to left front brake caliper)
 11. Brake hose (brake pipe/upper joint assembly to right front brake caliper)
 12. Brake hose (metering valve to right front brake caliper)
 13. Brake hose (brake pipe/upper joint assembly to front brake calipers)
 14. Relay unit lead
 15. Main fuse lead
 16. Right auxiliary light coupler
 17. Positive battery lead
 18. Front right turn signal light coupler
 19. Throttle cable (accelerator cable)
 20. Throttle cable (decelerator cable)
 21. Front brake light switch lead
- A. Pass the clutch hose, handlebar switch leads, grip warmer leads, front brake light switch lead, and clutch switch lead through the guide.
 - B. Route the main switch lead to the inside of the clutch hose.
 - C. Fasten the right handlebar switch lead, right grip warmer lead, front brake light switch lead, main switch lead, and immobilizer unit lead with a plastic locking tie. Face the end of the plastic locking tie downward, angled inward, and then cut off the excess end of the tie.
 - D. Route the immobilizer unit lead to the inside of the clutch hose.
 - E. Insert the projection on the wire harness holder completely into the hole in the electrical components tray.
 - F. To electrical components board
 - G. Pass the brake hose (front brake master cylinder to brake pipe/lower joint assembly), right handlebar switch lead, right grip warmer lead, throttle cables, and front brake light switch lead through the guide as shown in the illustration.
 - H. Fasten the right grip warmer lead to the throttle cables with a plastic locking tie 10 mm (0.39 in) or less from the end of the throttle cable boot. Face the end of the plastic locking tie upward or downward, and then cut off the excess end of the tie.

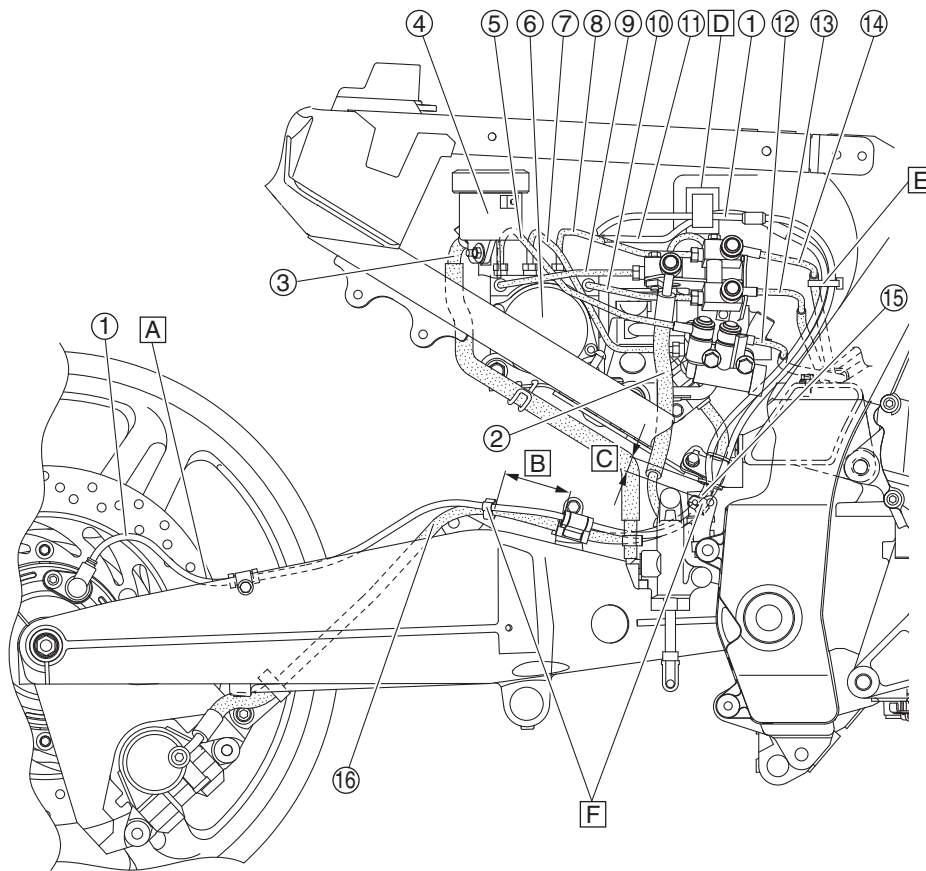
CABLE ROUTING

Radiator and battery (right side view)



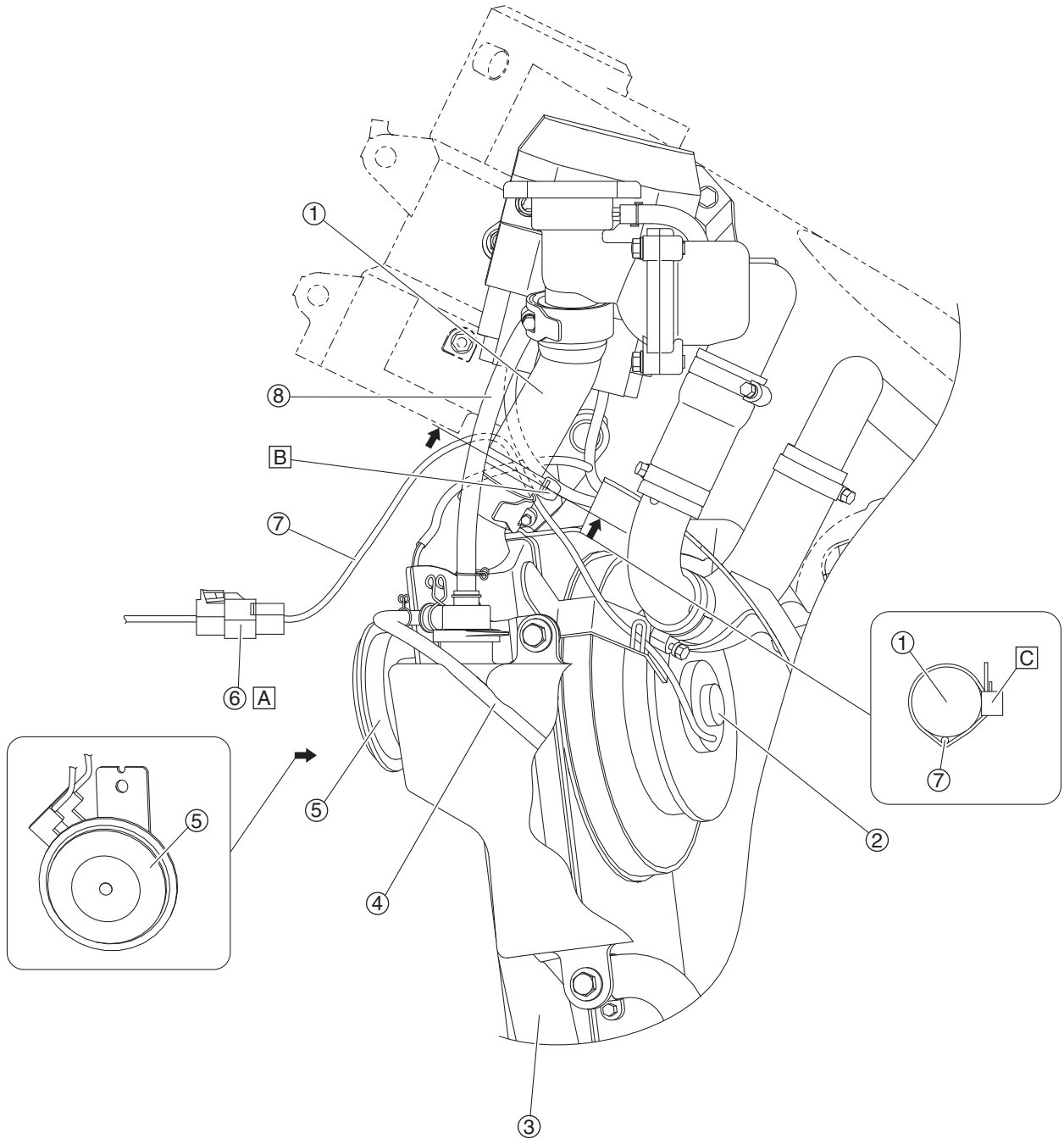
1. Starter motor lead
2. ECU (engine control unit)
3. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
4. Right handlebar switch lead
5. Throttle cable (accelerator cable)
6. Throttle cable (decelerator cable)
7. Headlight relay (on/off)
8. Radiator fan motor relay
9. Starter relay coupler
10. Front right turn signal light coupler
11. ABS test coupler lead
12. Yamaha diagnostic tool connector
13. Right radiator fan motor coupler
14. Negative battery lead
15. O₂ sensor lead
16. Water pump breather hose
17. Crankshaft position sensor lead
18. O₂ sensor coupler
19. Hazard lighting fuse
20. Fuse box 2
21. Fuse box 1
22. Windshield drive system fuse
23. Fuses (brake light and cruise control system)
24. ECU (engine control unit) leads
25. Wire harness
 - A. Blue tape
 - B. To electrical components board
 - C. Cover the positive battery lead terminal and starter motor lead terminal with the covers.
 - D. Pass the starter motor lead through the guide on the electrical components tray.
 - E. Insert the projection on the wire harness holder completely into the hole in the electrical components tray.
 - F. Fasten the right radiator fan motor lead with the holder on the air guide.
 - G. Route the right radiator fan motor lead between the leads (starter motor lead, negative battery lead, and O₂ sensor lead) and the base of the holder that is fastening the leads.
 - H. Fasten the negative battery lead, starter motor lead, O₂ sensor lead, and water pump breather hose with a plastic locking tie, making sure to install the tie around the end of the hose's protective sleeve, and then cut off the excess end of the tie. Do not kink the water pump breather hose and do not face the end of the plastic locking tie downward.
 - I. The plastic locking tie on the O₂ sensor lead should be positioned to the front of the bracket.
 - J. Install the fuse holder for the brake light fuse and cruise control system fuse completely onto the tab on the electrical components tray.
 - K. Install the fuse boxes securely onto the brackets until a distinct "click" is heard.
 - L. Fasten the leads with the plastic band so that they are positioned in a straight line as shown in the illustration. Face the end of the plastic band forward. Do not cut off the excess end of the plastic band.
 - M. Outward
 - N. Route the O₂ sensor lead to the outside of the other leads and the hose.

Rear brake hose (right side view)



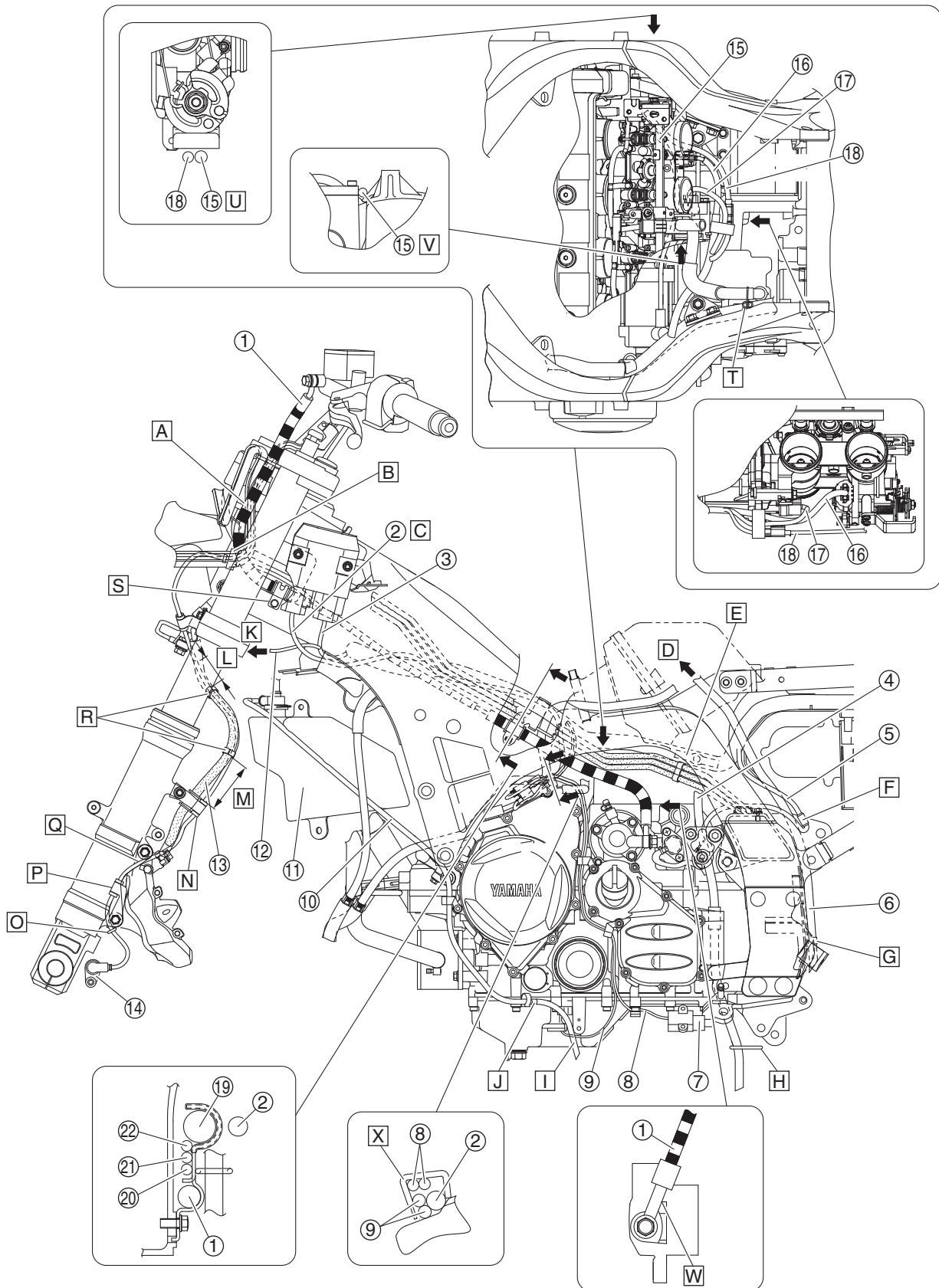
1. Rear wheel sensor lead
 2. Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)
 3. Rear brake fluid reservoir hose
 4. Rear brake fluid reservoir
 5. Brake pipe (hydraulic unit to metering valve)
 6. Hydraulic unit assembly
 7. Brake pipe (hydraulic unit to proportioning valve)
 8. Brake pipe/upper joint assembly
 9. Brake pipe/middle joint assembly
 10. Brake pipe/lower joint assembly
 11. Rear brake light switch lead
 12. Brake pipe (metering valve to right front brake caliper)
 13. Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)
 14. Brake pipe (brake pipe/upper joint assembly to front brake calipers)
 15. Rear brake light switch
 16. Brake hose (brake pipe to rear brake caliper)
- A. Route the rear wheel sensor lead to the inside of the swingarm, making sure that the lead does not protrude above the swingarm.
 - B. 45–55 mm (1.77–2.17 in)
 - C. 20–30 mm (0.79–1.18 in)
 - D. Fasten the rear brake light switch lead and rear wheel sensor lead with the holder.
 - E. Fasten the brake pipe (brake pipe/upper joint assembly to front brake calipers), rear wheel sensor lead, and rear brake light switch lead with a plastic locking tie. Face the end of the plastic locking tie inward.
 - F. Fasten the rear wheel sensor lead to the brake hose (brake pipe to rear brake caliper) with the two holders, making sure that the fastener of each holder faces inward.

Horn and radiator (left side view)



1. Radiator inlet hose
2. Left radiator fan motor
3. Radiator
4. Coolant reservoir breather hose
5. Horn
6. Left radiator fan motor coupler
7. Left radiator fan motor lead
8. Coolant reservoir hose
- A. After connecting the left radiator fan motor coupler, position the coupler between the left side cowling and the left lower inner panel.
- B. Fasten the left radiator fan motor lead to the radiator inlet hose with the plastic band. Be sure to position the plastic band above the radiator hose band. Make sure that there is no slack in the left radiator fan motor lead and that the lead does not contact the metal hose fitting of the radiator.
- C. Face the end of the plastic band outward. Do not cut off the excess end of the plastic band.

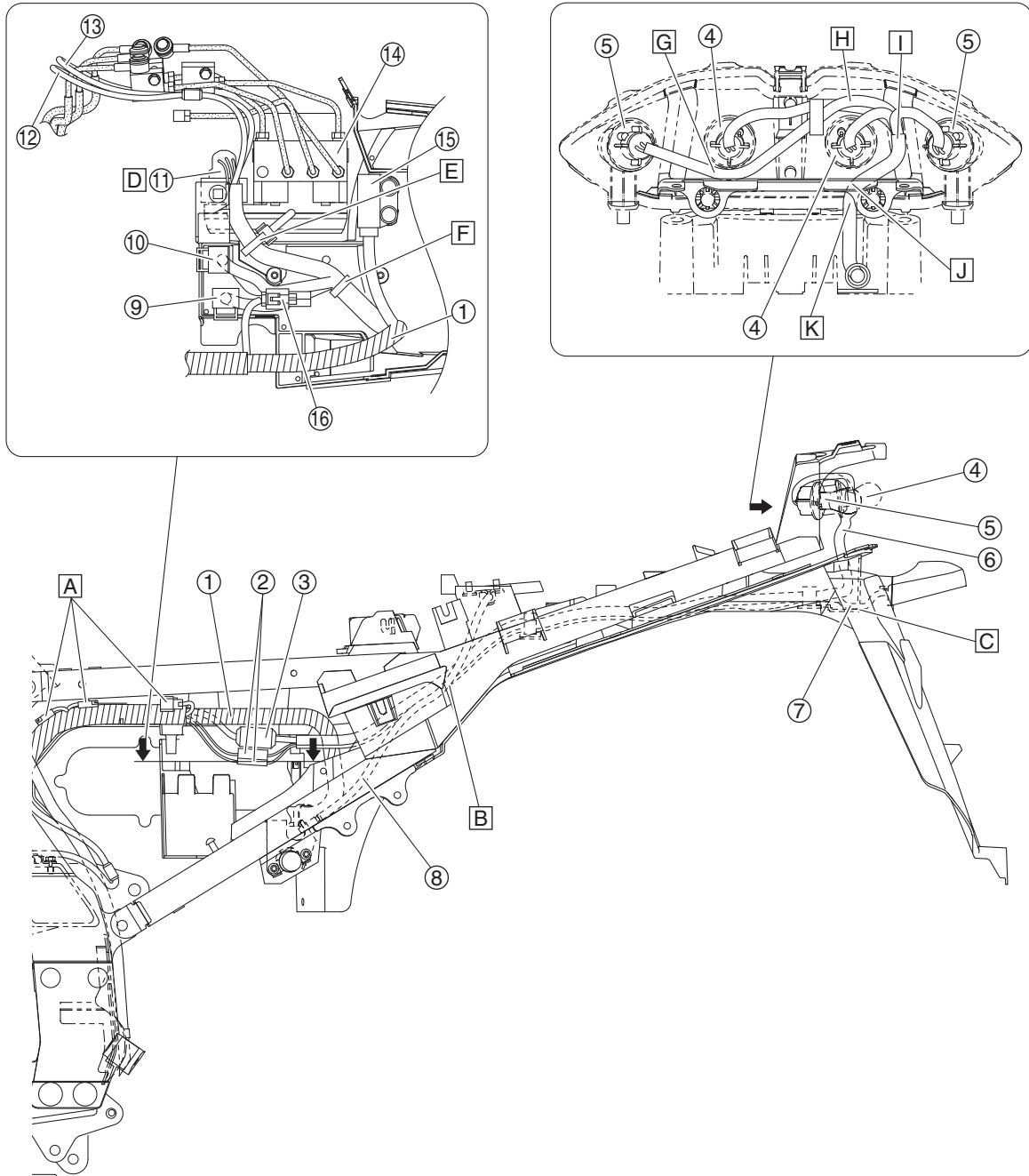
Front brake hose and engine (left side view)



1. Clutch hose
2. AC magneto lead
3. Rectifier/regulator lead
4. Air filter case breather hose
5. Gear position switch lead
6. Fuel tank breather/overflow hose
7. Sidestand switch
8. Sidestand switch lead
9. Oil level switch lead
10. Coolant reservoir breather hose
11. Coolant reservoir
12. Horn lead
13. Brake hose (brake pipe/upper joint assembly to left front brake caliper)
14. Front wheel sensor
15. Starter motor lead
16. Accelerator position sensor lead
17. Throttle servo motor lead
18. Crankshaft position sensor lead
19. Wire harness
20. Brake pipe (metering valve to right front brake caliper)
21. Brake pipe (brake pipe/upper joint assembly to front brake calipers)
22. Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)
 - A. Route the clutch hose in front of the front fork as shown in the illustration.
 - B. Secure the plastic band by inserting the projection on the band into the hole in the windshield drive unit bracket, and then fasten the handlebar switch leads, front wheel sensor lead, grip warmer leads, front brake light switch lead, and clutch switch lead with the band, making sure that the end of the band faces down. Do not cut off the excess end of the plastic band.
 - C. Route the AC magneto lead to the outside of the horn lead.
 - D. To fuel tank
 - E. Insert the projection on the wire harness holder completely into the hole in the frame.
 - F. Route the gear position switch lead so that the coupler is positioned as shown in the illustration.
 - G. Pass the fuel tank breather/overflow hose through the guide on the universal joint dust cover.
 - H. Pass the air filter case breather hose through the guide on the muffler bracket.
 - I. When installing the left side cowling, make sure that the end of the coolant reservoir breather hose protrudes from the bottom of the cowling.
 - J. Make sure that the paint mark on the coolant reservoir breather hose is positioned to the rear of the holder.
 - K. To horn
 - L. 43–53 mm (1.69–2.09 in)
 - M. 60–70 mm (2.36–2.76 in)
 - N. Fasten the grommets on the front wheel sensor lead and the brake hose (brake pipe/upper joint assembly to left front brake caliper) with the holder.
 - O. Pass the front wheel sensor lead through the guide.
 - P. Fasten the grommet on the front wheel sensor lead with the holder.
 - Q. Route the front wheel sensor lead between the left front brake caliper and the brake hose (brake pipe/upper joint assembly to left front brake caliper).
 - R. Fasten the front wheel sensor lead to the brake hose (brake pipe/upper joint assembly to left front brake caliper) with the two holders, making sure to position the lead to the inside of the hose.
 - S. Fasten the clutch hose with the holder.
 - T. After securing the wire harness, rotate the hose clamp until the ends of the clamp contact the harness.
 - U. Route the starter motor lead and crankshaft position sensor lead under the throttle body pulley bracket.
 - V. Route the starter motor lead between the rear balancer cover bolt and the rib on the crankcase.
 - W. When installing the clutch hose onto the clutch release cylinder, make sure that the pipe section on the end of the hose contacts the stopper on the clutch release cylinder body.
 - X. Fasten the protective sleeve of each lead.

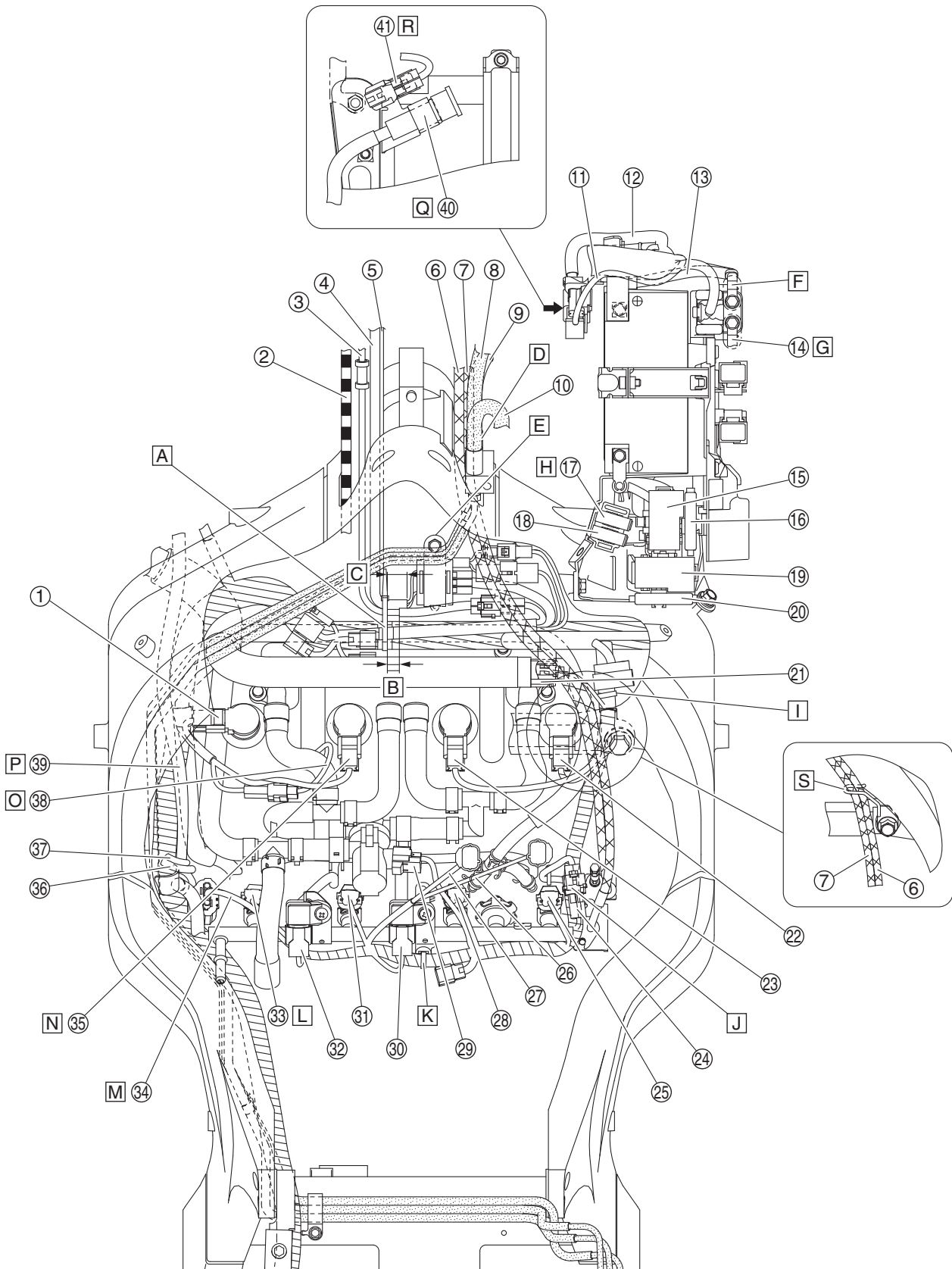
CABLE ROUTING

Rear fender (left side view)



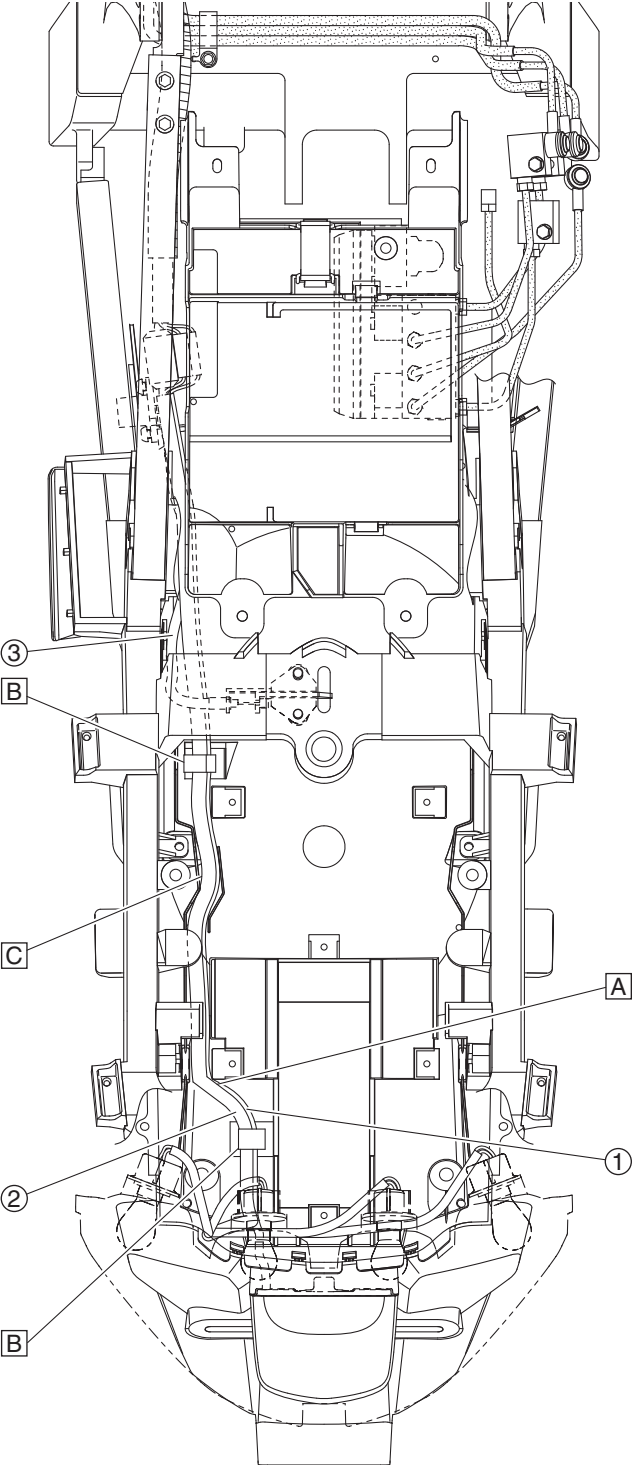
1. Wire harness
 2. License plate light connectors
 3. Tail/brake light assembly coupler
 4. Tail/brake light
 5. Rear turn signal light
 6. Tail/brake light assembly lead
 7. License plate light lead
 8. Seat lock cable
 9. Brake switch relay
 10. Brake light relay
 11. ABS ECU coupler
 12. Rear wheel sensor lead
 13. Rear brake light switch lead
 14. Hydraulic unit assembly
 15. Lean angle sensor
 16. Yamaha diagnostic tool coupler
- A. Route the wire harness so that the joint couplers are positioned on top of the harness.
 - B. Route the wire harness to the inside of the seat lock cable.
 - C. Pass the license plate light lead through the hole in the rear fender.
 - D. Securely connect the ABS ECU coupler.
 - E. Secure the plastic band by inserting the projection on the band into the hole in the rear fender, and then fasten the wire harness at the positioning tape with the band.
 - F. Insert the projection on the wire harness holder into the hole in the rear fender.
 - G. Route the rear right turn signal light lead under the right tail/brake light bulb socket.
 - H. Route the rear right turn signal light lead and right tail/brake light lead over the left tail/brake light bulb socket.
 - I. Route the leads between the left tail/brake light bulb socket and the rear left turn signal light bulb socket.
 - J. Route the tail/brake light assembly lead between the left tail/brake light bulb socket and the mounting boss on the tail/brake light assembly.
 - K. Route the tail/brake light assembly lead between the tail/brake light assembly and its bracket.

Throttle bodies (top view)



1. Ignition coil #1 coupler
 2. Clutch hose
 3. Front wheel sensor lead
 4. Immobilizer unit lead
 5. Main switch lead
 6. Throttle cable (decelerator cable)
 7. Throttle cable (accelerator cable)
 8. Brake hose (brake pipe/upper joint assembly to front brake calipers)
 9. Brake hose (metering valve to right front brake caliper)
 10. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
 11. ABS test coupler lead
 12. Main fuse lead
 13. Positive battery lead
 14. Starter motor lead
 15. Fuse box 1
 16. Windshield drive system fuse
 17. Cruise control system fuse
 18. Brake light fuse
 19. Fuse box 2
 20. Hazard lighting fuse
 21. Coolant temperature sensor coupler
 22. Ignition coil #4 coupler
 23. Ignition coil #3 coupler
 24. Grip cancel switch coupler
 25. Fuel injector #4 coupler
 26. Fuel pump lead
 27. Fuel sender lead
 28. Fuel injector #3 coupler
 29. Air induction system solenoid coupler
 30. Intake air pressure sensor coupler
 31. Fuel injector #2 coupler
 32. Atmospheric pressure sensor coupler
 33. Fuel injector #1 coupler
 34. Throttle position sensor lead
 35. Ignition coil #2 coupler
 36. Sidestand switch lead
 37. Oil level switch lead
 38. Cylinder identification sensor lead
 39. AC magneto lead
 40. Main fuse coupler
 41. ABS test coupler
- A. Fasten the main switch lead, immobilizer unit lead, and front wheel sensor lead to the wire harness with a plastic locking tie, making sure to align the tie with the white tape on the harness. Face the end of the plastic locking tie forward. Do not cut off the excess end of the plastic locking tie.
 - B. Position the plastic locking tie 0–20 mm (0–0.79 in) from the end of the protective sleeve of the front wheel sensor lead.
 - C. Position the plastic locking tie 10–30 mm (0.39–1.18 in) from the end of the protective sleeve of the immobilizer unit lead.
 - D. Route the throttle cables and brake hoses through the right opening in the frame.
 - E. Install the immobilizer unit coupler holder so that the end with the bolt is facing forward.
 - F. Install the positive battery lead terminal so that it is not positioned to the outside of the starter relay.
 - G. Install the starter motor lead terminal so that it is not positioned to the outside of the starter relay.
 - H. Install the fuse holders so that the hinged portions of the holders are facing inward.
 - I. Insert the projection on the wire harness holder completely into the hole in the plate on the cylinder head cover.
 - J. Insert the projection on the wire harness holder completely into the hole in the plate on the throttle body.
 - K. Insert the projection on the wire harness holder completely into the hole in the plate on the fuel rail.
 - L. Route the fuel injector lead under the air induction system hose.
 - M. Route the throttle position sensor lead under the air induction system hose.
 - N. Route the ignition coil #2 lead over the air induction system hoses.
 - O. Route the cylinder identification sensor lead over the air induction system hoses.
 - P. Route the AC magneto lead under the oil level switch lead and sidestand switch lead, and above the wire harness.
 - Q. Install the main fuse coupler holder completely onto the tab on the plate.
 - R. Install the ABS test coupler completely onto the tab on the plate.
 - S. Pass the throttle cables through the guide.

Rear fender (top view)

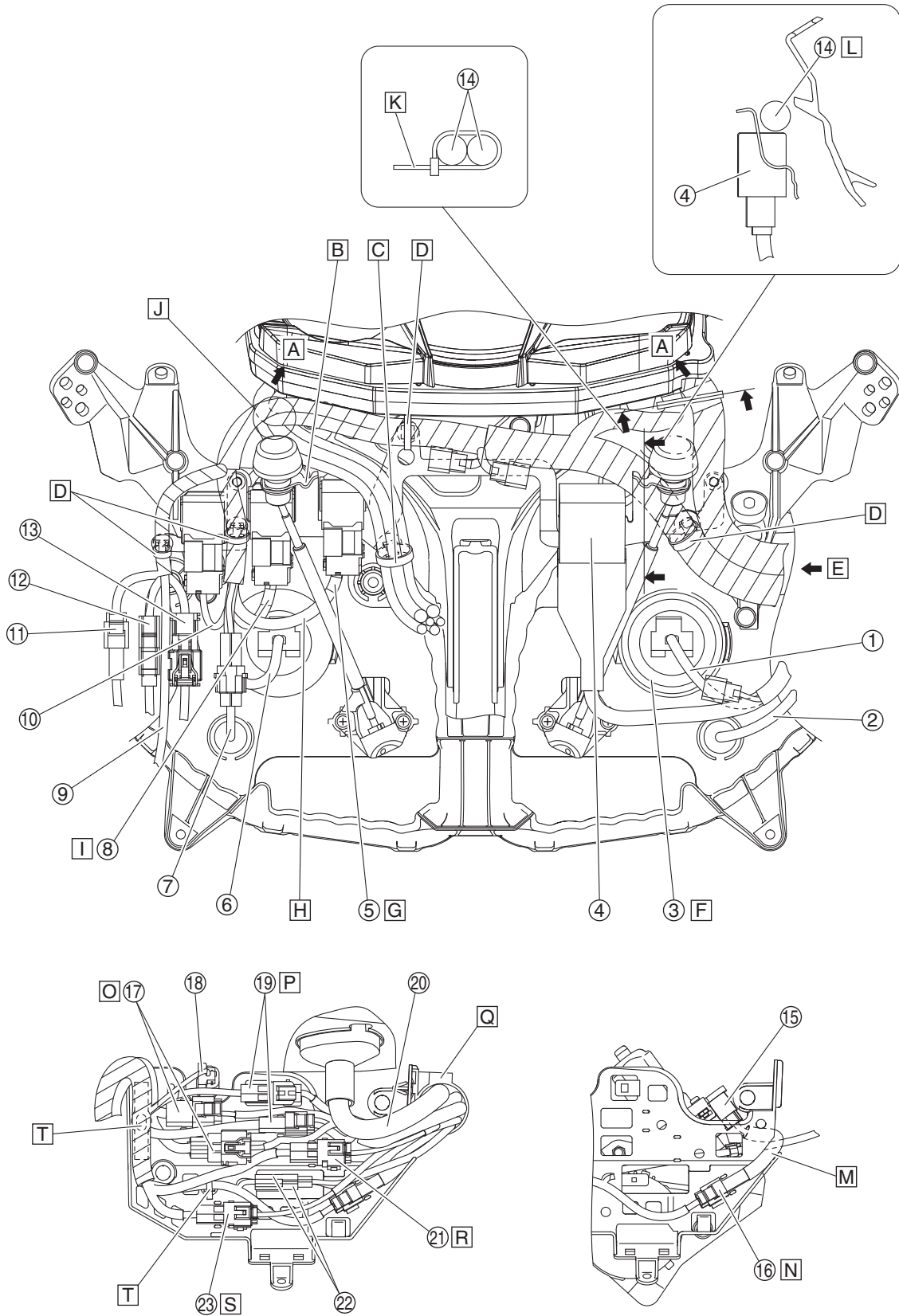


CABLE ROUTING

1. License plate light lead
2. Tail/brake light assembly lead
3. Seat lock cable
- A. Route the tail/brake light assembly lead and license plate light lead between the rib and the U-lock holder on the rear fender, making sure that the leads are not routed on top of the holder.
- B. Fasten the tail/brake light assembly lead and license plate light lead with the holder.
- C. Route the tail/brake light assembly lead and license plate light lead between the ribs on the rear fender.

CABLE ROUTING

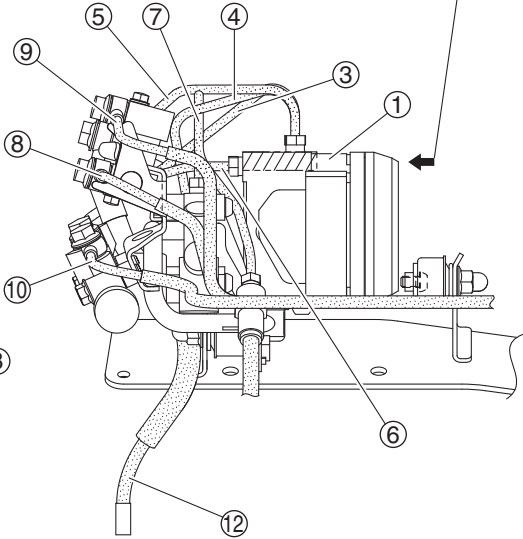
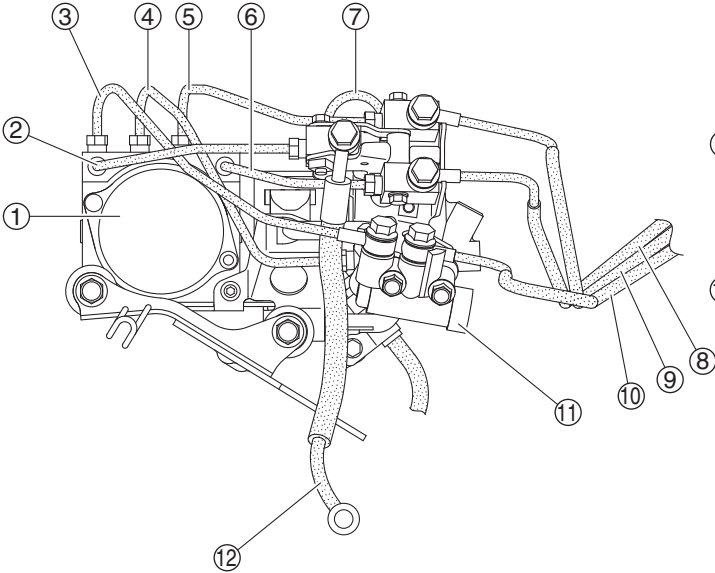
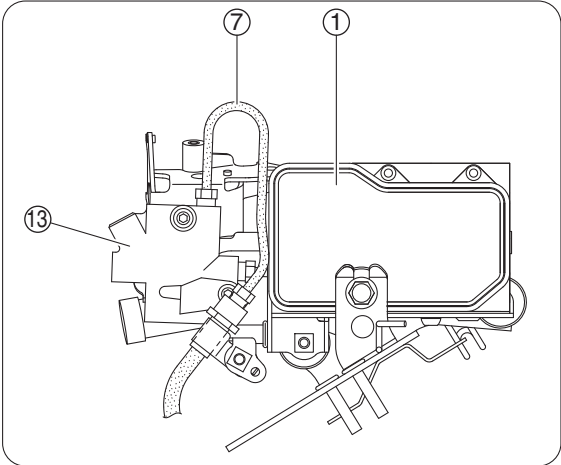
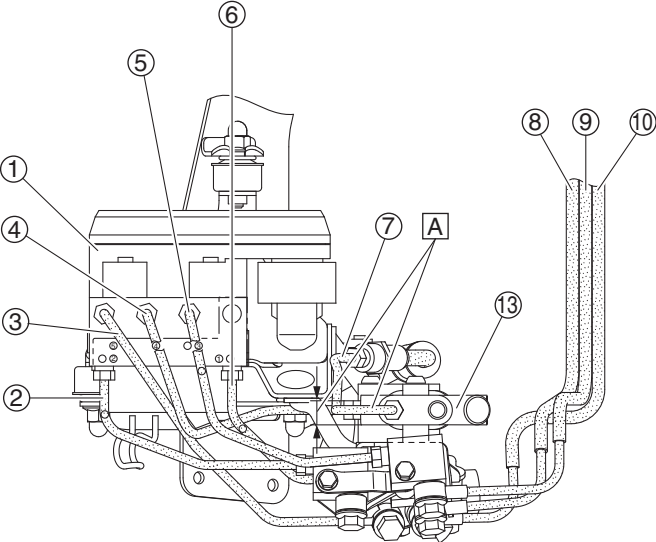
Front cowling assembly and electrical components board



1. Right headlight lead
2. Right auxiliary light lead
3. Relay unit lead
4. Main relay
5. Headlight relay (dimmer) lead
6. Left headlight lead
7. Left auxiliary light lead
8. Windshield drive unit relay (down) lead
9. Left radiator fan motor lead
10. Windshield drive unit relay (up) lead
11. Accessory box solenoid sub-lead coupler
12. Auxiliary DC jack coupler
13. Front left turn signal light coupler
14. Wire harness
15. Windshield drive unit coupler
16. Windshield drive unit sub-lead coupler
17. Left handlebar switch couplers
18. Air temperature sensor lead
19. Right handlebar switch couplers
20. Meter assembly lead
21. Front brake light switch coupler
22. Grip warmer couplers
23. Clutch switch coupler
 - A. Towards the front of the vehicle
 - B. Make sure that the handlebar switch leads, grip warmer leads, front brake light switch lead, and clutch switch lead are not resting on top of the relay bracket.
 - C. Secure the plastic band by inserting the projection on the band into the hole in the relay bracket, and then fasten the handlebar switch leads, grip warmer leads, front brake light switch lead, and clutch switch lead with the band. Face the end of the plastic band outward. Do not cut off the excess end of the plastic band.
 - D. Insert the projection on the wire harness holder completely into the hole in the relay bracket.
 - E. From electrical components tray
 - F. Route the relay unit lead to the rear of the headlight beam adjusting knob shaft.
 - G. Red tape
 - H. Route the headlight relay (dimmer) lead to the front of the headlight beam adjusting knob shaft.
 - I. Blue tape
 - J. Route the relay leads, meter assembly lead, and leads (to electrical components board) in the order listed from top to bottom.
 - K. Fasten the wire harness at the white tape on both portions of the harness with a plastic locking tie. Position the end of the plastic locking tie under the meter assembly, facing inward. Do not cut off the excess end of the plastic locking tie.
 - L. Route the wire harness between the relay bracket and windshield drive unit bracket.
 - M. Route the windshield drive unit sub-lead to the front of the windshield cable.
 - N. Insert the projection on the windshield drive unit sub-lead coupler completely into the hole in the electrical components board.
 - O. Insert the projection on left handlebar switch coupler completely into the hole in the electrical components board.
 - P. Insert the projection on right handlebar switch coupler completely into the hole in the electrical components board.
 - Q. Secure the holder by inserting the projection on the holder into the hole in the electrical components board, and then fasten the handlebar switch leads, grip warmer leads, front brake light switch lead, clutch switch lead, and meter assembly lead with the holder. Face the catch of the holder upward.
 - R. Insert the projection on the front brake light switch coupler completely into the hole in the electrical components board.
 - S. Insert the projection on the clutch switch coupler completely into the hole in the electrical components board.
 - T. Insert the projection on the wire harness holder completely into the hole in the electrical components board.

CABLE ROUTING

Hydraulic unit assembly (top and side view)



1. Hydraulic unit assembly
2. Brake pipe/middle joint assembly
3. Brake pipe (hydraulic unit to metering valve)
4. Brake pipe (hydraulic unit to proportioning valve)
5. Brake pipe/upper joint assembly
6. Brake pipe/lower joint assembly
7. Brake pipe (proportioning valve to rear brake hose)
8. Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)
9. Brake pipe (brake pipe/upper joint assembly to front brake calipers)
10. Brake pipe (metering valve to right front brake caliper)
11. Metering valve
12. Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)
13. Proportioning valve
- A. Position the brake pipe (proportioning valve to rear brake caliper) within the range shown in the illustration.

PERIODIC CHECKS AND ADJUSTMENTS

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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.

EAU46910

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.	Every 40000 km (24000 mi)					
4	* Fuel injection	• Adjust synchronization.	√	√	√	√	√	√
5	* Mufflers and exhaust pipes	• Check the screw clamps for looseness.	√	√	√	√	√	
6	* Air induction system	• Check the air cut-off valve, reed valve, and hose for damage. • Replace any damaged parts if necessary.		√	√	√	√	√

EAU1770F

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	• Clean. • Replace.		√		√		
2	* Clutch	• Check operation, fluid level and vehicle for fluid leakage.	√	√	√	√	√	
3	* Front brake	• Check operation, fluid level and vehicle for fluid leakage. • Replace brake pads.	√	√	√	√	√	√
4	* Rear brake	• Check operation, fluid level and vehicle for fluid leakage. • Replace brake pads.	√	√	√	√	√	√

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. 		√	√	√	√	√
		<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 *	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)					
12 *	Chassis fasteners	<ul style="list-style-type: none"> • Make sure that all nuts, bolts and screws are properly tightened. 		√	√	√	√	√
13	Brake lever pivot shaft	<ul style="list-style-type: none"> • Lubricate with silicone grease. 		√	√	√	√	√
14	Brake pedal pivot shaft	<ul style="list-style-type: none"> • Lubricate with lithium-soap-based grease. 		√	√	√	√	√
15	Clutch lever pivot shaft	<ul style="list-style-type: none"> • Lubricate with silicone grease. 		√	√	√	√	√
16	Shift pedal pivot shaft	<ul style="list-style-type: none"> • Lubricate with lithium-soap-based grease. 		√	√	√	√	√
17	Sidestand, centerstand	<ul style="list-style-type: none"> • Check operation. • Lubricate with lithium-soap-based grease. 		√	√	√	√	√
18 *	Sidestand switch	<ul style="list-style-type: none"> • Check operation. 	√	√	√	√	√	√
19 *	Front fork	<ul style="list-style-type: none"> • Check operation and for oil leakage. 		√	√	√	√	
20 *	Shock absorber assembly	<ul style="list-style-type: none"> • Check operation and shock absorber for oil leakage. 		√	√	√	√	
21 *	Rear suspension relay arm and connecting arm pivoting points	<ul style="list-style-type: none"> • Check operation. 		√	√	√	√	
		<ul style="list-style-type: none"> • Lubricate with lithium-soap-based grease. 			√		√	
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 *	Cooling system	<ul style="list-style-type: none"> • Check coolant level and vehicle for coolant leakage. 		√	√	√	√	√
		<ul style="list-style-type: none"> • Change coolant. 	Every 3 years					
25	Final gear oil	<ul style="list-style-type: none"> • Check oil level and vehicle for oil leakage. • Change. 	√	√	√	√	√	
26 *	Front and rear brake switches	<ul style="list-style-type: none"> • Check operation. 	√	√	√	√	√	√
27	Moving parts and cables	<ul style="list-style-type: none"> • Lubricate. 		√	√	√	√	√
28 *	Throttle grip	<ul style="list-style-type: none"> • Check operation. • Check throttle grip free play, and adjust if necessary. • Lubricate cable and grip housing. 		√	√	√	√	√
		<ul style="list-style-type: none"> • Check operation. • Adjust headlight beam. 	√	√	√	√	√	√

PERIODIC MAINTENANCE

EAU17670

TIP

- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
 - Hydraulic brake and clutch service
 - Regularly check and, if necessary, correct the brake and clutch fluid levels.
 - Every two years replace the internal components of the brake master cylinders and calipers as well as clutch master and release cylinders, and change the brake and clutch fluids.
 - Replace the brake and clutch hoses every four years and if cracked or damaged.
-

PERIODIC MAINTENANCE

EAS21030

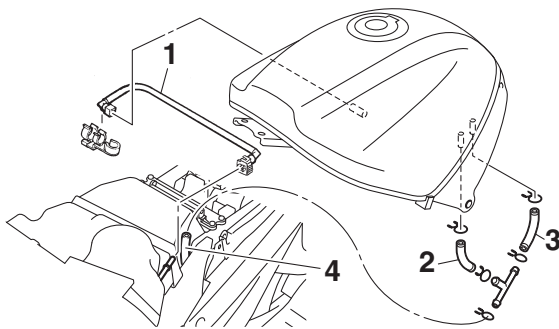
CHECKING THE FUEL LINE

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

EC3P61005

NOTICE

Make sure the fuel tank breather/overflow hose is routed correctly.



3. Install:
 - T-bar
Refer to "GENERAL CHASSIS" on page 4-1.
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.
 - Rider seat
Refer to "GENERAL CHASSIS" on page 4-1.

EAS20680

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS" on page 4-1.
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.
 - T-bar
Refer to "GENERAL CHASSIS" on page 4-1.
2. Remove:
 - Ignition coil
3. Remove:
 - Spark plug

ECA13320

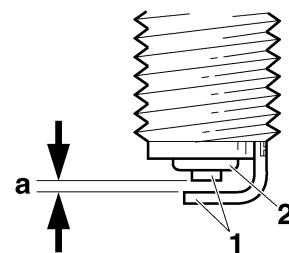
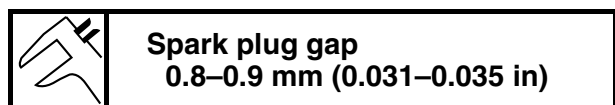
NOTICE

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.

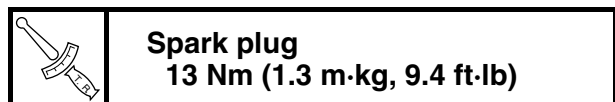
4. Check:
 - Spark plug type
Incorrect → Change.



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



8. Install:
 - Spark plug



TIP

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

9. Install:
 - Ignition coil

PERIODIC MAINTENANCE

10. Install:

- T-bar
Refer to "GENERAL CHASSIS" on page 4-1.
- Fuel tank
Refer to "FUEL TANK" on page 7-1.
- Rider seat
Refer to "GENERAL CHASSIS" on page 4-1.

EAS20490

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

TIP

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

1. Remove:

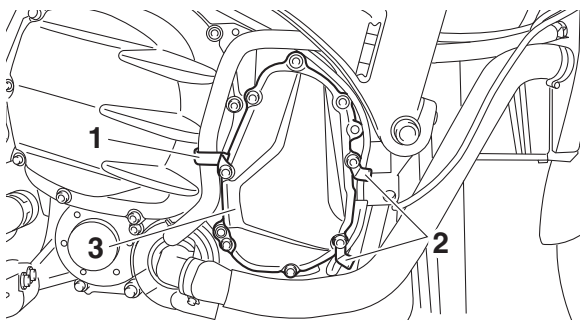
- Rider seat
- Right side cowling
Refer to "GENERAL CHASSIS" on page 4-1.
- Fuel tank
Refer to "FUEL TANK" on page 7-1.
- T-bar
Refer to "GENERAL CHASSIS" on page 4-1.
- Air cut-off valve
Refer to "AIR INDUCTION SYSTEM" on page 7-13.
- Thermostat inlet pipe 1
Refer to "THERMOSTAT" on page 6-6.

2. Remove:

- Spark plugs
- Cylinder head cover
- Cylinder head cover gasket
Refer to "CAMSHAFTS" on page 5-11.

3. Remove:

- Hose holder "1"
- Lead holders "2"
- Pickup rotor cover "3"



4. Measure:

- Valve clearance
Out of specification → Adjust.



Valve clearance (cold)

Intake

0.15–0.22 mm (0.0059–0.0087 in)

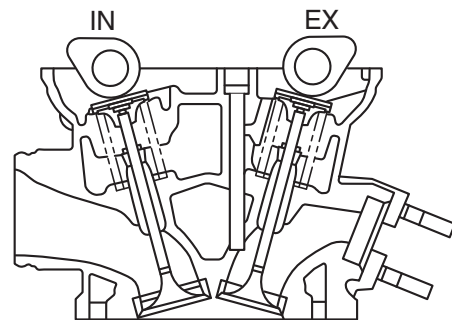
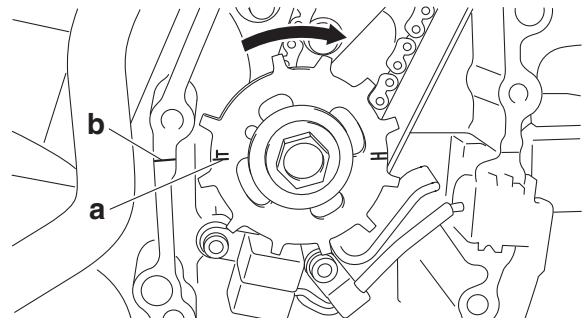
Exhaust

0.18–0.25 mm (0.0071–0.0098 in)

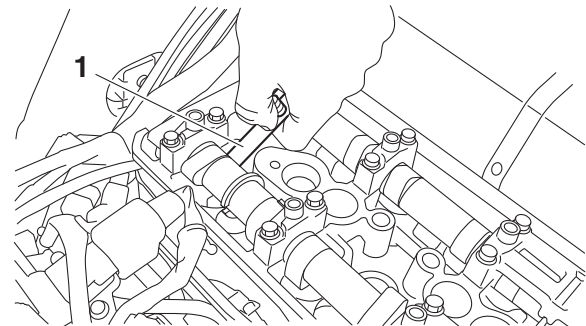
- a. Turn the crankshaft clockwise.
- b. When piston #1 is at TDC on the compression stroke, align the TDC mark "a" on the pickup rotor with the crankcase mating surface "b".

TIP

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



- c. Measure the valve clearance with a thickness gauge "1".



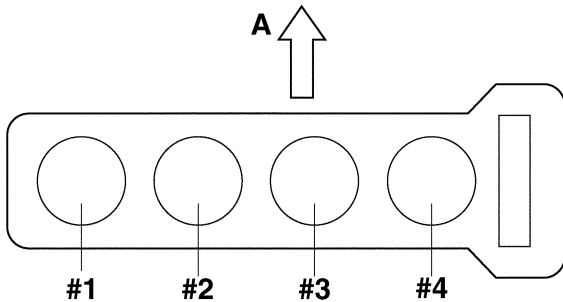
TIP

- If the valve clearance is incorrect, record the measured reading.

PERIODIC MAINTENANCE

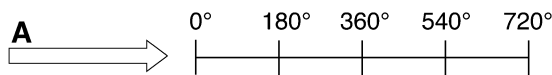
- Measure the valve clearance in the following sequence.

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



A. Front

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



B	#1	C			
	#2		C		
	#3				C
	#4			C	

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

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



5. Remove:
- Camshafts

TIP

- Refer to “CAMSHAFTS” on page 5-11.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

6. Adjust:

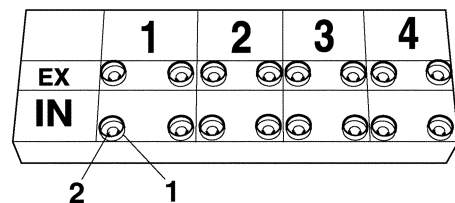
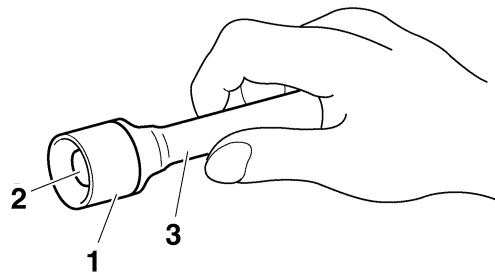
- Valve clearance

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

Valve lapper
90890-04101
Valve lapping tool
YM-A8998

TIP

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



- b. Calculate the difference between the specified valve clearance and the measured valve clearance.

Example:

Specified valve clearance = 0.15–0.22 mm (0.0059–0.0087 in)

Measured valve clearance = 0.25 mm (0.0098 in)

$0.25 \text{ mm (0.0098 in)} - 0.22 \text{ mm (0.0087 in)} = 0.03 \text{ mm (0.001 in)}$

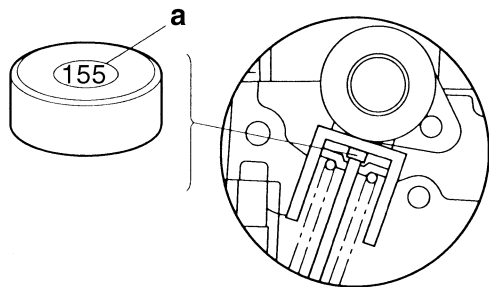
- c. Check the thickness of the current valve pad.

TIP

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

PERIODIC MAINTENANCE

Example:
 If the valve pad is marked "155", the pad thickness is 1.55 mm (0.061 in).



d. Calculate the sum of the values obtained in steps (b) and (c) to determine the required valve pad thickness and the valve pad number.

Example:

$1.55 \text{ mm (0.061 in)} + 0.03 \text{ mm (0.001 in)} = 1.58 \text{ mm (0.062 in)}$

The valve pad number is 158.

e. Round off the valve pad number according to the following table, and then select the suitable valve pad.

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

TIP

Refer to the following table for the available valve pads.

Valve pad range	No. 120–240
Valve pad thickness	1.20–2.40 mm (0.0472–0.0945 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

Example:

Valve pad number = 158

Rounded value = 160

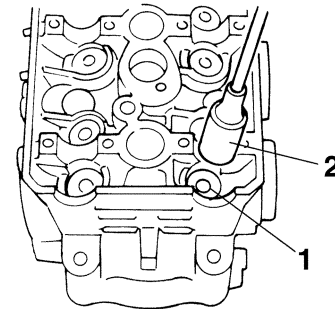
New valve pad number = 160

f. Install the new valve pad "1" and the valve lifter "2".

TIP

- Lubricate the valve lifter with engine oil.
- The valve lifter must turn smoothly when rotated by hand.

- Install the valve lifter and the valve pad in the correct place.



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



Camshaft cap bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

- Refer to "CAMSHAFTS" on page 5-11.
- Lubricate the camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshaft sprockets marks with the cylinder head edge.
- Turn the crankshaft clockwise several full turns to seat the parts.

h. Measure the valve clearance again.

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

7. Install:

- All removed parts

TIP

For installation, reverse the removal procedure.

EAS1MC1033

CHECKING THE ENGINE IDLING SPEED

TIP

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

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



Engine idling speed
1000–1100 r/min

3. Check:

- ISC (idle speed control) learning value
“00” or “01” → Check the intake system.
“02” → Clean the throttle bodies.
Refer to “CHECKING AND CLEANING THE THROTTLE BODIES” on page 7-7.



- a. Connect the Yamaha diagnostic tool. Use the diagnostic code number “67”. Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.
- b. Check the ISC (idle speed control) leaning value.



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 hose
- Exhaust system
- Breather hoses

Checking the throttle body synchronization

1. Stand the vehicle on a level surface.

TIP

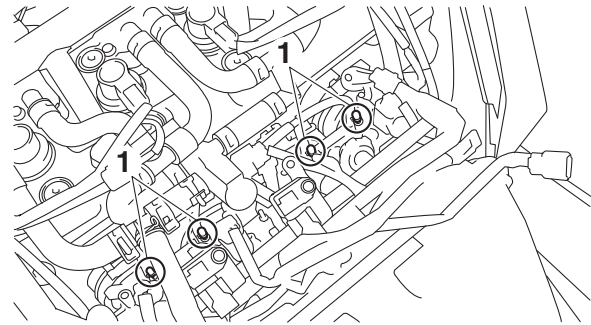
Place the vehicle on the centerstand.

2. Remove:

- Rider seat
Refer to “GENERAL CHASSIS” on page 4-1.
- Fuel tank
Refer to “FUEL TANK” on page 7-1.
- T-bar
Refer to “GENERAL CHASSIS” on page 4-1.

3. Remove:

- Caps “1”

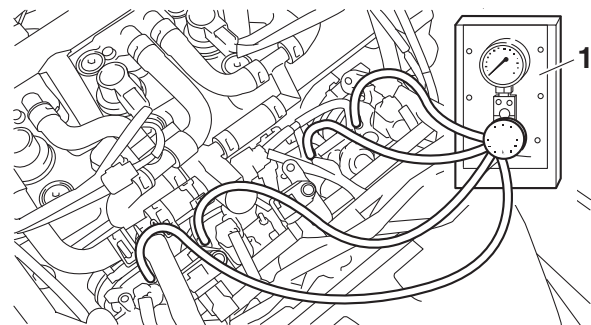


4. Install:

- Vacuum gauge “1”



Vacuum gauge
90890-03094
Vacuummate
YU-44456



5. Install:

- Fuel tank

6. Check:

- Throttle body synchronization



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



Engine idling speed
1000–1100 r/min

- b. Check the vacuum pressure.



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

If out of specification → Adjust the throttle body synchronization.



PERIODIC MAINTENANCE

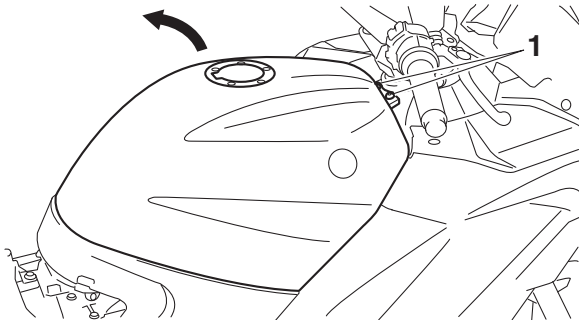
Adjusting the throttle body synchronization

1. Remove the fuel tank bolts "1" and lift up the fuel tank.

ECA1MC1024

NOTICE

When lifting up the fuel tank, be careful not to pull the fuel tank breather/overflow hose.



2. Adjust:

- Throttle body synchronization

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



**Engine idling speed
1000–1100 r/min**

- b. Using the throttle body that has the bypass air screw "1" with a white paint mark as the standard, adjust the other throttle bodies by turning its bypass air screw in or out.

ECA1MC1013

NOTICE

Do not turn the bypass air screw (white paint mark) of the throttle body that is the standard. Otherwise, the engine may run roughly at idle and the throttle bodies may not operate properly.

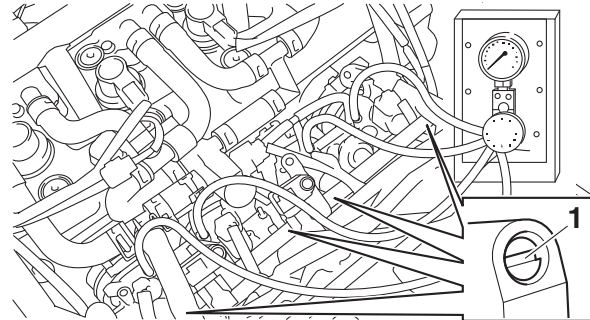
TIP

- Turn the bypass air screw using the carburetor angle driver.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If a bypass air screw was removed, turn the screw in fully and be sure to synchronize the throttle bodies.
- If the throttle body synchronization can not be adjusted using the bypass air screw, clean or replace the throttle bodies.

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



**Carburetor angle driver 2
90890-03173**



3. Stop the engine and remove the measuring equipment.
4. Install:
 - Caps
5. Install:
 - T-bar
Refer to "GENERAL CHASSIS" on page 4-1.
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.
 - Rider seat
Refer to "GENERAL CHASSIS" on page 4-1.
6. Adjust:
 - Throttle grip free play
Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-31.



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

EAS21080

CHECKING THE EXHAUST SYSTEM

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

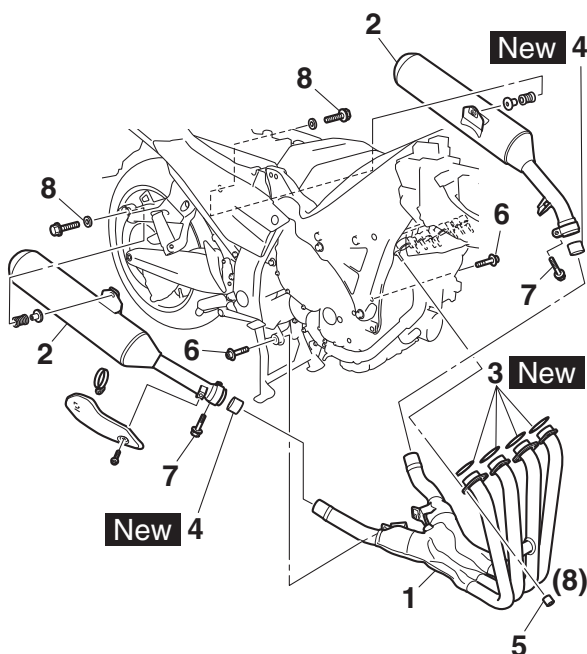
1. Remove:
 - Side cowlings
Refer to "GENERAL CHASSIS" on page 4-1.
2. Check:
 - Exhaust pipe assembly "1"
 - Mufflers "2"
Cracks/damage → Replace.
 - Gaskets "3", "4"
Exhaust gas leaks → Replace.
3. Check:
 - Tightening torque
 - Exhaust pipe assembly nuts "5"

PERIODIC MAINTENANCE

- Exhaust pipe assembly bolts “6”
- Exhaust pipe assembly and muffler bolts “7”
- Muffler bolts “8”



Exhaust pipe assembly nut
 20 Nm (2.0 m·kg, 14 ft·lb)
Exhaust pipe assembly bolt
 17 Nm (1.7 m·kg, 12 ft·lb)
Exhaust pipe assembly and muffler bolt
 20 Nm (2.0 m·kg, 14 ft·lb)
Muffler bolt
 25 Nm (2.5 m·kg, 18 ft·lb)



4. Install:
- Side cowlings
- Refer to “GENERAL CHASSIS” on page 4-1.

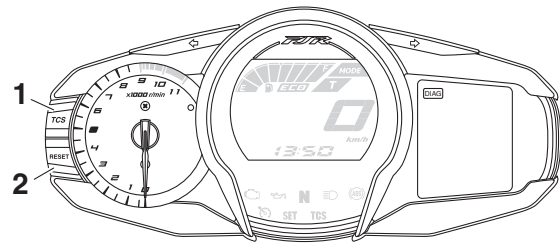
EAS20600

ADJUSTING THE EXHAUST GAS VOLUME

TIP

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

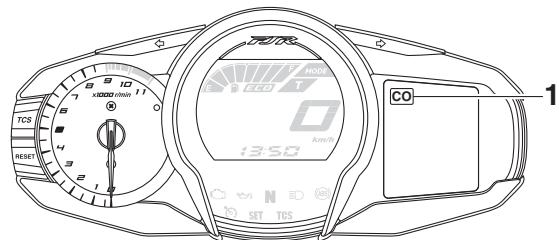
1. Turn the main switch to “OFF”.
2. Simultaneously press and hold the “TCS” button “1” and “RESET” button “2”, turn the main switch to “ON”, and continue to press the buttons for 8 seconds or more.



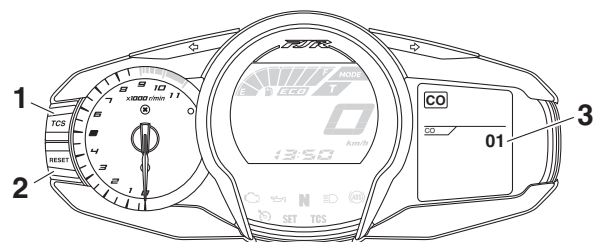
TIP

All displays on the multi-function meter right display disappear and “DIAG” appears.

3. Press the “TCS” button to select the CO adjustment mode “CO” “1” or the diagnostic mode “DIAG”.



4. After selecting “CO”, simultaneously press the “TCS” button “1” and “RESET” button “2” for 2 seconds or more to execute the selection.
5. Press the “TCS” button or “RESET” button to select a cylinder number “3”.



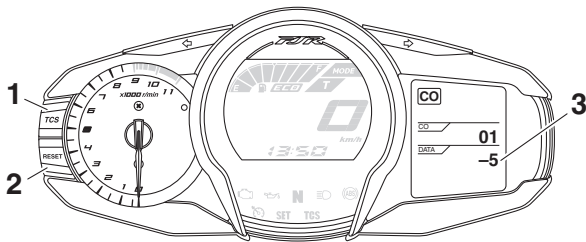
TIP

The selected cylinder number appears on the multi-function meter right display.

- To decrease the selected cylinder number, press the “RESET” button.
- To increase the selected cylinder number, press the “TCS” button.

PERIODIC MAINTENANCE

6. After selecting the cylinder number, simultaneously press the "TCS" button "1" and "RESET" button "2" for 2 seconds or more to execute the selection.
7. Change the CO adjustment volume "3" by pressing the "TCS" button or "RESET" button.



TIP

The CO adjustment volume appears on the multi-function meter right display.

- To decrease the CO adjustment volume, press the "RESET" button.
- To increase the CO adjustment volume, press the "TCS" button.

8. Simultaneously press the "TCS" button and "RESET" button to return to the cylinder number selection (step 5).
9. Turn the main switch to "OFF" to cancel the mode.

EAS1MC1035

CHECKING THE AIR INDUCTION SYSTEM

Refer to "CHECKING THE AIR INDUCTION SYSTEM" on page 7-17.

EAS21070

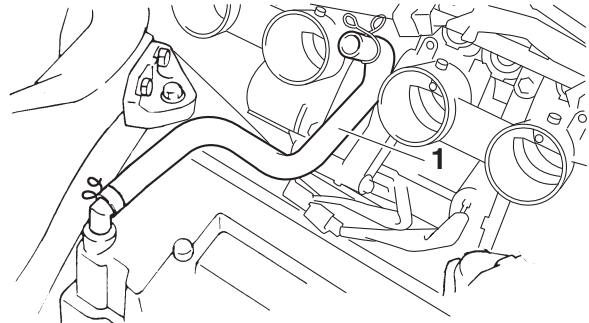
CHECKING THE CRANKCASE BREATHER HOSE

1. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS" on page 4-1.
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.
 - T-bar
 - Air filter case
Refer to "GENERAL CHASSIS" on page 4-1.
2. Check:
 - Crankcase breather hose "1"
Cracks/damage → Replace.
Loose connection → Connect properly.

ECA13450

NOTICE

Make sure the crankcase breather hose is routed correctly.

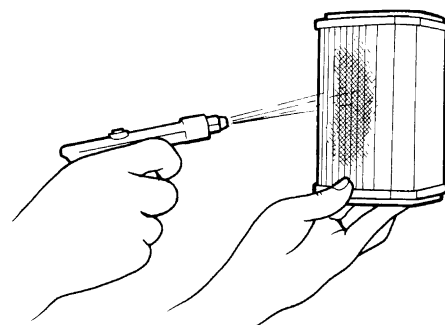


3. Install:
 - Air filter case
Refer to "GENERAL CHASSIS" on page 4-1.
 - T-bar
Refer to "GENERAL CHASSIS" on page 4-1.
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.
 - Rider seat
Refer to "GENERAL CHASSIS" on page 4-1.

EAS20920

CLEANING THE AIR FILTER ELEMENT

1. Remove:
 - Left side cover
Refer to "GENERAL CHASSIS" on page 4-1.
 - Air filter case cover
 - Air filter element
Refer to "GENERAL CHASSIS" on page 4-1.
2. Clean:
 - Air filter element
Apply compressed air to the outer surface of the air filter element.



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

EC3P61043

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

PERIODIC MAINTENANCE

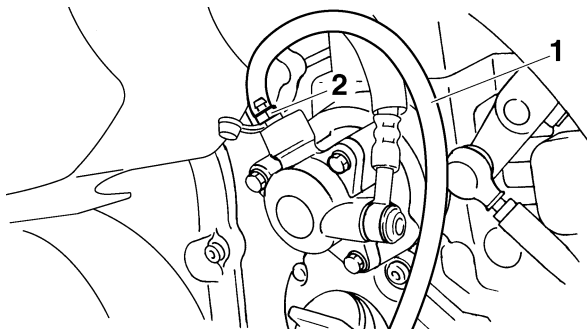
TIP

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

1. Bleed:

- Hydraulic clutch system

- Fill the clutch master cylinder reservoir to the proper level with the specified brake and clutch fluid.
- Install the clutch master cylinder reservoir diaphragm.
- Connect a clear plastic hose “1” tightly to the bleed screw “2”.

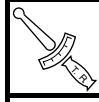


- Place the other end of the hose into a container.
- Slowly squeeze the clutch lever several times.
- Fully squeeze the clutch lever and hold it in position.
- Loosen the bleed screw.

TIP

Loosening the bleed screw will release the pressure and cause the clutch lever to contact the handlebar grip.

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



Clutch release cylinder bleed screw
5 Nm (0.5 m·kg, 3.6 ft·lb)

- Fill the clutch master cylinder reservoir to the proper level with the specified brake and clutch fluid.
Refer to “CHECKING THE CLUTCH FLUID LEVEL” on page 3-12.

EWA13010

WARNING

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



EAS21160

ADJUSTING THE FRONT DISC BRAKE

1. Adjust:

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



- While pushing the brake lever forward, turn the adjusting dial “1” until the brake lever is in the desired position.

TIP

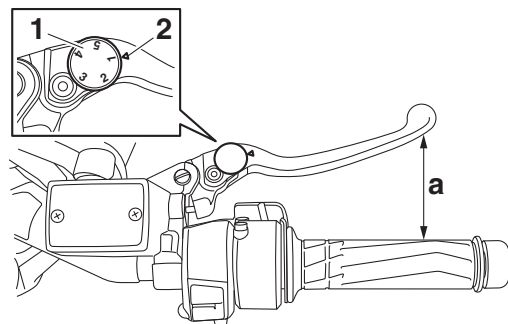
Be sure to align the setting on the adjusting dial with the “△” mark “2” on the brake lever.

Position #1

Distance “a” is the largest.

Position #5

Distance “a” is the smallest.



EWA13050

WARNING

A soft or spongy feeling in the brake lever can indicate the presence of air in the brake system. Before the vehicle is operated, the air must be removed by bleeding the brake system. Air in the brake system will considerably reduce braking performance.

ECA13490

NOTICE

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



EAS21240

CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

TIP

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

2. Remove:

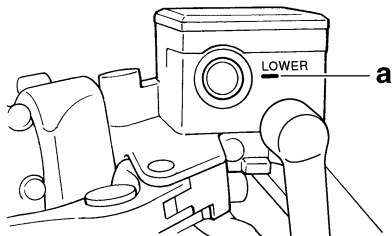
- Right side cover
Refer to “GENERAL CHASSIS” on page 4-1.

3. Check:

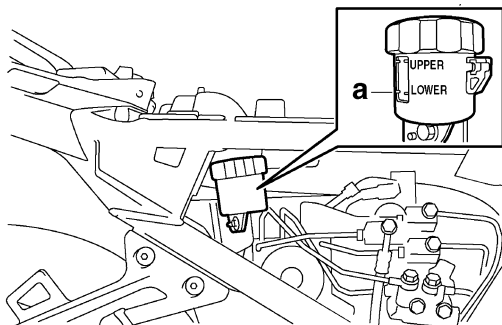
- Brake fluid level
Below the minimum level mark “a” → Add the specified brake fluid to the proper level.

	<p>Front brake Specified brake fluid DOT 4</p> <p>Rear brake Specified brake fluid DOT 4</p>
--	--

A



B



- A. Front brake
B. Unified brake system

EWA1MC1023

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 or brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

NOTICE

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

TIP

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

4. Install:

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

EAS22780

BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)

EWA14000

WARNING

Always bleed the brake system when the brake related parts are removed.

EC3P61012

NOTICE

- Bleed the brake system in the following order.
- 1st step: Front brake calipers
- 2nd step: Right front brake caliper (unified brake system)
- 3rd step: Rear brake caliper

EW3P61010

WARNING

Bleed the ABS whenever:

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

PERIODIC MAINTENANCE

TIP

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

1. Remove:

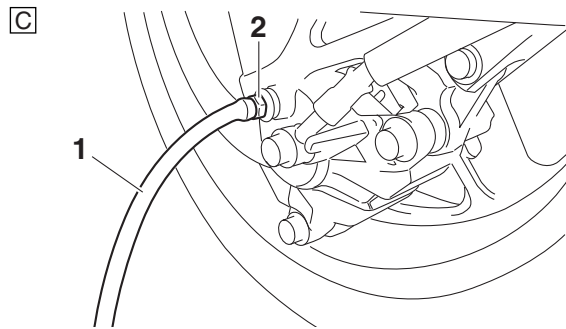
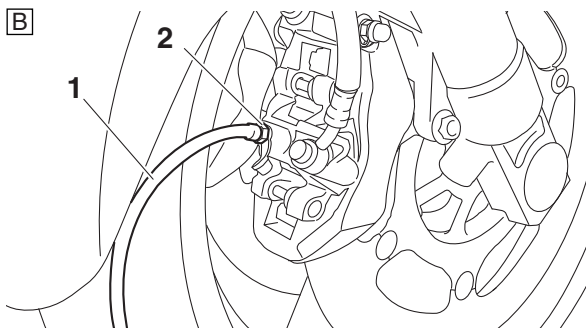
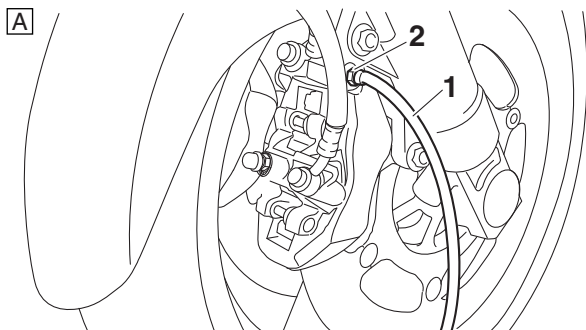
- Right side cover

Refer to "GENERAL CHASSIS" on page 4-1.

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. Right front brake caliper (unified brake system)
C. 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 4-72.

EC3P61029

NOTICE

Make sure that the main switch is turned 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 the specified torque.



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

- 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 3-14.

PERIODIC MAINTENANCE

EWA14020

WARNING

After bleeding the ABS, check the brake operation.



3. Install:
 - Right side cover
 Refer to "GENERAL CHASSIS" on page 4-1.

EAS21250

CHECKING THE FRONT BRAKE PADS

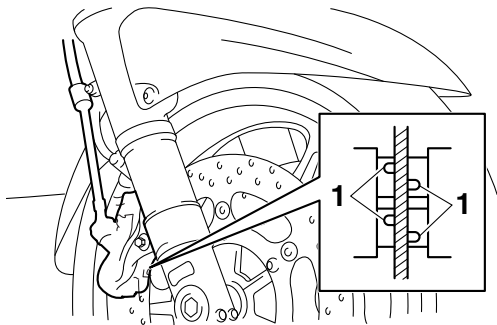
The following procedure applies to all of the brake pads.

EC3P61037

NOTICE

The amount of wear may differ for the brake pads of the right front brake caliper between the brake pads operated by the brake lever and the brake pads operated by the brake pedal. Each set of brake pads should be checked individually and replaced if necessary.

1. Operate the brake.
2. Check:
 - Front brake pad
 Wear indicator grooves "1" almost disappeared → Replace the brake pads as a set. Refer to "FRONT BRAKE" on page 4-38.

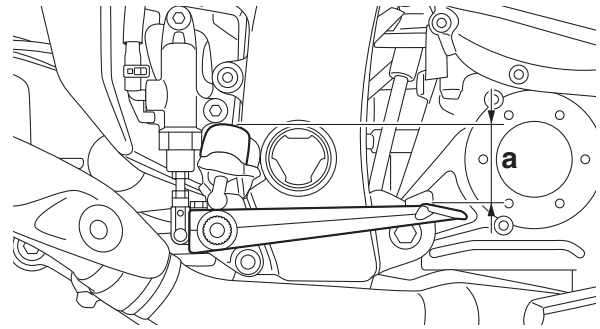


EAS21190

ADJUSTING THE REAR DISC BRAKE

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

Brake pedal position
42.0 mm (1.65 in) (below the top of the rider footrest)



2. Adjust:
 - Brake pedal position



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

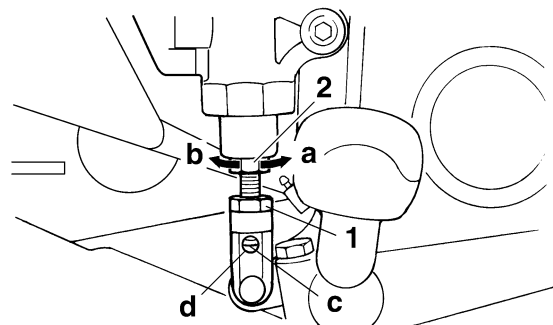
Direction "a"
Brake pedal is raised.

Direction "b"
Brake pedal is lowered.

EWA13070

WARNING

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



- c. Tighten the locknut "1" to specification.

Rear brake master cylinder locknut
16 Nm (1.6 m·kg, 11 ft·lb)

EW3P61002

WARNING

A soft or spongy feeling in the brake pedal can indicate the presence of air in the brake system. Before the vehicle is operated, the air must be removed by bleeding the brake system. Air in the brake system will considerably reduce braking performance.

ECA13510

NOTICE

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



3. Adjust:

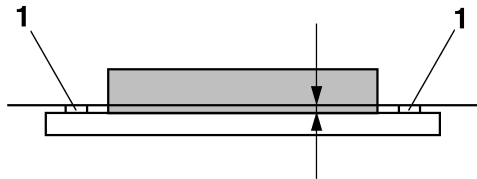
- Rear brake light switch
Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-30.

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 "1" almost touch the brake disc → Replace the brake pads as a set.
Refer to "REAR BRAKE" on page 4-50.



EAS21280

CHECKING THE BRAKE HOSES

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

1. Check:
 - Brake hoses
Cracks/damage/wear → Replace.
2. Check:
 - Brake hose holders
Loose → Tighten the holder bolts.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
 - Brake hoses
Brake fluid leakage → Replace the damaged hose.
Refer to "FRONT BRAKE" on page 4-38, "REAR BRAKE" on page 4-50 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-63.

EAS21670

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

EWA13260

WARNING

Never attempt to make any repairs to the wheel.

TIP

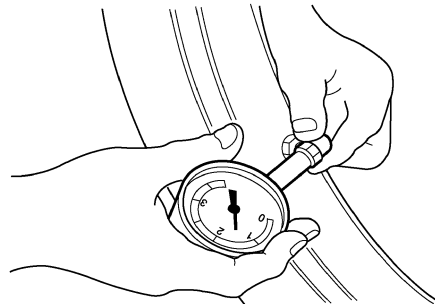
After a tire or wheel has been changed or replaced, always balance the wheel.

EAS21650

CHECKING THE TIRES

The following procedure applies to both of the tires.

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



EWA13180

WARNING

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

PERIODIC MAINTENANCE



Tire air pressure (measured on cold tires)

- Loading condition**
0–90 kg (0–198 lb)
- Front**
250 kPa (2.50 kgf/cm², 36 psi)
- Rear**
290 kPa (2.90 kgf/cm², 42 psi)
- Loading condition**
90–215 kg (198–474 lb)
- Front**
250 kPa (2.50 kgf/cm², 36 psi)
- Rear**
290 kPa (2.90 kgf/cm², 42 psi)
- High-speed riding**
- Front**
250 kPa (2.50 kgf/cm², 36 psi)
- Rear**
290 kPa (2.90 kgf/cm², 42 psi)
- Maximum load**
215 kg (474 lb)

* Total weight of rider, passenger, cargo and accessories

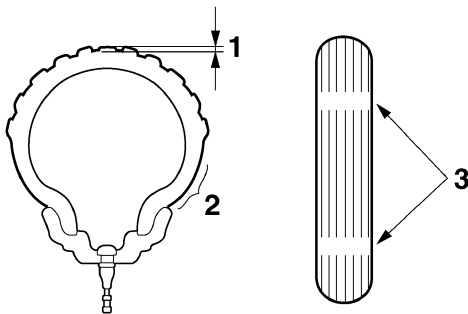
EWA13190

⚠ 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.



- Tire tread depth
- Side wall
- Wear indicator



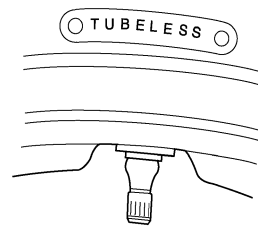
- Wear limit (front)**
1.6 mm (0.06 in) (Europe)
1.0 mm (0.04 in) (AUS)
- Wear limit (rear)**
1.6 mm (0.06 in) (Europe)
1.0 mm (0.04 in) (AUS)

EWA14080

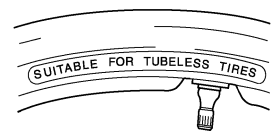
⚠ WARNING

- 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



B



- Tire
- 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**
120/70 ZR17M/C (58W)
- Manufacturer/model**
METZELER/Roadtec Z8
BRIDGESTONE/BT023F F

PERIODIC MAINTENANCE



Rear tire
Size
180/55 ZR17M/C (73W)
Manufacturer/model
METZELER/Roadtec Z8 C
BRIDGESTONE/BT023R F

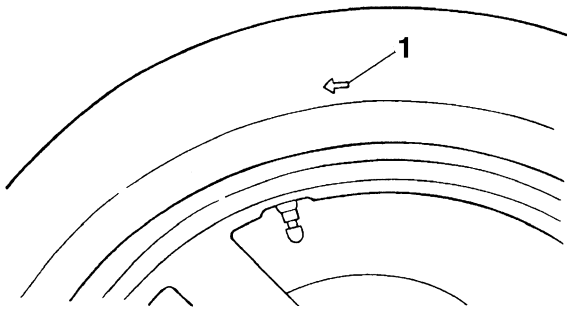
EWA13210

⚠️ WARNING

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

TIP

For tires with a direction of rotation mark "1": Install the tire with the mark pointing in the direction of wheel rotation.



EAS1MC1037

CHECKING THE WHEEL BEARINGS

The following procedure applies to all of the wheel bearings.

1. Check:
 - Wheel bearings

Refer to "CHECKING THE FRONT WHEEL" on page 4-25 and "CHECKING THE REAR WHEEL" on page 4-34.

EAS1MC1038

CHECKING THE SWINGARM PIVOT

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

Refer to "REMOVING THE SWINGARM" on page 4-104.

EAS1MC1039

LUBRICATING THE SWINGARM PIVOT

1. Lubricate:
 - Bearings
 - Oil seals



Recommended lubricant
Lithium-soap-based grease

Refer to "INSTALLING THE SWINGARM" on page 4-104.

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

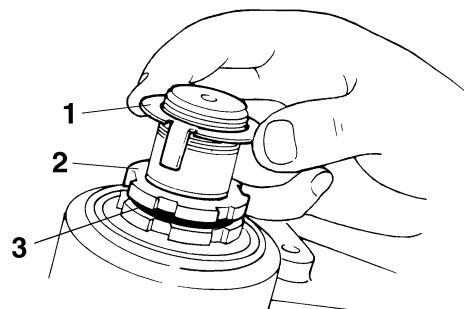
Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Check:
 - Steering head

Grasp the bottom of the front fork legs and gently rock the front fork.
Binding/looseness → Adjust the steering head.
3. Remove:
 - Upper bracket

Refer to "STEERING HEAD" on page 4-94.
4. Adjust:
 - Steering head

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



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



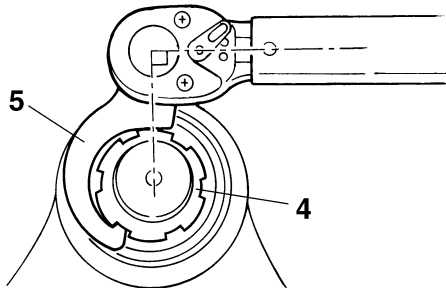
Steering nut wrench
90890-01403
Exhaust flange nut wrench
YU-A9472



Lower ring nut (initial tightening torque)
52 Nm (5.2 m·kg, 37 ft·lb)

TIP

Set a 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 the steering nut wrench.

EWA13140



WARNING

Do not overtighten the lower ring nut.

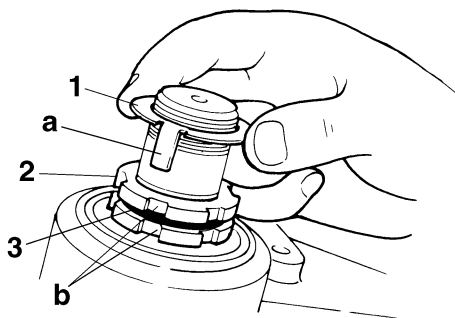


**Lower ring nut (final tightening torque)
18 Nm (1.8 m-kg, 13 ft-lb)**

- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
Refer to “STEERING HEAD” on page 4-94.
- e. Install the rubber washer “3”.
- f. Install the upper ring nut “2”.
- g. Finger tighten the upper ring nut, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- h. Install the lock washer “1”.

TIP

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



5. Install:

- Upper bracket
Refer to “STEERING HEAD” on page 4-94.

EAS1MC1040

LUBRICATING THE STEERING HEAD

1. Lubricate:
- Upper bearing
 - Lower bearing
 - Bearing races
 - Ring nut threads



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

EAS1MC1041

CHECKING THE CHASSIS FASTENERS

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

Refer to “CHASSIS TIGHTENING TORQUES” on page 2-22.

EAS21700

LUBRICATING THE LEVERS

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



**Recommended lubricant
Silicone grease**

EAS21710

LUBRICATING THE PEDALS

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



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

EAS1MC1042

CHECKING THE SIDESTAND

1. Check:
- Sidestand operation
Check that the sidestand moves smoothly.
Rough movement → Repair or replace.

EAS21720

LUBRICATING THE SIDESTAND

Lubricate the pivoting point, metal-to-metal moving parts, and spring contact points of the sidestand.



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



PERIODIC MAINTENANCE

EAS1MC1043

CHECKING THE CENTERSTAND

1. Check:
 - Centerstand operation
Check that the centerstand moves smoothly.
Rough movement → Repair or replace.

EAS21730

LUBRICATING THE CENTERSTAND

Lubricate the pivoting point, metal-to-metal moving parts, and spring contact points of the centerstand.



EAS1MC1044

CHECKING THE SIDESTAND SWITCH

Refer to “CHECKING THE SWITCHES” on page 8-169.

EAS21530

CHECKING THE FRONT FORK

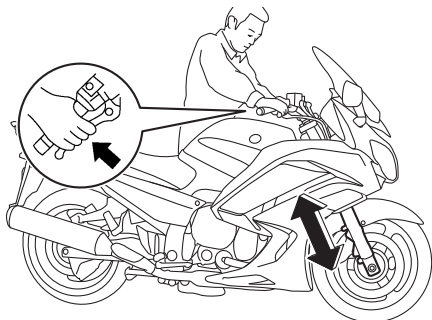
1. Stand the vehicle on a level surface.

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 4-82.



EAS21580

ADJUSTING THE FRONT FORK LEGS

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

EWA13120



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

Spring preload

EWA1MC1011



Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.

ECA13570

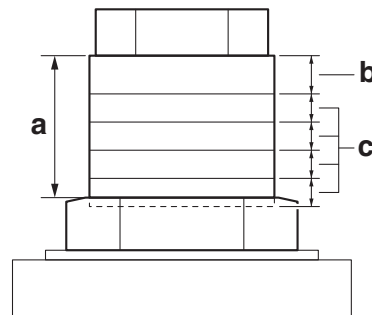


- Grooves are provided to indicate the adjustment position.
- Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - Spring preload

TIP

The spring preload setting is determined by measuring the distance “a” shown in the illustration.



- b. 4.0 mm (0.16 in)
- c. 3.0 mm (0.12 in)

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

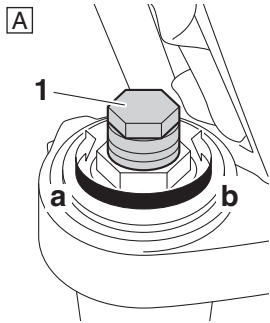
Direction “a”
Spring preload is increased (suspension is harder).
Direction “b”
Spring preload is decreased (suspension is softer).

PERIODIC MAINTENANCE

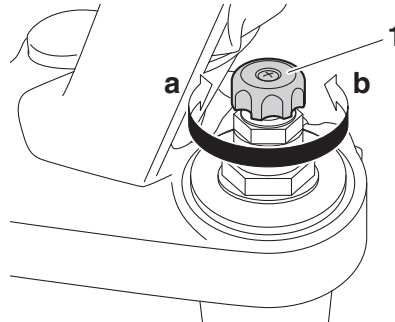
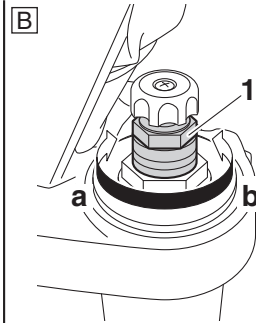


Spring preload adjusting positions

- Minimum (soft)
15.0 mm (0.59 in)
- Standard
10.0 mm (0.39 in)
- Maximum (hard)
0 mm (0 in)



- A. Left side
- B. Right side



Compression damping (right side only)

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - Compression damping

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

Direction "a"

Compression damping is increased (suspension is harder).

Direction "b"

Compression damping is decreased (suspension is softer).

Rebound damping (right side only)

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - Rebound damping

- a. Turn the adjusting knob "1" in direction "a" or "b".

Direction "a"

Rebound damping is increased (suspension is harder).

Direction "b"

Rebound damping is decreased (suspension is softer).



Rebound damping adjusting positions

- Minimum (soft)
16 click(s) out*
- Standard
12 click(s) out*
- Maximum (hard)
1 click out*

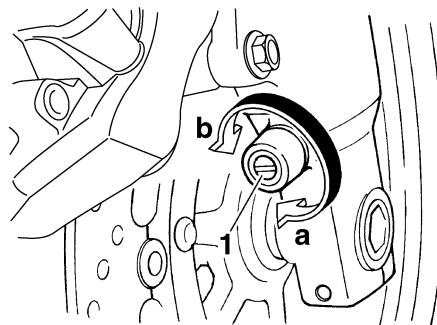
* With the adjusting knob fully turned in



Compression damping adjusting positions

- Minimum (soft)
21 click(s) out*
- Standard
11 click(s) out*
- Maximum (hard)
1 click out*

* With the adjusting screw fully turned in



EAS1MC1045

CHECKING THE REAR SUSPENSION

1. Stand the vehicle on a level surface.

EWA13120

WARNING

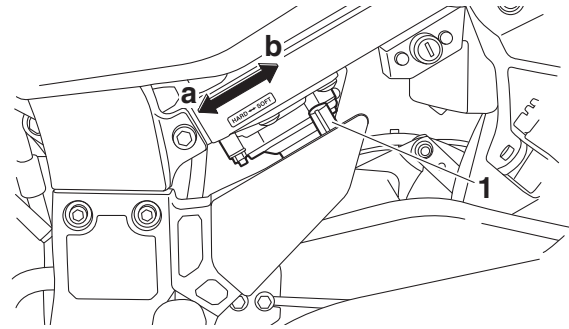
Securely support the vehicle so that there is no danger of it falling over.

2. Check:

- Rear shock absorber assembly
Gas leaks/oil leaks → Replace the rear shock absorber assembly.
Refer to “CHECKING THE REAR SHOCK ABSORBER ASSEMBLY” on page 4-100.

3. Check:

- Rear shock absorber assembly operation
- Rear suspension link pivots
Push down seat on the vehicle several times and check if the rear shock absorber assembly rebounds smoothly.
Rough movement → Repair.
Refer to “REAR SHOCK ABSORBER ASSEMBLY” on page 4-98.



Rebound damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:

- Rebound damping

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

Direction “a”

Rebound damping is increased (suspension is harder).

Direction “b”

Rebound damping is decreased (suspension is softer).

EAS21600

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

EWA13120

WARNING

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

Spring preload

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:

- Spring preload

- a. Move the adjusting lever “1” in direction “a” or “b”.

- b. Adjust the adjusting lever to “HARD” or “SOFT”.

Direction “a”

Spring preload is increased (suspension is harder).

Direction “b”

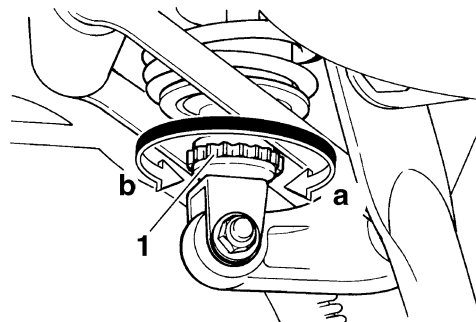
Spring preload is decreased (suspension is softer).



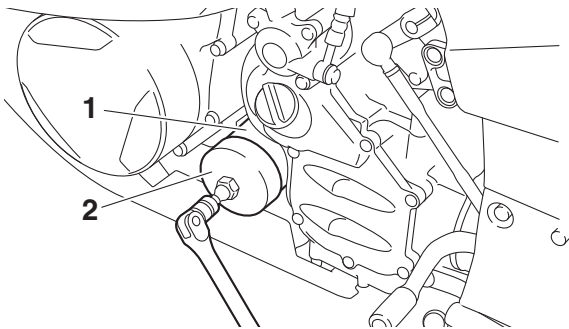
Rebound damping adjusting positions

Minimum (soft)
20 click(s) out*
Standard
12 click(s) out*
Maximum (hard)
3 click(s) out*

* With the adjusting knob fully turned in



PERIODIC MAINTENANCE

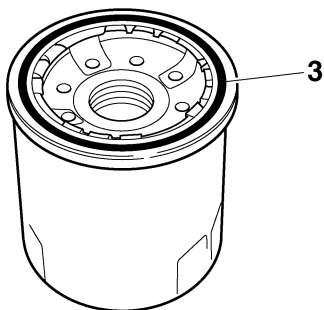


b. Lubricate the O-ring “3” of a new oil filter cartridge with a thin coat of engine oil.

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 the oil filter wrench.



Oil filter cartridge
17 Nm (1.7 m·kg, 12 ft·lb)



6. Install:

- Engine oil drain bolt

(along with the gasket **New**)



Engine oil drain bolt
43 Nm (4.3 m·kg, 31 ft·lb)

7. Fill:

- Crankcase
(with the specified amount of the recommended engine oil)



Engine oil quantity
Total amount
4.90 L (5.18 US qt, 4.31 Imp.qt)
Without oil filter cartridge replacement
3.80 L (4.02 US qt, 3.34 Imp.qt)
With oil filter cartridge replacement
4.00 L (4.23 US qt, 3.52 Imp.qt)

8. Install:

- Engine oil filler cap

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

10.Check:

- Engine
(for engine oil leaks)

11.Check:

- Engine oil level
Refer to “CHECKING THE ENGINE OIL LEVEL” on page 3-24.

12.Check:

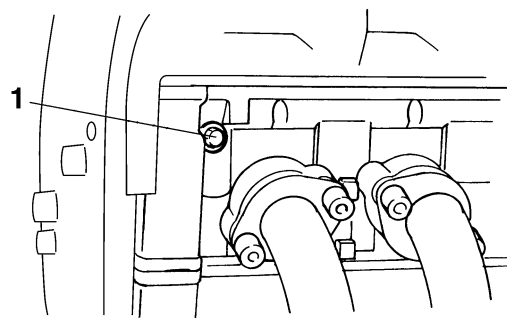
- Engine oil pressure



a. Remove the right side cowling.

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

b. Slightly loosen the engine oil check bolt “1”.



c. Start the engine and keep it idling until engine oil starts to seep from the engine oil check bolt. If no engine oil comes out after one minute, turn the engine off so that it will not seize.

d. Check the engine oil passages, the oil filter cartridge and the oil pump for damage or leakage.

Refer to “OIL PUMP” on page 5-60.

e. Start the engine after solving the problem(s) and check the engine oil pressure again.

f. Tighten the engine oil check bolt to specification.



Engine oil check bolt
15 Nm (1.5 m·kg, 11 ft·lb)

g. Install the right side cowling.

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



13.Reset the maintenance counter for the engine oil.

Refer to “MULTI-FUNCTION METER UNIT” on page 1-35.

PERIODIC MAINTENANCE

EAS20820

MEASURING THE ENGINE OIL PRESSURE

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

ECA13410

NOTICE

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

3. Remove:
 - Right side cowling
Refer to “GENERAL CHASSIS” on page 4-1.
4. Remove:
 - Main gallery bolt

EWA12980

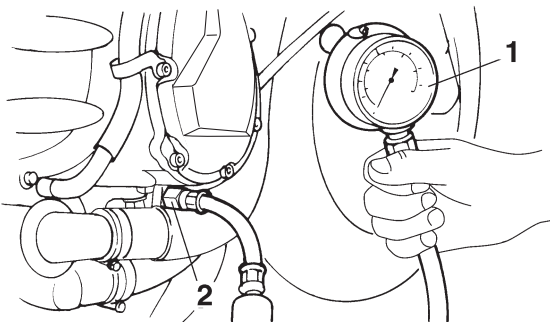
WARNING

The engine, muffler and engine oil are extremely hot.

5. Install:
 - Oil pressure gauge set “1”
 - Oil pressure adapter B “2”



**Oil pressure gauge set
90890-03120
Oil pressure adapter B
90890-03124**



6. Measure:
 - Engine oil pressure
(at the following conditions)
Out of specification → Adjust.



Oil pressure
30.0 kPa/1050 r/min (0.30 kgf/cm²/1050 r/min, 4.4 psi/1050 r/min) at oil temperature of 85.0 °C (185.0 °F)
Oil temperature
75.0–95.0 °C (167.0–203.0 °F)

Engine oil pressure	Possible causes
Below specification	<ul style="list-style-type: none"> • Faulty oil pump • Clogged oil filter • Leaking oil passage • Broken or damaged oil seal
Above specification	<ul style="list-style-type: none"> • Leaking oil passage • Faulty oil filter • Oil viscosity too high

7. Install:
 - Main gallery bolt



**Main gallery bolt
8 Nm (0.8 m·kg, 5.8 ft·lb)**

8. Install:
 - Right side cowling
Refer to “GENERAL CHASSIS” on page 4-1.

EAS21110

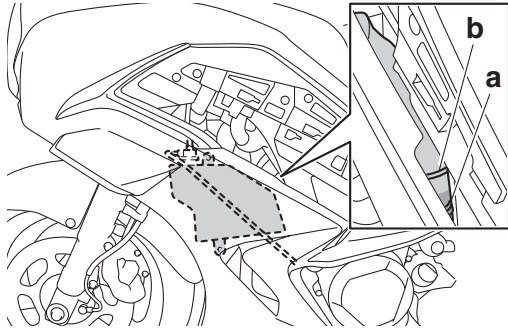
CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

TIP

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

2. Remove:
 - Left side panel
Refer to “GENERAL CHASSIS” on page 4-1.
3. Check:
 - Coolant level
The coolant level should be between the minimum level mark “a” and maximum level mark “b”.
Below the minimum level mark → Add the recommended coolant to the proper level.



ECA13470

NOTICE

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.

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

5. Check:

- Coolant level

TIP

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

6. Install:

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

EAS21120

CHECKING THE COOLING SYSTEM

1. Remove:

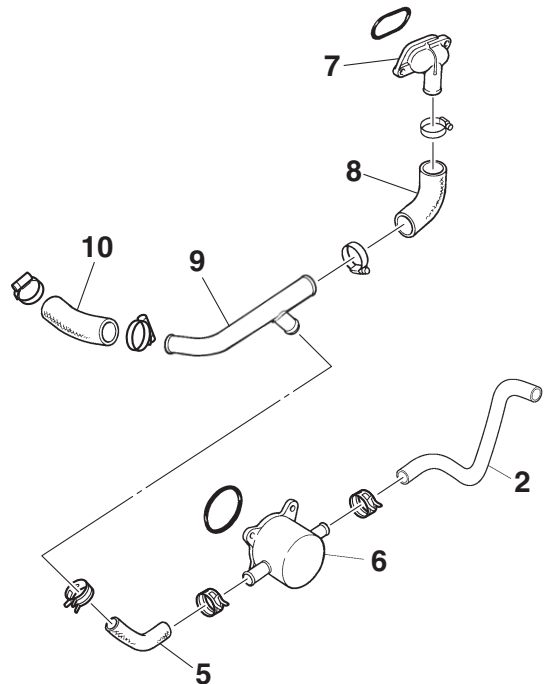
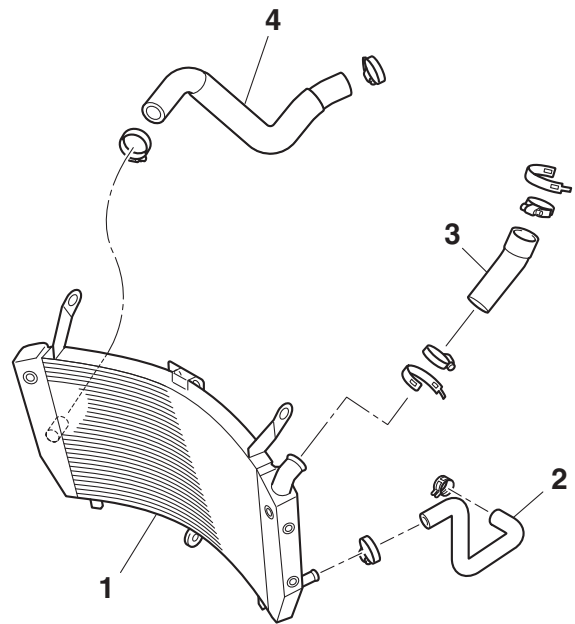
- Side cowlings
Refer to "GENERAL CHASSIS" on page 4-1.
- Exhaust pipe assembly
Refer to "ENGINE REMOVAL" on page 5-3.

2. Check:

- Radiator "1"
- Oil cooler outlet hose "2"
- Radiator inlet hose "3"
- Radiator outlet hose "4"
- Oil cooler inlet hose "5"
- Oil cooler "6"
- Water jacket joint "7"
- Water jacket joint inlet hose "8"
- Water pump outlet pipe "9"
- Water pump outlet hose "10"

Cracks/damage → Replace.

Refer to "RADIATOR" on page 6-1, "OIL COOLER" on page 6-4, "THERMOSTAT" on page 6-6 and "WATER PUMP" on page 6-10.



3. Install:

- Exhaust pipe assembly
Refer to "ENGINE REMOVAL" on page 5-3.
- Side cowlings
Refer to "GENERAL CHASSIS" on page 4-1.

EAS21130

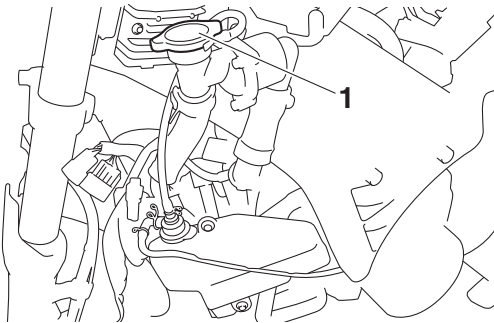
CHANGING THE COOLANT

1. Remove:

- Side cowlings
Refer to "GENERAL CHASSIS" on page 4-1.

PERIODIC MAINTENANCE

2. Remove:
 - Radiator cap "1"



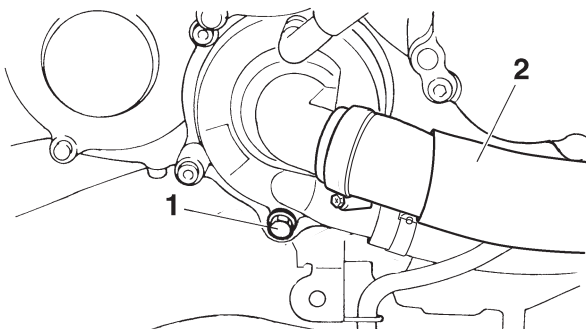
EWA13030

WARNING

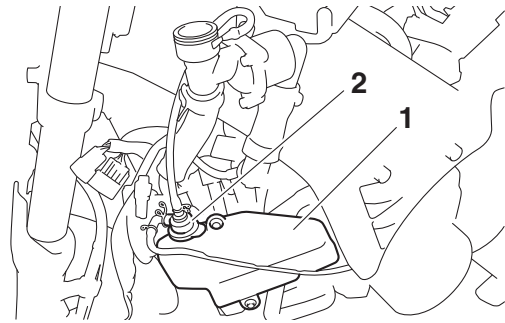
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

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

3. Remove:
 - Coolant drain bolt (water pump) "1" (along with the copper washer)
4. Disconnect:
 - Radiator outlet hose "2"



5. Drain:
 - Coolant (from the engine and radiator)
6. Remove:
 - Coolant reservoir "1"
 - Coolant reservoir cap "2"



7. Drain:
 - Coolant (from the coolant reservoir)
8. Install:
 - Coolant reservoir
9. Connect:
 - Radiator outlet hose
10. Install:
 - Coolant drain bolt (water pump) (along with the copper washer **New**)



Coolant drain bolt (water pump)
10 Nm (1.0 m·kg, 7.2 ft·lb)

11. Fill:
 - Cooling system (with the specified amount of the recommended coolant)



Recommended antifreeze
High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines
Mixing ratio
1:1 (antifreeze:water)
Radiator capacity (including all routes)
2.60 L (2.75 US qt, 2.29 Imp.qt)
Coolant reservoir capacity (up to the maximum level mark)
0.25 L (0.26 US qt, 0.22 Imp.qt)

Handling notes for coolant

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

EWA13040

WARNING

- If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.

PERIODIC MAINTENANCE

- If coolant is swallowed, induce vomiting and get immediate medical attention.

ECA13480

NOTICE

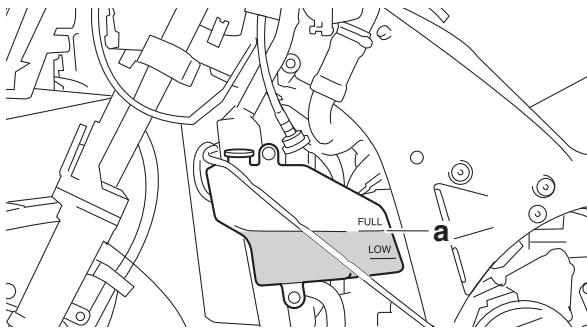
- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- If coolant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

12. Install:

- Radiator cap

13. Fill:

- Coolant reservoir
(with the recommended coolant to the maximum level mark "a")



14. Install:

- Coolant reservoir cap

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

16. Check:

- Coolant level
Refer to "CHECKING THE COOLANT LEVEL" on page 3-26.

TIP

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

17. Install:

- Side cowlings
Refer to "GENERAL CHASSIS" on page 4-1.

EAS21460

CHECKING THE FINAL GEAR OIL LEVEL

1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on the centerstand.

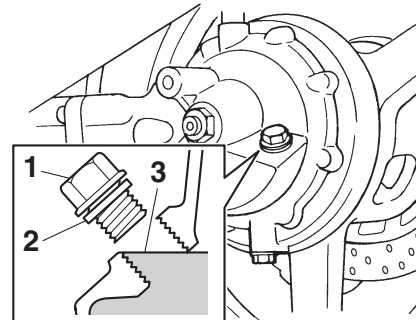
- Make sure the vehicle is upright.

2. Remove:

- Final gear oil filler bolt "1"
(along with the gasket "2")

3. Check:

- Final gear oil level
The final gear oil level should be to the bottom brim "3" of the filler hole.
Below the bottom brim → Add the recommended final gear oil to the proper level.



Type

Shaft drive gear oil (Part No.: 9079E-SH002-00)

4. Install:

- Final gear oil filler bolt
(along with the gasket **New**)

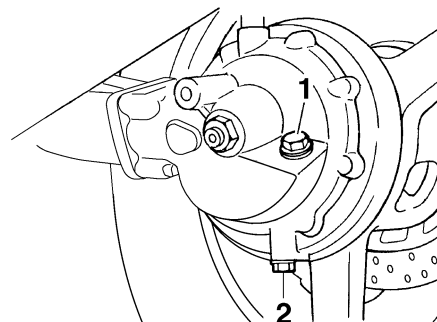


Final gear oil filler bolt
23 Nm (2.3 m·kg, 17 ft·lb)

EAS21470

CHANGING THE FINAL GEAR OIL

1. Place a container under the final gear case.
2. Remove:
 - Final gear oil filler bolt "1"
(along with the gasket)
 - Final gear oil drain bolt "2"
(along with the gasket)Completely drain the final gear case of its oil.



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

	Recommended lubricant Engine oil or a suitable cable lubricant
---	--

TIP

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

EAS1MC1034

CHECKING THE THROTTLE GRIP OPERATION

1. Check:
 - Throttle cables
 - Damage/deterioration → Replace.
 - Throttle cable installation
 - Incorrect → Reinstall the throttle cables.
 - Refer to “HANDLEBARS” on page 4-76.
2. Check:
 - Throttle grip movement
 - Rough movement → Lubricate or replace the defective part(s).

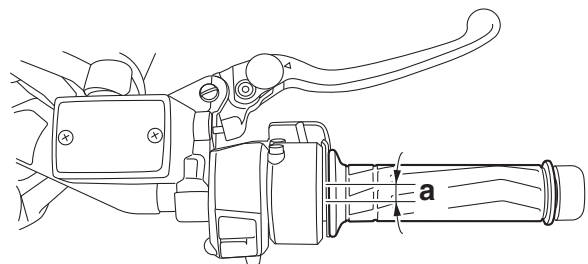
	Recommended lubricant Suitable cable lubricant
---	--

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

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



4. Adjust:
 - Throttle grip free play

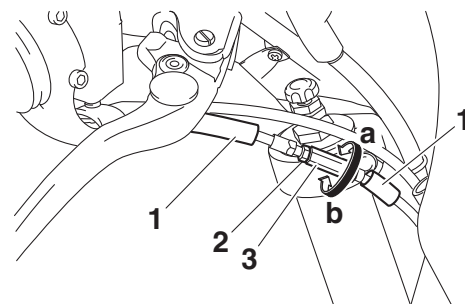
TIP

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



- a. Slide back the rubber covers “1”.
- b. Loosen the locknut “2”.
- c. Turn the adjusting nut “3” 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.



- d. Tighten the locknut.
- e. Slide the rubber covers to its original position.

EWA1MC1010

WARNING

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



EAS1MC1047

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 8-169 and "CHECKING THE BULBS AND BULB SOCKETS" on page 8-172.

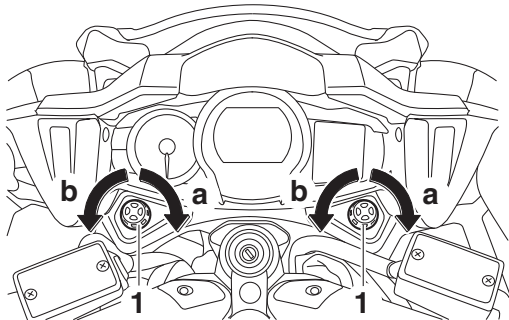
EAS21810

ADJUSTING THE HEADLIGHT BEAMS

1. Adjust:
 - Headlight beam (vertically)

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

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



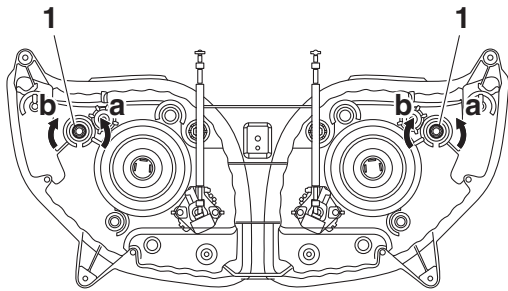
2. Adjust:
 - Headlight beam (horizontally)

a. Turn the adjusting screws "1" in direction "a" or "b".
Left headlight

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

Right headlight

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



EAS21790

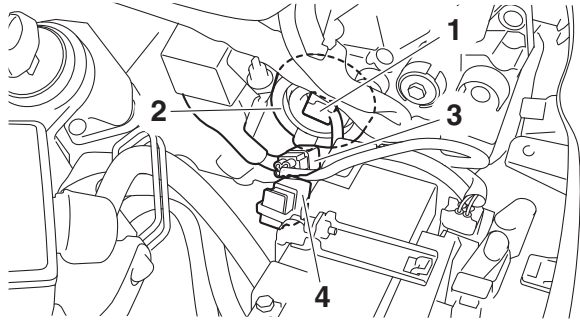
REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

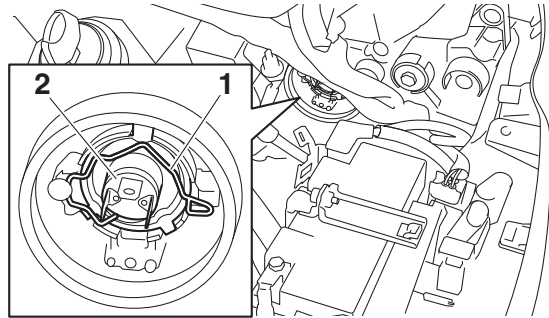
1. Remove:
 - Right upper inner panel
 - Left side cowlingRefer to "GENERAL CHASSIS" on page 4-1.
2. Disconnect:
 - Headlight coupler "1"
3. Remove:
 - Headlight bulb cover "2"

TIP

When removing the right headlight bulb cover, it is necessary to remove the ABS test coupler "3" and main fuse holder "4".



4. Detach:
 - Headlight bulb holder "1"
5. Remove:
 - Headlight bulb "2"



EWA13320

WARNING

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

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:

- Headlight bulb cover

TIP

If the ABS test coupler and main fuse holder are removed, it is necessary to install them.

9. Connect:

- Headlight coupler

CHASSIS

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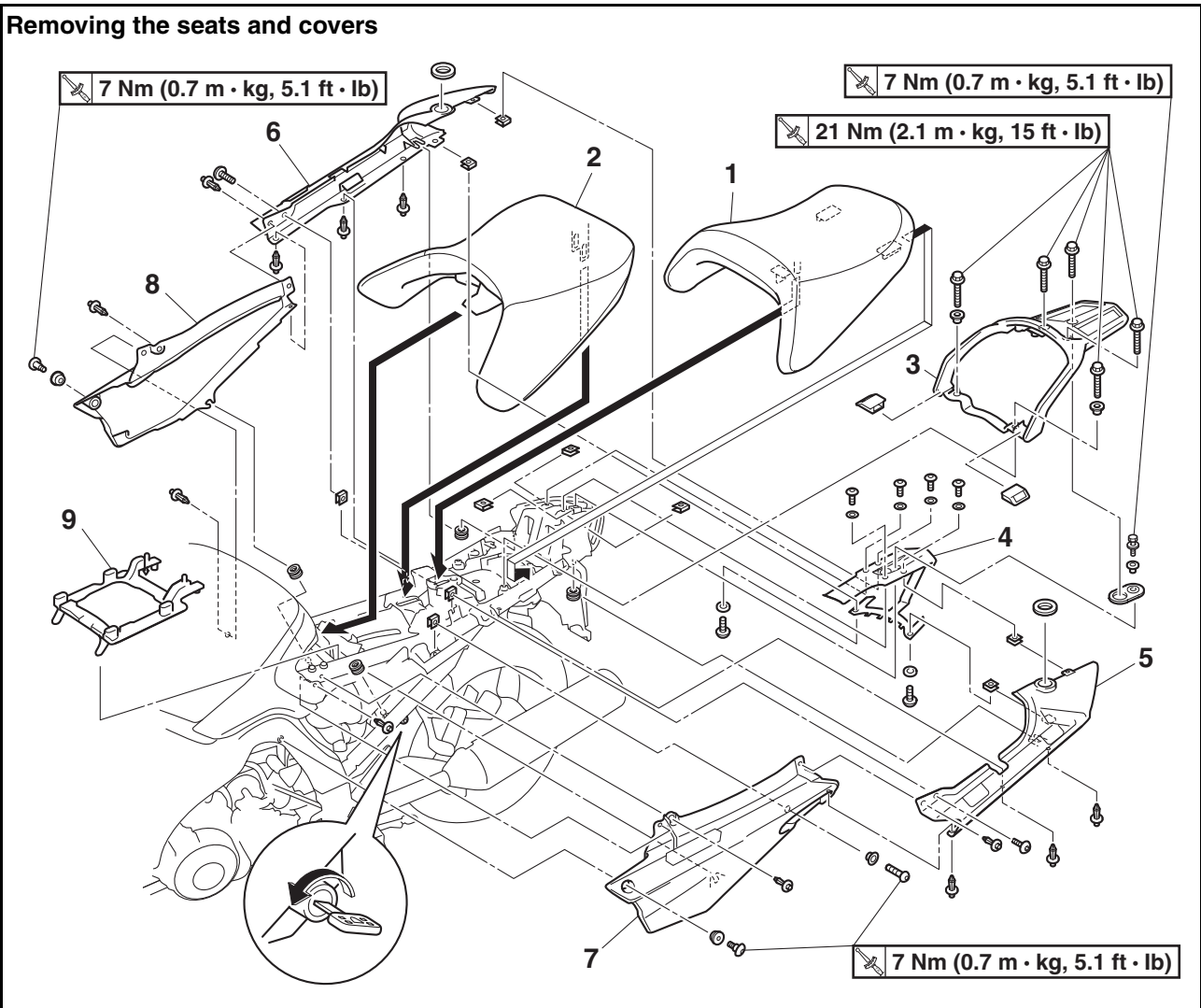
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EAS21830

GENERAL CHASSIS

Removing the seats and covers



Order	Job/Parts to remove	Q'ty	Remarks
1	Passenger seat	1	
2	Rider seat	1	
3	Grab bar	1	
4	Center rear cowling	1	
5	Left rear cowling	1	
6	Right rear cowling	1	
7	Left side cover	1	
8	Right side cover	1	
9	Rider seat height position adjuster	1	
			For installation, reverse the removal procedure.

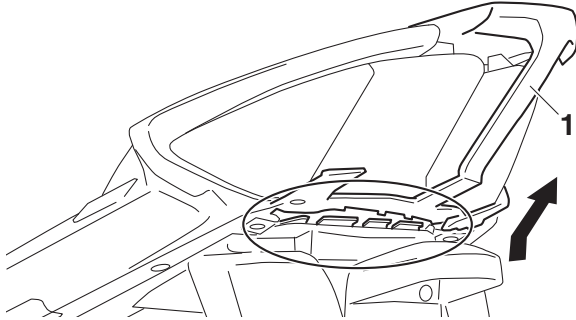
EAS1MC1049

REMOVING THE CENTER REAR COWLING

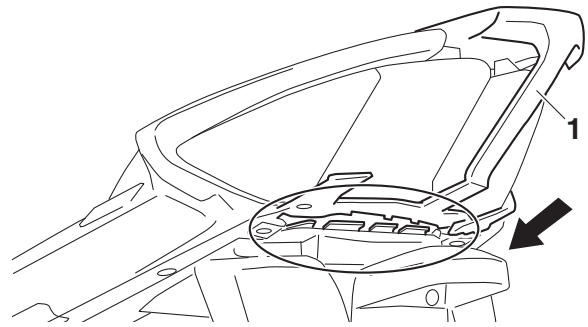
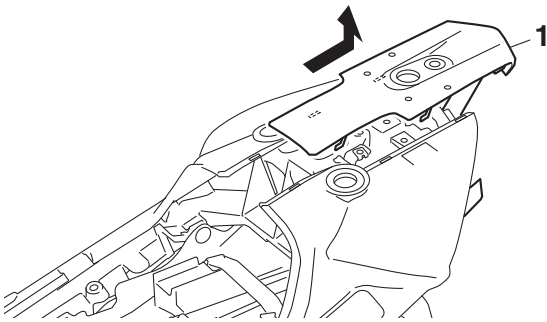
1. Remove:

- Center rear cowling "1"

a. Unhook the projections on the center rear cowling from the rear fender.



b. Unhook the projections on the center rear cowling from the rear cowlings. Slide the center rear cowling rearward and remove it.



EAS1MC1050

REMOVING THE REAR COWLINGS

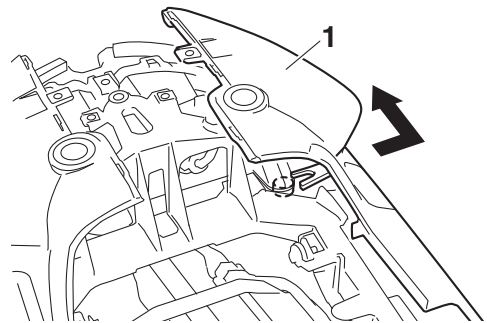
The following procedure applies to both of the rear cowlings.

1. Remove:

- Rear cowling "1"

a. Pull the rear of the rear cowling outward to remove it from the grommet on the tail/brake light assembly.

b. Slide the rear cowling rearward and remove it.



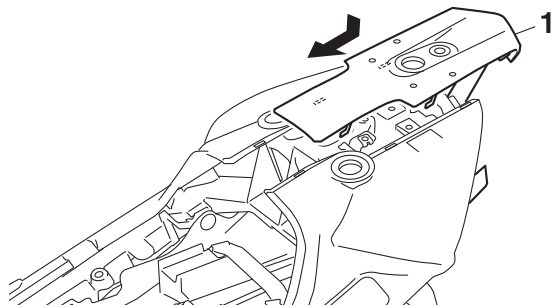
EAS1MC1054

INSTALLING THE CENTER REAR COWLING

1. Install:

- Center rear cowling "1"

a. Install the center rear cowling by fitting the projections on the cowling into the holes in the left and right rear cowlings and sliding it forward.



b. Fit the projections on the center rear cowling into the holes in the rear fender.

EAS1MC1053

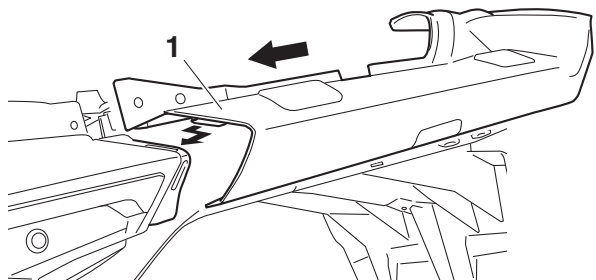
INSTALLING THE REAR COWLINGS

The following procedure applies to both of the rear cowlings.

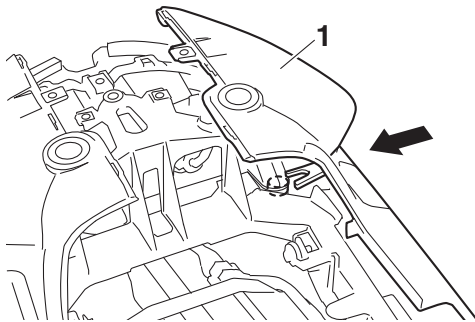
1. Install:

- Rear cowling "1"

a. Insert the projection on the rear cowling into the side cover.



- b. Make sure that the grommet on the tail/brake light assembly fits into the slot in the rear cowling.



EAS1MC1051

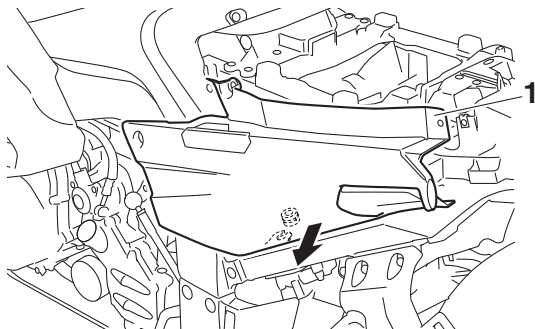
REMOVING THE SIDE COVERS

The following procedure applies to both of the side covers.

1. Remove:
- Side cover "1"

TIP

Pull the bottom of the side cover outward to remove it from the grommet on the frame.



EAS1MC1052

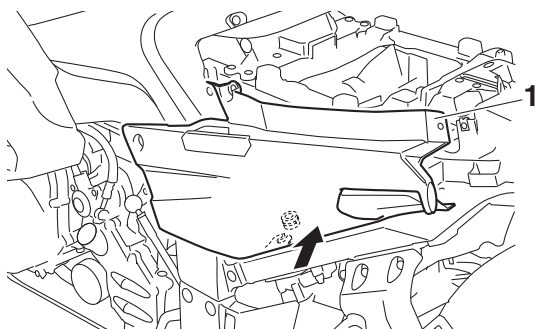
INSTALLING THE SIDE COVERS

The following procedure applies to both of the side covers.

1. Install:
- Side cover "1"

TIP

Make sure that the grommet on the frame fits into the slot in the side cover.



EAS1MC1055

INSTALLING THE SEATS

1. Install:
- Rider seat height position adjuster
 - Rider seat

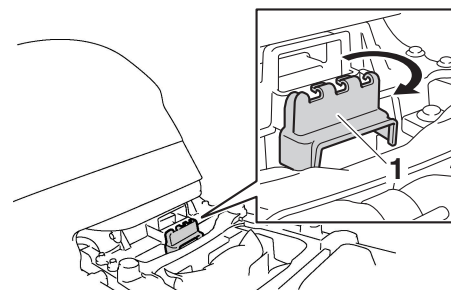
TIP

The rider seat height can be adjusted to one of two positions to suit the rider's preference.

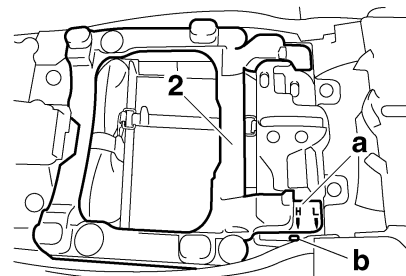


To install the rider seat in the high position

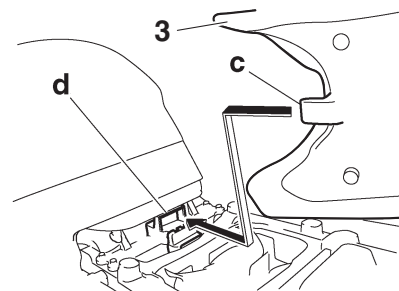
- a. Move the rider seat holder cover "1" to the lower position as shown.



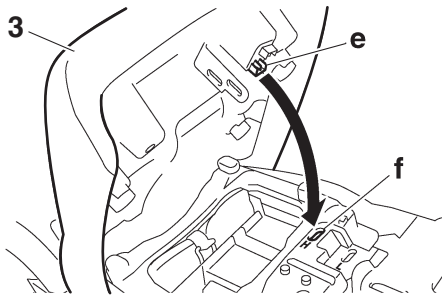
- b. Install the rider seat height position adjuster "2" so that the "H" mark "a" is aligned with the match mark "b".



- c. Insert the projection "c" on the front of the rider seat "3" into seat holder "d" as shown.



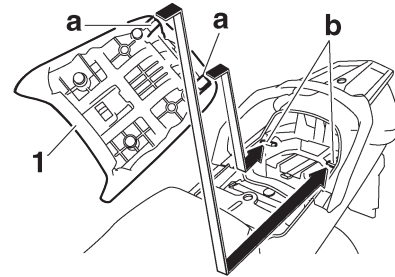
- d. Align the projection "e" on the bottom of the rider seat "3" with the "H" position slot "f", and then push the rear of the seat down to lock it in place as shown.



2. Install:
- Passenger seat "1"

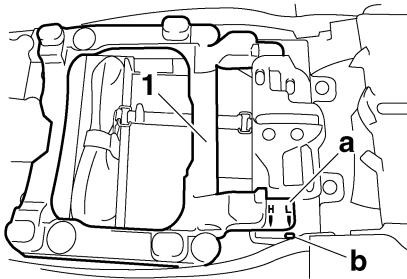
TIP

Insert the projections "a" on the rear of the passenger seat into the seat holders "b" as shown, and then push the front of the seat down to lock it in place.

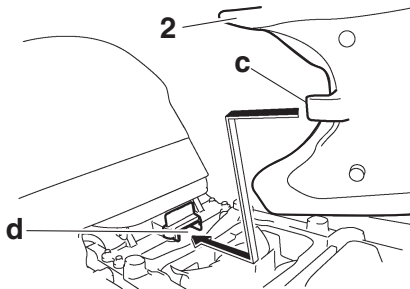


To install the rider seat in the low position

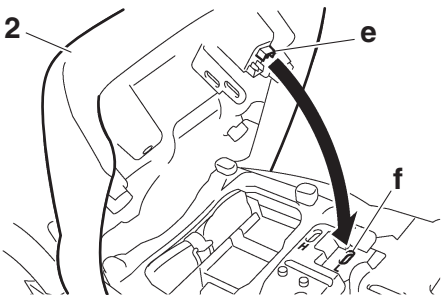
- a. Install the rider seat height position adjuster "1" so that the "L" mark "a" is aligned with the match mark "b".



- b. Insert the projection "c" on the front of the rider seat "2" into seat holder "d" as shown.

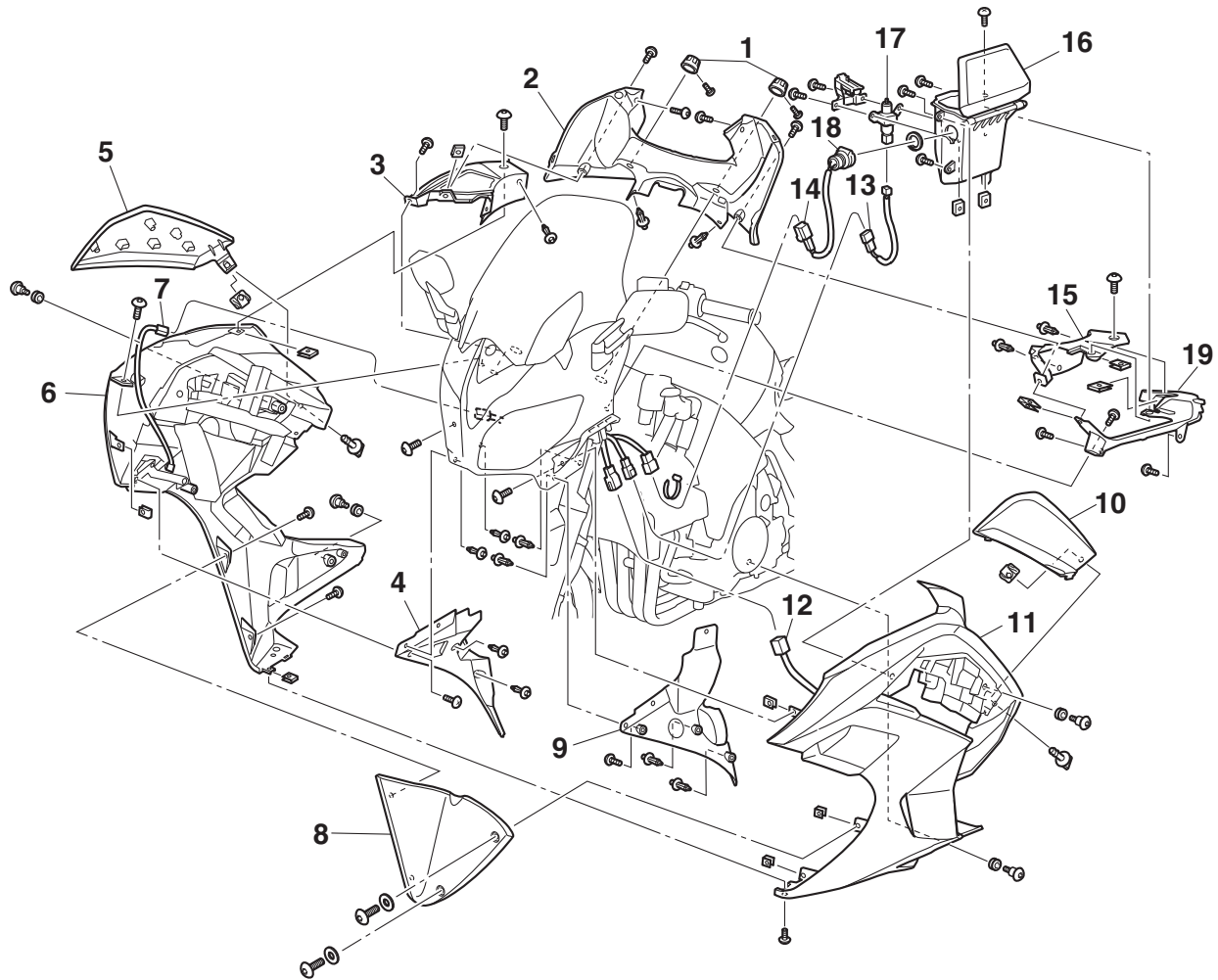


- c. Align the projection "e" on the bottom of the rider seat "2" with the "L" position slot "f", and then push the rear of the seat down to lock it in place as shown.



GENERAL CHASSIS

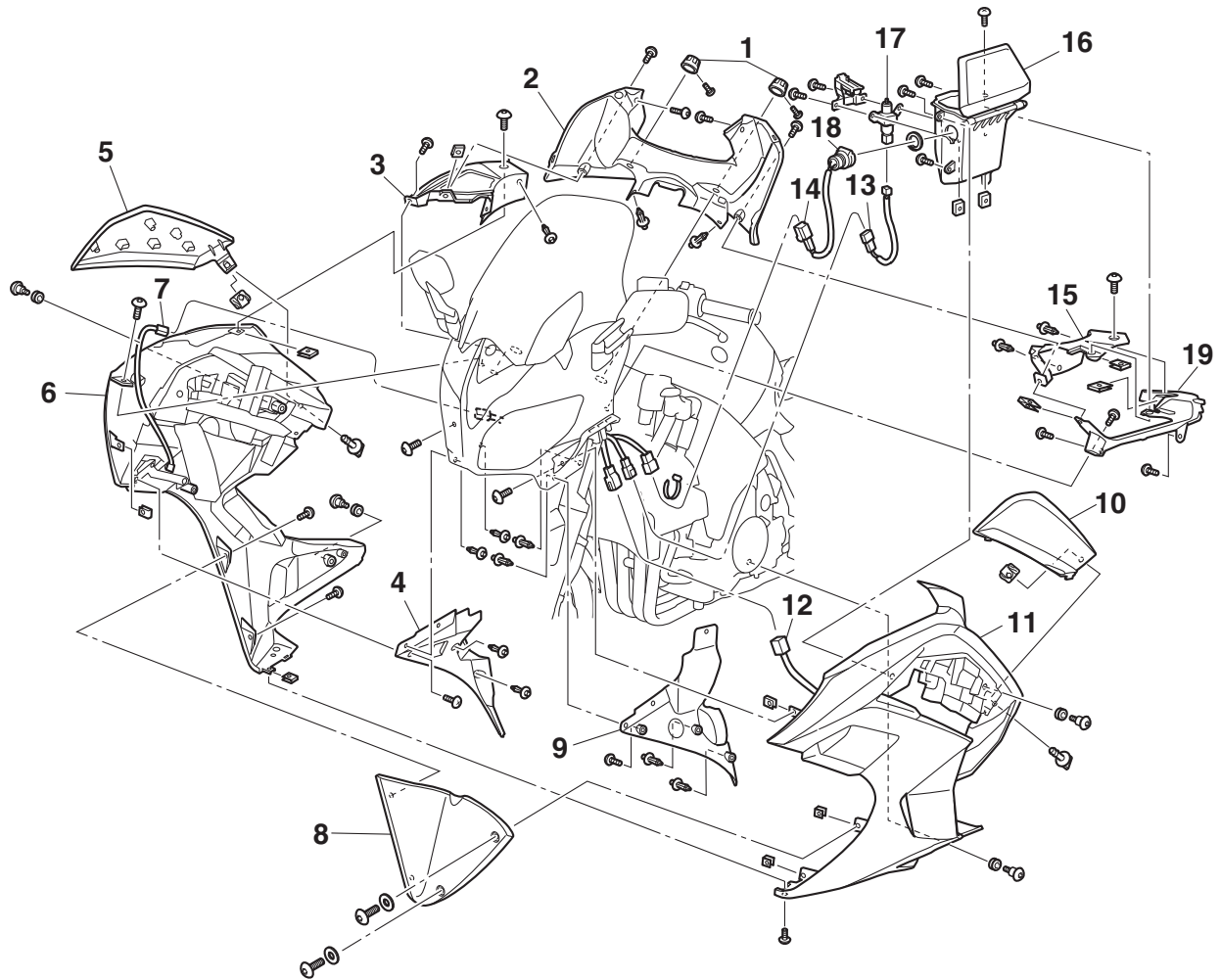
Removing the side cowlings



Order	Job/Parts to remove	Q'ty	Remarks
			TIP _____ Open the accessory box lid.
1	Headlight beam adjusting knob	2	
2	Front cowling inner panel	1	
3	Right upper inner panel	1	
4	Right lower inner panel	1	
5	Right side panel	1	
6	Right side cowling	1	
7	Front right turn signal light coupler	1	Disconnect.
8	Bottom cowling	1	
9	Left lower inner panel	1	
10	Left side panel	1	
11	Left side cowling	1	
12	Front left turn signal light coupler	1	Disconnect.
13	Accessory box solenoid sub-lead coupler	1	Disconnect.
14	Auxiliary DC jack coupler	1	Disconnect.
15	Left upper inner panel 1	1	

GENERAL CHASSIS

Removing the side cowlings



Order	Job/Parts to remove	Q'ty	Remarks
16	Accessory box	1	
17	Accessory box solenoid	1	
18	Auxiliary DC jack	1	
19	Left upper inner panel 2	1	
			For installation, reverse the removal procedure.

EAS1MC1056

ADJUSTING THE SIDE PANELS

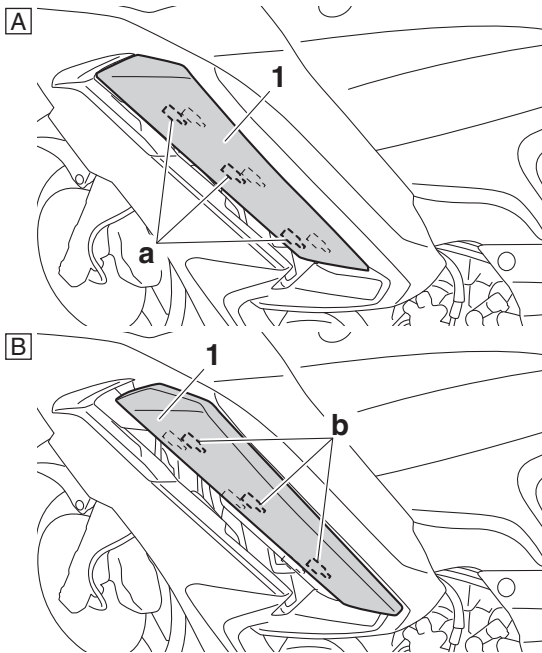
The following procedure applies to both of the side panels.

1. Adjust:

- Side panel position

TIP

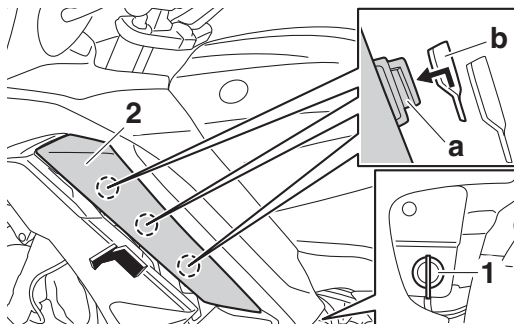
The side panel "1" can be opened 20 mm (0.79 in) for added ventilation to suit the riding conditions.



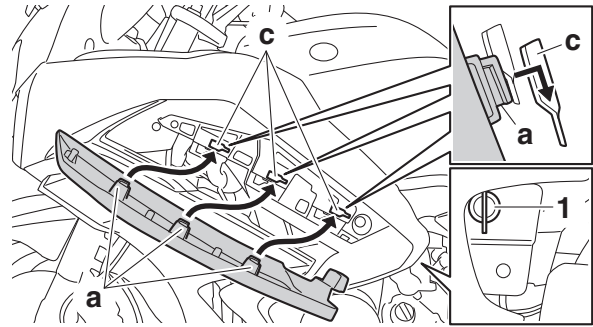
- A. Closed position
 B. Open position
 a. Lower slots
 b. Upper slots

To open a side panel

- Remove the quick fastener "1".
- Slide the side panel "2" forward to unhook its projections "a" from the lower slots "b", and then pull the panel off.

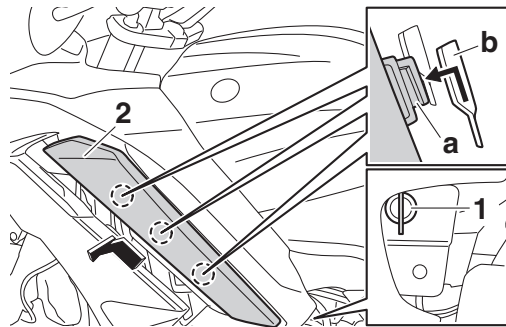


- Insert the projections "a" into the upper slots "c", and then slide the panel backward.
- Install the quick fastener "1".

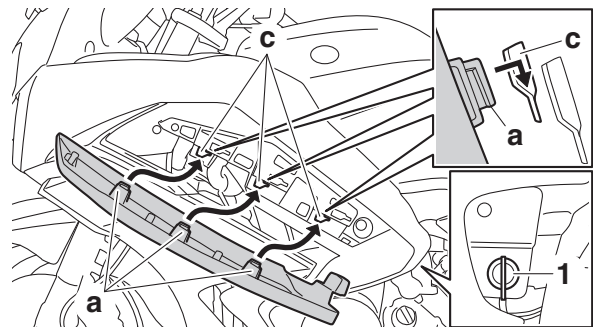


To close a side panel

- Remove the quick fastener "1".
- Slide the side panel "2" forward to unhook its projections "a" from the upper slots "b", and then pull the panel off.



- Insert the projections "a" into the lower slots "c", and then slide the panel backward.
- Install the quick fastener "1".



TIP

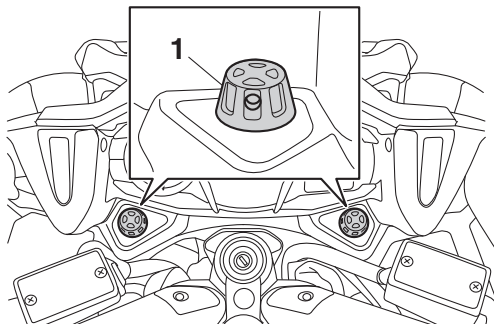
Make sure that the side panel is properly installed.

EAS1MC1057

REMOVING THE FRONT COWLING INNER PANEL

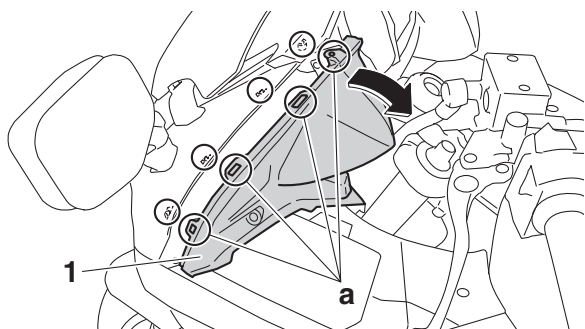
1. Remove:

- Headlight beam adjusting knob "1"

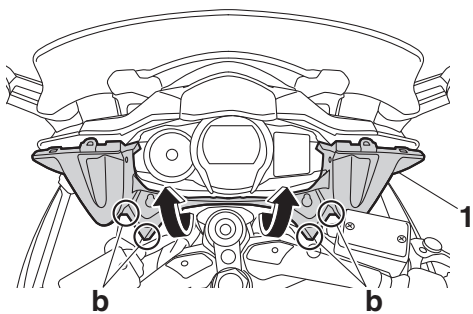


2. Remove:
- Front cowling inner panel "1"

- a. Unhook the tabs "a" on the top of the front cowling inner panel from the front cowling.

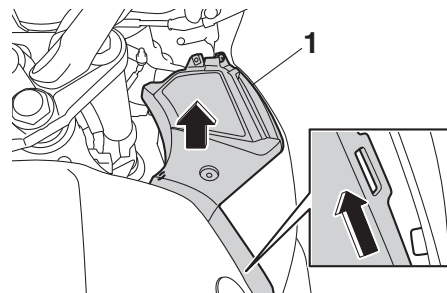


- b. Unhook the projections "b" on the bottom of the front cowling inner panel from the upper inner panels and remove the front cowling inner panel.



3. Remove:
- Right upper inner panel "1"

TIP
Take the right upper inner panel off.

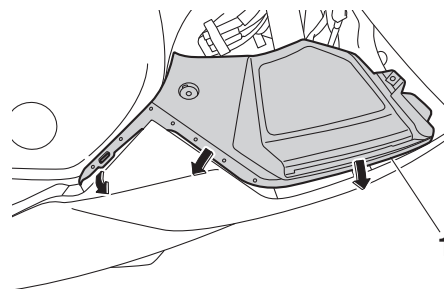


EAS1MC1060

INSTALLING THE FRONT COWLING INNER PANEL

1. Install:
- Right upper inner panel "1"

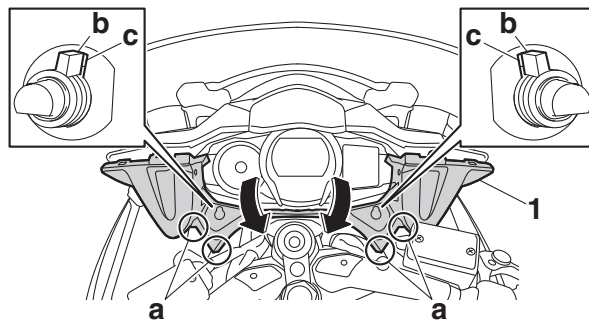
TIP
Place the right upper inner panel in its original position.



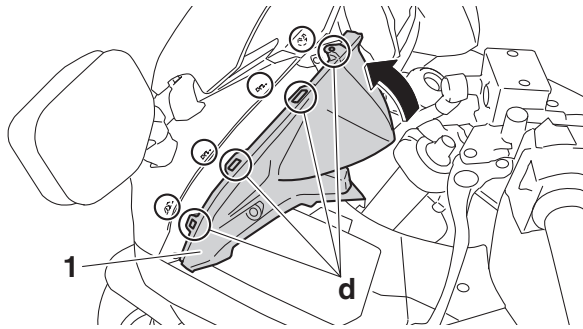
2. Install:
- Front cowling inner panel "1"

- a. Fit the projections "a" on the bottom of the front cowling inner panel into the holes in the upper inner panels.

TIP
Make sure to align the projections "b" on the headlight beam adjusting knob joint with the slots "c" in the front cowling inner panel.



- b. Fit the tabs "d" on the top of the front cowling inner panel onto the projections on the front cowling inner panel, and place the front cowling inner panel in its original position.



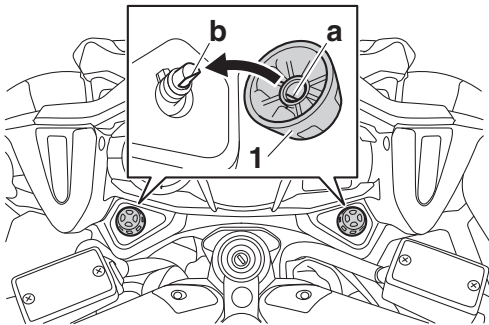
- a. Connect the front left turn signal light coupler, auxiliary DC jack coupler, and accessory box solenoid coupler, and then fasten the front left turn signal light lead “a”, auxiliary DC jack lead “b”, and accessory box solenoid lead “c” with a plastic locking tie.

TIP

Make sure that the couplers are aligned as shown in the illustration.

3. Install:

- Headlight beam adjusting knob “1”



TIP

Align the flat portion “a” of the hole in the headlight beam adjusting knob with the flat portion “b” of the headlight beam adjusting knob joint.

EAS1MC1058

REMOVING THE SIDE COWLINGS

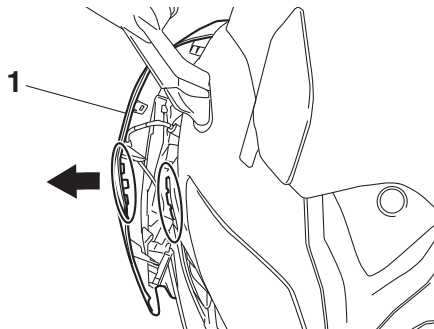
The following procedure applies to both of the side cowlings.

1. Remove:

- Side cowling “1”

TIP

Unhook the projections on the side cowling from the front cowling.



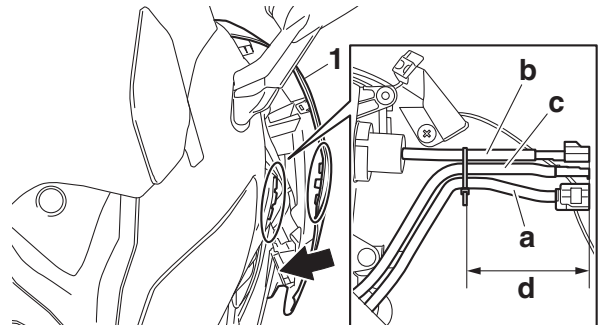
EAS1MC1059

INSTALLING THE SIDE COWLINGS

1. Install:

- Left side cowling “1”

- b. Fit the projections on the left side cowling into the holes in the front cowling.



d. 70–120 mm (2.8–4.7 in)

2. Install:

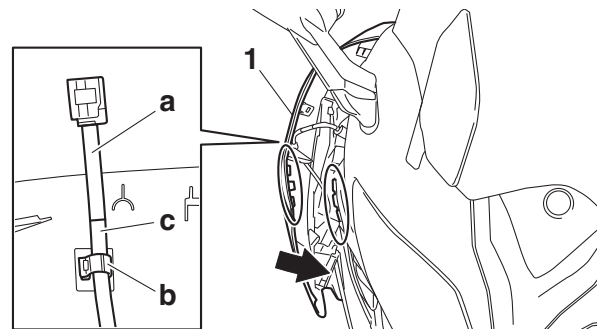
- Right side cowling “1”

- a. Connect the front right turn signal light coupler, and then fasten the front right turn signal light lead “a” with the holder “b” on the right side cowling.

TIP

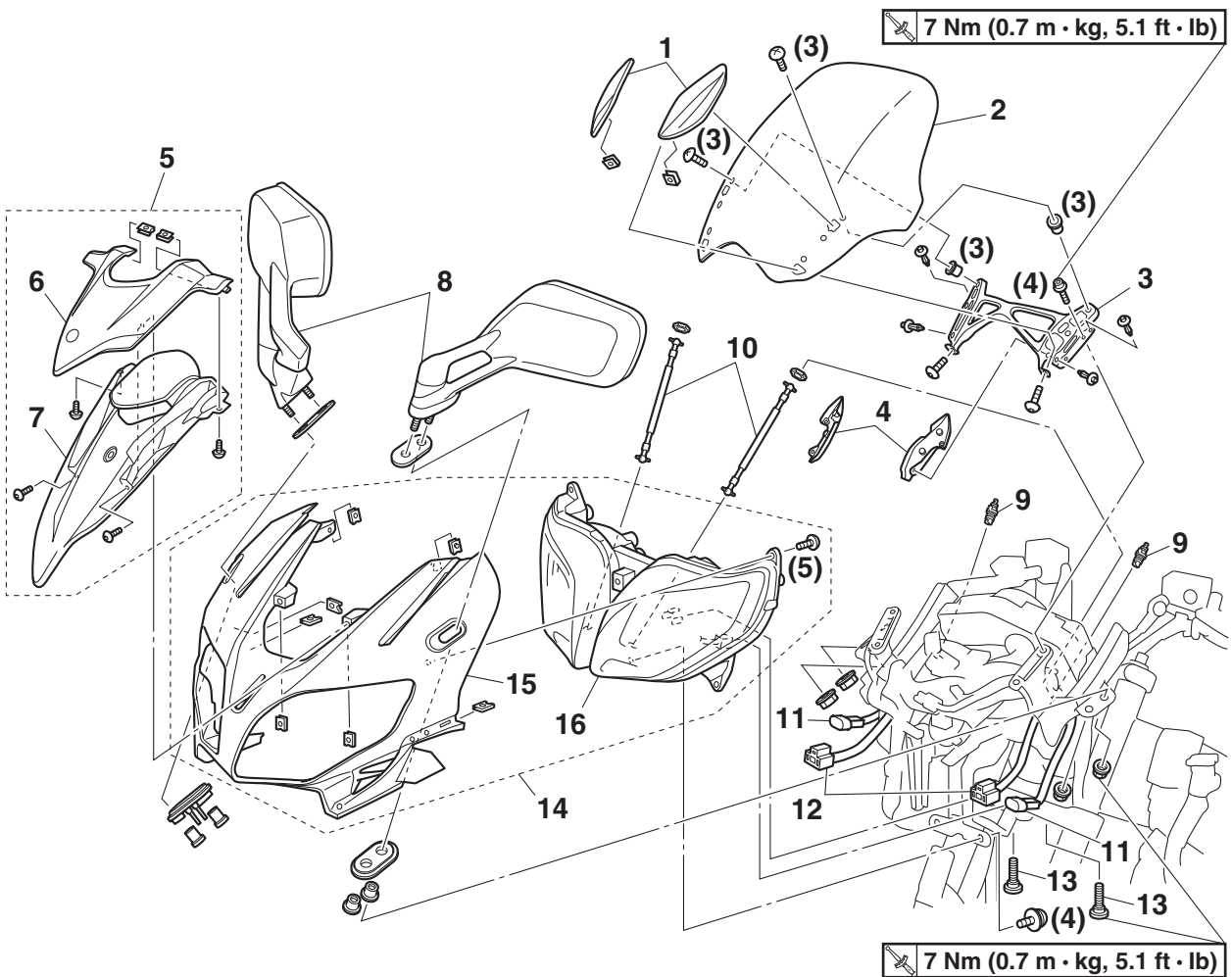
Make sure that the lower edge of the white tape “c” on the front right turn signal light lead is aligned with the upper edge of the holder.

- b. Fit the projections on the right side cowling into the holes in the front cowling.



GENERAL CHASSIS

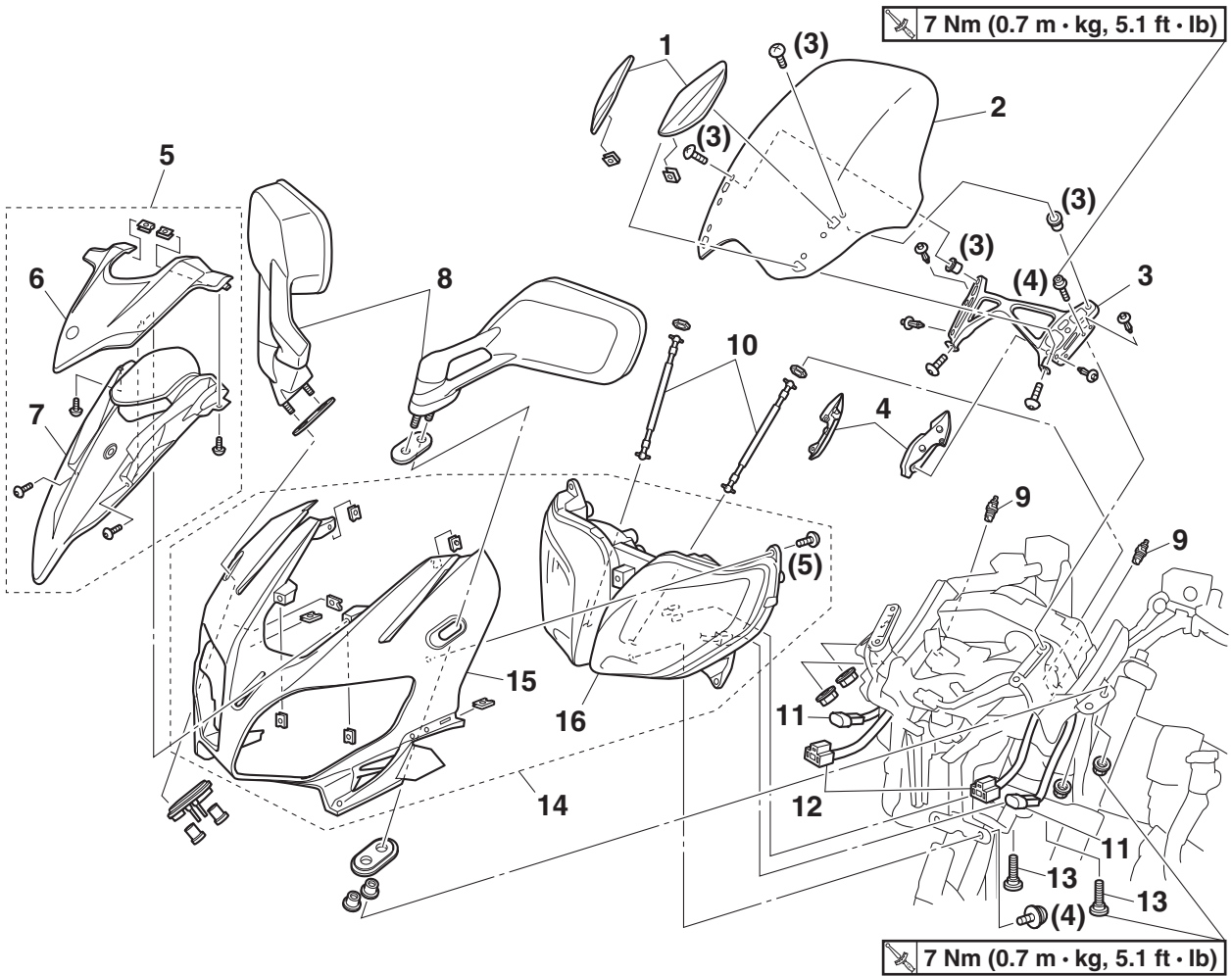
Removing the front cowling assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Side cowlings		Refer to "Removing the side cowlings".
1	Windshield bracket outer cover	2	
2	Windshield	1	
3	Windshield bracket	1	
4	Windshield bracket inner cover	2	
5	Center cover assembly	1	
6	Upper center cover	1	
7	Lower center cover	1	
8	Rearview mirror	2	
9	Headlight beam adjusting knob joint	2	
10	Headlight beam adjusting knob shaft	2	
11	Auxiliary light coupler	2	Disconnect.
12	Headlight coupler	2	Disconnect.
13	Lower bracket cover bolt	2	
14	Front cowling assembly	1	
15	Front cowling	1	

GENERAL CHASSIS

Removing the front cowling assembly



Order	Job/Parts to remove	Q'ty	Remarks
16	Headlight assembly	1	
			For installation, reverse the removal procedure.

EAS1MC1061

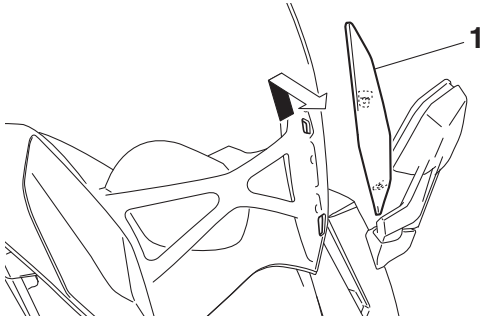
REMOVING THE WINDSHIELD BRACKET COVERS

The following procedure applies to both of the windshield bracket covers.

1. Remove:
 - Windshield bracket outer cover "1"

TIP

Slide the windshield bracket outer cover upward, and then remove it.



EAS1MC1064

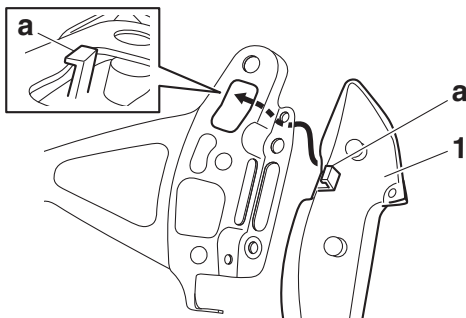
INSTALLING THE WINDSHIELD BRACKET COVERS

The following procedure applies to both of the windshield bracket covers.

1. Install:
 - Windshield bracket inner cover "1"

TIP

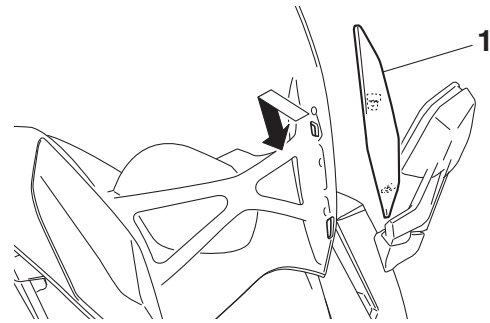
Hook the projection "a" on the windshield bracket inner cover "1" onto the windshield bracket.



2. Install:
 - Windshield
 - Windshield bracket outer cover "1"

TIP

Fit the projections on the windshield bracket outer cover into the holes in the windshield, and then slide the cover downward.



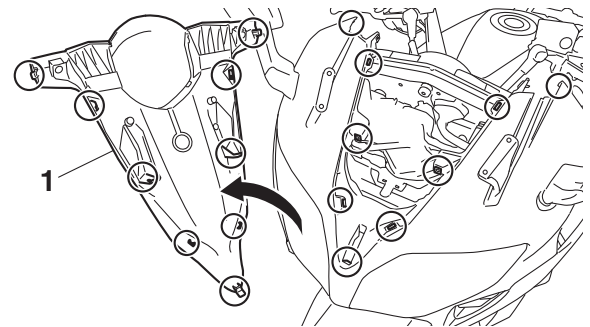
EAS1MC1062

REMOVING THE CENTER COVERS

1. Remove:
 - Center cover assembly "1"

TIP

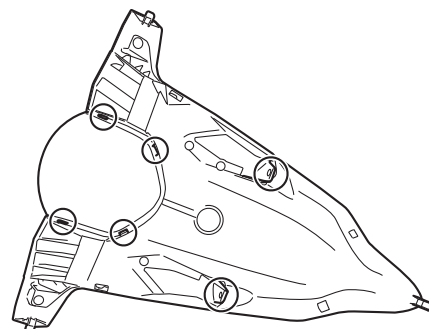
Unhook the projections on the lower center cover from the front cowling and remove the center cover assembly.



2. Remove:
 - Upper center cover

TIP

Unhook the projections on the upper center cover from the lower center cover and remove the upper center cover.



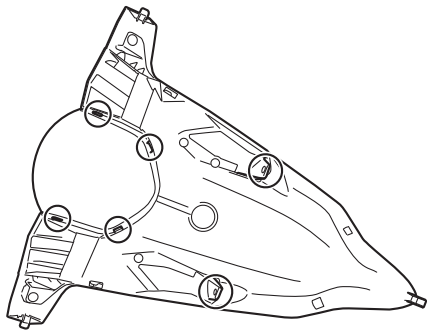
EAS1MC1063

INSTALLING THE CENTER COVERS

1. Install:
 - Upper center cover

TIP

Fit the projections on the upper center cover into the holes in the lower center cover.

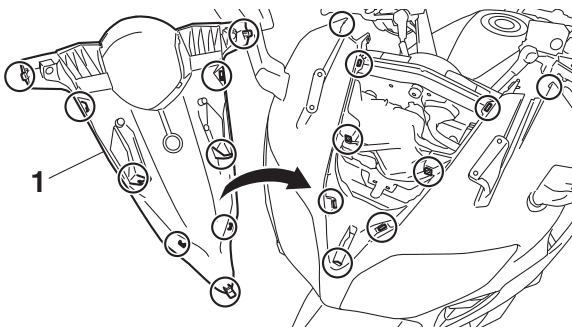


2. Install:

- Center cover assembly "1"

TIP

Fit the projections on the lower center cover into the holes in the front cowling.



EAS1MC1031

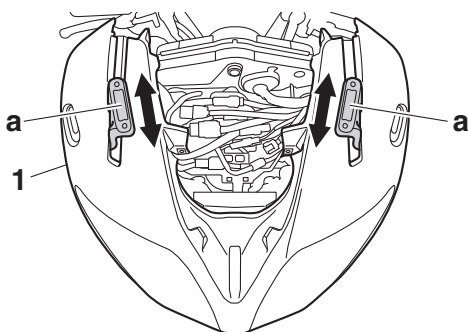
INSTALLING THE FRONT COWLING ASSEMBLY

1. Install:

- Front cowling assembly "1"

TIP

After installing the front cowling assembly, operate the windshield drive unit and check that the windshield drive unit arms "a" do not contact the front cowling when they move up and down.



EAS1MC1080

INSTALLING THE HEADLIGHT BEAM ADJUSTING KNOB JOINTS

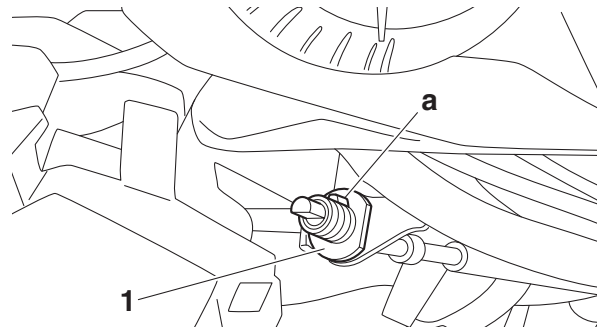
The following procedure applies to both of the headlight beam adjusting knob joints.

1. Install:

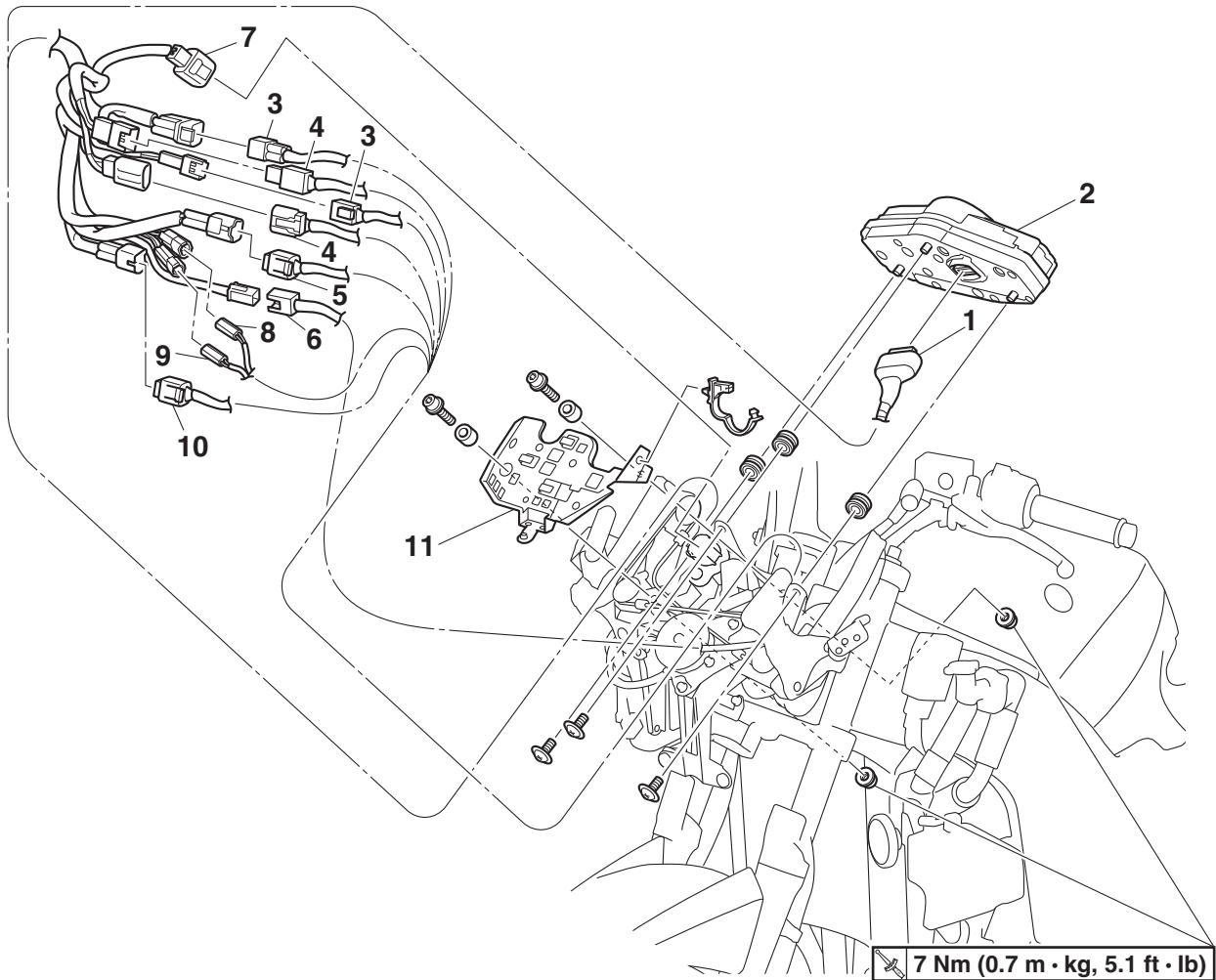
- Headlight beam adjusting knob joint "1"

TIP

Face the projection "a" on the headlight beam adjusting knob joint forward.

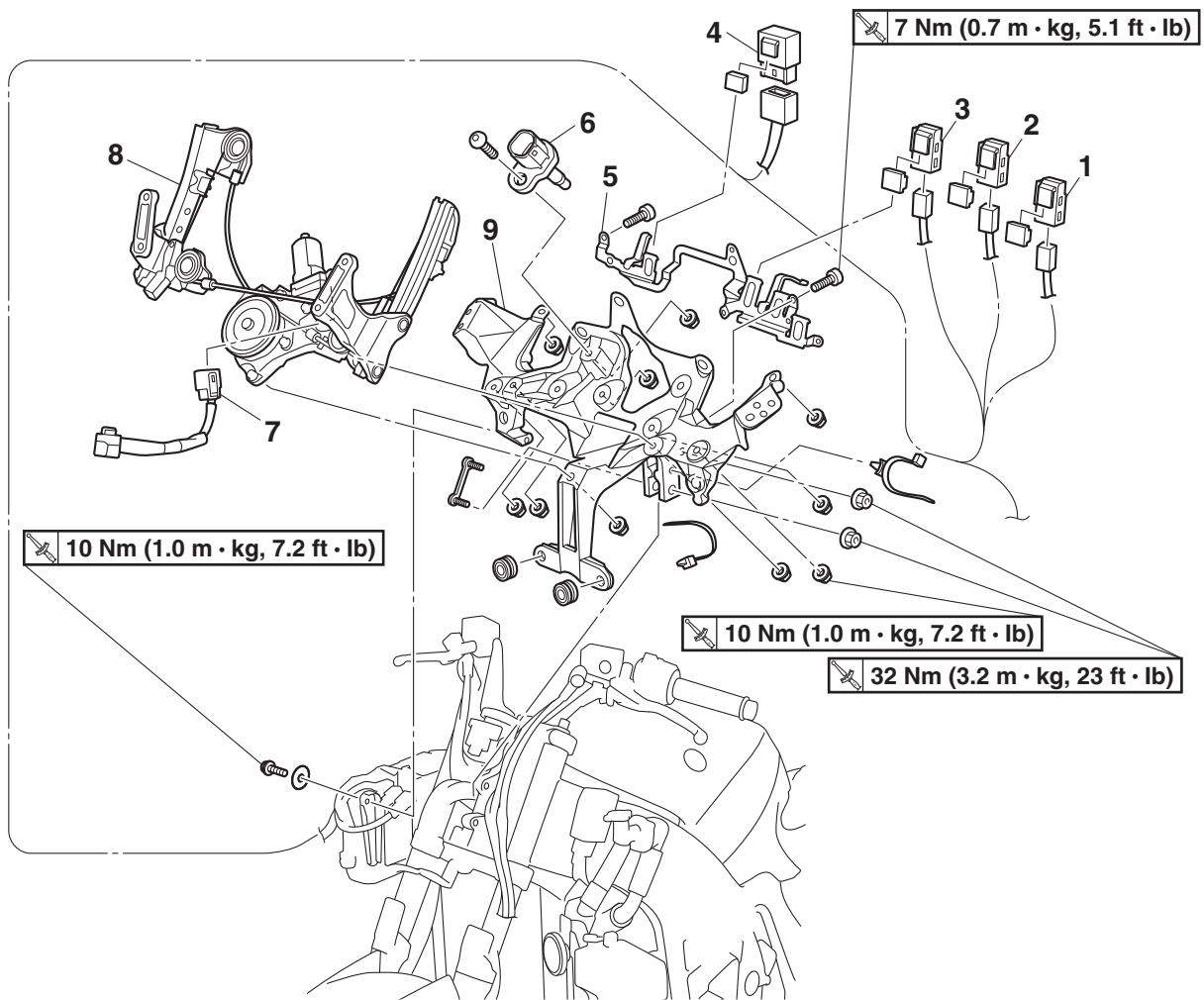


Removing the meter assembly and electrical components board



Order	Job/Parts to remove	Q'ty	Remarks
	Side cowlings		Refer to "Removing the side cowlings".
	Front cowling assembly		Refer to "Removing the front cowling assembly".
1	Meter assembly coupler	1	Disconnect.
2	Meter assembly	1	
3	Right handlebar switch coupler	2	Disconnect.
4	Left handlebar switch coupler	2	Disconnect.
5	Front brake light switch coupler	1	Disconnect.
6	Windshield drive unit sub-lead coupler	1	Disconnect.
7	Air temperature sensor coupler	1	Disconnect.
8	Right grip warmer coupler	1	Disconnect. Gray coupler.
9	Left grip warmer coupler	1	Disconnect. Black coupler.
10	Clutch switch coupler	1	Disconnect.
11	Electrical components board	1	
			For installation, reverse the removal procedure.

Removing the windshield drive unit



Order	Job/Parts to remove	Q'ty	Remarks
	Side cowlings		Refer to "Removing the side cowlings".
	Front cowling assembly		Refer to "Removing the front cowling assembly".
	Electrical components board		Refer to "Removing the meter assembly and electrical components board".
1	Windshield drive unit relay (up)	1	
2	Windshield drive unit relay (down)	1	
3	Headlight relay (dimmer)	1	
4	Relay unit	1	
5	Relay bracket	1	
6	Air temperature sensor	1	
7	Windshield drive unit sub-lead	1	
8	Windshield drive unit	1	
9	Windshield drive unit bracket	1	
			For installation, reverse the removal procedure.

EAS1MC1079

INSTALLING THE WINDSHIELD DRIVE UNIT


1. Check:

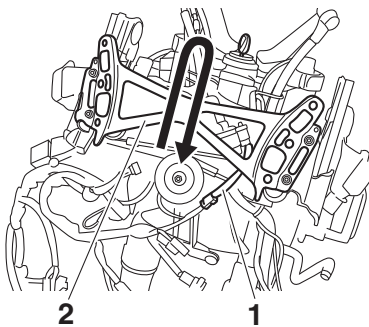
- Windshield drive unit operation

TIP

After installing the windshield drive unit to the windshield drive unit bracket, check the operation of the drive unit.

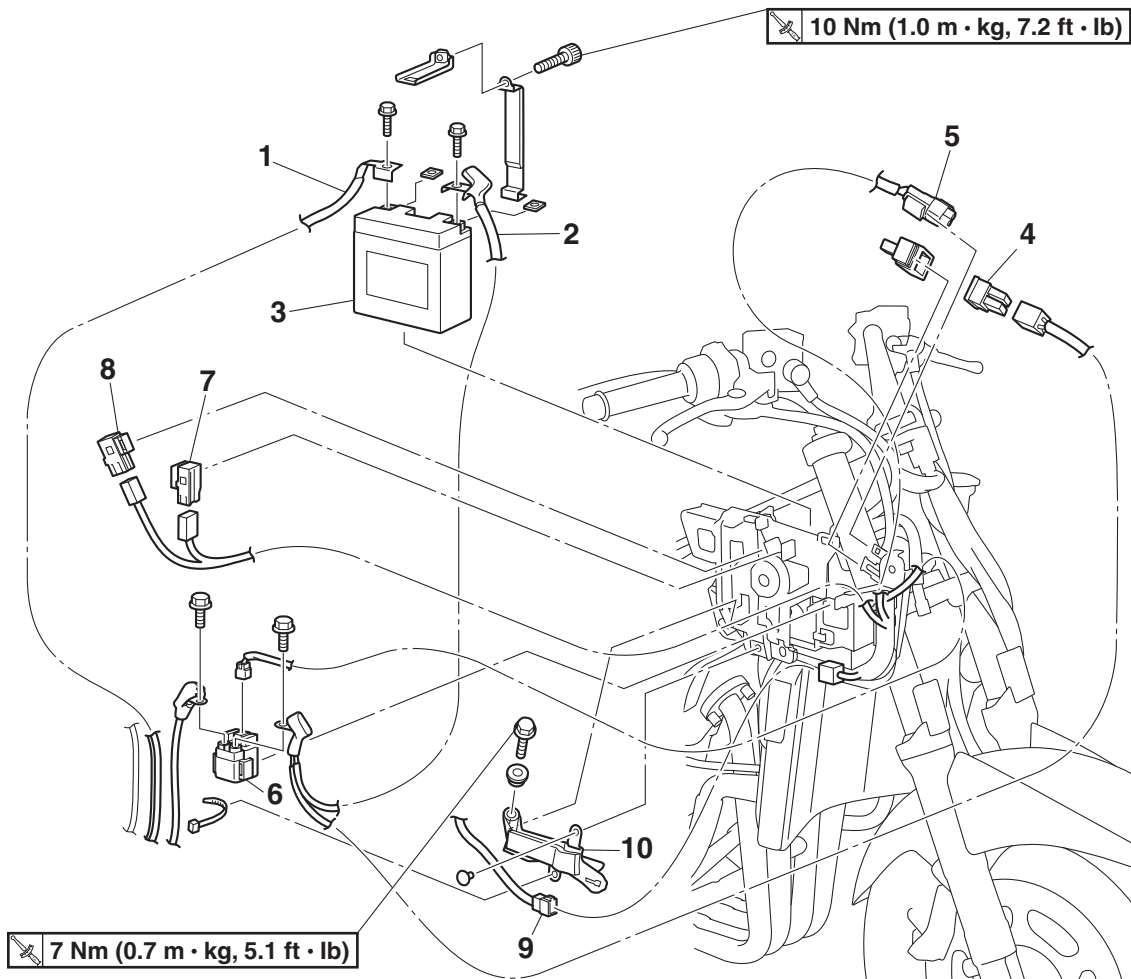
- a. Install the windshield drive unit sub-lead "1", and then connect the windshield drive unit sub-lead to the wire harness.
- b. Install the windshield bracket "2".
- c. Operate the windshield drive unit and check that the windshield drive unit arms can be moved fully up and down within the specified operation time.

	<p>Specified operation time 1.9–3.8 seconds</p>
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GENERAL CHASSIS

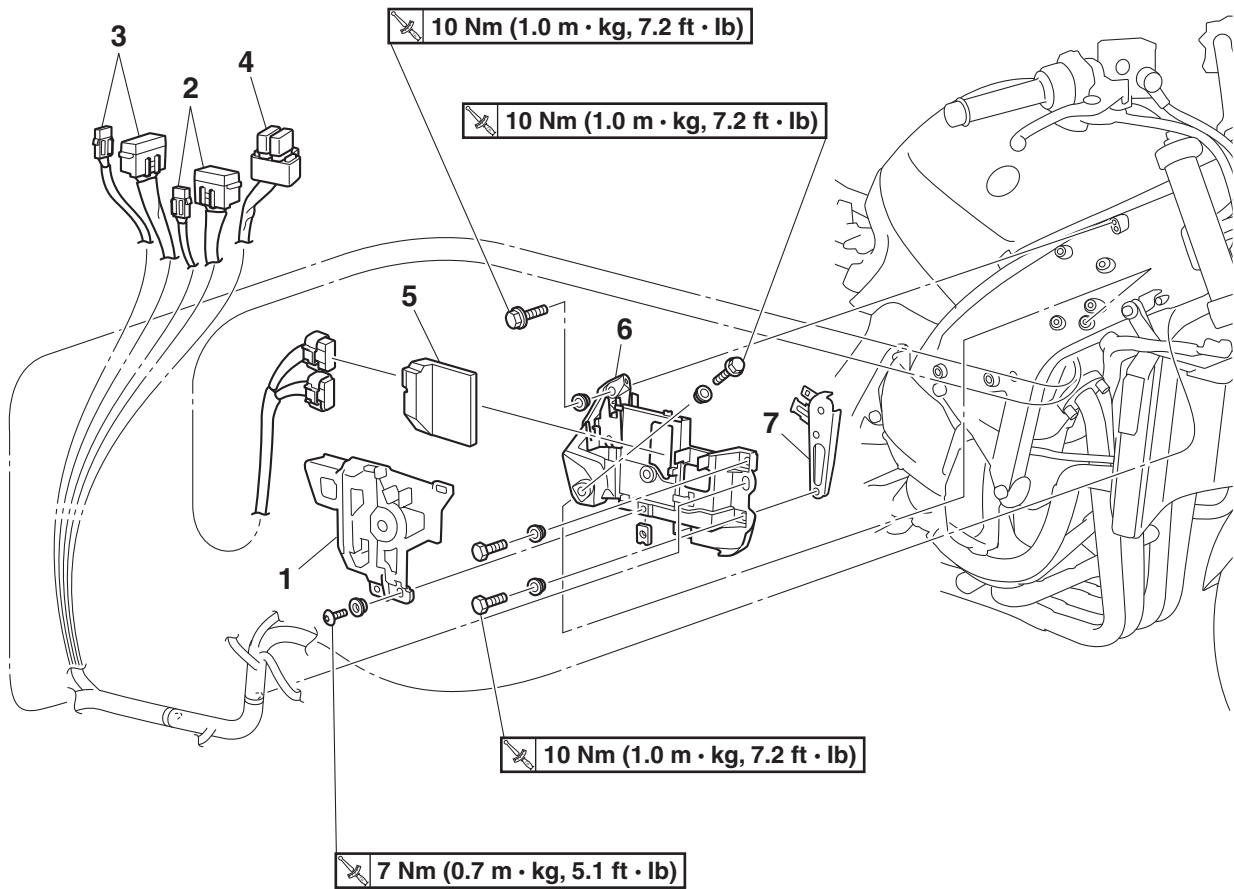
Removing the electrical components tray 1/2



Order	Job/Parts to remove	Q'ty	Remarks
	Right side cowling		Refer to "Removing the side cowlings".
1	Negative battery lead	1	Disconnect.
2	Positive battery lead	1	Disconnect.
3	Battery	1	
4	Main fuse	1	
5	ABS test coupler	1	
6	Starter relay	1	
7	Radiator fan motor relay	1	
8	Headlight relay (on/off)	1	
9	Right radiator fan motor coupler	1	Disconnect.
10	Air guide	1	
			For installation, reverse the removal procedure.

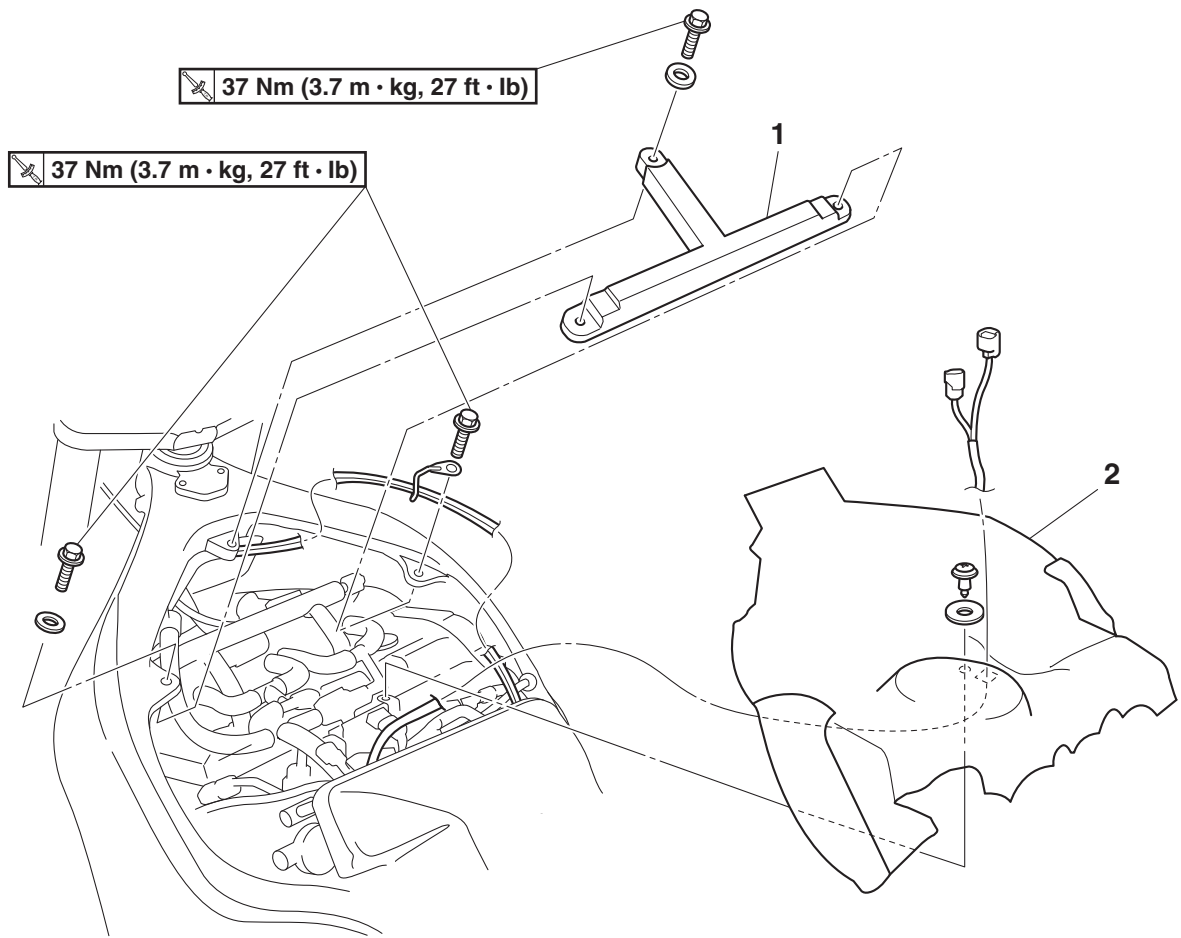
GENERAL CHASSIS

Removing the electrical components tray 2/2



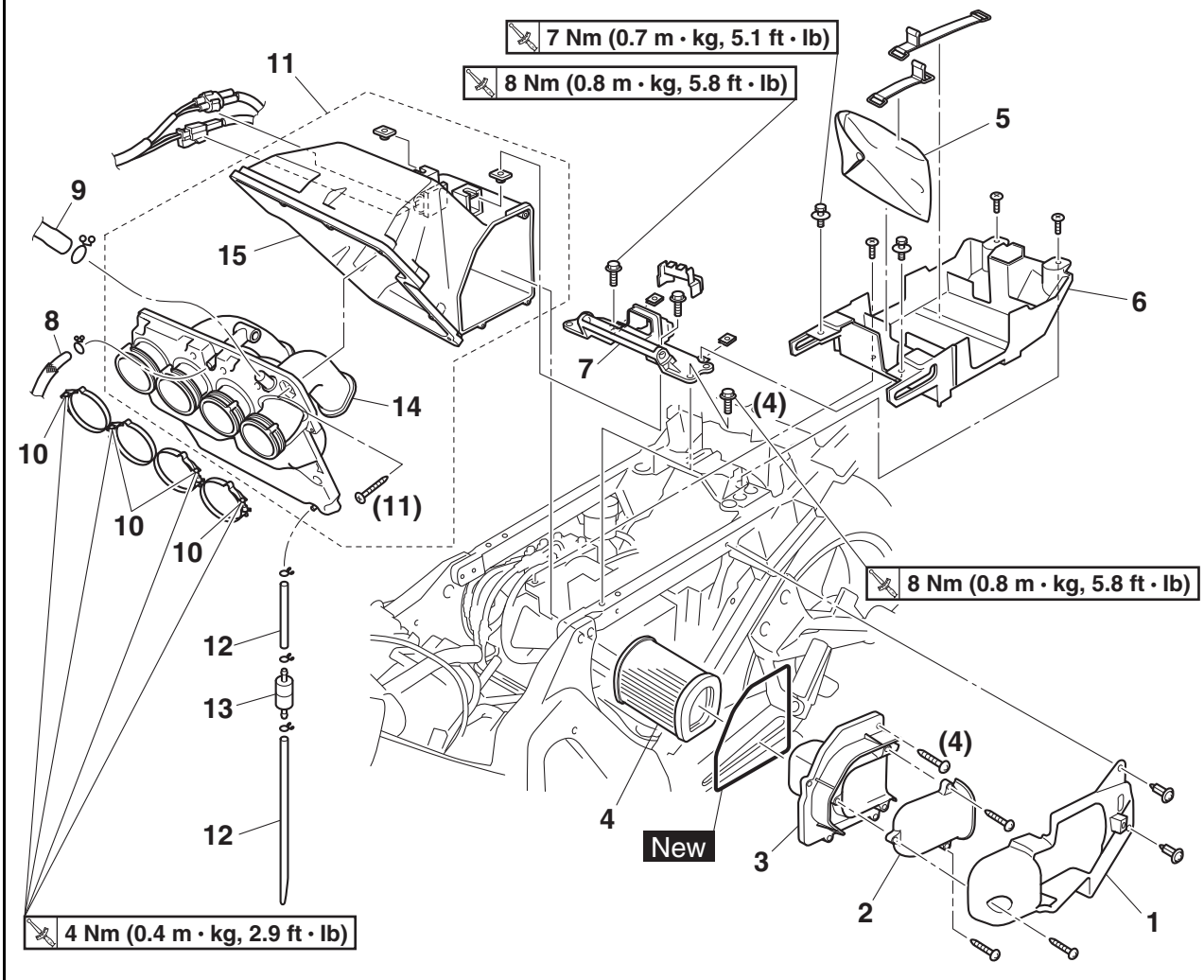
Order	Job/Parts to remove	Q'ty	Remarks
1	ECU cover	1	
2	Fuse box 1/Windshield drive system fuse	1/1	
3	Fuse box 2/Hazard lighting fuse	1/1	
4	Cruise control system fuse/Brake light fuse	1/1	
5	ECU (engine control unit)	1	
6	Electrical components tray	1	
7	Electrical components tray bracket	1	
			For installation, reverse the removal procedure.

Removing the T-bar



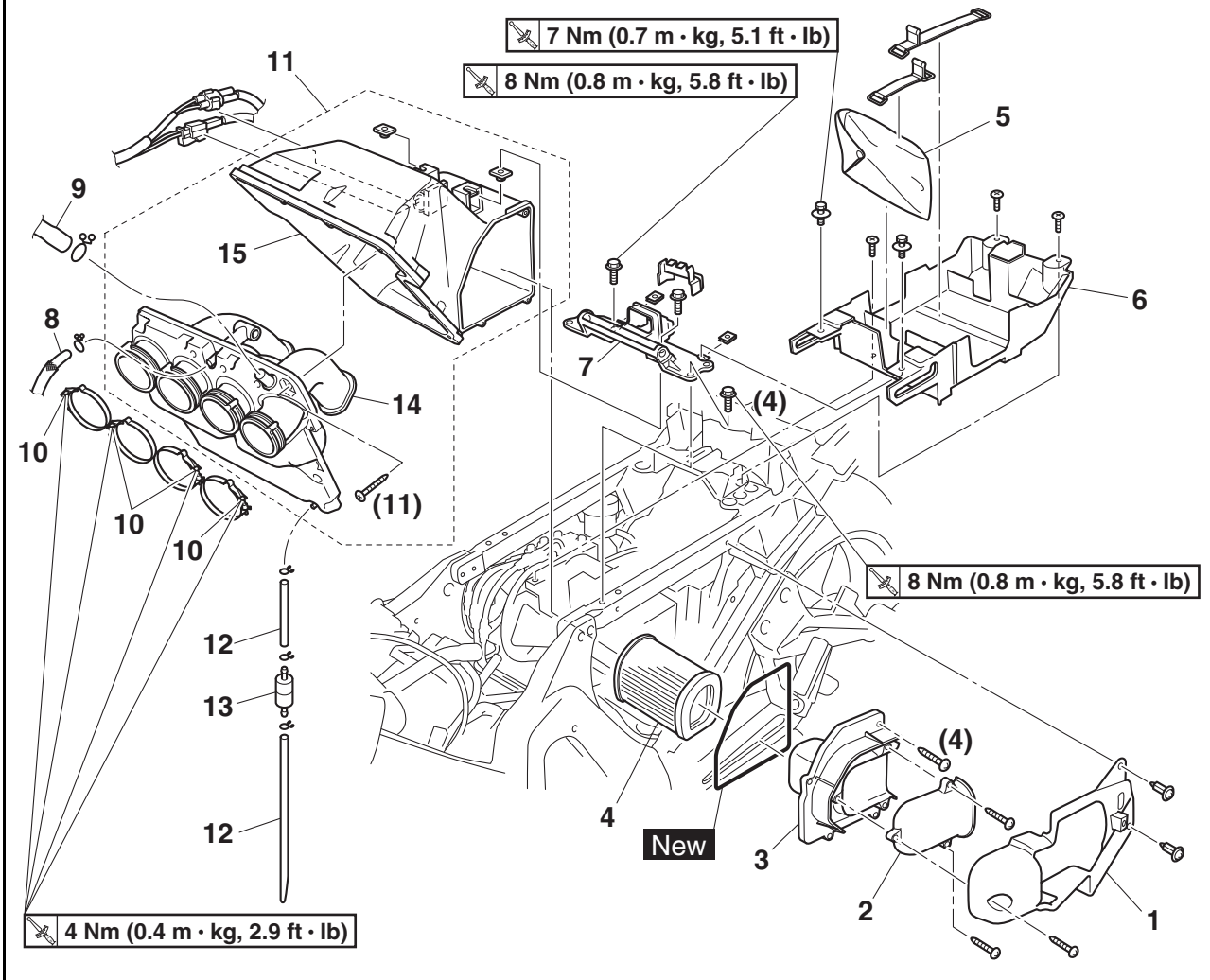
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "Removing the seats and covers".
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	T-bar	1	
2	Heat protector	1	
			For installation, reverse the removal procedure.

Removing the air filter case



Order	Job/Parts to remove	Q'ty	Remarks
	Left side cover		Refer to "Removing the seats and covers".
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	T-bar		Refer to "Removing the T-bar".
1	Air shroud	1	
2	Air duct	1	
3	Air filter case cover	1	
4	Air filter element	1	
5	Owner's tool kit	1	
6	Storage compartment	1	
7	Rear lower fuel tank bracket	1	
8	Crankcase breather hose	1	Disconnect.
9	Air induction system hose (air filter case joint assembly to 3-way joint)	1	Disconnect.
10	Air filter case joint clamp screw	4	Loosen.
11	Air filter case assembly	1	
12	Air filter case breather hose	2	

Removing the air filter case

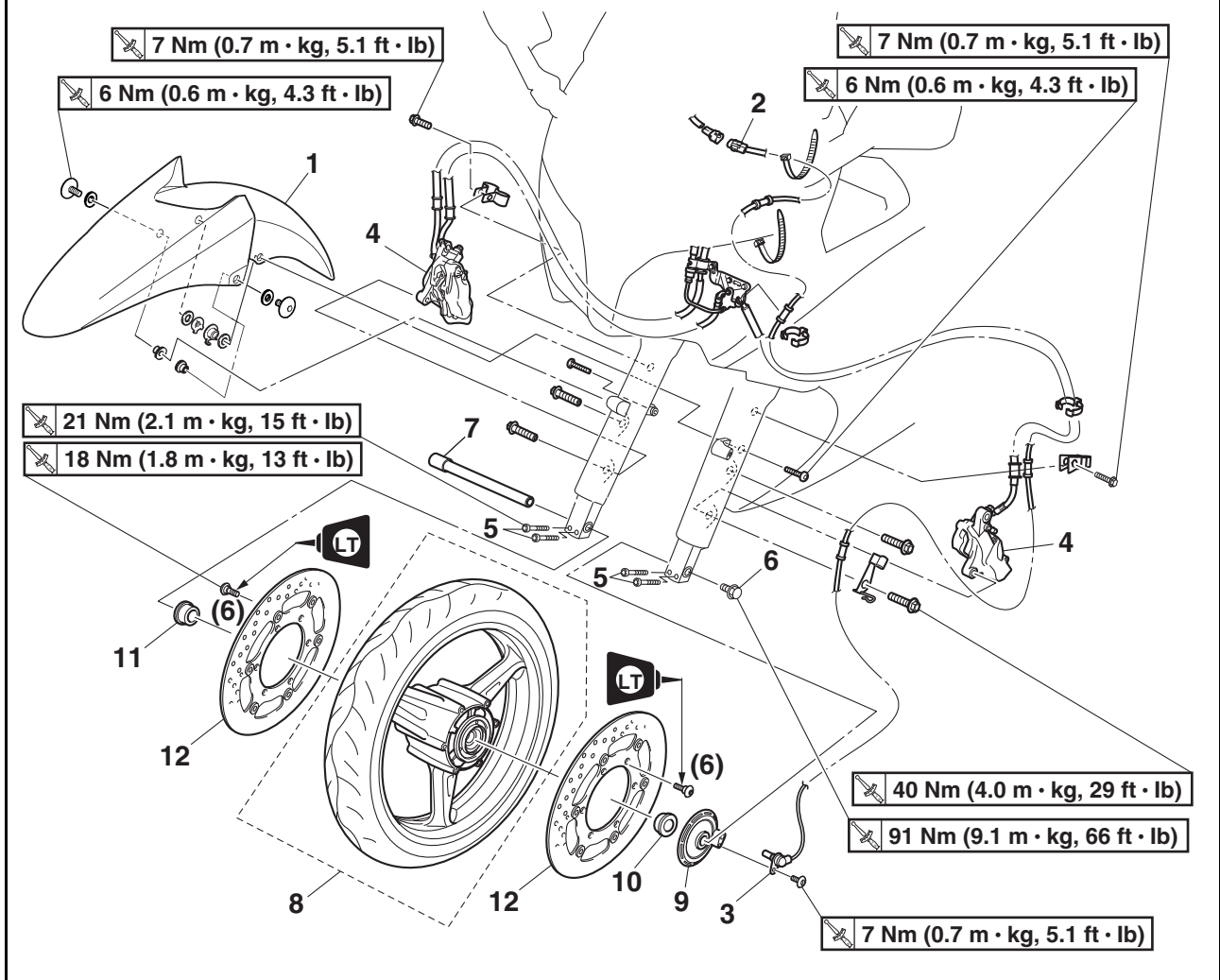


Order	Job/Parts to remove	Q'ty	Remarks
13	Filter assembly	1	
14	Air filter case joint assembly	1	
15	Air filter case	1	
			For installation, reverse the removal procedure.

EAS21880

FRONT WHEEL

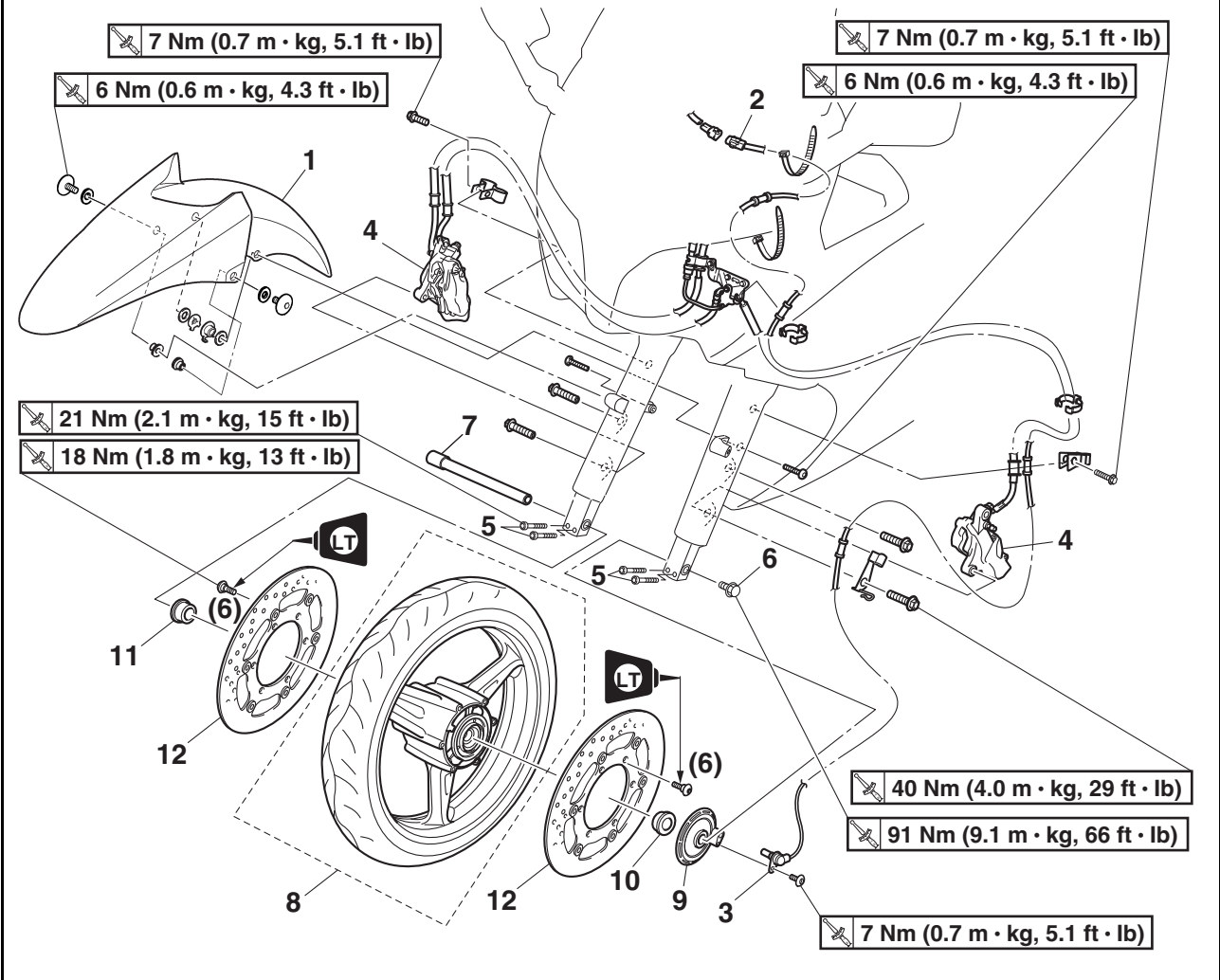
Removing the front wheel, brake discs, wheel sensor, and sensor housing



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Front fender	1	
2	Front wheel sensor coupler	1	Disconnect.
3	Front wheel sensor	1	
4	Front brake caliper	2	
5	Front wheel axle pinch bolt	4	Loosen.
6	Front wheel axle bolt	1	
7	Front wheel axle	1	
8	Front wheel	1	
9	Front wheel sensor housing	1	
10	Collar (left side)	1	l = 13.5 mm (0.53 in)
11	Collar (right side)	1	l = 18.0 mm (0.71 in)

FRONT WHEEL

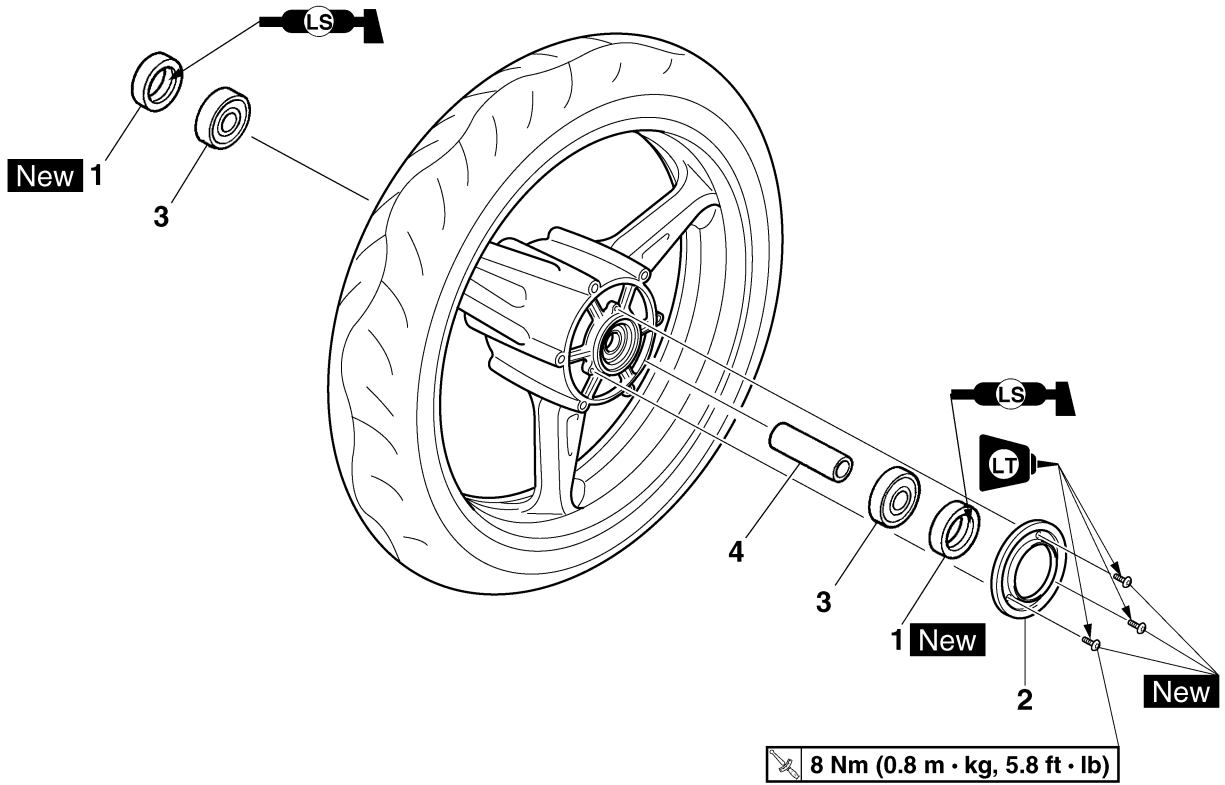
Removing the front wheel, brake discs, wheel sensor, and sensor housing



Order	Job/Parts to remove	Q'ty	Remarks
12	Front brake disc	2	
			For installation, reverse the removal procedure.

FRONT WHEEL

Disassembling the front wheel



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

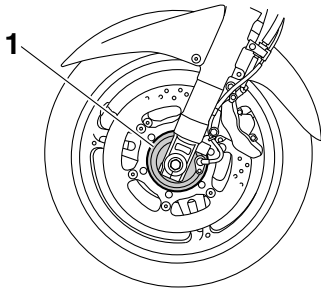
EAS21900

REMOVING THE FRONT WHEEL

ECA1MC1028

NOTICE

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



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
 - Front brake calipers

ECA1MC1015

NOTICE

Do not operate the brake lever or the brake pedal when removing the brake calipers.

3. Elevate:
 - Front wheel

TIP

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

EAS21910

DISASSEMBLING THE FRONT WHEEL

ECA3P6D003

NOTICE

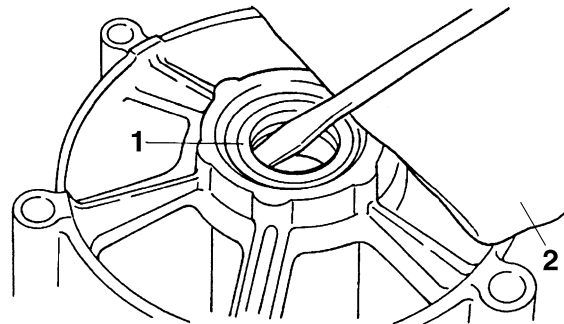
- Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel sensor rotor.
- Do not drop the wheel sensor rotor or subject it to shocks.
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.

1. Remove:
 - Oil seals
 - Wheel bearings

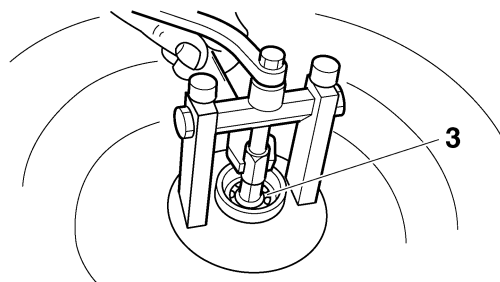
- a. Clean the surface of the front wheel hub.
- b. Remove the oil seals "1" with a flathead screwdriver.

TIP

To prevent damaging the wheel or wheel sensor rotor, place a rag "2" between the screwdriver and the surface of the wheel or rotor.



- c. Remove the wheel sensor rotor.
- d. Remove the wheel bearings "3" with a general bearing puller.



EAS21920

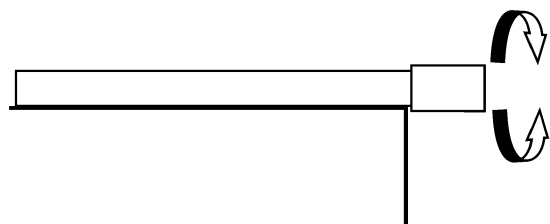
CHECKING THE FRONT WHEEL

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:

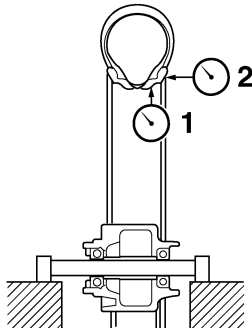
- Tire
- Front wheel
Damage/wear → Replace.
Refer to “CHECKING THE TIRES” on page 3-17 and “CHECKING THE WHEELS” on page 3-17.

3. Measure:

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

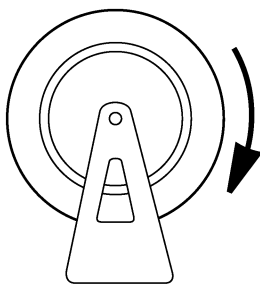


**Radial wheel runout limit
1.0 mm (0.04 in)**
**Lateral wheel runout limit
0.5 mm (0.02 in)**



4. Check:

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



EAS22010

MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

ECA3P6D004

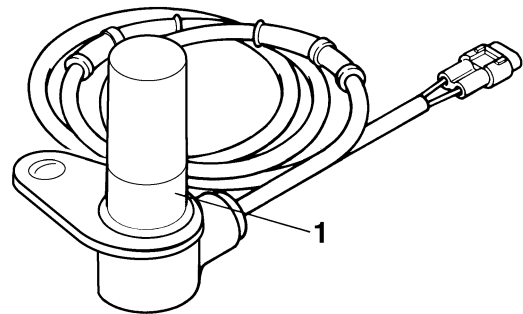
NOTICE

- **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 magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the 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.

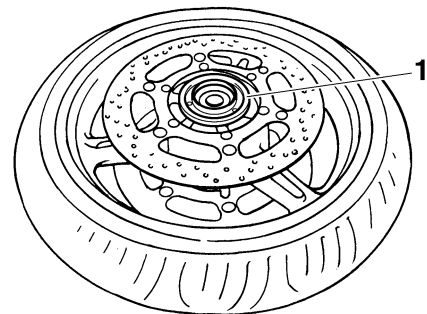


2. Check:

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

TIP

- The wheel sensor rotor is installed on the inner side of the wheel hub.
- When cleaning the wheel sensor rotor, be careful not to damage the surface of the rotor magnet.



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.

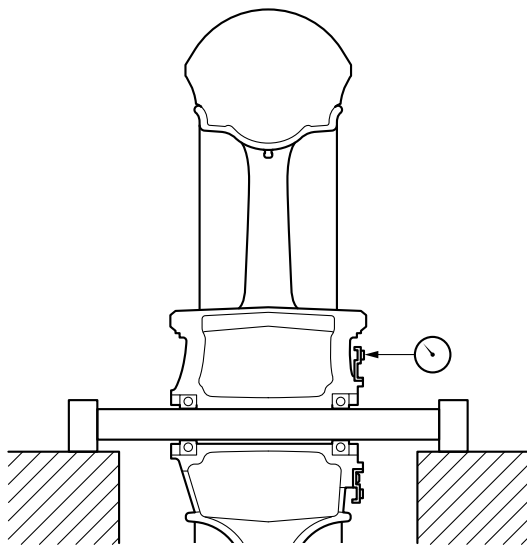


Wheel sensor rotor deflection limit
0.14 mm (0.0055 in)

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

TIP

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



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



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

ECA3P6D005

NOTICE

Replace the wheel sensor rotor bolts with new ones.

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

EAS21960

ASSEMBLING THE FRONT WHEEL

ECA3P6D003

NOTICE

- Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel sensor rotor.
- 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**

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

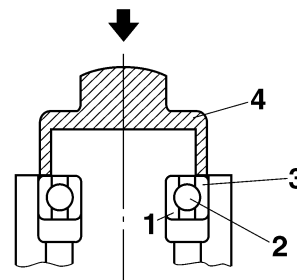
EC3P61021

NOTICE

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

TIP

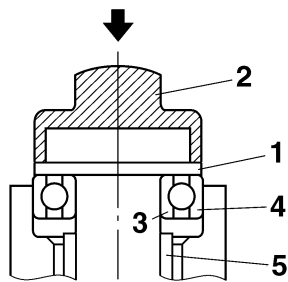
Use a socket "4" that matches the diameter of the wheel bearing outer race.



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

TIP

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



2. Install:

- Front wheel sensor rotor



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

ECA1MC1032

NOTICE

Replace the wheel sensor rotor bolts with new ones.

3. Measure:

- Wheel sensor rotor deflection
 Out of specification → Correct the wheel sensor rotor deflection or replace the wheel sensor rotor.
 Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-26.



Wheel sensor rotor deflection limit
0.14 mm (0.0055 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 discs installed.

1. Remove:

- Balancing weight(s)

2. Find:

- Front wheel’s heavy spot

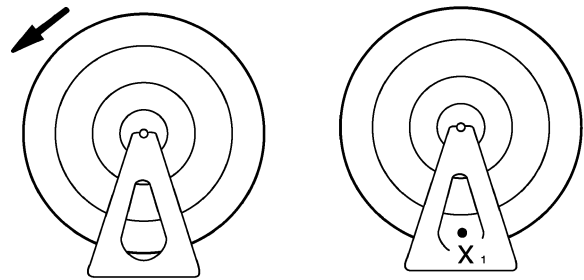
TIP

Place the front wheel on a suitable balancing stand.



- a. Spin the front wheel.**

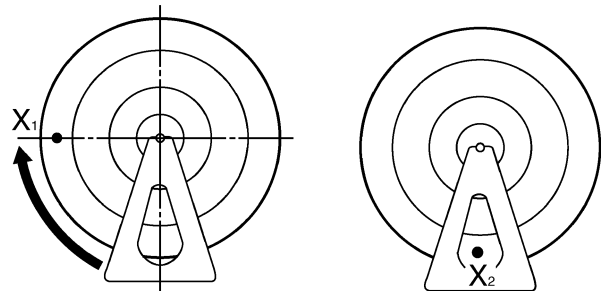
- b. When the front wheel stops, put an “X₁” mark at the bottom of the wheel.**



- 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”.**



3. Adjust:

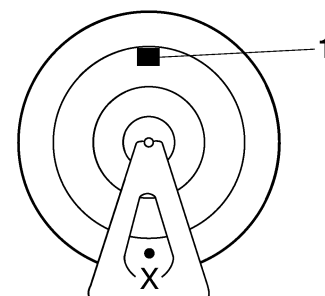
- Front wheel static balance



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

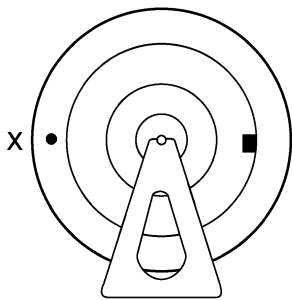
TIP

Start with the lightest weight.



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

FRONT WHEEL



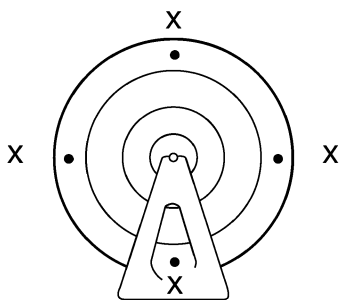
- c. If the heavy spot does not stay in that position, install a heavier weight.
- d. Repeat steps (b) and (c) until the front wheel is balanced.



4. Check:
- Front wheel static balance



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



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



EAS22000

INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)

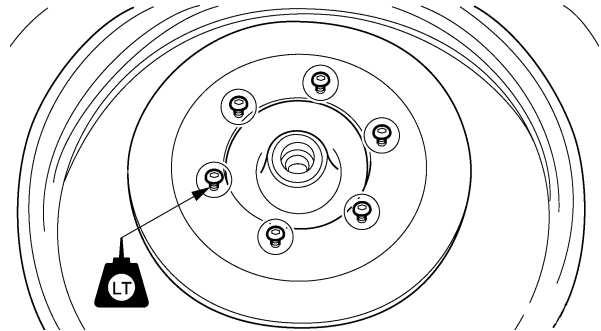
- 1. Install:
 - Front brake discs



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

TIP

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



- 2. Check:
 - Front brake discs
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-43.
- 3. Lubricate:
 - Oil seal lips

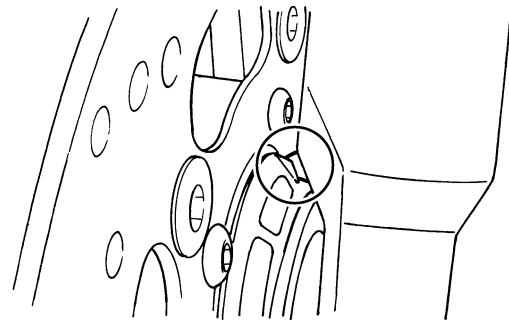


Recommended lubricant
Lithium-soap-based grease

- 4. Install:
 - Collars
 - Front wheel sensor housing
 - Front wheel

TIP

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



- 5. Install:
 - Front wheel axle
 - Front wheel axle bolt
 - Front wheel axle pinch bolts



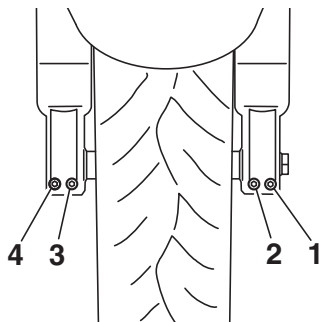
Front wheel axle bolt
91 Nm (9.1 m·kg, 66 ft·lb)
Front wheel axle pinch bolt
21 Nm (2.1 m·kg, 15 ft·lb)

EC3P61022

NOTICE

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

- a. Insert the front wheel axle from the right side and tighten it with the front wheel axle bolt from the left side to 91 Nm (9.1 m·kg, 66 ft·lb).
- b. In the order pinch bolt “2” → pinch bolt “1” → pinch bolt “2”, tighten each bolt to 21 Nm (2.1 m·kg, 15 ft·lb) without performing temporary tightening.
- c. Check that the right end of the front wheel axle is flush with the front fork. If necessary, manually push the front wheel axle or lightly tap it with a soft hammer until its end is flush with the front fork. However, if the surface of the front wheel axle end is not parallel to the surface of the front fork, align a point on the outer edge of the axle with the fork, making sure that the axle does not protrude past the fork.
- d. In the order pinch bolt “4” → pinch bolt “3” → pinch bolt “4”, tighten each bolt to 21 Nm (2.1 m·kg, 15 ft·lb) without performing temporary tightening.



6. Measure:

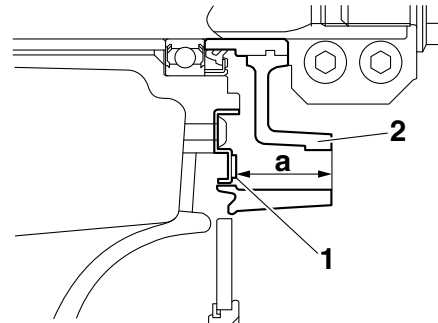
TIP

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

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



Distance “a” (between the wheel sensor rotor and wheel sensor housing)
28.82–29.66 mm (1.135–1.168 in)



7. Install:
- Front brake calipers
 - Front wheel sensor



Front brake caliper bolt
40 Nm (4.0 m·kg, 29 ft·lb)
Front wheel sensor bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)

TIP

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

ECA1MC1035

NOTICE

- Make sure there are no foreign materials in the wheel hub. Foreign materials cause damage to the inner sensor rotor and wheel sensor.
- To route the front wheel sensor lead, refer to “CABLE ROUTING” on page 2-47.

EWA13500

WARNING

Make sure the brake hose is routed properly.

8. Check:
 - Front wheel sensor installation
Check if the wheel sensor housing is installed properly.
9. Install:
 - Front fender

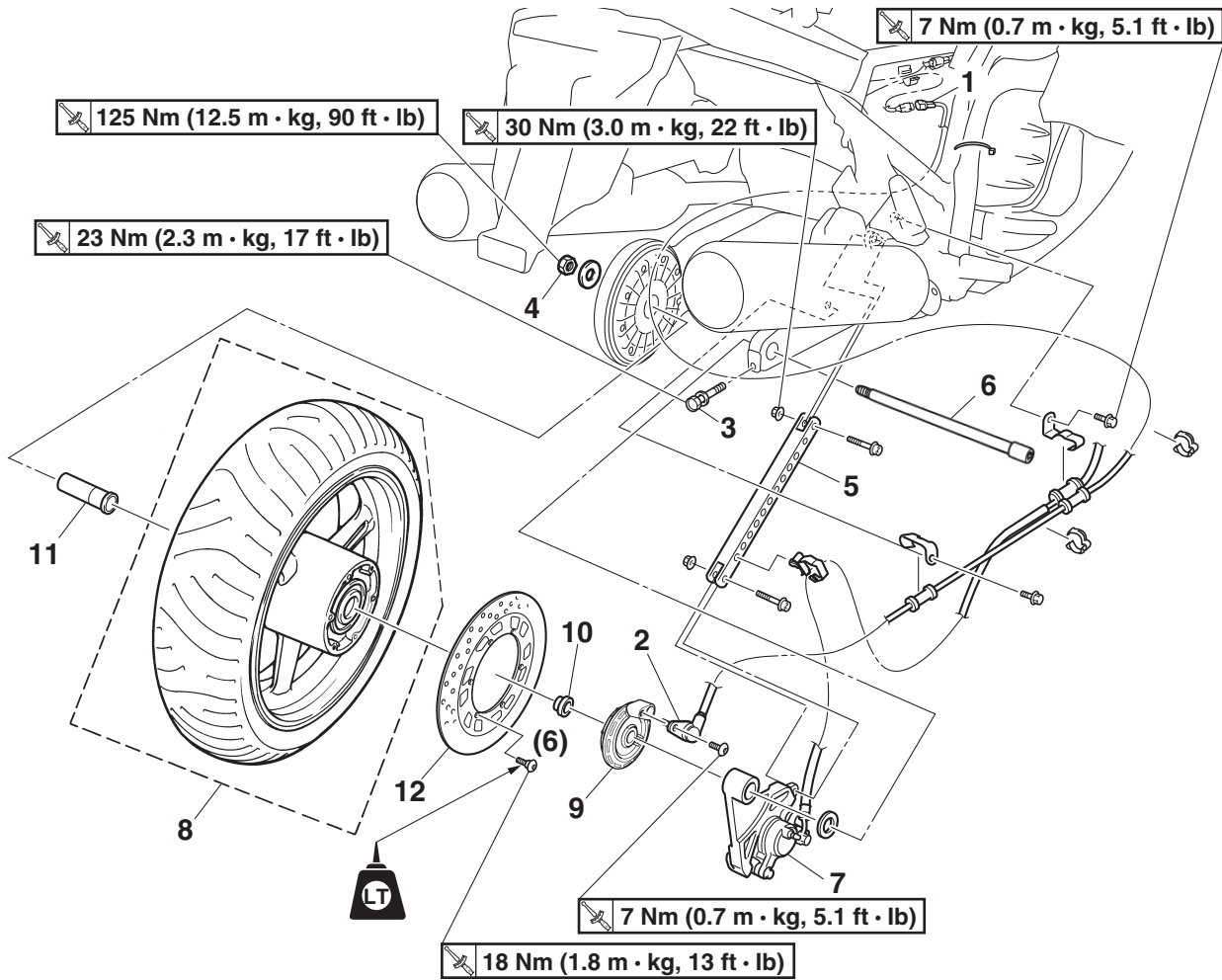
TIP

When installing the front fender, make sure that there is no dirt between the front fender and front fork legs.

EAS22030

REAR WHEEL

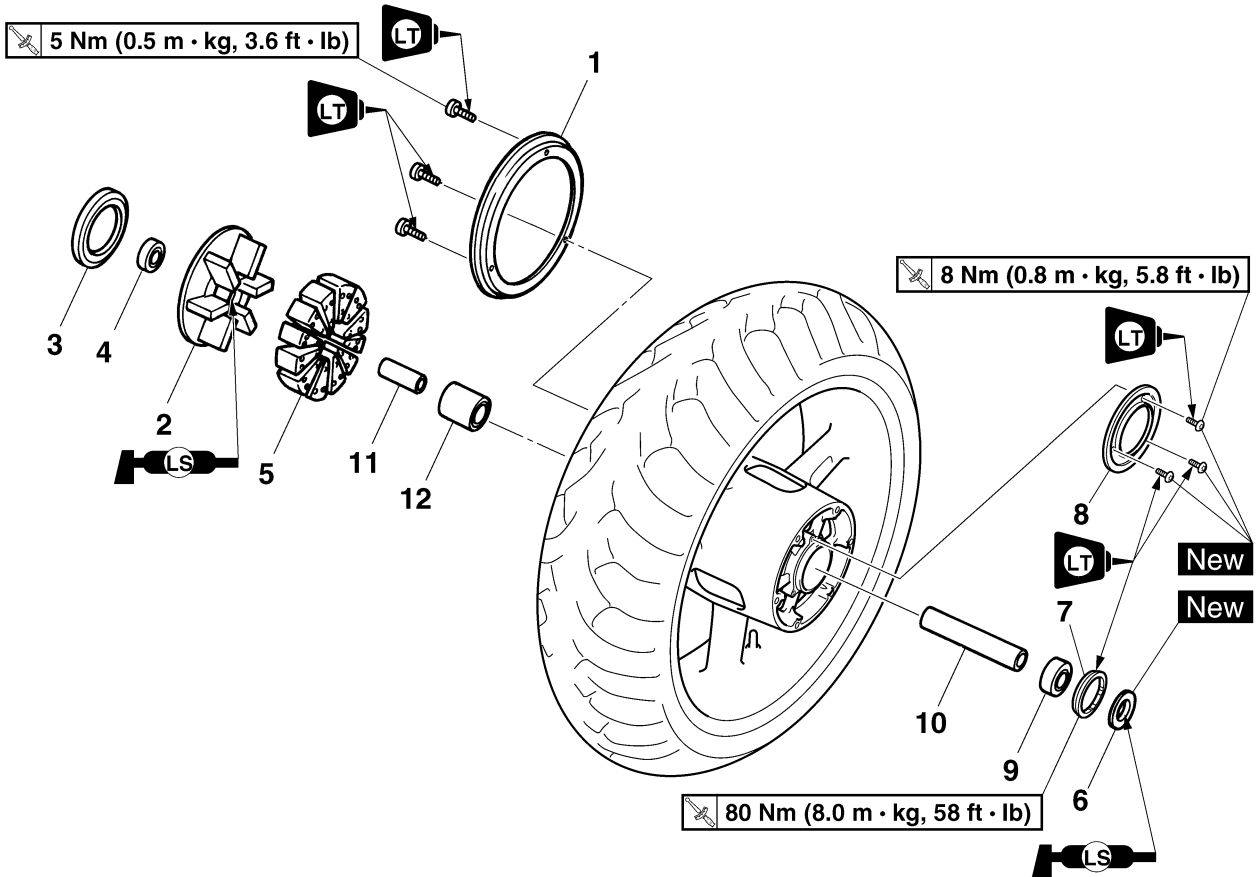
Removing the rear wheel, brake disc, wheel sensor, and sensor housing



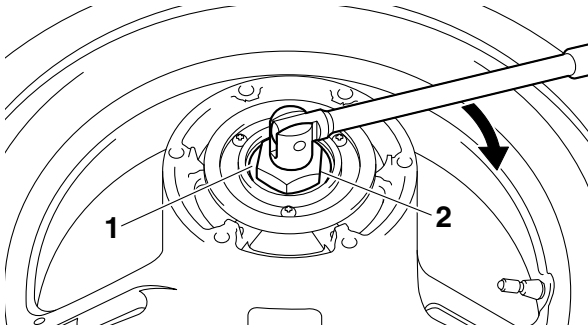
Order	Job/Parts to remove	Q'ty	Remarks
	Right side cover		Refer to "GENERAL CHASSIS" on page 4-1.
1	Rear wheel sensor coupler	1	Disconnect.
2	Rear wheel sensor	1	
3	Rear wheel axle pinch bolt	1	Loosen.
4	Rear wheel axle nut	1	
5	Brake torque rod	1	
6	Rear wheel axle	1	
7	Rear brake caliper	1	
8	Rear wheel	1	
9	Rear wheel sensor housing	1	
10	Collar	1	
11	Collar	1	
12	Rear brake disc	1	
			For installation, reverse the removal procedure.

REAR WHEEL

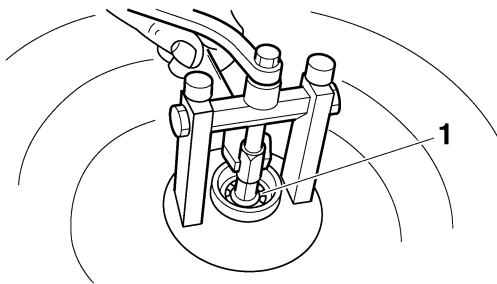
Disassembling the rear wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Dust cover	1	
2	Rear wheel drive hub	1	
3	Dust seal	1	
4	Wheel bearing	1	
5	Rear wheel drive hub damper	6	
6	Oil seal	1	
7	Bearing retainer	1	Left-hand threads
8	Rear wheel sensor rotor	1	
9	Wheel bearing	1	
10	Spacer	1	
11	Spacer	1	
12	Bearing	1	
			For assembly, reverse the disassembly procedure.



- d. Remove the wheel sensor rotor.
- e. Remove the wheel bearings "1" with a general bearing puller.



EAS22090

CHECKING THE REAR WHEEL

1. Check:
 - Rear wheel axle
 - Rear wheel
 - Wheel bearings
 - Oil seal
 Refer to "CHECKING THE FRONT WHEEL" on page 4-25.
2. Check:
 - Tire
 - Rear wheel
 Damage/wear → Replace.
 Refer to "CHECKING THE TIRES" on page 3-17 and "CHECKING THE WHEELS" on page 3-17.
3. Measure:
 - Radial wheel runout
 - Lateral wheel runout
 Refer to "CHECKING THE FRONT WHEEL" on page 4-25.



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

EAS22200

MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR

ECA3P6D008

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

1. Check:
 - Rear wheel sensor
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-26.
2. Check:
 - Rear wheel sensor rotor
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-26.
3. Measure:
 - Rear wheel sensor rotor deflection
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-26.



Wheel sensor rotor deflection limit
0.14 mm (0.0055 in)

EAS22140

ASSEMBLING THE REAR WHEEL

ECA3P6D003

NOTICE

- Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel sensor rotor.
- 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:
 - Bearing "1"



Installed depth of bearing "a"
3.5–4.5 mm (0.14–0.18 in)

EAS22170

INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

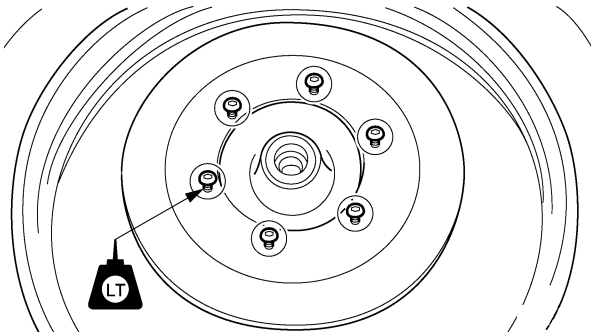
1. Install:
 - Rear brake disc



Rear brake disc bolt
18 Nm (1.8 m·kg, 13 ft·lb)
LOCTITE®

TIP

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



2. Check:
 - Rear brake disc
Refer to "CHECKING THE REAR BRAKE DISC" on page 4-56.
3. Lubricate:
 - Oil seal lips



Recommended lubricant
Lithium-soap-based grease

4. Install:
 - Rear wheel sensor housing
 - Rear wheel
 - Rear brake caliper
 - Rear wheel axle
 - Brake torque rod
 - Rear wheel axle nut

TIP

- Align the slot "a" of the rear wheel sensor housing "1" with the projection "b" of the rear brake caliper bracket "2", and then assemble them.
- After assembling the rear wheel sensor housing and the rear brake caliper bracket, make sure that the projection "c" on the housing is aligned with the projection "d" on the bracket.

ECA14470

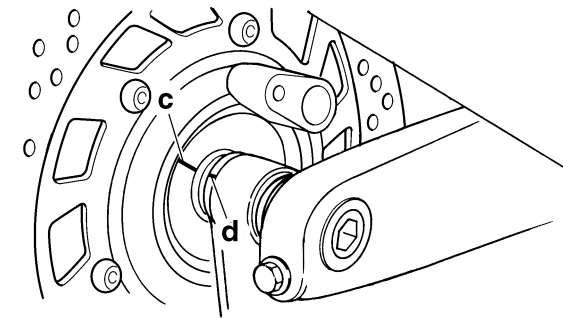
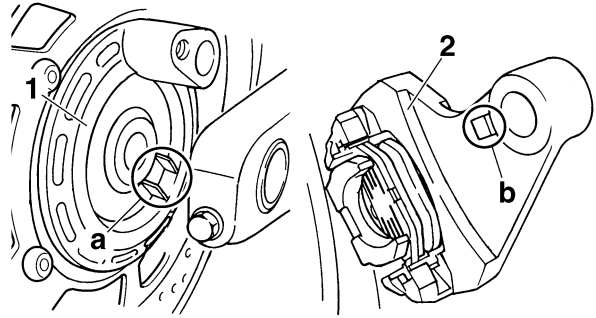
NOTICE

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

EWA13500

WARNING

Make sure the brake hose is routed properly.



5. Tighten:
 - Brake torque rod nuts
 - Rear wheel axle nut
 - Rear wheel axle pinch bolt



Brake torque rod nut
30 Nm (3.0 m·kg, 22 ft·lb)
Rear wheel axle nut
125 Nm (12.5 m·kg, 90 ft·lb)
Rear wheel axle pinch bolt
23 Nm (2.3 m·kg, 17 ft·lb)

6. Measure:

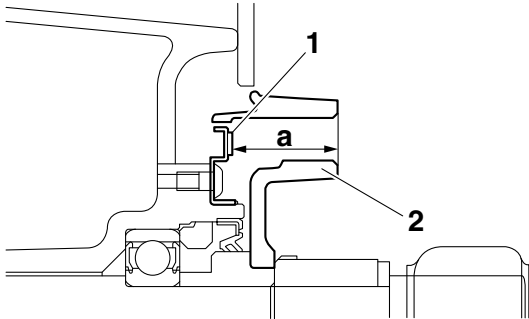
TIP

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

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



Distance “a” (between the wheel sensor rotor and wheel sensor housing)
28.84–29.64 mm (1.135–1.167 in)



7. Install:

- Rear wheel sensor



Rear wheel sensor bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)

ECA1MC1030

NOTICE

To route the rear wheel sensor lead, refer to “CABLE ROUTING” on page 2-47.

TIP

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

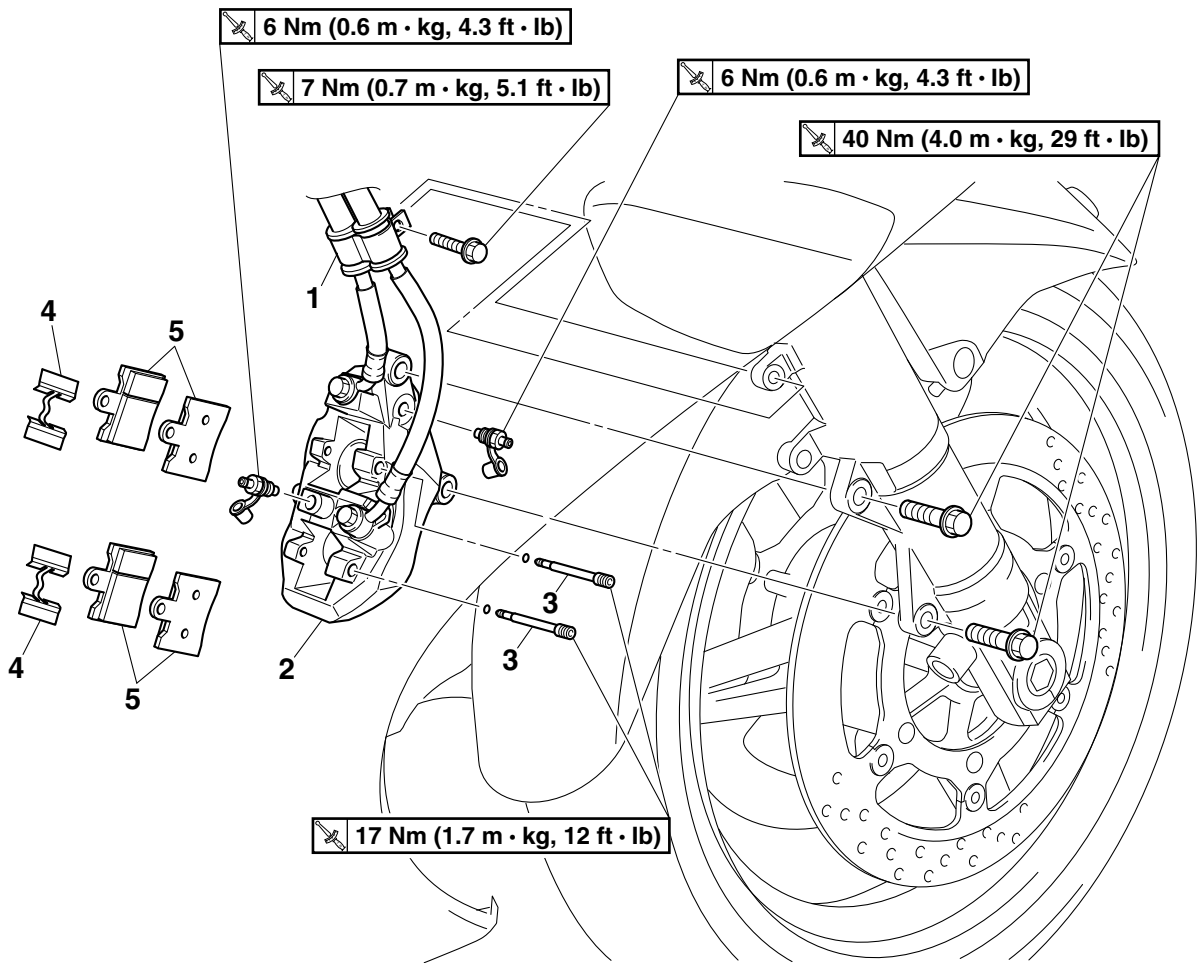
8. Check:

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

EAS22210

FRONT BRAKE

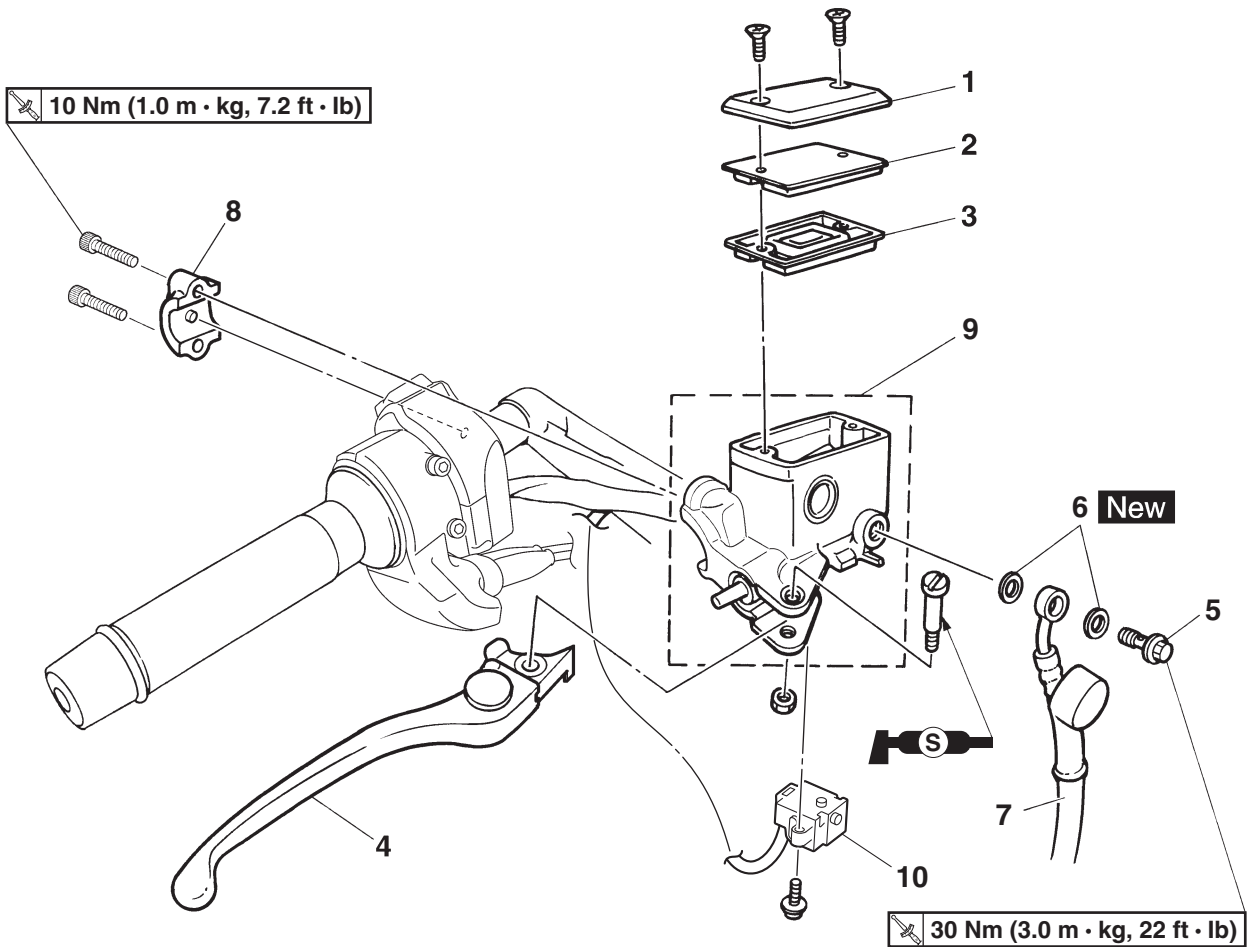
Removing the front brake pads



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

FRONT BRAKE

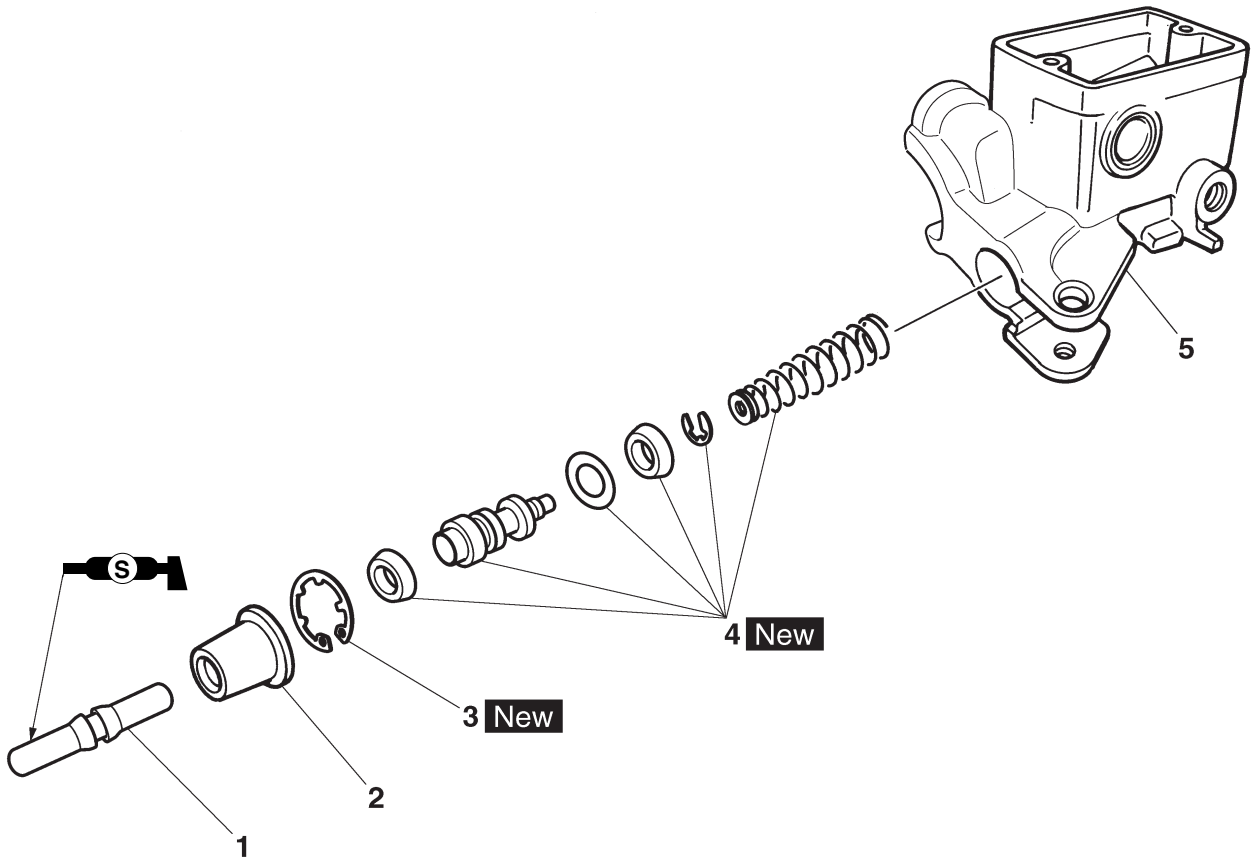
Removing the front brake master cylinder



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

FRONT BRAKE

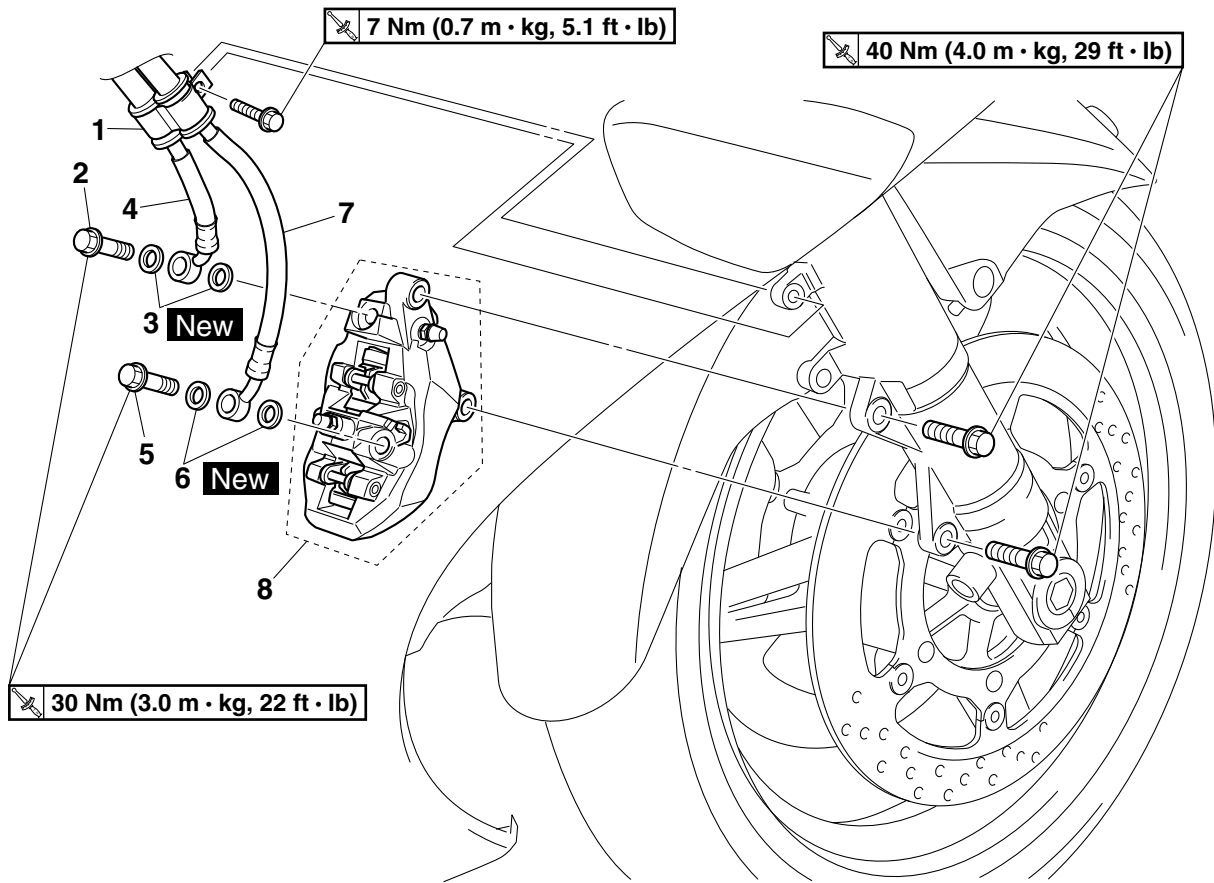
Disassembling the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder push rod	1	
2	Dust boot	1	
3	Circlip	1	
4	Brake master cylinder kit	1	
5	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

FRONT BRAKE

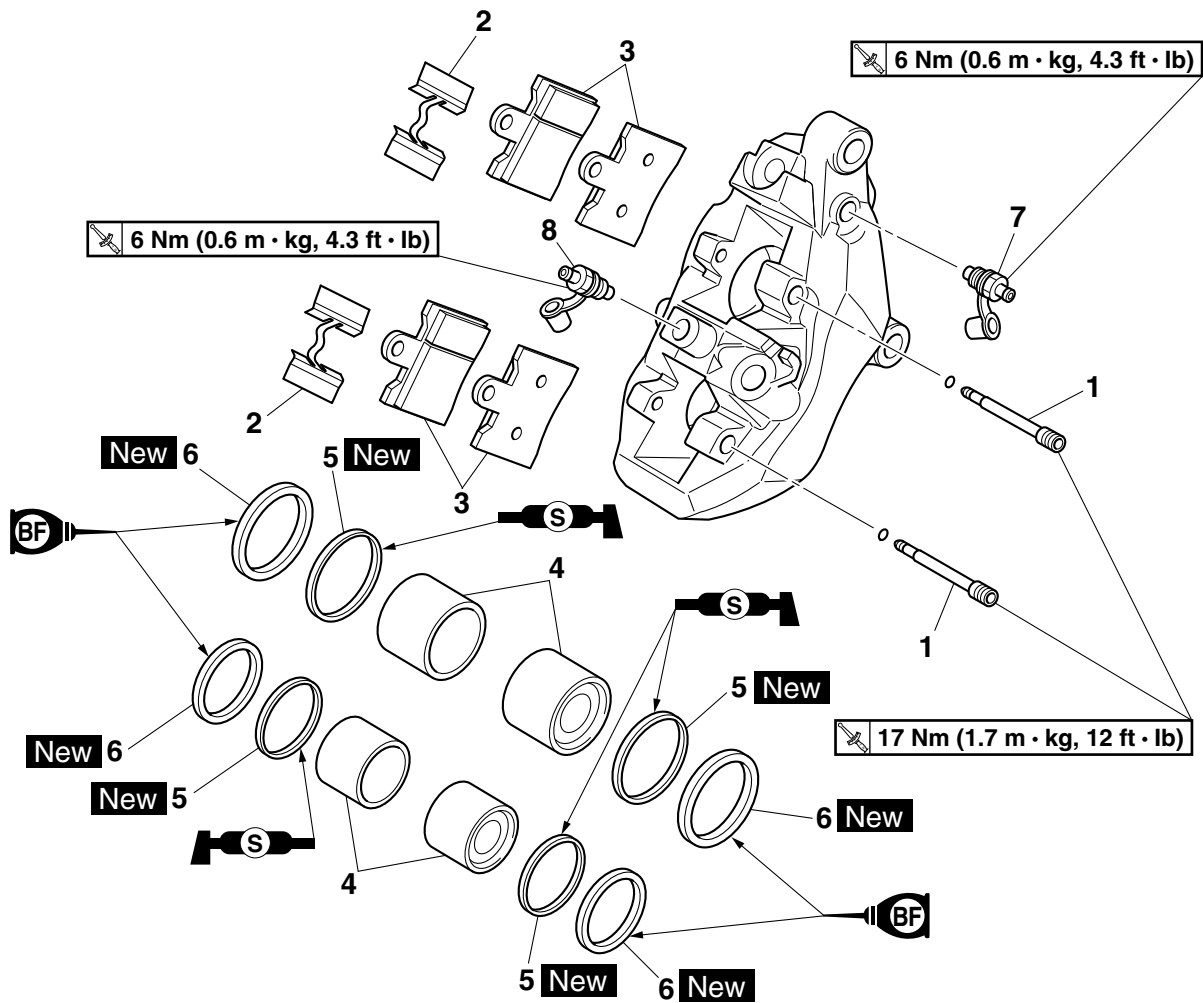
Removing the front brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
1	Brake hose holder	1	
2	Brake hose union bolt	1	
3	Copper washer	2	
4	Brake hose (brake pipe/upper joint assembly to right front brake caliper)	1	
5	Brake hose union bolt (unified brake system)	1	Right side only.
6	Copper washer	2	Right side only.
7	Brake hose (metering valve to right front brake caliper)	1	Right side only.
8	Front brake caliper	1	
			For installation, reverse the removal procedure.

FRONT BRAKE

Disassembling the front brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake pad bolt	2	
2	Brake pad spring	2	
3	Front brake pad	4	
4	Brake caliper piston	4	
5	Brake caliper piston dust seal	4	
6	Brake caliper piston seal	4	
7	Bleed screw	1	
8	Bleed screw	1	Right side only.
			For assembly, reverse the disassembly procedure.

EAS22220

INTRODUCTION

EWA14100

WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

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

EAS22240

CHECKING THE FRONT BRAKE DISCS

The following procedure applies to both brake discs.

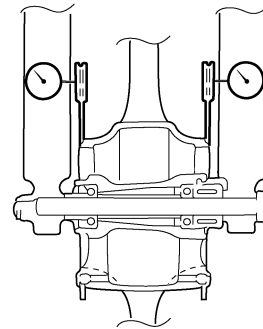
1. Remove:
 - Front wheel
Refer to "FRONT WHEEL" on page 4-22.
2. Check:
 - Brake disc
Damage/galling → Replace.
3. Measure:
 - Brake disc deflection
Out of specification → Correct the brake disc deflection or replace the brake disc.



Brake disc deflection limit
0.10 mm (0.0039 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.

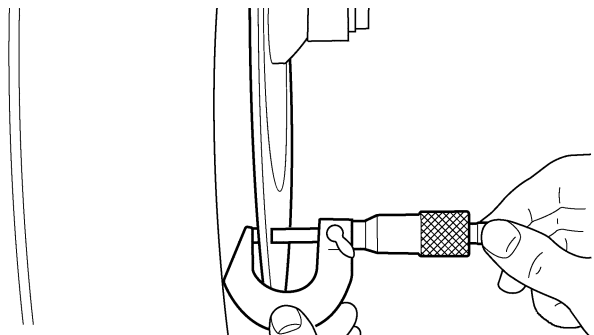
- e. Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.



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

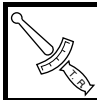


Brake disc thickness limit
4.0 mm (0.16 in)



5. Adjust:
 - Brake disc deflection

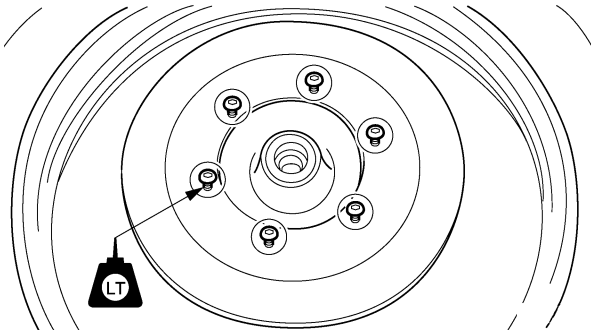
- a. Remove the brake disc.
- b. Rotate the brake disc by one bolt hole.
- c. Install the brake disc.



Brake disc bolt
18 Nm (1.8 m·kg, 13 ft·lb)
LOCTITE®

TIP

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



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



6. Install:
 - Front wheel
 Refer to "FRONT WHEEL" on page 4-22.

EAS22260

REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

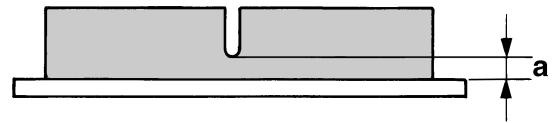
TIP

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

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



Brake pad lining thickness (inner)
 5.5 mm (0.22 in)
Limit
 0.5 mm (0.02 in)
Brake pad lining thickness (outer)
 5.5 mm (0.22 in)
Limit
 0.5 mm (0.02 in)



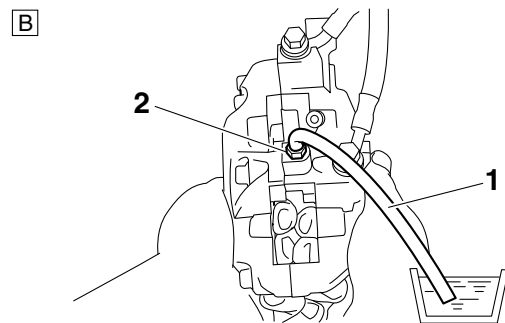
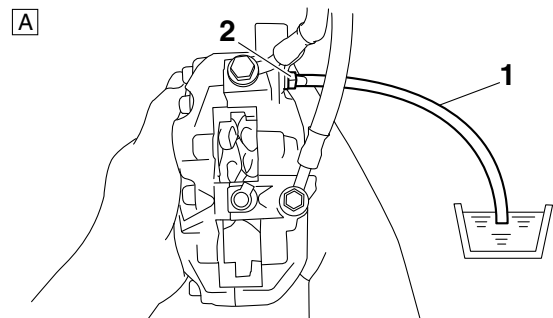
2. Install:
 - Brake pads
 - Brake pad springs

TIP

Always install new brake pads and new brake pad springs 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.



- A. Front brake
- B. Unified brake system

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



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

- d. Install new brake pads and new brake pad springs.



EWA13560

WARNING

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

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



EAS22390

CHECKING THE FRONT BRAKE CALIPERS

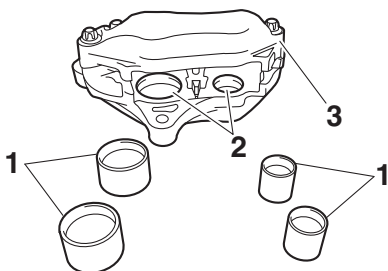
Recommended brake component replacement schedule	
Brake pads	If necessary
Piston dust seals	Every two years
Piston seals	Every two years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

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

EWA3P6D001

WARNING

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



EAS22410

ASSEMBLING THE FRONT BRAKE CALIPERS

EWA3P6D002

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 CALIPERS

The following procedure applies to both of the brake calipers.

1. Install:
 - Front brake caliper “1” (temporarily)
 - Copper washers **New**
 - Brake hose (brake pipe/upper joint assembly to right front brake caliper) “2”
 - Brake hose (metering valve to right front brake caliper) “3”
 - Brake hose union bolts “4”

	Brake hose union bolt 30 Nm (3.0 m·kg, 22 ft·lb)
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EWA1MC1014

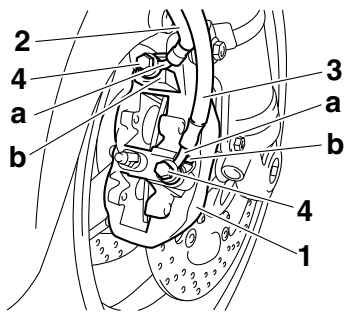
WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-47.

ECA14170

NOTICE

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




2. Remove:
- Brake caliper

3. Install:

- Brake pads
- Brake pad springs
- Brake pad bolts
- Brake caliper
- Brake hose holder

Refer to “REPLACING THE FRONT BRAKE PADS” on page 4-44.

	Brake pad bolt
	17 Nm (1.7 m·kg, 12 ft·lb)
	Brake caliper bolt
	40 Nm (4.0 m·kg, 29 ft·lb)
	Brake hose holder bolt
	7 Nm (0.7 m·kg, 5.1 ft·lb)

4. Fill:

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

	Specified brake fluid
	DOT 4

EW3P61008

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.

5. Bleed:

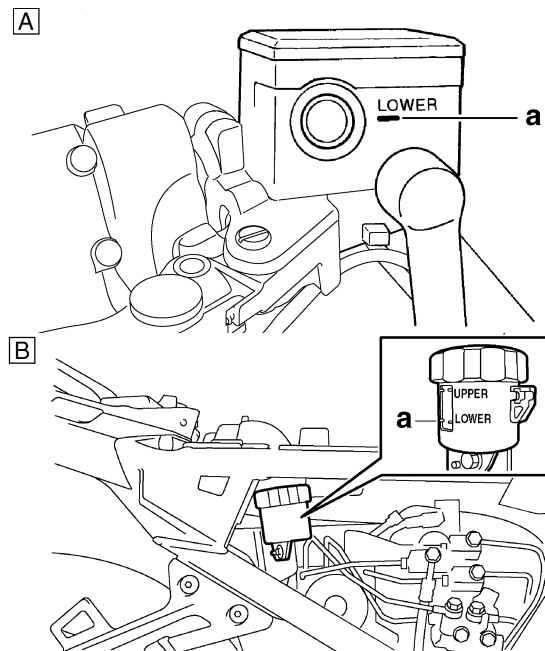
- Brake system

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.

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 3-14.



A. Front brake

B. Unified brake system

7. Check:

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

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.

EAS22490

REMOVING THE FRONT BRAKE MASTER CYLINDER

TIP

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

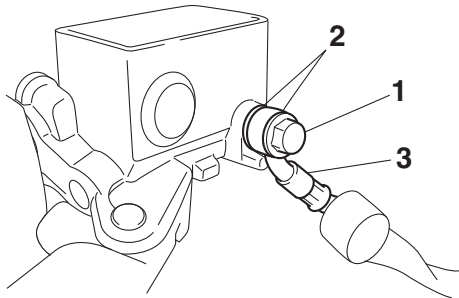
1. Remove:

- Brake hose union bolt “1”

- Copper washers “2”
- Brake hose (front brake master cylinder to brake pipe/lower joint assembly) “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

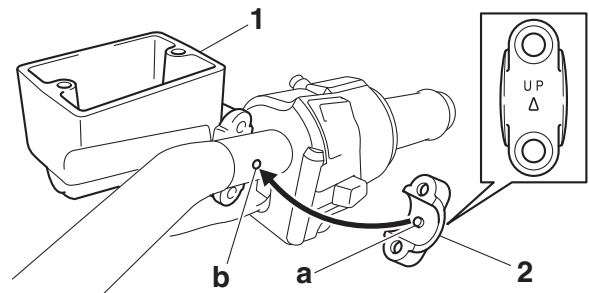
1. Install:
 - Brake master cylinder “1”
 - Brake master cylinder holder “2”



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

TIP

- Install the brake master cylinder holder with the “UP” mark facing up.
- Fit the projection “a” on the brake master cylinder holder into the hole “b” in the right handlebar.
- First, tighten the upper bolt, then the lower bolt.



2. Install:

- Copper washers **New**
- Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
- Brake hose union bolt



**Brake hose union bolt
30 Nm (3.0 m·kg, 22 ft·lb)**

EWA1MC1014

WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-47.

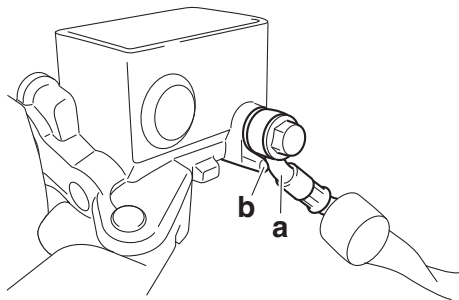
EC3P61025

NOTICE

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

TIP

Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



3. Fill:

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



EW3P61008

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

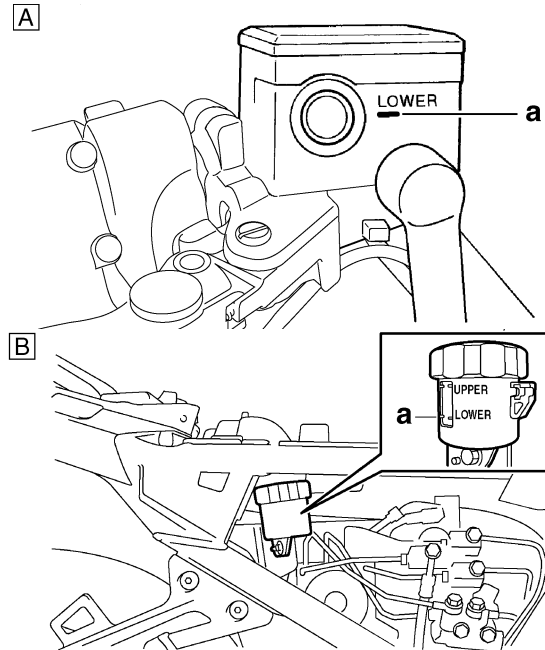
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:

- Brake system
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.

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 3-14.



A. Front brake

B. Unified brake system

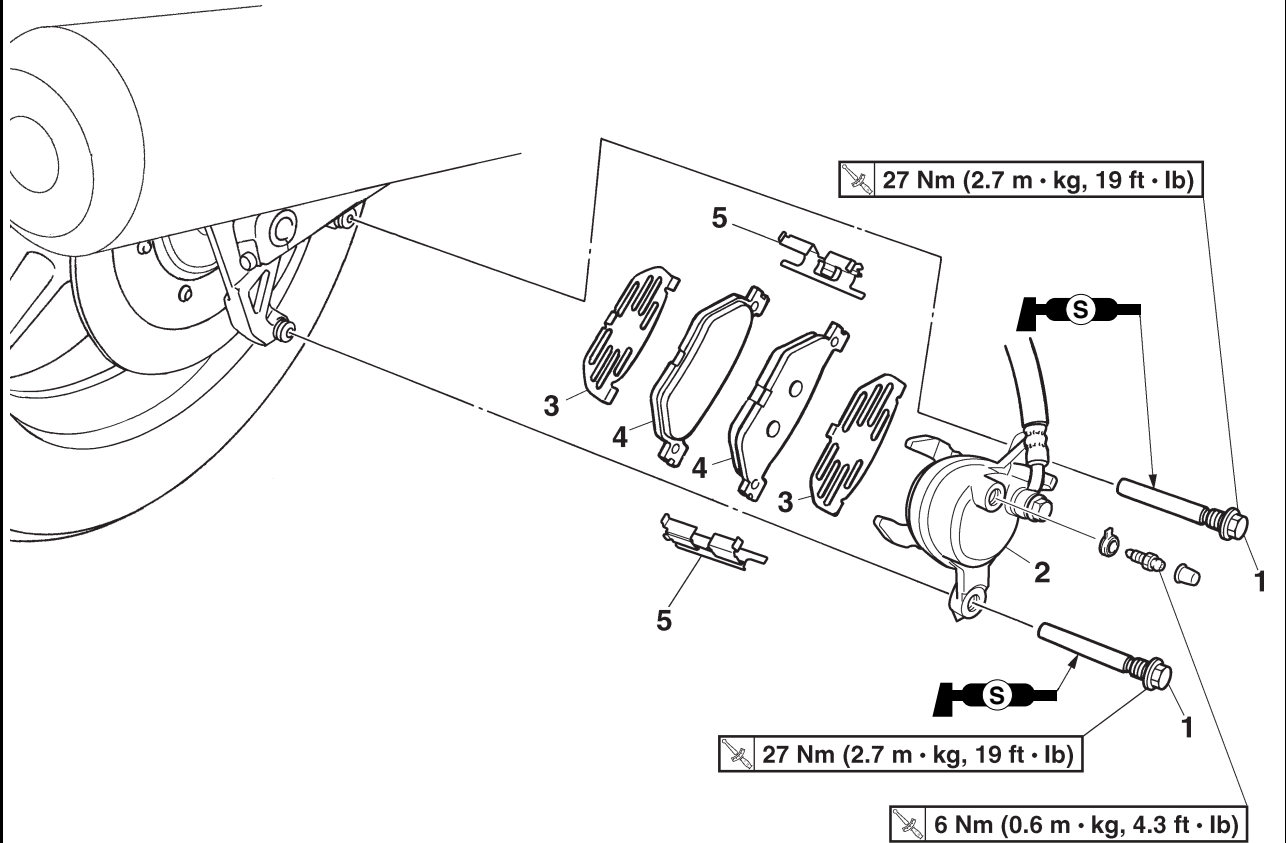
6. Check:

- Brake lever and brake pedal operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.

EAS22550

REAR BRAKE

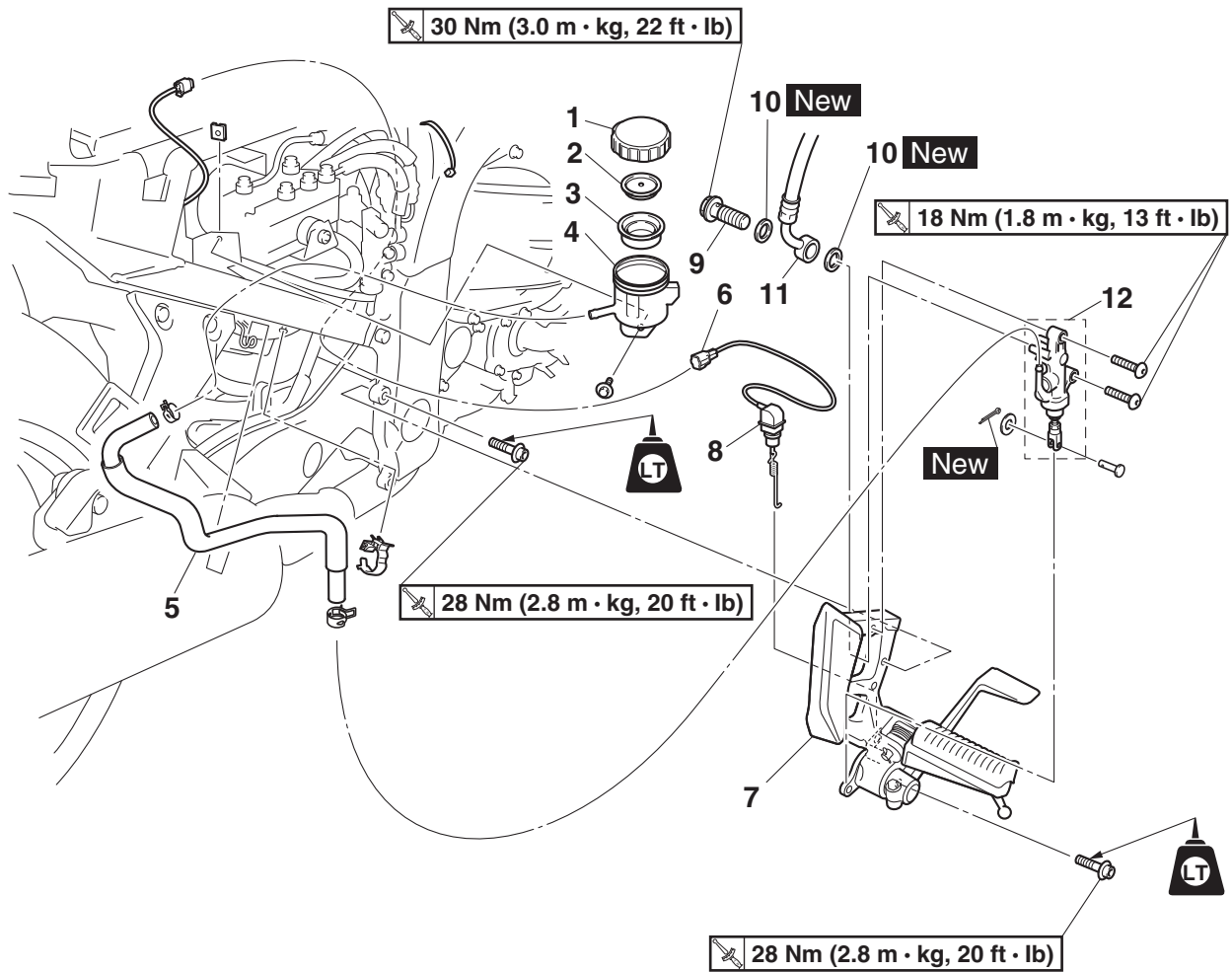
Removing the rear brake pads



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

REAR BRAKE

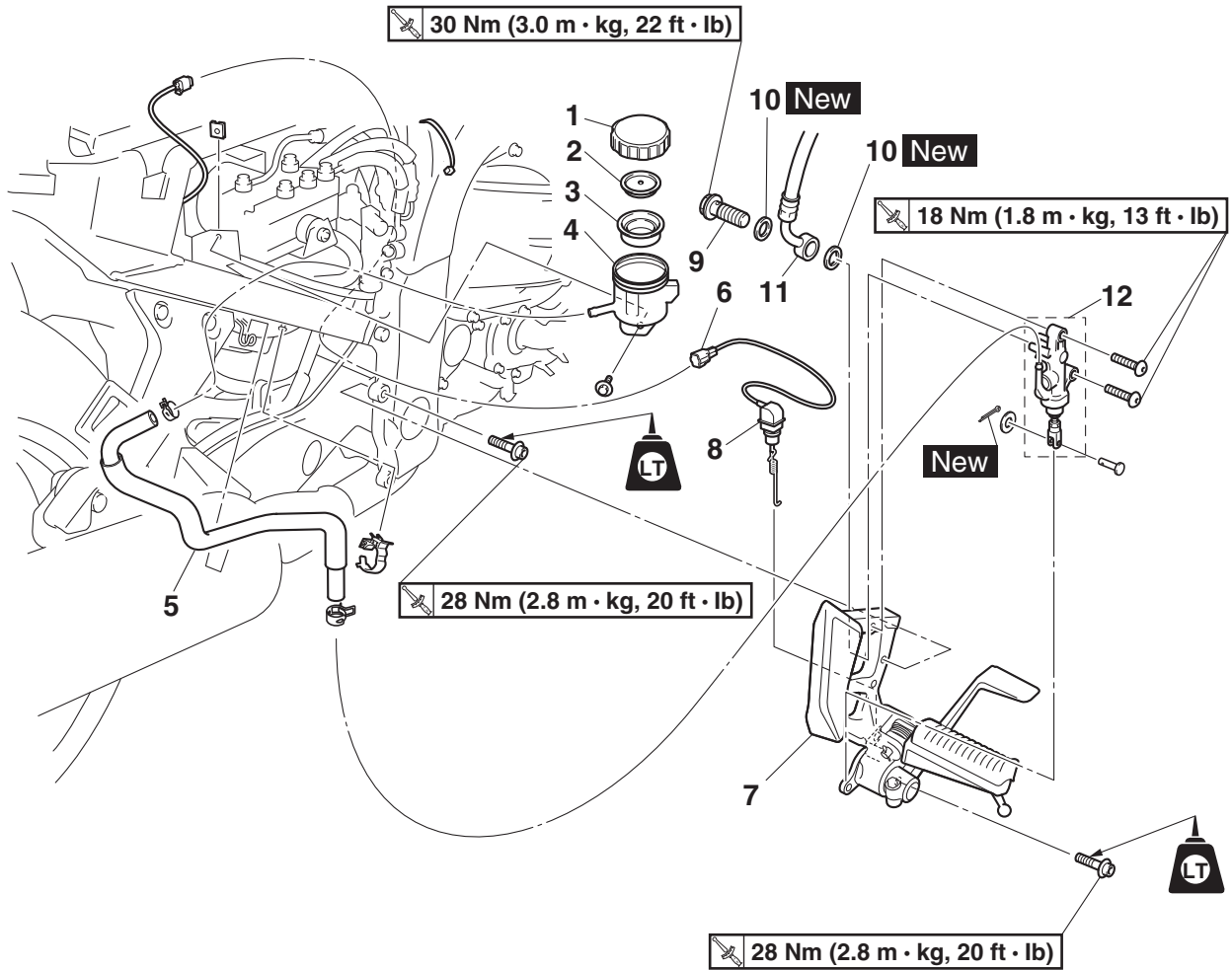
Removing the rear brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
	Right side cover		Refer to "GENERAL CHASSIS" on page 4-1.
1	Brake fluid reservoir cap	1	
2	Brake fluid reservoir diaphragm holder	1	
3	Brake fluid reservoir diaphragm	1	
4	Brake fluid reservoir	1	
5	Brake fluid reservoir hose	1	
6	Rear brake light switch coupler	1	Disconnect.
7	Right footrest assembly	1	
8	Rear brake light switch	1	
9	Brake hose union bolt	1	
10	Copper washer	2	
11	Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)	1	

REAR BRAKE

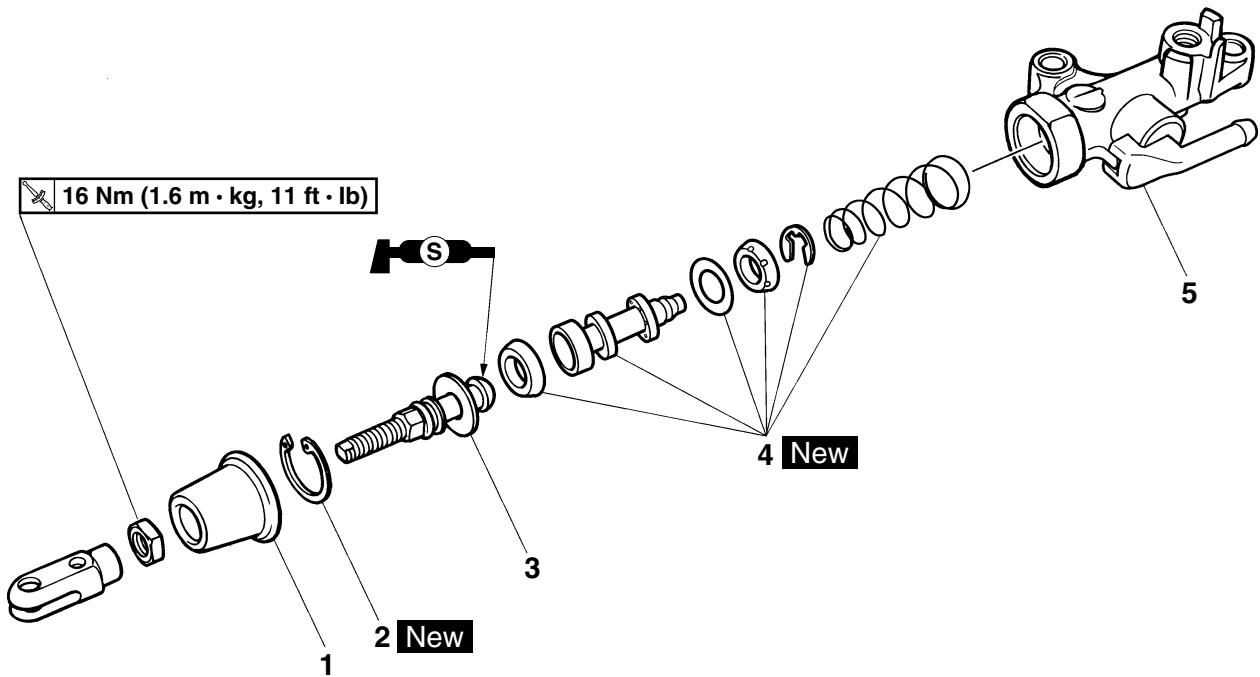
Removing the rear brake master cylinder



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

REAR BRAKE

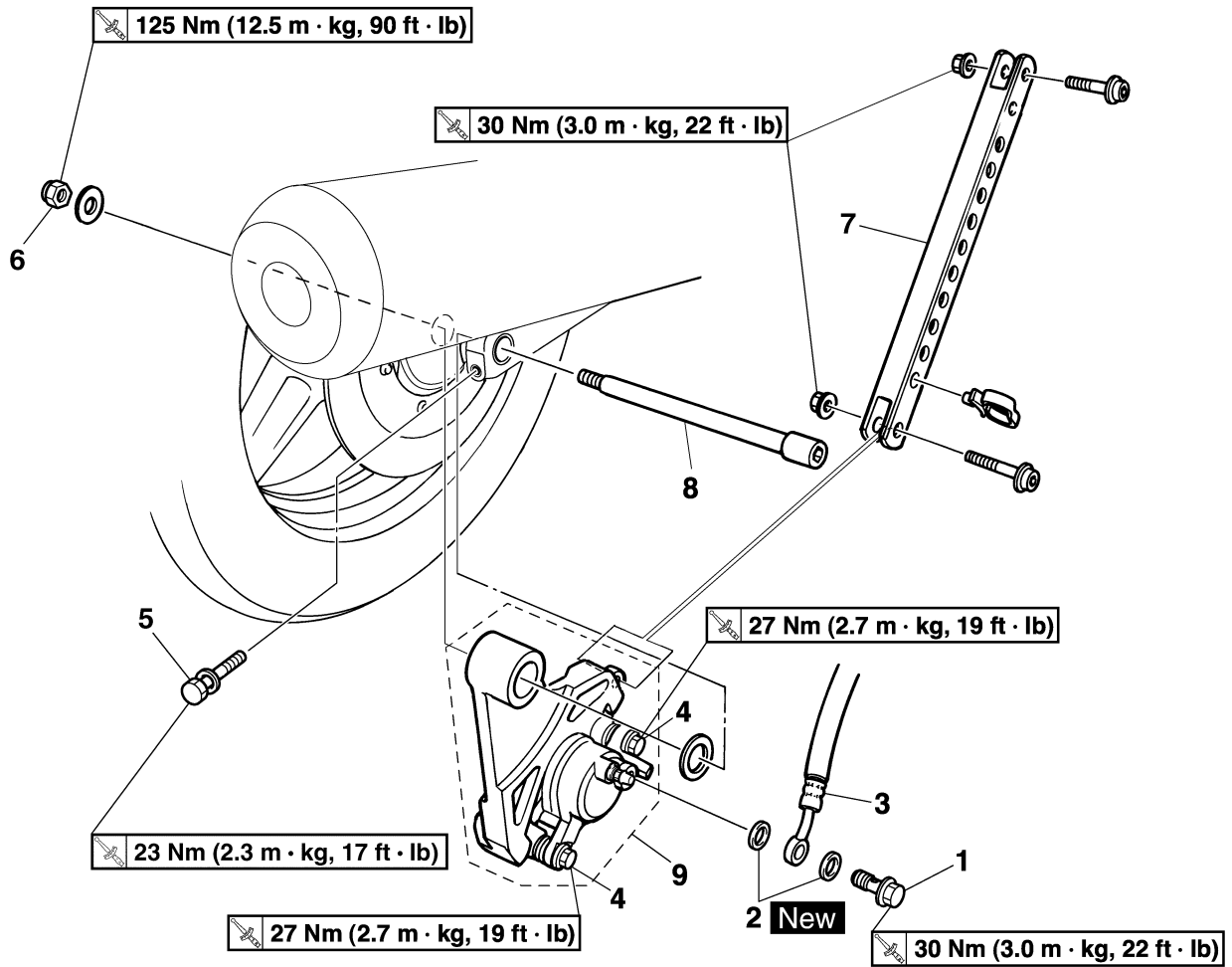
Disassembling the rear brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
1	Dust boot	1	
2	Circlip	1	
3	Brake master cylinder push rod	1	
4	Brake master cylinder kit	1	
5	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

REAR BRAKE

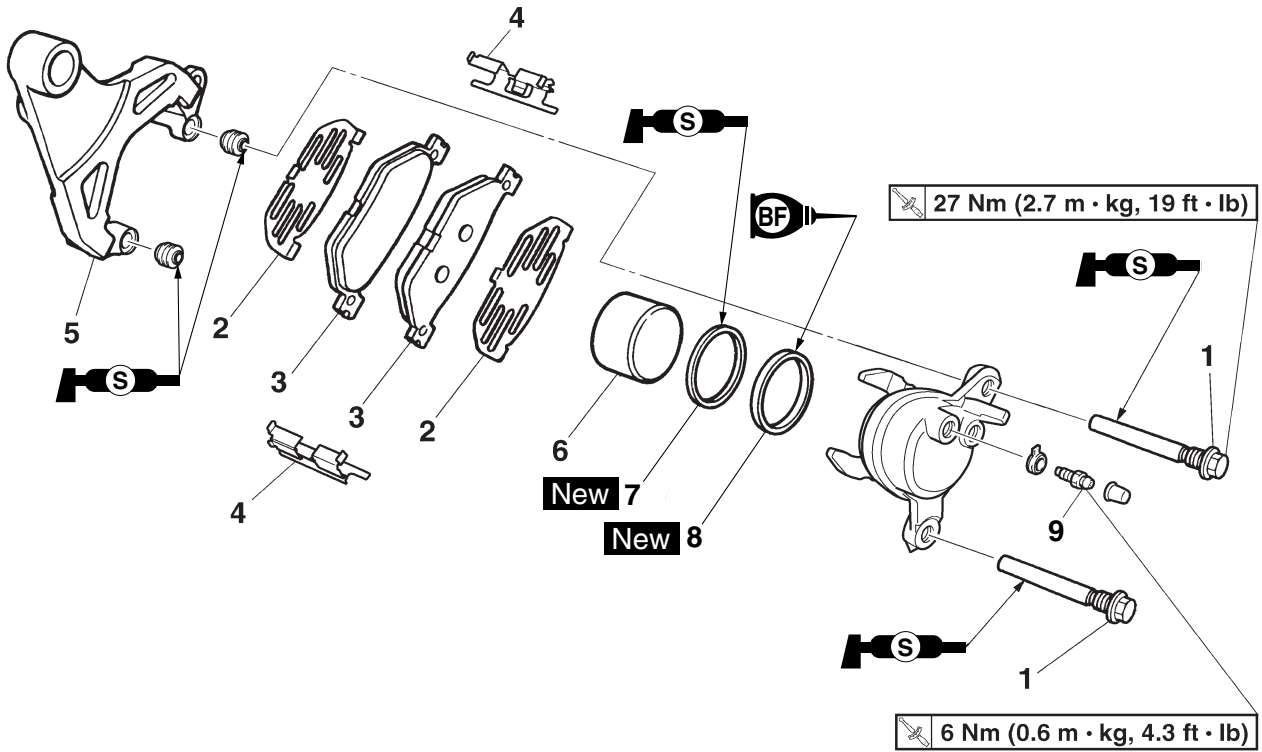
Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
1	Brake hose union bolt	1	
2	Copper washer	2	
3	Brake hose (proportioning valve to rear brake caliper)	1	
4	Rear brake caliper bolt	2	Loosen.
5	Rear wheel axle pinch bolt	1	Loosen.
6	Rear wheel axle nut	1	
7	Brake torque rod	1	
8	Rear wheel axle	1	
9	Rear brake caliper assembly	1	
			For installation, reverse the removal procedure.

REAR BRAKE

Disassembling the rear brake caliper



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

EAS22560

INTRODUCTION

EWA14100

WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

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

EAS22570

CHECKING THE REAR BRAKE DISC

1. Remove:
 - Rear wheel
Refer to "REAR WHEEL" on page 4-31.
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 DISCS" on page 4-43.



Brake disc deflection limit
0.15 mm (0.0059 in)

4. Measure:
 - Brake disc thickness
Measure the brake disc thickness at a few different locations.
Out of specification → Replace.
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-43.



Brake disc thickness limit
4.5 mm (0.18 in)

5. Adjust:
 - Brake disc deflection
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-43.



Brake disc bolt
18 Nm (1.8 m·kg, 13 ft·lb)
LOCTITE®

6. Install:
 - Rear wheel
Refer to "REAR WHEEL" on page 4-31.

EAS22580

REPLACING THE REAR BRAKE PADS

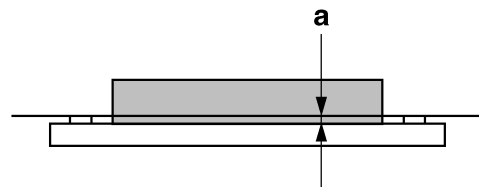
TIP

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)
6.3 mm (0.25 in)
Limit
0.8 mm (0.03 in)
Brake pad lining thickness (outer)
6.3 mm (0.25 in)
Limit
0.8 mm (0.03 in)



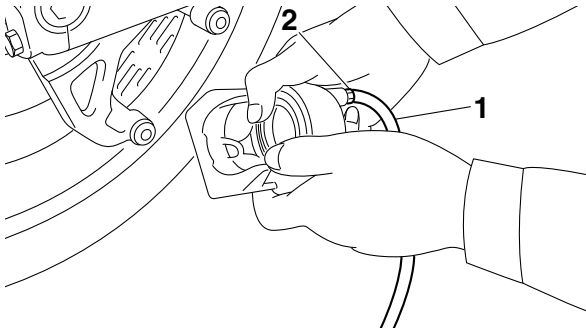
2. Install:
 - Brake pad springs
 - Brake pad shims (onto the brake pads)
 - Brake pads

REAR BRAKE


TIP

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

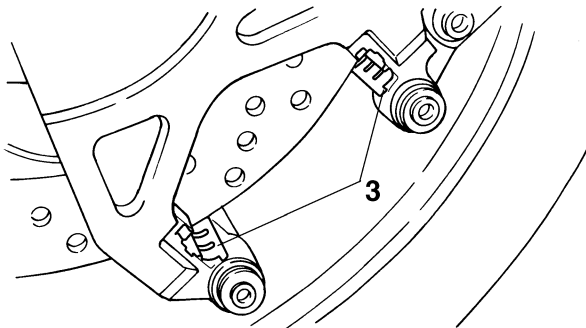
- Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.
- Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.



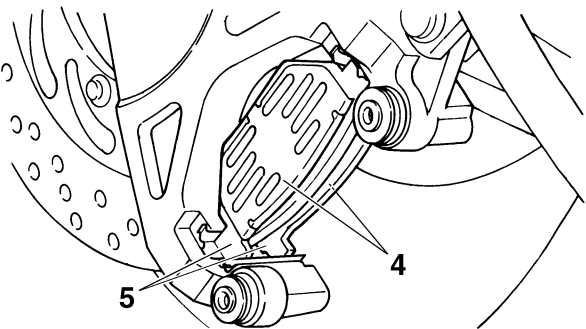
- Tighten the bleed screw.

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

- Install new brake pad springs "3".



- Install a new brake pad shim "4" onto each new brake pad "5".
- Install new brake pads.



- Lubricate:

- Rear brake caliper bolt



Recommended lubricant
Silicone grease

ECA3P6D017

NOTICE

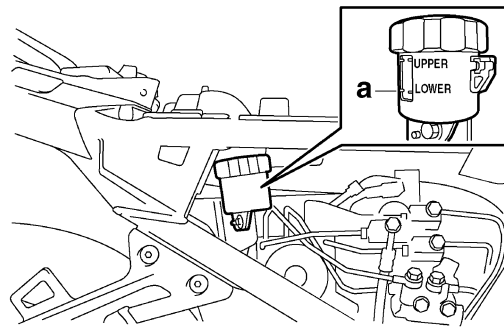
- Do not allow grease to contact the brake pads.
- Remove any excess grease.

- Install:
 - Rear brake caliper



Rear brake caliper bolt
27 Nm (2.7 m·kg, 19 ft·lb)

- 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 3-14.



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

EAS22590

REMOVING THE REAR BRAKE CALIPER

TIP

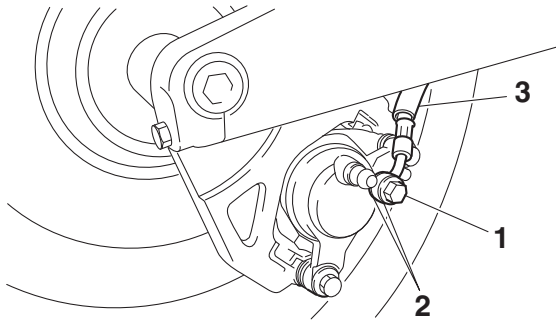
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

- Remove:
 - Brake hose union bolt "1"
 - Copper washers "2"
 - Brake hose (proportioning valve to rear brake caliper) "3"

TIP

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

REAR BRAKE

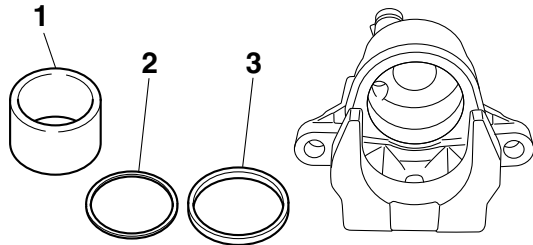


EAS22600

DISASSEMBLING THE REAR BRAKE CALIPER

1. Remove:

- Brake caliper piston "1"
- Brake caliper piston dust seal "2"
- Brake caliper piston seal "3"

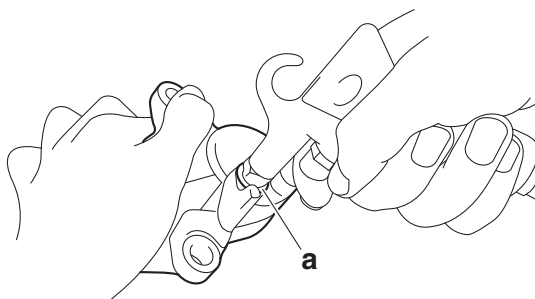


a. Blow compressed air into the brake hose joint opening "a" to force out the piston from the brake caliper.

EWA13550

⚠ WARNING

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



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

EAS22640

CHECKING THE REAR BRAKE CALIPER

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

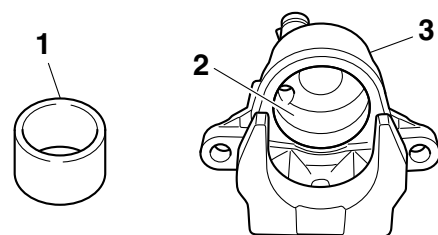
1. Check:

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

EWA3P6D003

⚠ WARNING

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



2. Check:

- Brake caliper bracket
Cracks/damage → Replace.

EAS22650

ASSEMBLING THE REAR BRAKE CALIPER

EWA3P6D004

⚠ WARNING

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.

REAR BRAKE

- Never use solvents on internal brake components as they will cause the brake caliper piston dust seal and brake caliper piston seal to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston dust seal and brake caliper piston seal.

	Specified brake fluid DOT 4
---	--

EAS22670

INSTALLING THE REAR BRAKE CALIPER

1. Install:

- Rear brake caliper assembly (temporarily)
- Rear wheel axle
- Brake torque rod
- Rear wheel axle nut

TIP

- Do not install the brake pads, brake pad shims, and brake pad springs.
- Align the slot "a" of the rear wheel sensor housing "1" with the projection "b" of the rear brake caliper bracket "2", and then assemble them.
- After assembling the rear wheel sensor housing and the rear brake caliper bracket, make sure that the projection "c" on the housing is aligned with the projection "d" on the bracket.

ECA14470

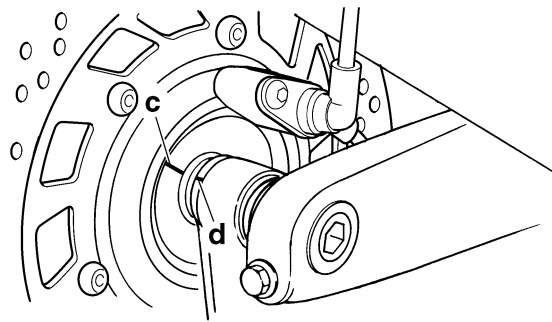
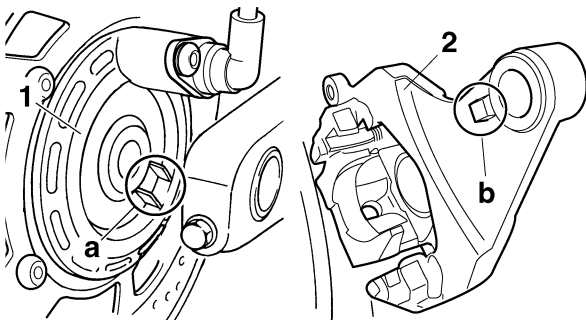
NOTICE

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

EWA13500

WARNING

Make sure the brake hose is routed properly.



2. Tighten:

- Brake torque rod nuts
- Rear wheel axle nut
- Rear wheel axle pinch bolt



Brake torque rod nut
30 Nm (3.0 m·kg, 22 ft·lb)
Rear wheel axle nut
125 Nm (12.5 m·kg, 90 ft·lb)
Rear wheel axle pinch bolt
23 Nm (2.3 m·kg, 17 ft·lb)

3. Install:

- Copper washers **New**
- Brake hose (proportioning valve to rear brake caliper) "1"
- Brake hose union bolt "2"



Brake hose union bolt
30 Nm (3.0 m·kg, 22 ft·lb)

EWA1MC1014

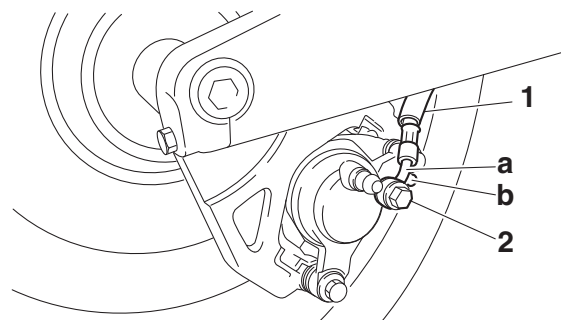
WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-47.

EC3P61044


NOTICE

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



4. Remove:
 - Rear brake caliper bolts
 - Rear brake caliper
5. Install:
 - Brake pad springs
 - Rear brake pads
 - Brake pad shims
 - Rear brake caliper bolts
 - Rear brake caliper

Refer to “REPLACING THE REAR BRAKE PADS” on page 4-56.

	Rear brake caliper bolt 27 Nm (2.7 m·kg, 19 ft·lb)
---	---

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

	Specified brake fluid DOT 4
---	--

EWA13090

WARNING

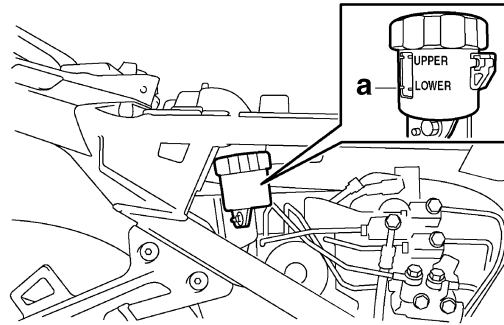
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

7. Bleed:
 - Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.
8. 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 3-14.



9. Check:
 - Brake pedal operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.

EAS22700

REMOVING THE REAR BRAKE MASTER CYLINDER

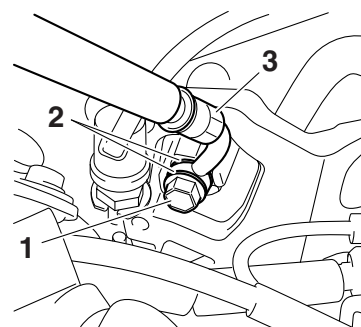
TIP

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

1. Remove:
 - Brake hose union bolt “1”
 - Copper washers “2”
 - Brake hose (rear brake master cylinder to brake pipe/middle joint assembly) “3”

TIP

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

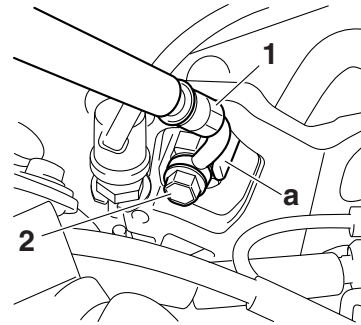


EAS22720

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.

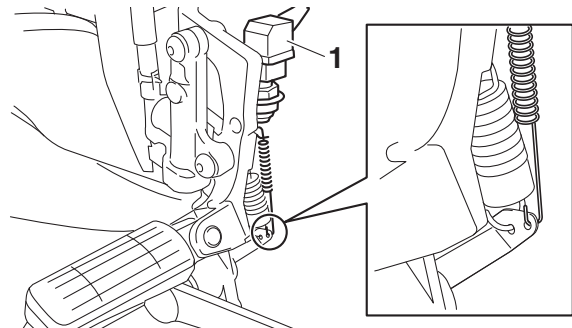
2. Check:
 - Brake master cylinder kit
Damage/scratches/wear → Replace.
3. Check:
 - Brake fluid reservoir
Cracks/damage → Replace.
 - Brake fluid reservoir diaphragm
Cracks/damage → Replace.
4. Check:
 - Brake hose
Cracks/damage/wear → Replace.



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

TIP

Install the rear brake light switch spring as shown in the illustration.



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

	Specified brake fluid DOT 4
--	--

EAS22730

ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520

WARNING

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



**Specified brake fluid
DOT 4**

EAS22740

INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:
 - Copper washers **New**
 - Brake hose (rear brake master cylinder to brake pipe/middle joint assembly) “1”
 - Rear brake hose union bolt “2”



**Brake hose union bolt
30 Nm (3.0 m·kg, 22 ft·lb)**

EWA1MC1014

WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-47.

ECA14160

NOTICE

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

EWA13090

WARNING

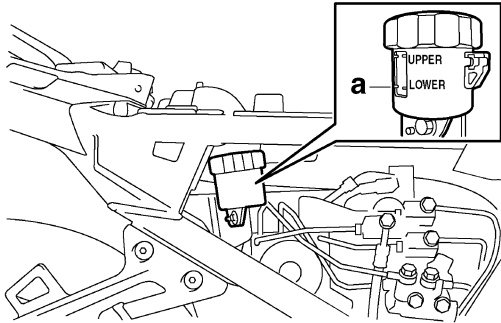
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

ECA13540

NOTICE

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

4. Bleed:
 - Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.
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 3-14.



6. Check:
 - Brake pedal operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.
7. Adjust:
 - Brake pedal position
Refer to “ADJUSTING THE REAR DISC BRAKE” on page 3-16.
8. Adjust:
 - Rear brake light operation timing
Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-30.

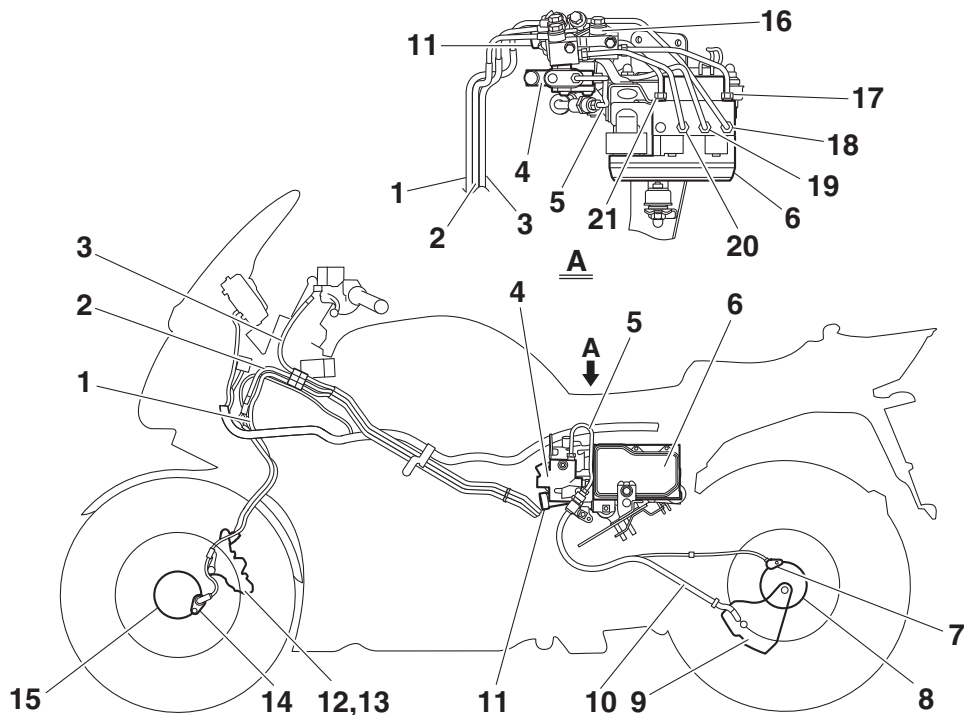
ABS (ANTI-LOCK BRAKE SYSTEM)

EAS22760

ABS (ANTI-LOCK BRAKE SYSTEM)

ET3P61060

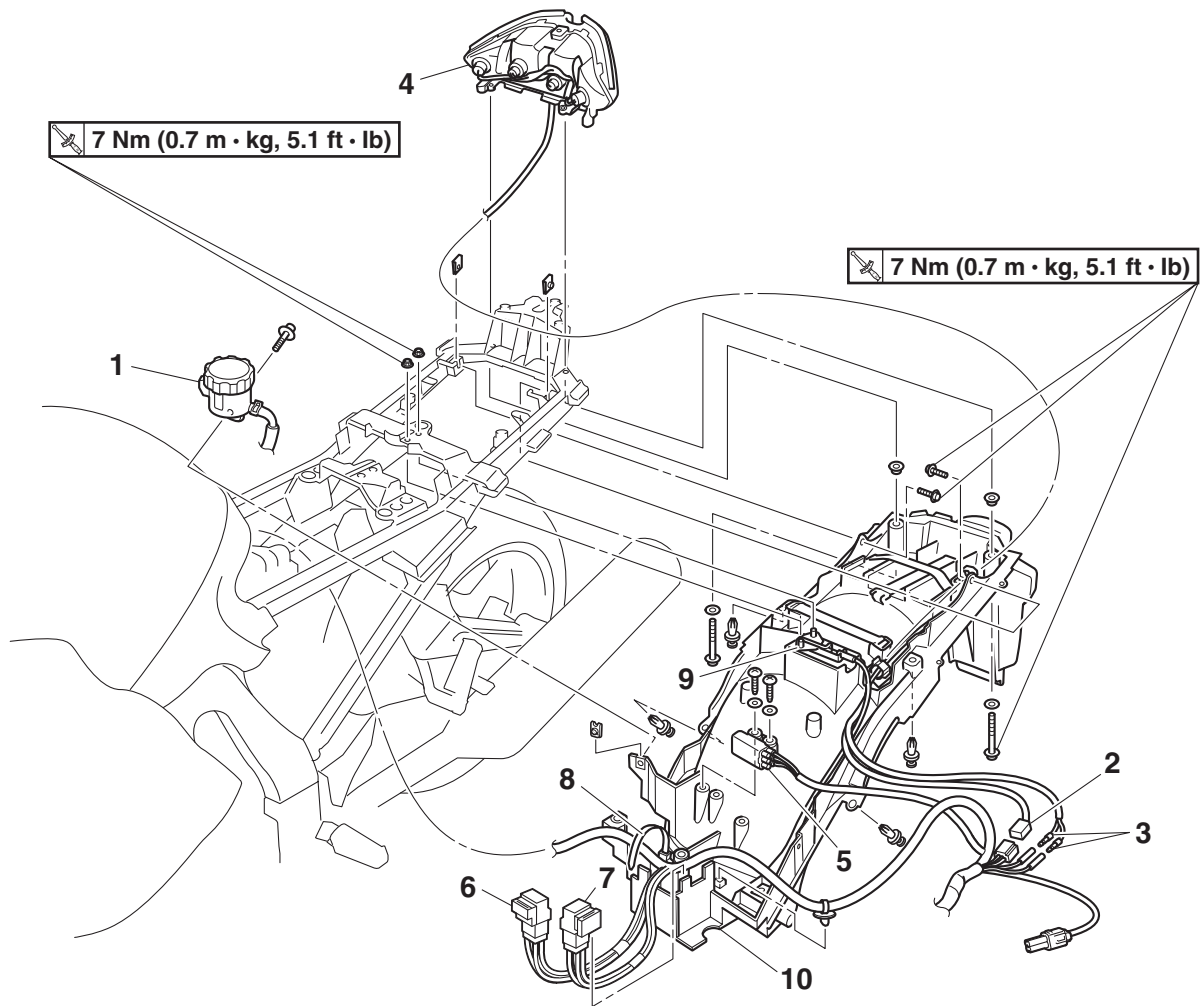
ABS COMPONENTS CHART



1. Brake hose (metering valve to right front brake caliper)
2. Brake hose (brake pipe/upper joint assembly to front brake calipers)
3. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
4. Proportioning valve
5. Brake pipe (proportioning valve to rear brake hose)
6. Hydraulic unit assembly
7. Rear wheel sensor
8. Rear wheel sensor rotor
9. Rear brake caliper
10. Brake hose (brake pipe to rear brake caliper)
11. Metering valve
12. Left front brake caliper
13. Right front brake caliper (partially operated together with the rear brake)
14. Front wheel sensor
15. Front wheel sensor rotor
16. Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)
17. Brake pipe/middle joint assembly
18. Brake pipe (hydraulic unit to metering valve)
19. Brake pipe (hydraulic unit to proportioning valve)
20. Brake pipe/upper joint assembly
21. Brake pipe/lower joint assembly

ABS (ANTI-LOCK BRAKE SYSTEM)

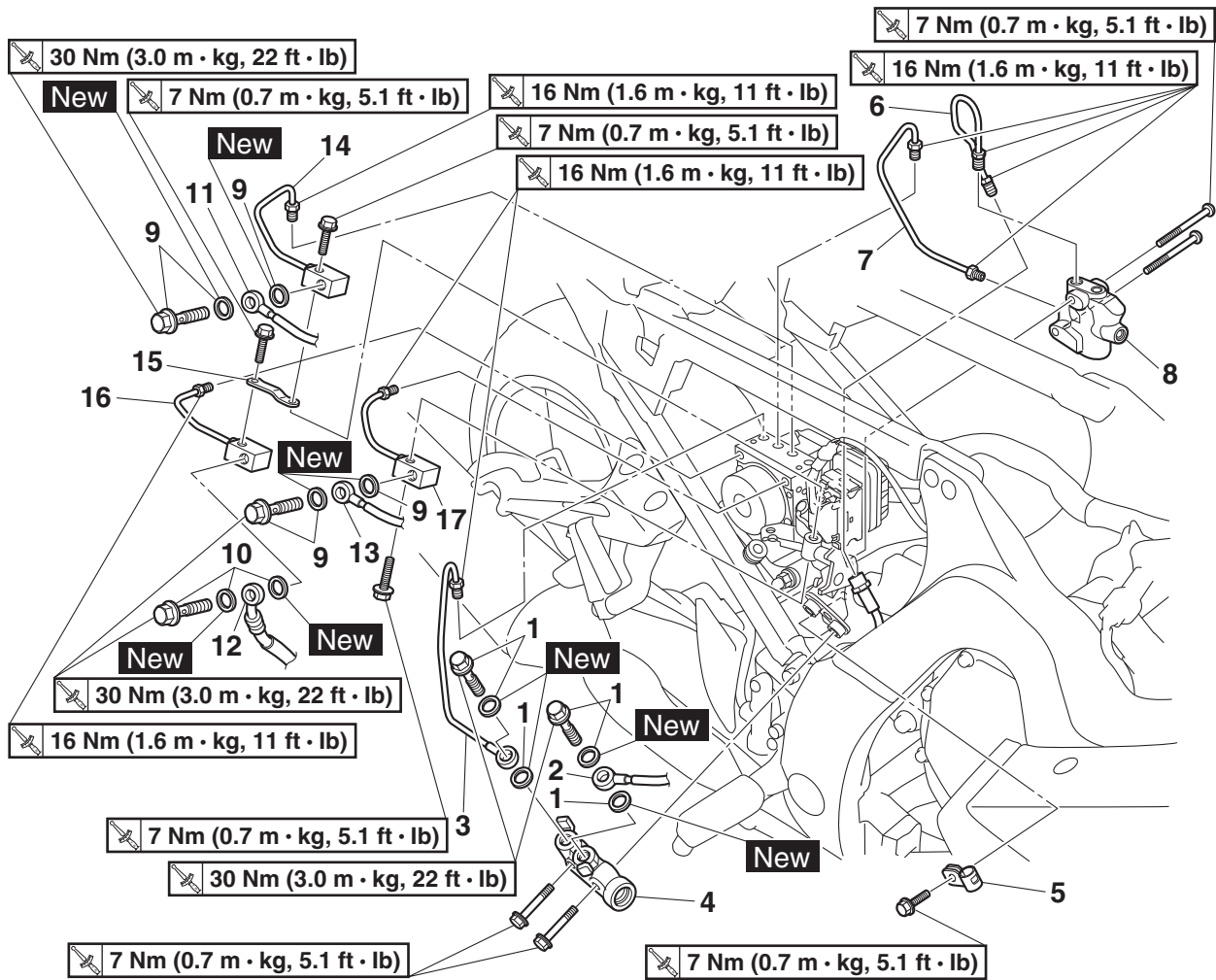
Removing the rear fender assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rear cowlings/Side covers/Air shroud		Refer to "GENERAL CHASSIS" on page 4-1.
1	Brake fluid reservoir	1	
2	Tail/brake light assembly coupler	1	Disconnect.
3	License plate light connector	2	Disconnect.
4	Tail/brake light assembly	1	
5	Lean angle sensor	1	
6	Brake light relay	1	
7	Brake switch relay	1	
8	Plastic band	1	
9	Seat lock cable assembly	1	
10	Rear fender assembly	1	
			For installation, reverse the removal procedure.

ABS (ANTI-LOCK BRAKE SYSTEM)

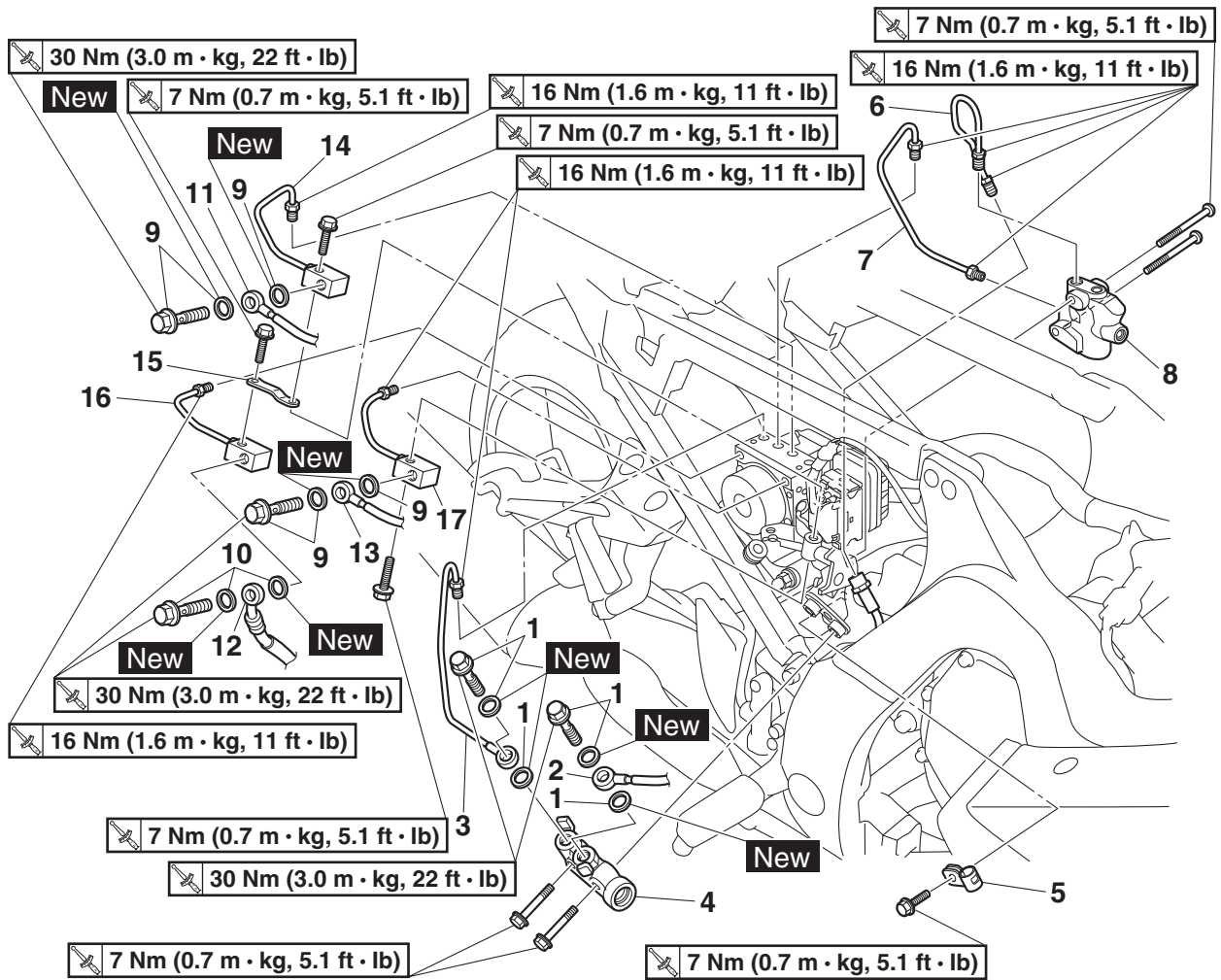
Removing the metering valve, proportioning valve, and brake pipes



Order	Job/Parts to remove	Q'ty	Remarks
	Right side cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
1	Brake pipe union bolt/Gasket	2/4	
2	Brake pipe (metering valve to right front brake caliper)	1	Disconnect.
3	Brake pipe (hydraulic unit to metering valve)	1	
4	Metering valve	1	
5	Brake hose holder	1	
6	Brake pipe (proportioning valve to rear brake hose)	1	
7	Brake pipe (hydraulic unit to proportioning valve)	1	
8	Proportioning valve	1	
9	Brake pipe union bolt/Gasket	2/4	
10	Brake hose union bolt/Gasket	1/2	
11	Brake pipe (brake pipe/upper joint assembly to front brake calipers)	1	Disconnect.

ABS (ANTI-LOCK BRAKE SYSTEM)

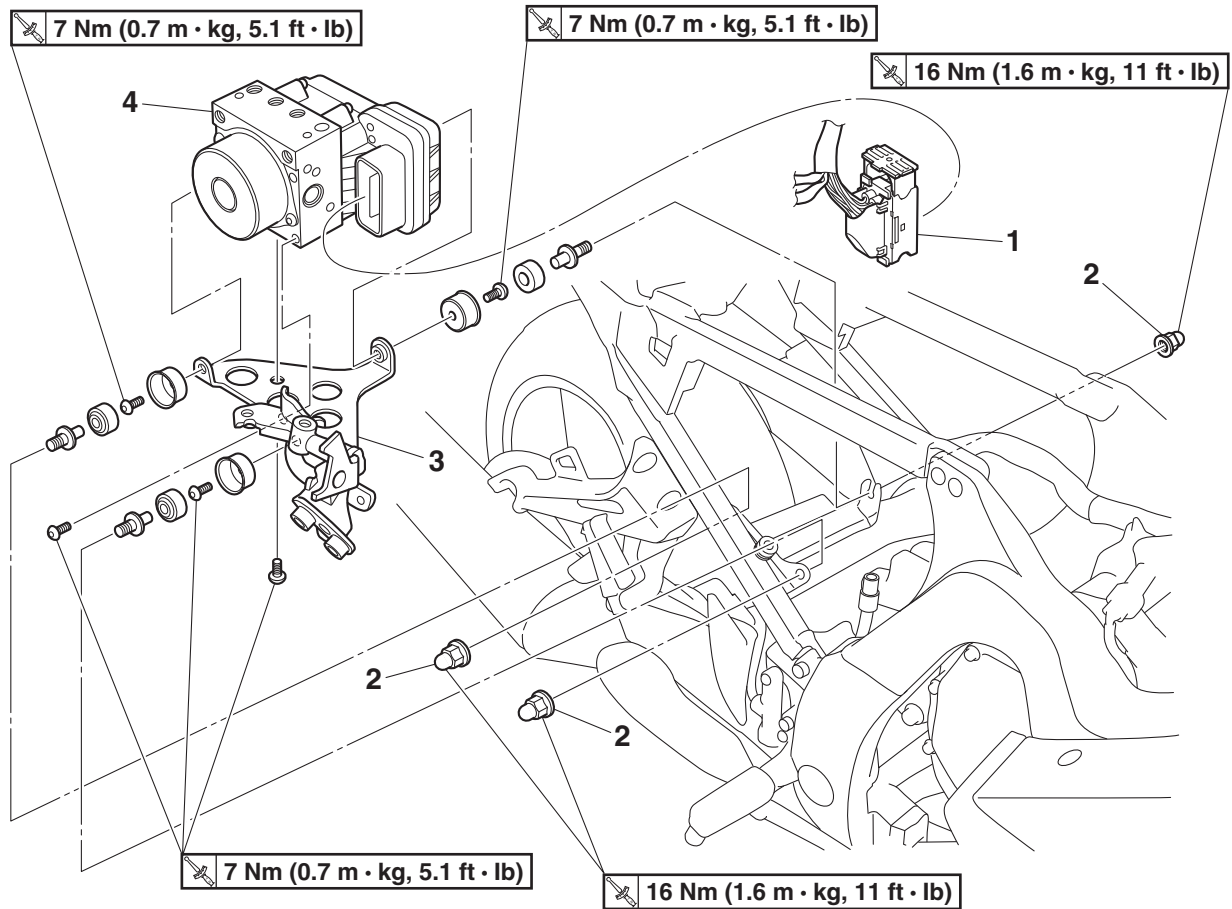
Removing the metering valve, proportioning valve, and brake pipes



Order	Job/Parts to remove	Q'ty	Remarks
12	Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)	1	Disconnect.
13	Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)	1	Disconnect.
14	Brake pipe/upper joint assembly	1	
15	Brake pipe/joint assembly stay	1	
16	Brake pipe/middle joint assembly	1	
17	Brake pipe/lower joint assembly	1	
			For installation, reverse the removal procedure.

ABS (ANTI-LOCK BRAKE SYSTEM)

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rear cowlings/Side covers/Air shroud		Refer to "GENERAL CHASSIS" on page 4-1.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
	Rear fender/Metering valve/Proportioning valve/Brake pipes		Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-63.
1	ABS ECU coupler	1	Disconnect.
2	Cap nut	3	
3	Hydraulic unit assembly bracket	1	
4	Hydraulic unit assembly	1	
			For installation, reverse the removal procedure.

ABS (ANTI-LOCK BRAKE SYSTEM)

ET3P6D003

REMOVING THE HYDRAULIC UNIT ASSEMBLY

ECA3P6D018

NOTICE

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

EWA13930

WARNING

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

ECA3P6D010

NOTICE

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

1. Remove:

- Brake pipes
- Brake hoses
- Metering valve
- Proportioning valve
- Brake hose holder

TIP

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

ECA3P6D011

NOTICE

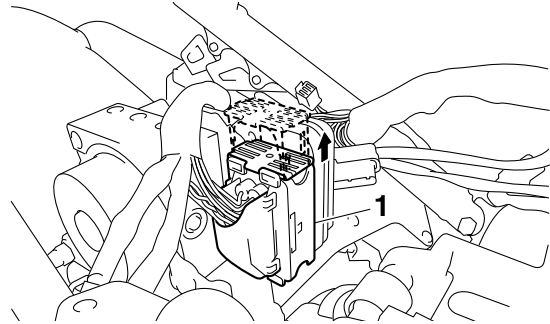
When removing the brake hoses and brake pipes, cover the area around the hydraulic unit assembly to catch any spilt brake fluid. Do not allow the brake fluid to contact other parts.

2. Disconnect:

- ABS ECU coupler “1”

TIP

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

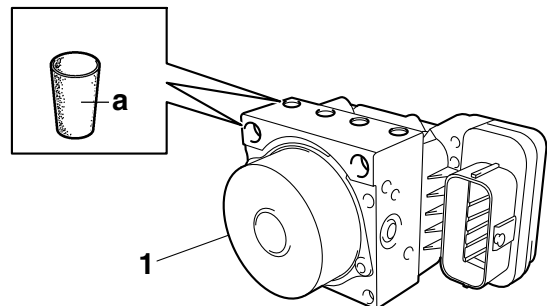


3. Remove:

- Hydraulic unit assembly “1”

TIP

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



ET3P6D004

CHECKING THE HYDRAULIC UNIT ASSEMBLY

1. Check:

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

ET3P61057

CHECKING THE PROPORTIONING VALVE AND METERING VALVE

1. Check:

- Proportioning valve
Cracks/damage → Replace the proportioning valve.

ABS (ANTI-LOCK BRAKE SYSTEM)

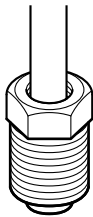
- Metering valve
Cracks/damage → Replace the metering valve

ET3P6D020

CHECKING THE BRAKE PIPES

The following procedure applies to all of the brake pipes.

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



ECA3P6D005

INSTALLING THE HYDRAULIC UNIT ASSEMBLY

1. Install:
 - Hydraulic unit assembly

TIP

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

ECA3P6D012

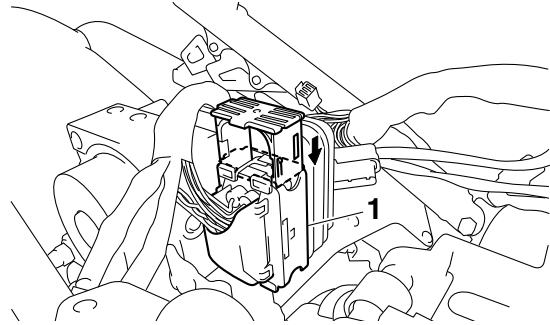
NOTICE

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

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

TIP

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



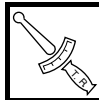
4. Install:
 - Brake pipe/lower joint assembly "1"
 - Brake pipe/middle joint assembly "2"
 - Brake pipe/joint assembly stay "3"
 - Brake pipe/upper joint assembly "4"

TIP

Temporarily tighten the brake pipe/joint assembly flare nuts and bolts.

5. Tighten:

- Brake pipe/joint assembly flare nuts "5"
- Brake pipe/joint assembly bolts "6"



Brake pipe/joint assembly flare nut

16 Nm (1.6 m·kg, 11 ft·lb)

Brake pipe/joint assembly bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)

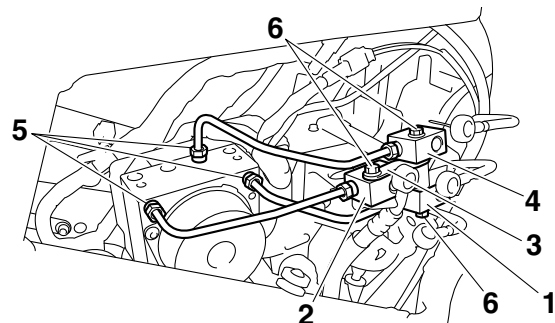
ECA3P6D022

NOTICE

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

TIP

First tighten the brake pipe/joint assembly flare nuts, then the brake pipe/joint assembly bolts.



6. Install:
 - Brake pipe (front brake master cylinder to brake pipe/lower joint assembly) "1"
 - Brake hose (rear brake master cylinder to brake pipe/middle joint assembly) "2"

ABS (ANTI-LOCK BRAKE SYSTEM)

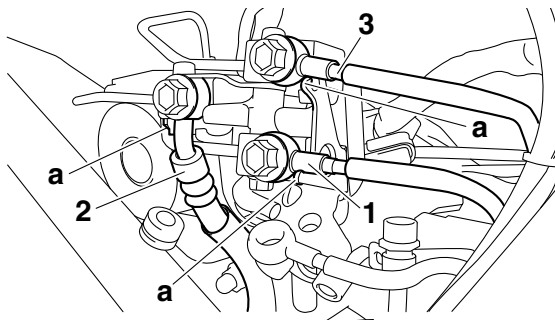
- Brake pipe (brake pipe/upper joint assembly to front brake calipers) "3"
- Gaskets **New**
- Brake pipe union bolts
- Brake hose union bolt



Brake pipe union bolt
30 Nm (3.0 m·kg, 22 ft·lb)
Brake hose union bolt
30 Nm (3.0 m·kg, 22 ft·lb)

TIP

When installing the brake hose and brake pipes onto the brake pipe joint assembly or brake hose joint assembly, make sure that the brake pipes touch the projections "a" on the hydraulic unit assembly bracket.



7. Install:
- Proportioning valve "1"
 - Brake pipe (hydraulic unit to proportioning valve) "2"



Proportioning valve bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)

TIP

Temporarily install the brake pipe.

8. Tighten:
- Brake pipe flare nuts



Brake pipe flare nut
16 Nm (1.6 m·kg, 11 ft·lb)

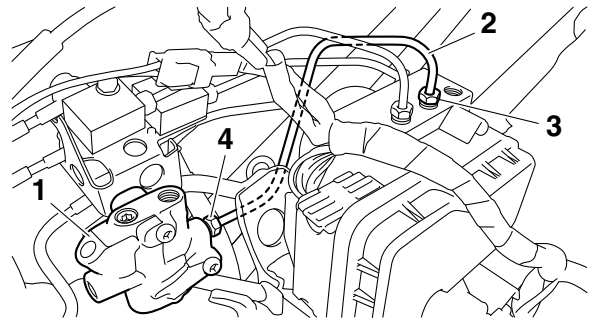
ECA3P6D022

NOTICE

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

TIP

First tighten the flare nut "3" on the hydraulic unit assembly end of the brake pipe, then the flare nut "4" on the proportioning valve end.



9. Install:

- Brake pipe (proportioning valve to rear brake hose) "1"
- Brake hose holder "2"

TIP

Temporarily tighten the brake pipe flare nuts and brake hose holder bolt.

10. Tighten:

- Brake pipe flare nuts "3"
- Brake hose holder bolt "4"



Brake pipe flare nut
16 Nm (1.6 m·kg, 11 ft·lb)
Brake hose holder bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)

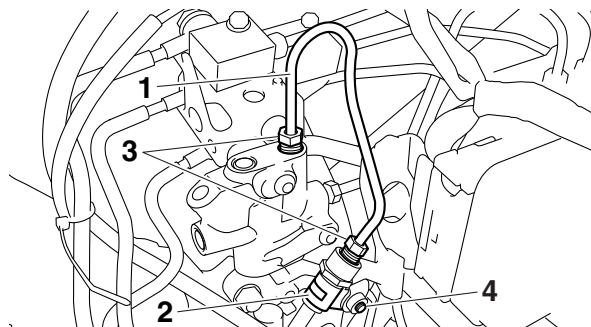
ECA3P6D022

NOTICE

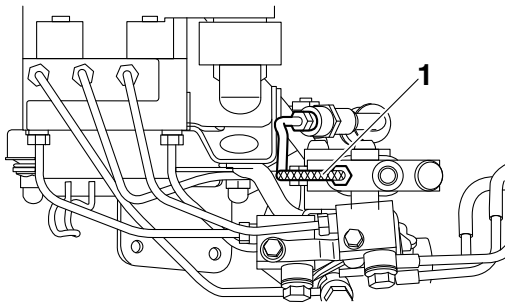
If the brake pipe flare nut does not turn easily, replace the hydraulic unit, brake pipes, and related parts as a set.

TIP

- First tighten the brake pipe flare nut, then the brake hose holder bolt.
- Make sure that the brake pipe is parallel to the proportioning valve as shown in the illustration.
- Do not bend the brake pipe when tightening the brake pipe flare nuts.



ABS (ANTI-LOCK BRAKE SYSTEM)



11. Install:

- Metering valve “1”
- Brake pipe (metering valve to right front brake caliper) “2”
- Brake pipe (hydraulic unit to metering valve) “3”
- Gaskets **New**
- Brake pipe union bolts

TIP

Temporarily install the metering valve and brake pipes.

12. Tighten:

- Brake pipe flare nut “4”
- Metering valve bolts “5”
- Brake pipe union bolts “6”



Brake pipe flare nut
16 Nm (1.6 m·kg, 11 ft·lb)
Metering valve bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)
Brake pipe union bolt
30 Nm (3.0 m·kg, 22 ft·lb)

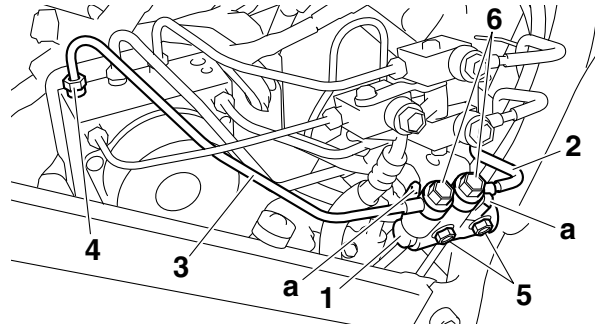
ECA3P6D022

NOTICE

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

TIP

- First tighten the brake pipe flare nut and metering valve bolts, then the brake pipe union bolts.
- When tightening the brake pipes onto the metering valve, make sure that the brake pipes touch the projections “a” on the metering valve.



13. 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.

14. Bleed:

- Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.

15. 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 4-72.)

ECA14770

NOTICE

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

ABS (ANTI-LOCK BRAKE SYSTEM)

16. Delete the fault codes. (Refer to “[C-1] DELETING THE FAULT CODES” on page 8-158.)
17. Perform a trial run. (Refer to “CHECKING THE ABS WARNING LIGHT” on page 4-75.)

EAS22800

HYDRAULIC UNIT OPERATION TESTS

The reaction-force pulsating action generated in the brake lever and brake pedal when the ABS is activated can be tested when the vehicle is stopped.

The hydraulic unit operation can be tested using the following two methods.

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

Hydraulic unit operation test 1

EWA13120



WARNING

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

TIP

Two people are necessary to perform hydraulic unit operation test 1.

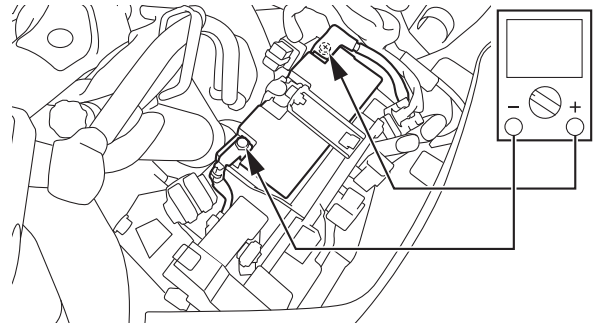
1. Place the vehicle on the centerstand.
2. Turn the main switch to “OFF”.
3. Remove:
 - Right upper inner panel
Refer to “GENERAL CHASSIS” on page 4-1.
4. Check:
 - Battery voltage
Lower than 12.8 V → Charge or replace the battery.



**Battery voltage
Higher than 12.8 V**

TIP

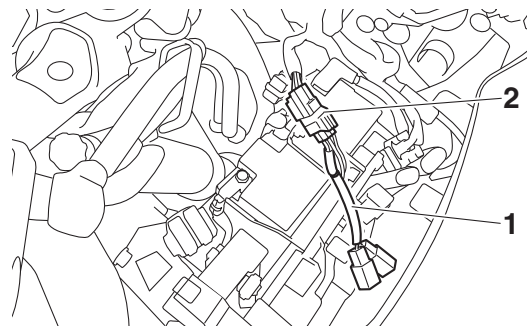
- If the battery voltage is lower than 12.8 V, charge the battery, and then perform hydraulic unit operation test 1.
- If the battery voltage is lower than 10 V, the ABS warning light comes on and the ABS does not operate.



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




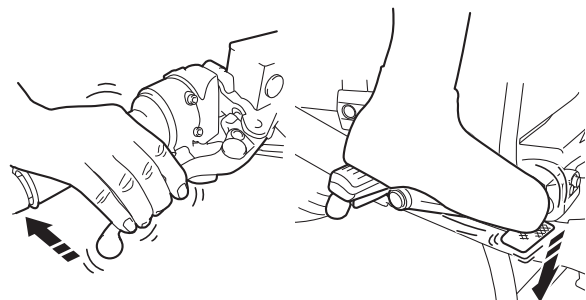
**Test coupler adapter
90890-03149**



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

TIP

- This check cannot be performed unless both the brake lever and the brake pedal are operated simultaneously when the main switch is turned to “ON”.
- Do not push the “” side of the start/engine stop switch when turning the main switch to “ON”, otherwise the operation test will not begin.



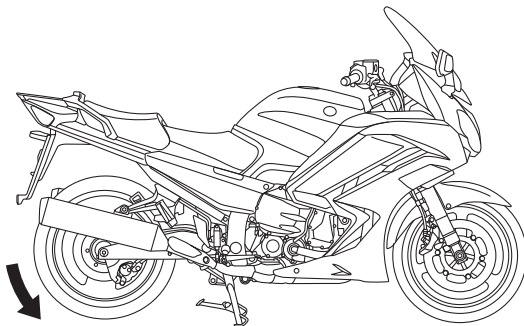
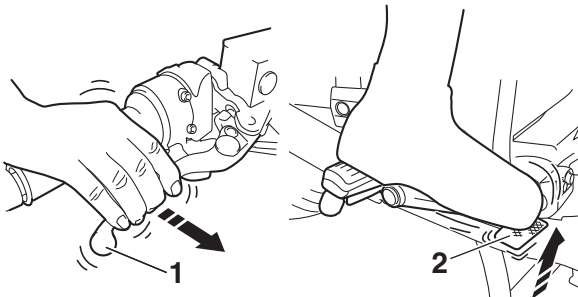
7. Check:
 - Hydraulic unit operation

ABS (ANTI-LOCK BRAKE SYSTEM)

When the main switch is turned to "ON", a single pulse will be generated in the brake lever "1". After the pulse is generated in the brake lever, it is generated in the brake pedal "2" twice.

TIP

A single pulse will be felt in the brake lever once, then in the brake pedal twice. The second person should confirm that the rear brake force is released during the second pulse in the brake pedal, third pulse overall, by manually applying force to rotate the rear wheel. If the rear brake force is released during the second pulse in the brake pedal, the second person will be able to rotate the rear wheel for 0.1 second.



ECA3P6D019

NOTICE

- Check that the pulse is felt in the brake lever once, and then in the brake pedal twice.
- 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 rear brake force is not released during the second pulse in the brake pedal, but during the pulse in the brake lever or during the first pulse in the brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.

- If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.

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

Hydraulic unit operation test 2

EWA13120

WARNING

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

1. Place the vehicle on the centerstand so that the rear wheel is elevated.
2. Check:
 - Engine stop due to sidestand operation

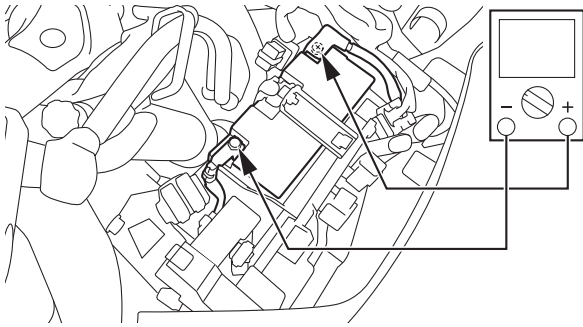
- a. Shift the transmission into gear and extend the sidestand.
- b. Turn the main switch to "ON".
- c. Push the "⊘" side of the start/engine stop switch, and check that the starter motor does not operate. If the starter motor operates, check the ignition circuit cut-off system. Refer to "ENGINE STOPPING DUE TO SIDESTAND OPERATION" on page 8-3.
- d. Turn the main switch to "OFF".
- e. Retract the sidestand.

 Battery voltage
Higher than 12.8 V

TIP

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

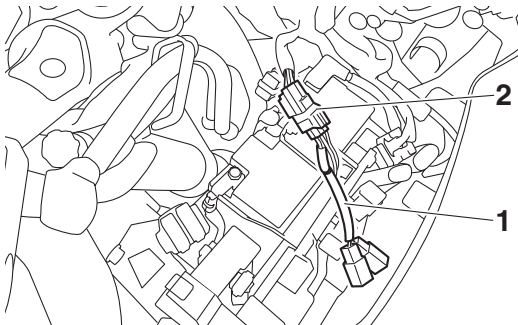
ABS (ANTI-LOCK BRAKE SYSTEM)



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



**Test coupler adapter
90890-03149**

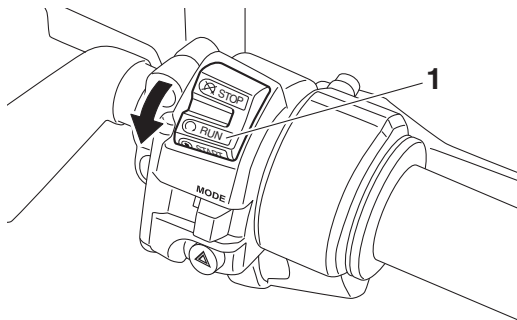


6. Extend the sidestand.
7. Turn the main switch to “ON”.
8. Push the “(⊖)” side of the start/engine stop switch “1” for at least 4 seconds.

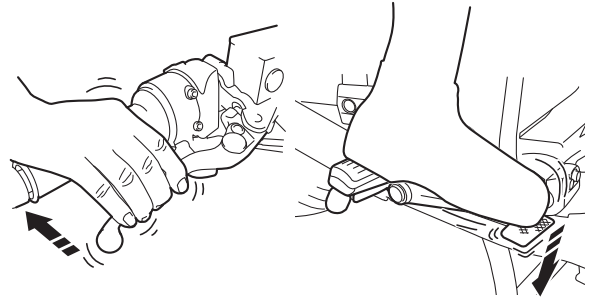
ECA14790

NOTICE

Do not operate the brake lever or the brake pedal.



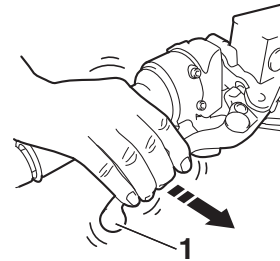
9. After releasing the start/engine stop switch, operate the brake lever and the brake pedal simultaneously.



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

TIP

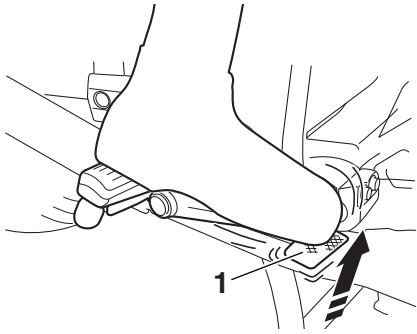
- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.



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

TIP

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



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

TIP

The reaction-force pulsating action consists of quick pulses.

ECA3P6D020

NOTICE

- Check that the pulsating action is felt in the brake lever, brake pedal, and again in the brake lever, in this order.
- If the pulsating action 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 pulsating action is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.

13. Turn the main switch to "OFF".

14. Remove the test coupler adapter from the ABS test coupler.

15. Turn the main switch to "ON".

16. Shift the transmission into neutral and retract the sidestand.

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

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

EAS1MC1084

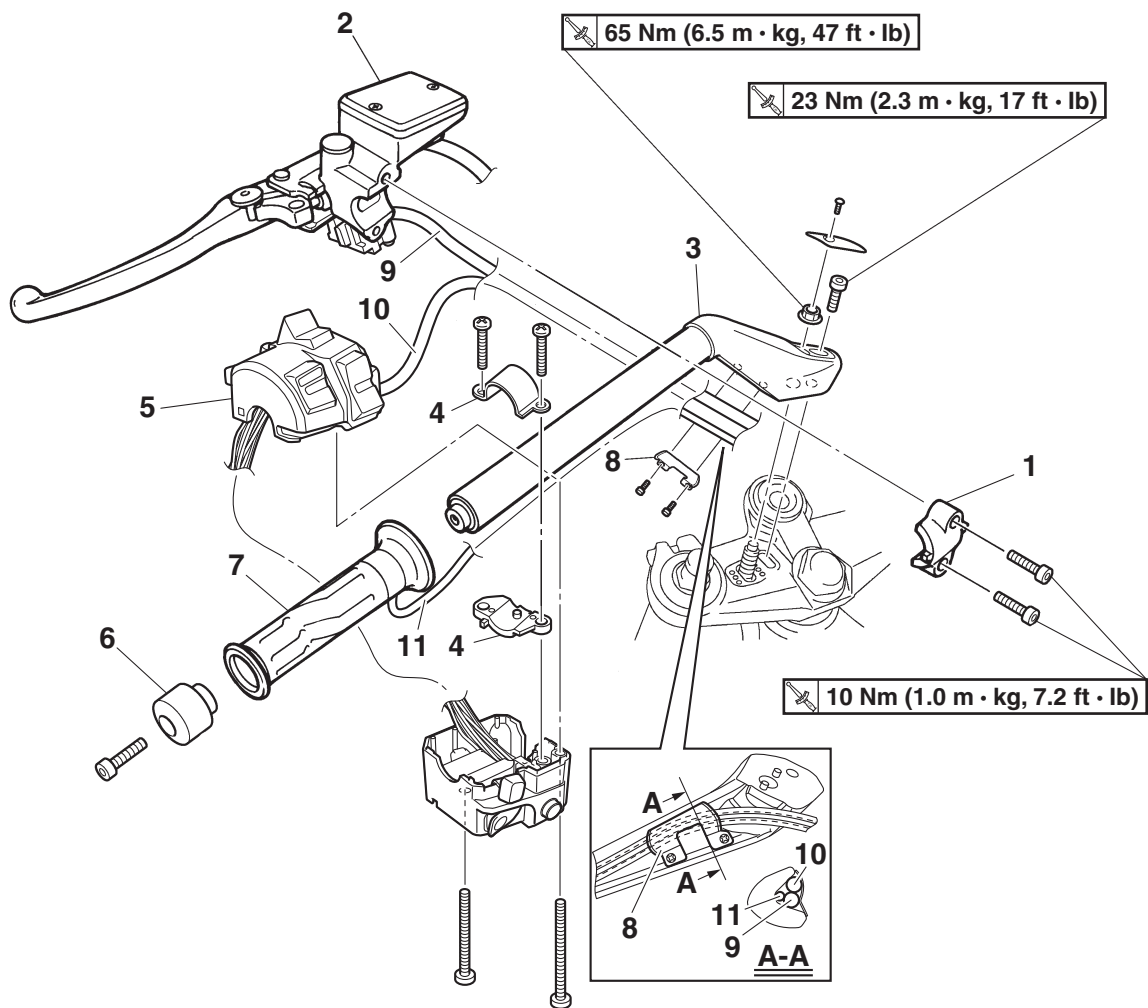
CHECKING THE ABS WARNING LIGHT

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.

EAS22850

HANDLEBARS

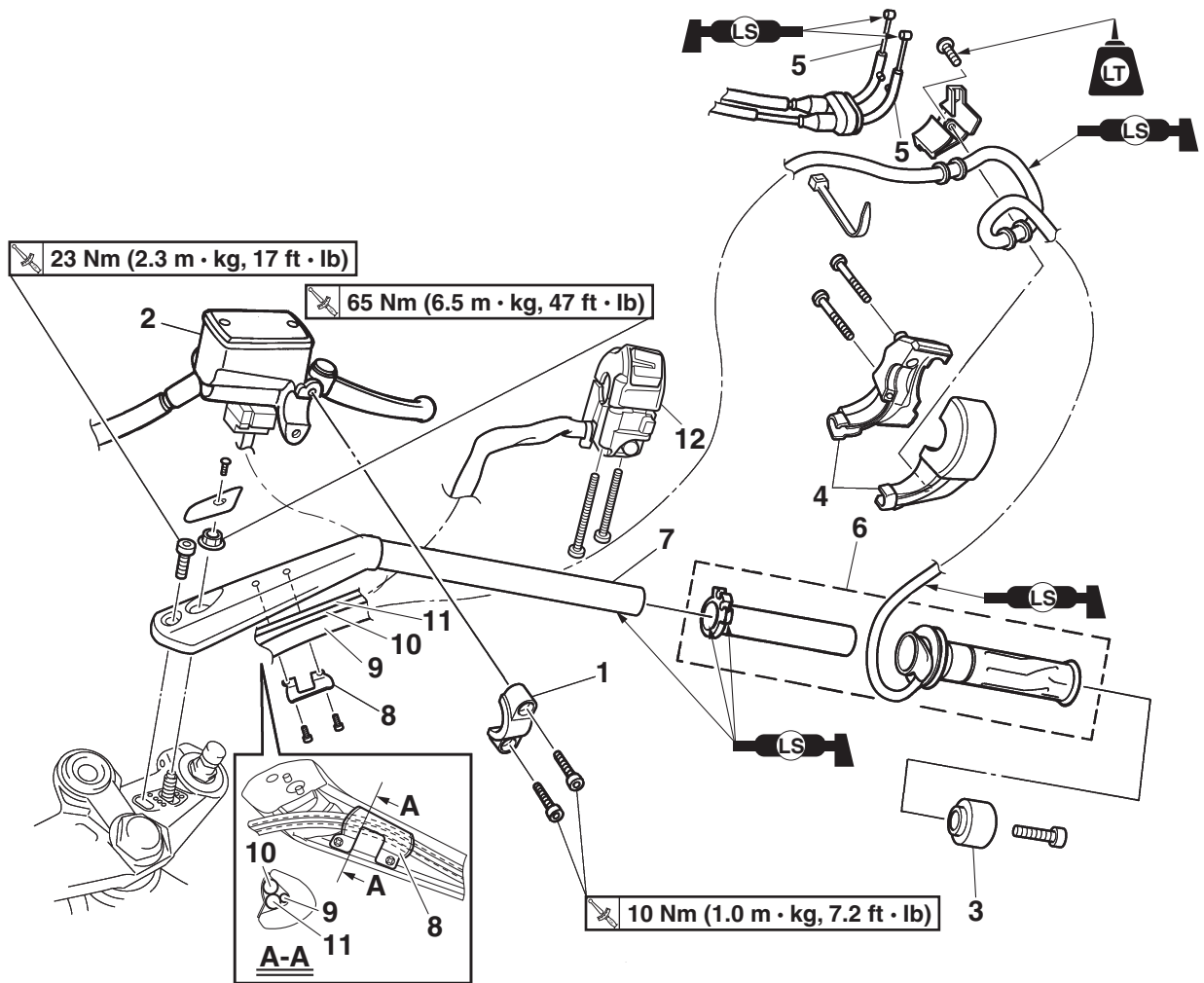
Removing the left handlebar



Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch master cylinder holder	1	
2	Clutch master cylinder assembly	1	
3	Left handlebar	1	
4	Left handlebar switch holder	2	
5	Left handlebar switch	1	
6	Grip end	1	
7	Handlebar grip	1	
8	Lead holder	1	
9	Clutch switch lead	1	
10	Left handlebar switch lead	1	
11	Left grip warmer lead	1	
			For installation, reverse the removal procedure.

HANDLEBARS

Removing the right handlebar



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake master cylinder holder	1	
2	Front brake master cylinder assembly	1	
3	Grip end	1	
4	Throttle cable housing	2	
5	Throttle cable	2	Disconnect.
6	Throttle grip	1	
7	Right handlebar	1	
8	Lead holder	1	
9	Right grip warmer lead	1	
10	Right handlebar switch lead	1	
11	Front brake light switch lead	1	
12	Right handlebar switch	1	
			For installation, reverse the removal procedure.

HANDLEBARS

EAS1MC1065

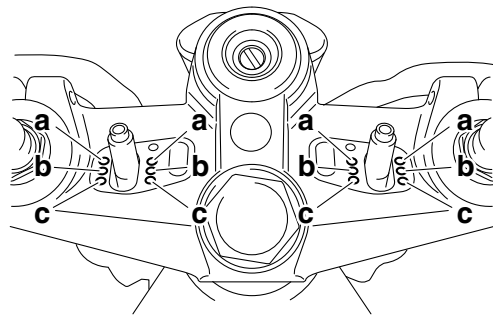
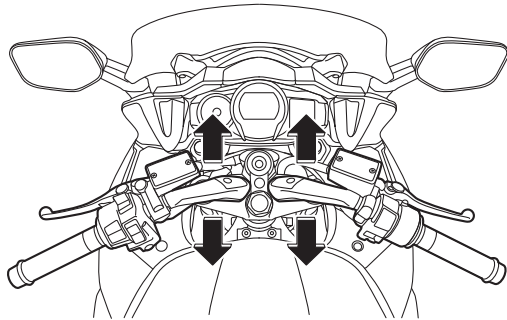
ADJUSTING THE HANDLEBAR POSITION

1. Check:

- Handlebar position

TIP

The handlebar position can be adjusted to one of three positions to suit the rider's preference.

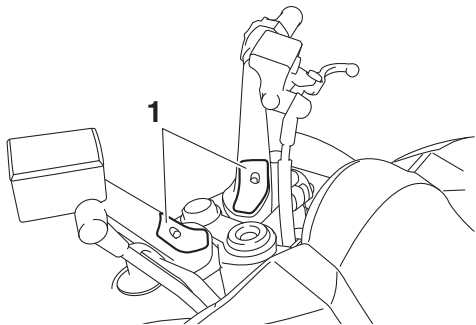


- a. Front position
- b. Standard position
- c. Rear position

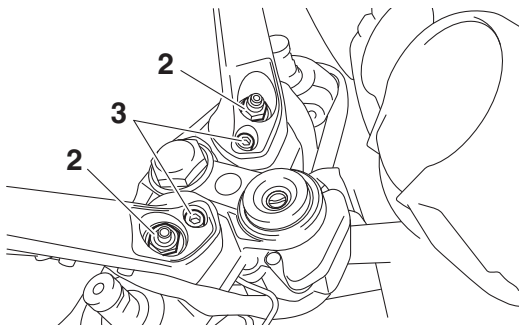
2. Adjust:

- Handlebar position

a. Remove the plates "1".



b. Remove the handlebar nuts "2" and bolts "3".



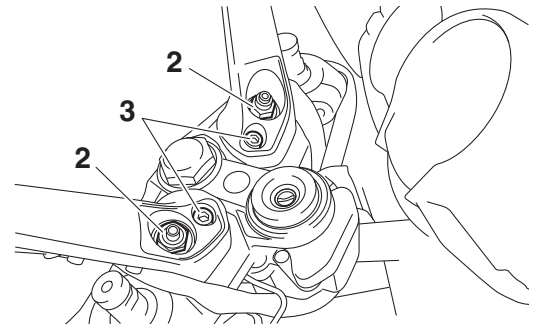
c. Remove the handlebars.

d. Install the handlebars in the desired position.


TIP

Fit the projections on each handlebar into the holes in the upper bracket, making sure that the handlebars are installed in the same position.

e. Install the handlebar bolts "3" and nuts "2" temporarily.



f. Tighten the handlebar bolts and nuts.

	Handlebar bolt
	23 Nm (2.3 m·kg, 17 ft·lb)
	Handlebar nut
	65 Nm (6.5 m·kg, 47 ft·lb)

TIP

First tighten the bolts, then tighten the nuts.

EAS22870

REMOVING THE HANDLEBARS

1. Stand the vehicle on a level surface.

EWA13120

⚠ WARNING

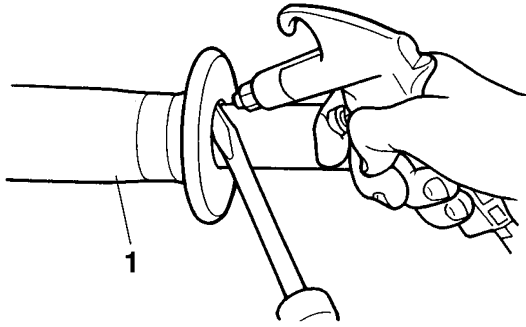
Securely support the vehicle so that there is no danger of it falling over.

2. Remove:

- Handlebar grip "1"

TIP

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



EAS22890

CHECKING THE HANDLEBARS

1. Check:
 - Left handlebar
 - Right handlebar
 Bends/cracks/damage → Replace.

EWA13690

WARNING

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

EAS22900

INSTALLING THE HANDLEBARS

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

2. Install:
 - Handlebar grip
 - Grip end "1"

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

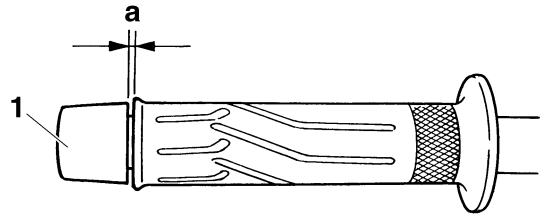
EWA13700

WARNING

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

TIP

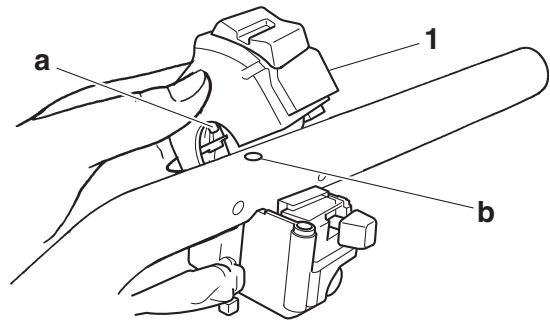
There should be 1–3 mm (0.04–0.12 in) of clearance "a" between the handlebar grip and the grip end.



3. Install:
 - Right handlebar switch "1"

TIP

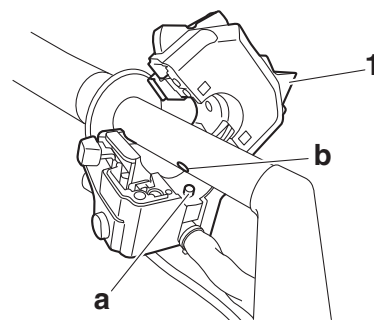
Align the projection "a" on the right handlebar switch with the hole "b" on the right handlebar.



4. Install:
 - Left handlebar switch "1"

TIP

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

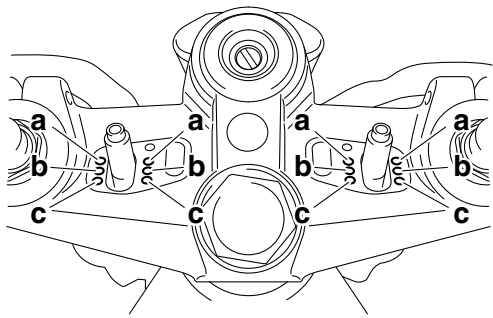


5. Install:
 - Right handlebar
 - Left handlebar

TIP

Fit the projections on each handlebar into the holes in the upper bracket, making sure that the handlebars are installed in the same position.

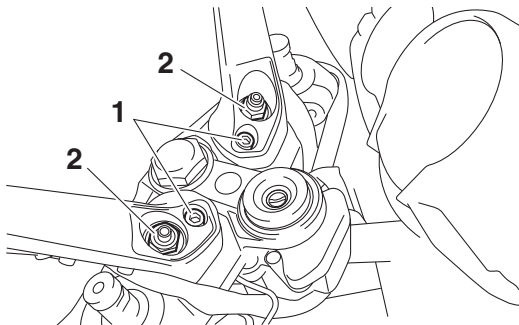
HANDLEBARS



- a. Front position
- b. Standard position
- c. Rear position



6. Install:

- Handlebar bolts "1"
- (temporarily)
- Handlebar nuts "2"
- (temporarily)



7. Tighten:

- Handlebar bolts
- Handlebar nuts

	Handlebar bolt
	23 Nm (2.3 m·kg, 17 ft·lb)
	Handlebar nut
	65 Nm (6.5 m·kg, 47 ft·lb)

TIP

First tighten the bolts, then tighten the nuts.

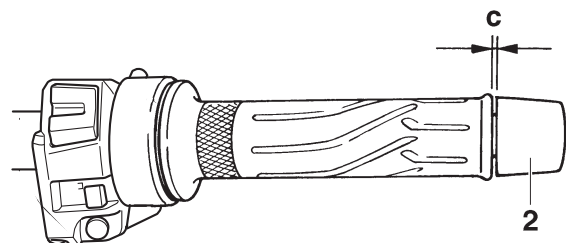
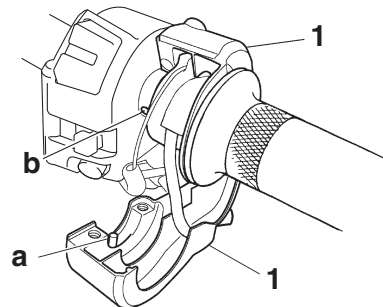
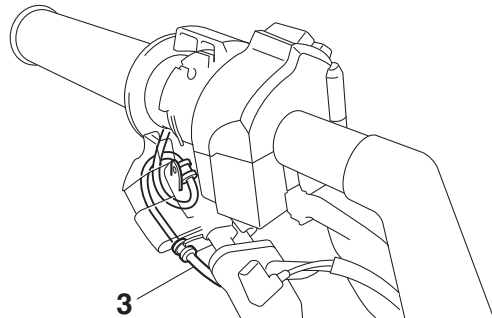
8. Install:

- Throttle grip
- Throttle cables
- Throttle cable housings "1"
- Grip end "2"

TIP


- Route the right grip warmer lead "3" through the throttle cable housing so that it forms a loop as shown in the illustration. Make sure that the loop is formed so that the section of the lead from the handlebar grip to the first molded grommet is routed above the section which exits the throttle cable housing.

- When installing the throttle cable housing, align the projection "a" on the housing with the hole "b" in the right handlebar and be sure not to pinch the right grip warmer lead.
- There should be 1–3 mm (0.04–0.12 in) of clearance "c" between the throttle grip and the grip end.



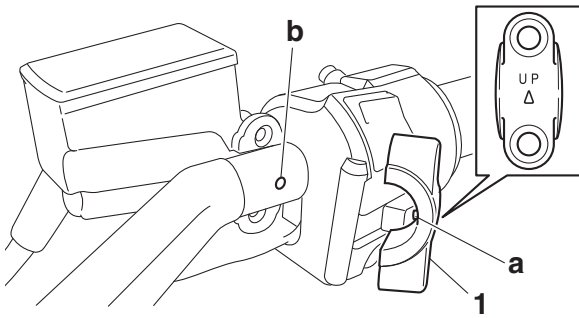
9. Install:

- Front brake master cylinder assembly
- Front brake master cylinder holder "1"

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

TIP

- Install the brake master cylinder holder with the "UP" mark facing up.
- Align the projection "a" on the front brake master cylinder with hole "b" on the right handlebar.
- First, tighten the upper bolt, then the lower bolt.



10. Install:

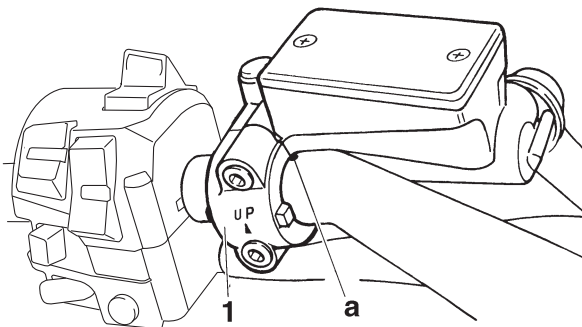
- Clutch master cylinder assembly
- Clutch master cylinder holder "1"



**Clutch master cylinder holder
bolt**
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

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



11. Adjust:

- Throttle grip free play
Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-31.

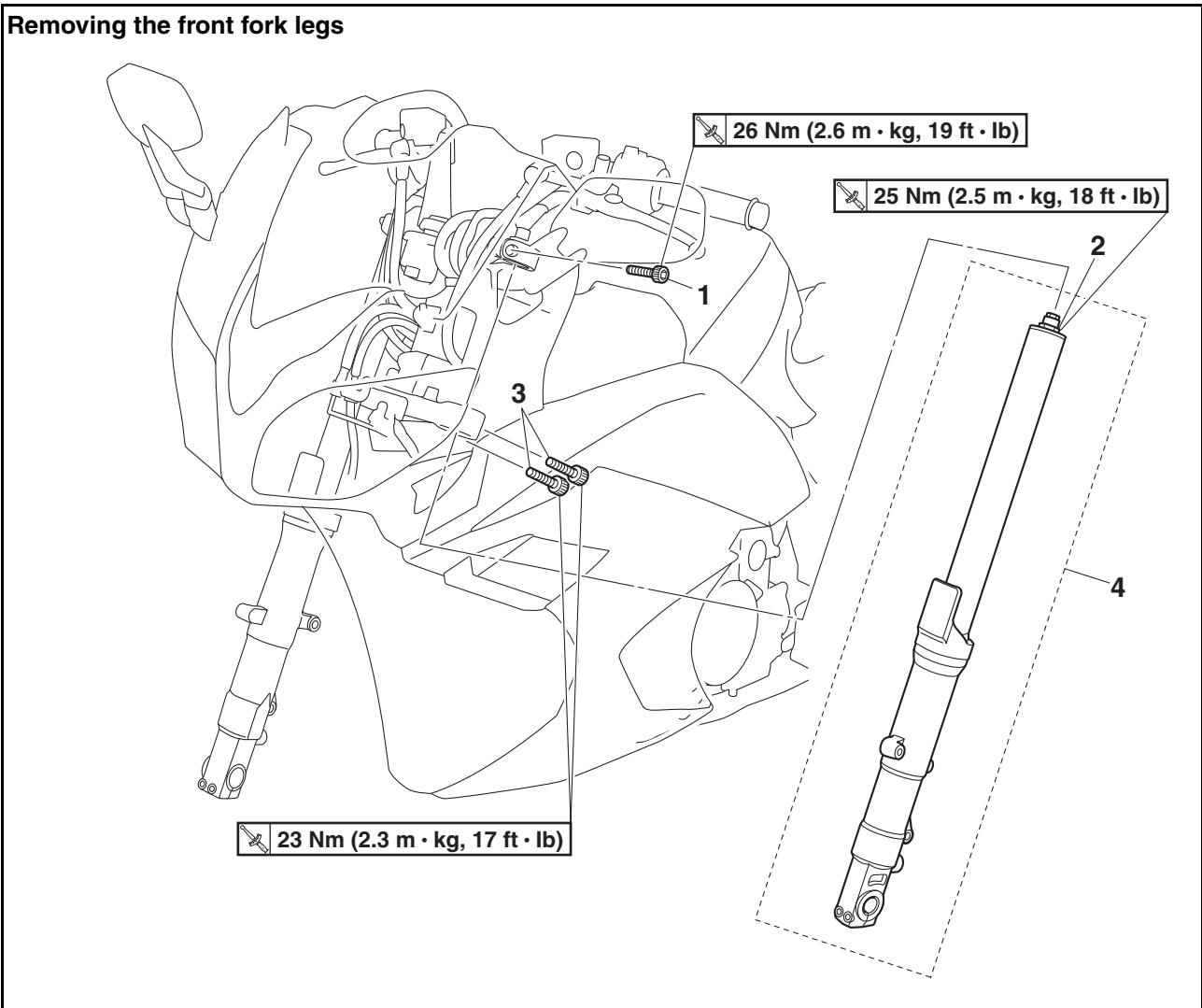


Throttle grip free play
3.0–5.0 mm (0.12–0.20 in)

EAS22950

FRONT FORK

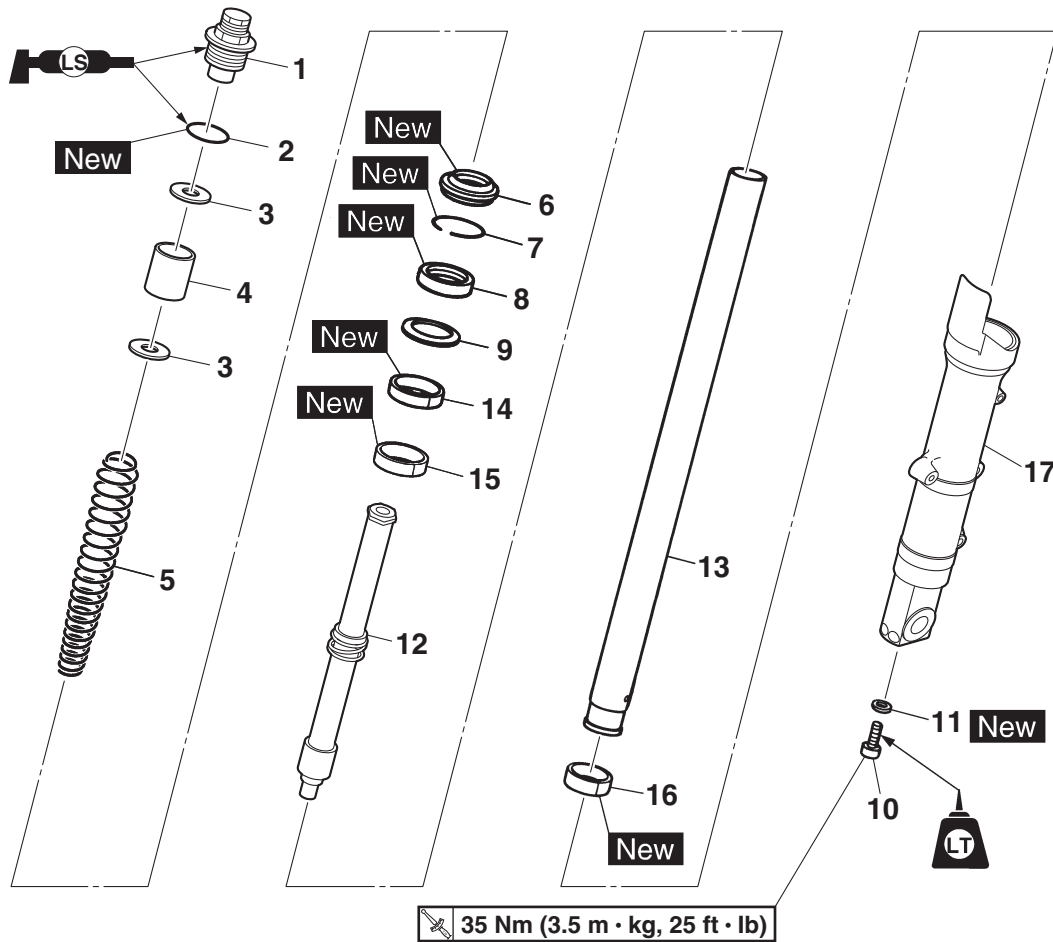
Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Lower inner panels		Refer to "GENERAL CHASSIS" on page 4-1.
	Front wheel		Refer to "FRONT WHEEL" on page 4-22.
1	Upper bracket pinch bolt	1	Loosen.
2	Cap bolt	1	Loosen.
3	Lower bracket pinch bolt	2	Loosen.
4	Front fork leg	1	
			For installation, reverse the removal procedure.

FRONT FORK

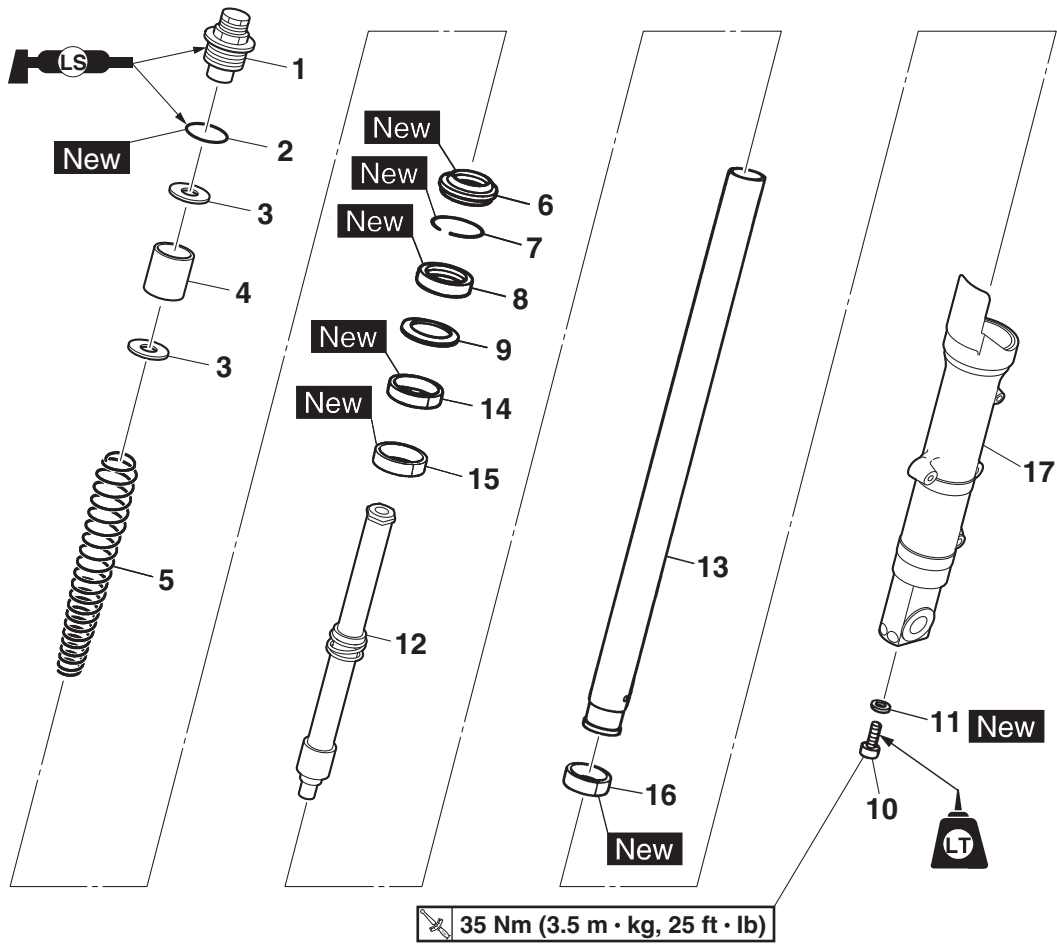
Disassembling the left front fork leg



Order	Job/Parts to remove	Q'ty	Remarks
1	Cap bolt	1	
2	O-ring	1	
3	Washer	2	
4	Spacer	1	
5	Fork spring	1	
6	Dust seal	1	
7	Oil seal clip	1	
8	Oil seal	1	
9	Washer	1	
10	Damper rod assembly bolt	1	
11	Copper washer	1	
12	Damper rod assembly	1	
13	Inner tube	1	
14	Outer tube bushing 1	1	D = 52 mm (2.05 in), l = 12 mm (0.47 in)
15	Outer tube bushing 2	1	D = 51 mm (2.01 in), l = 15 mm (0.59 in)
16	Inner tube bushing	1	

FRONT FORK

Disassembling the left front fork leg

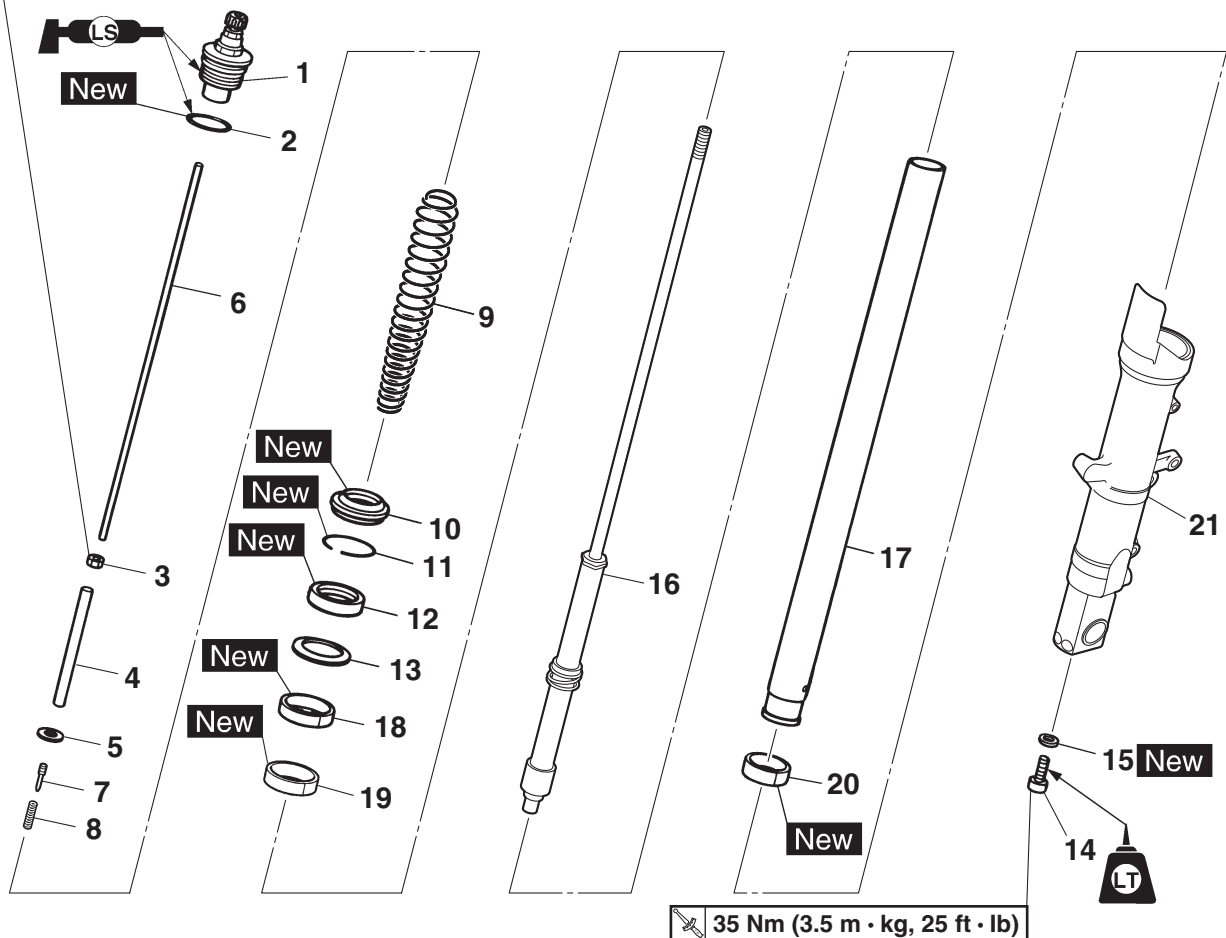


Order	Job/Parts to remove	Q'ty	Remarks
17	Outer tube	1	
			For assembly, reverse the disassembly procedure.

FRONT FORK

Disassembling the right front fork leg

14 Nm (1.4 m · kg, 10 ft · lb)



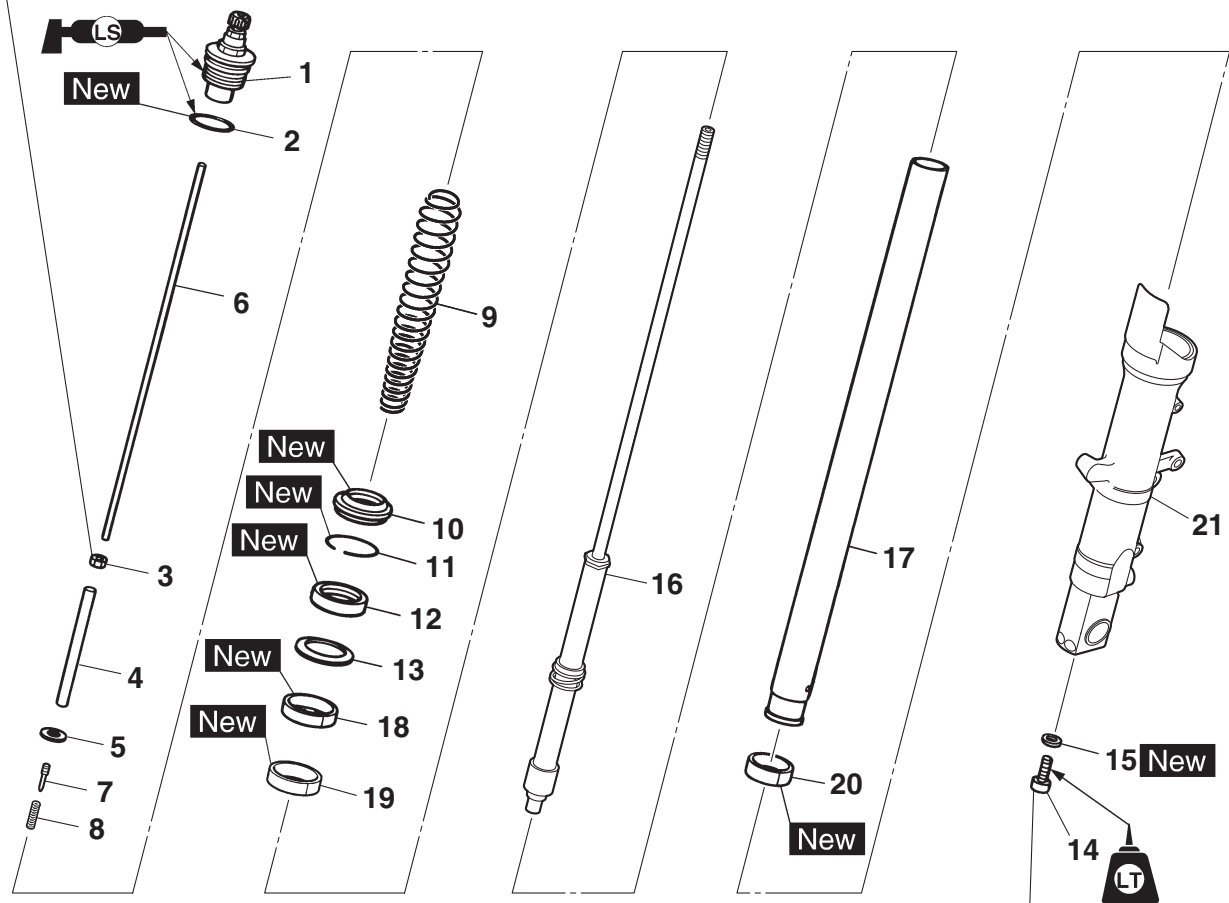
35 Nm (3.5 m · kg, 25 ft · lb)

Order	Job/Parts to remove	Q'ty	Remarks
1	Cap bolt	1	
2	O-ring	1	
3	Nut	1	
4	Spacer	1	
5	Washer	1	
6	Damper adjusting rod	1	
7	Damper adjusting valve	1	
8	Damper adjusting valve spring	1	
9	Fork spring	1	
10	Dust seal	1	
11	Oil seal clip	1	
12	Oil seal	1	
13	Washer	1	
14	Damper rod assembly bolt	1	
15	Copper washer	1	
16	Damper rod assembly	1	
17	Inner tube	1	

FRONT FORK

Disassembling the right front fork leg

14 Nm (1.4 m · kg, 10 ft · lb)



35 Nm (3.5 m · kg, 25 ft · lb)

Order	Job/Parts to remove	Q'ty	Remarks
18	Outer tube bushing 1	1	D = 52 mm (2.05 in), l = 12 mm (0.47 in)
19	Outer tube bushing 2	1	D = 51 mm (2.01 in), l = 15 mm (0.59 in)
20	Inner tube bushing	1	
21	Outer tube	1	
			For assembly, reverse the disassembly procedure.

FRONT FORK

EAS22960

REMOVING THE FRONT FORK LEGS

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

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

TIP

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

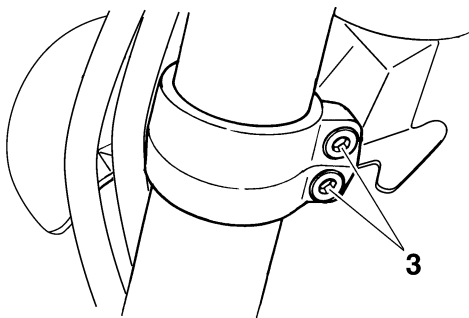
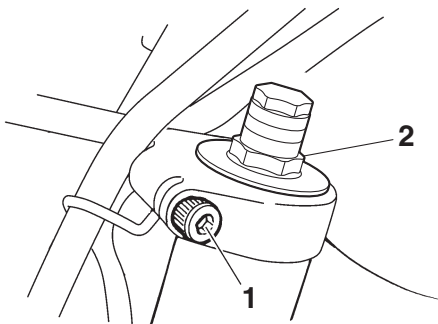
2. Loosen:

- Upper bracket pinch bolt "1"
- Cap bolt "2"
- Lower bracket pinch bolts "3"

EWA13640

WARNING

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

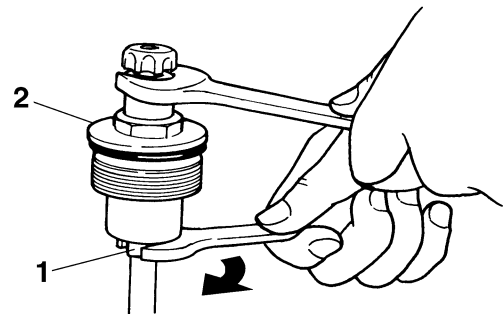


EAS22980

DISASSEMBLING THE FRONT FORK LEGS

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

1. Hold the nut "1" and loosen the cap bolt "2".
(Right side only)

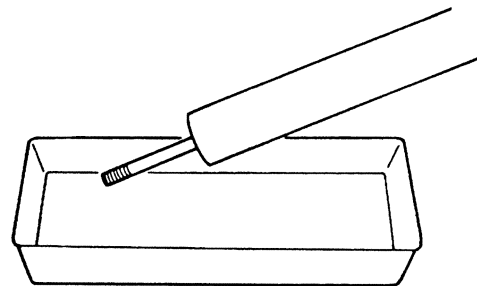


2. Drain:

- Fork oil

TIP

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



3. Remove:

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

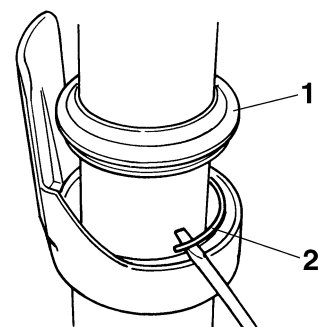
ECA14180

NOTICE

Do not scratch the inner tube.

TIP

- Do not remove the fork leg protector from the outer tube.
- If the front fork leg protector must be removed, always install a new one.

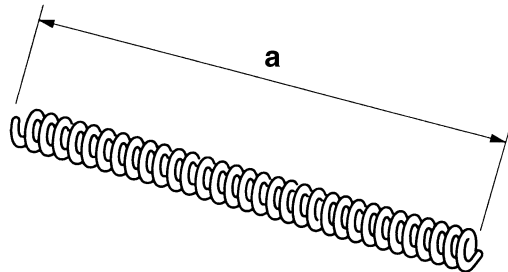


4. Remove:

- Oil seal



Fork spring free length
345.0 mm (13.58 in)
Limit
340.0 mm (13.39 in)



3. Check:

- Damper rod assembly
Damage/wear → Replace.
Obstruction → Blow out all of the oil passages with compressed air.

ECA1MC1017

NOTICE

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

4. Check:

- Cap bolt O-ring
Damage/wear → Replace.

EAS23030

ASSEMBLING THE FRONT FORK LEGS

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

EWA1MC1013

WARNING

- **The specified oil levels are different for the left and right front fork legs. Therefore, be sure to fill each front fork leg with the amount of fork oil specified for the fork leg.**
- **Incorrect 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 1
 - Outer tube bushing 2
 - Oil seal
 - Dust seal

- Before assembling the front fork leg, make sure all of the components are clean.

1. Install:

- Inner tube bushing **New**
- Damper rod assembly

ECA1MC1018

NOTICE

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

2. Lubricate:

- Inner tube's outer surface



Recommended oil

Suspension oil M1 or equivalent

3. Tighten:

- Damper rod assembly bolt



Damper rod assembly bolt

**35 Nm (3.5 m·kg, 25 ft·lb)
LOCTITE®**

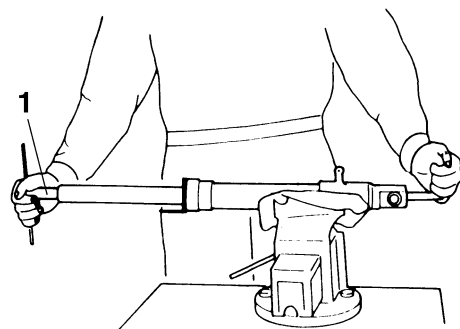
TIP

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



Damper rod holder

**90890-01447
YM-01447**



4. Install:

- Outer tube bushing 2 (D = 51 mm (2.01 in), l = 15 mm (0.59 in)) "1" **New**
(with the slide metal installer "2" and fork seal driver "3")

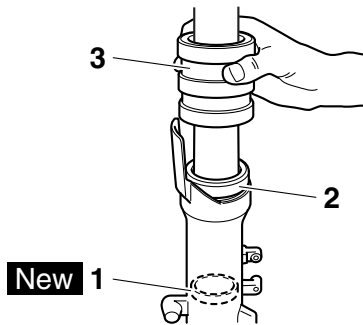
FRONT FORK



Slide metal installer
90890-01508
YM-01508
Fork seal driver
90890-01502
Fork seal driver (48)
YM-A0948



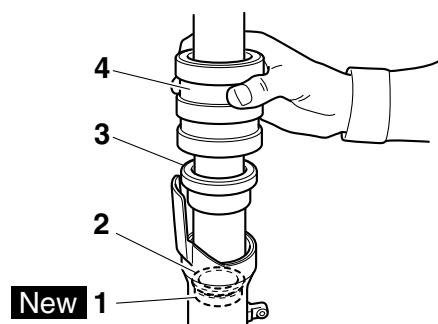
Slide metal installer
90890-01508
YM-01508
Fork seal driver
90890-01502
Fork seal driver (48)
YM-A0948



5. Install:
- Outer tube bushing 1 (D = 52 mm (2.05 in), l = 12 mm (0.47 in)) "1" **New**
 - Washer "2"
(with the slide metal installer "3" and fork seal driver (weight) "4")



Slide metal installer
90890-01508
YM-01508
Fork seal driver
90890-01502
Fork seal driver (48)
YM-A0948



6. Install:
- Oil seal "1" **New**
 - Suitable washer "2" (ex: 4SV-23115-00)
(with the slide metal installer "3" and fork seal driver (weight) "4")

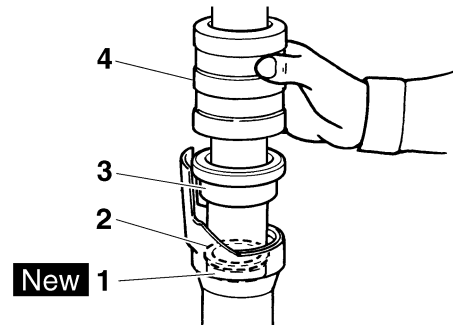
ECA14220

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.

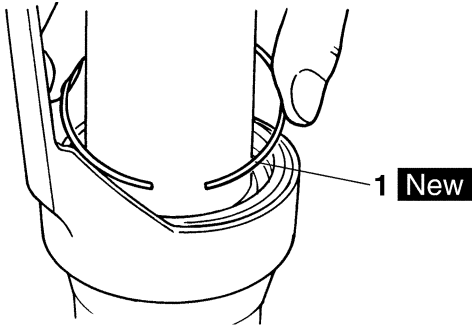


7. Remove:
- Suitable washer
8. Install:
- Oil seal clip "1" **New**

TIP


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

FRONT FORK

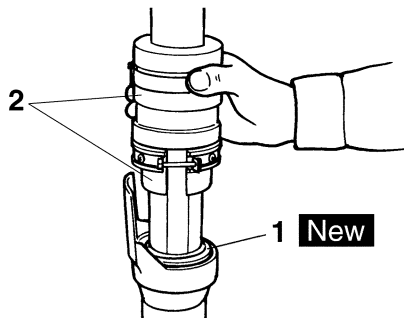


9. Install:

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




Fork seal driver
90890-01502
Fork seal driver (48)
YM-A0948



10.Fill:

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



Recommended oil
Suspension oil M1 or equivalent
Quantity
716.0 cm³ (24.21 US oz, 25.20 Imp.oz) (left side)
694.0 cm³ (23.46 US oz, 24.43 Imp.oz) (right side)

ECA14230

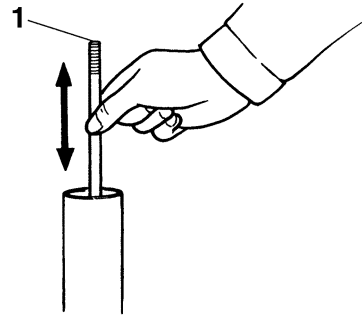
NOTICE

- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

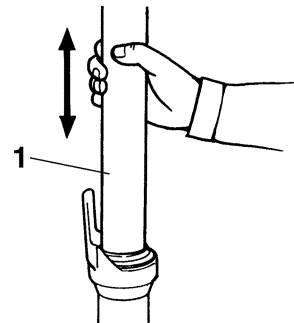
11.After filling the front fork leg, slowly stroke the damper rod assembly “1” up and down (at least ten times) to distribute the fork oil. (Right side only)

TIP

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



12.Slowly stroke the inner tube “1” up and down.




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

TIP

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

14.Measure:

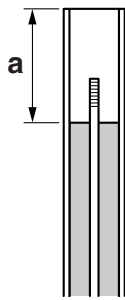
- Front fork leg oil level “a”
(from the top of the inner tube, with the outer tube fully compressed and without the fork spring)
Out of specification → Correct.



Level
106.0 mm (4.17 in) (left side)
90.0 mm (3.54 in) (right side)

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.

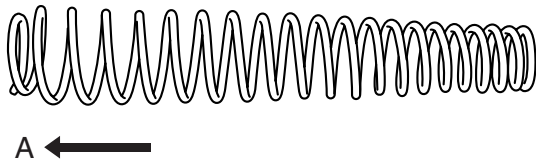


15. Install:

- Fork spring

TIP

Install the fork spring so that the end “A” shown in the illustration is facing up.



16. Install (right side):

- Washer “1”
- Spacer “2”
- Nut “3”
- Damper adjusting valve spring “4”
- Damper adjusting valve “5”
- Damper adjusting rod “6”
- Cap bolt “7”

- Install the washer “1” and spacer “2”.
- Install the nut “3” all the way onto the damper rod assembly and finger tighten it.
- Install the damper adjusting valve spring “4”, damper adjusting valve “5”, and damper adjusting rod “6”.
- Install the cap bolt “7” and finger tighten it.

EWA13670



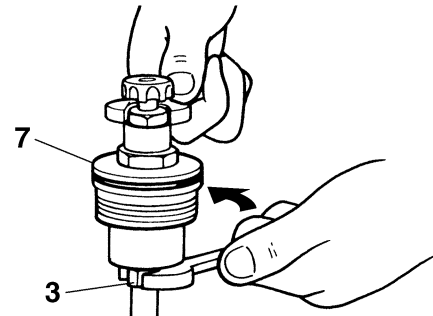
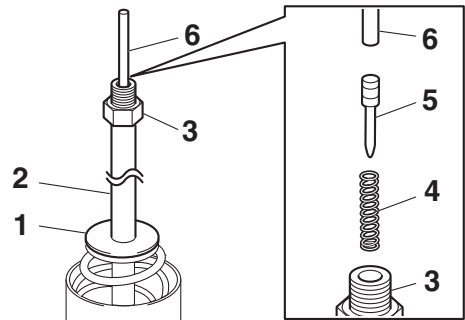
WARNING

Always use a new cap bolt O-ring.

- Hold the cap bolt and tighten the nut “3” to specification.

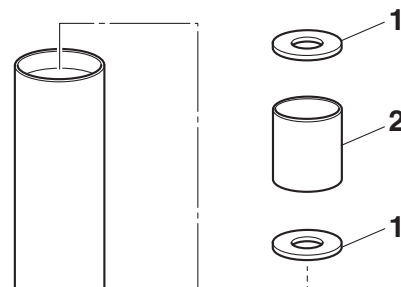


**Front fork cap bolt locknut
14 Nm (1.4 m·kg, 10 ft·lb)**



17. Install (left side):

- Washers “1”
- Spacer “2”



18. Install:

- Cap bolt
(to the outer tube)

TIP

Temporarily tighten the cap bolt.

EAS23050

INSTALLING THE FRONT FORK LEGS

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

1. Install:

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

TIP

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

2. Tighten:

- Lower bracket pinch bolts “1”



Lower bracket pinch bolt
23 Nm (2.3 m·kg, 17 ft·lb)

- Cap bolt “2”



Cap bolt
25 Nm (2.5 m·kg, 18 ft·lb)

- Upper bracket pinch bolt “3”



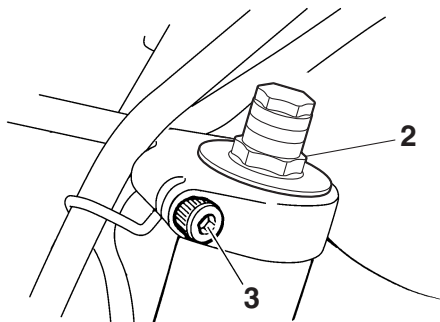
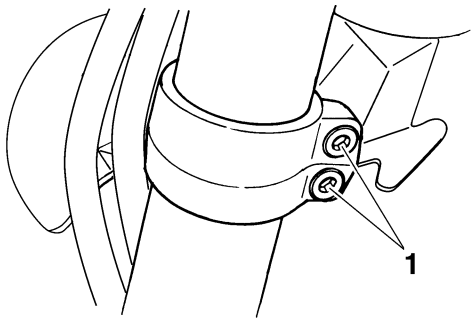
Upper bracket pinch bolt
26 Nm (2.6 m·kg, 19 ft·lb)

EWA13680



WARNING

Make sure the brake hoses are routed properly.



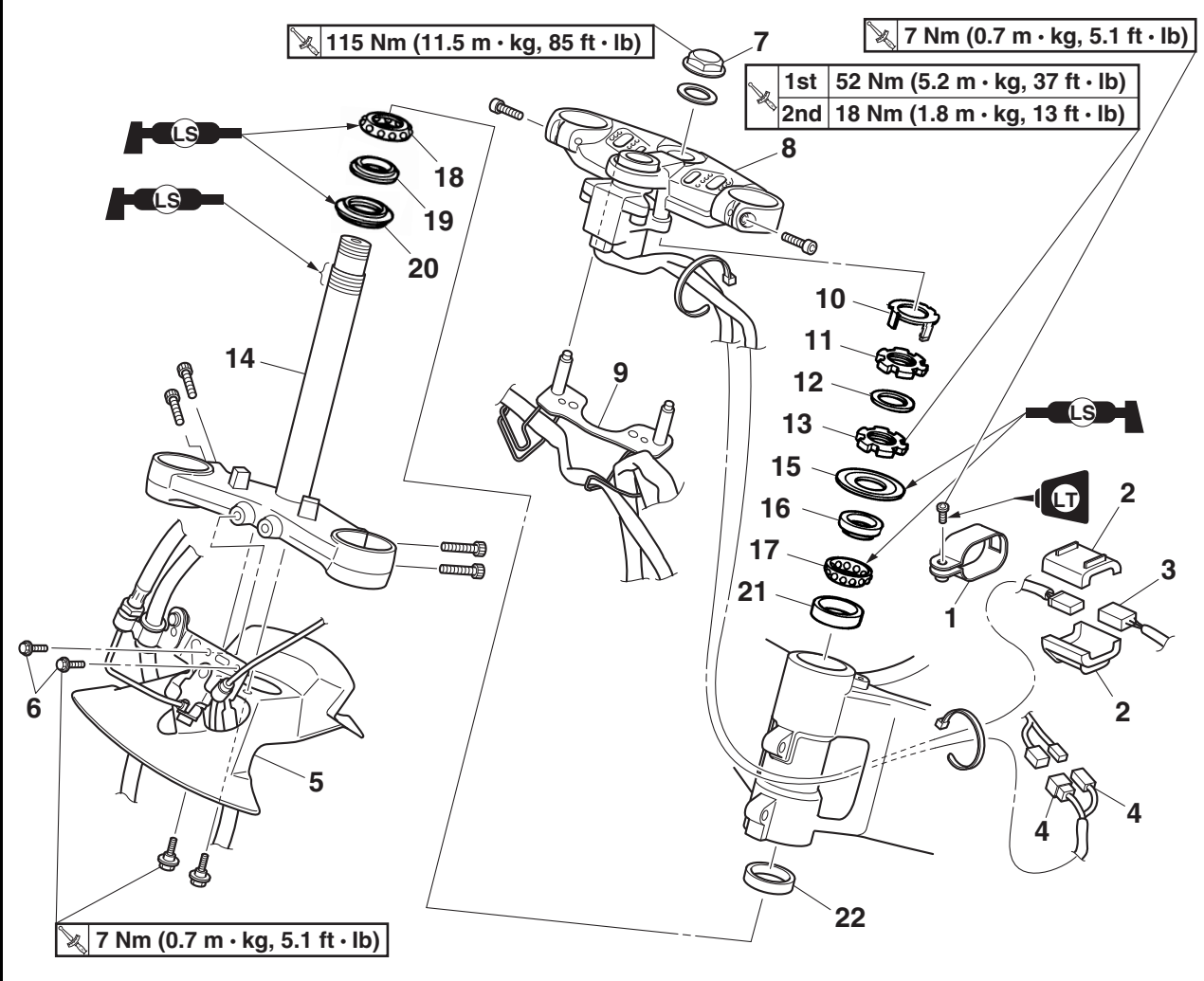
3. Adjust:

- Spring preload
 - Rebound damping (right side only)
 - Compression damping (right side only)
- Refer to “ADJUSTING THE FRONT FORK LEGS” on page 3-21.

EAS23090

STEERING HEAD

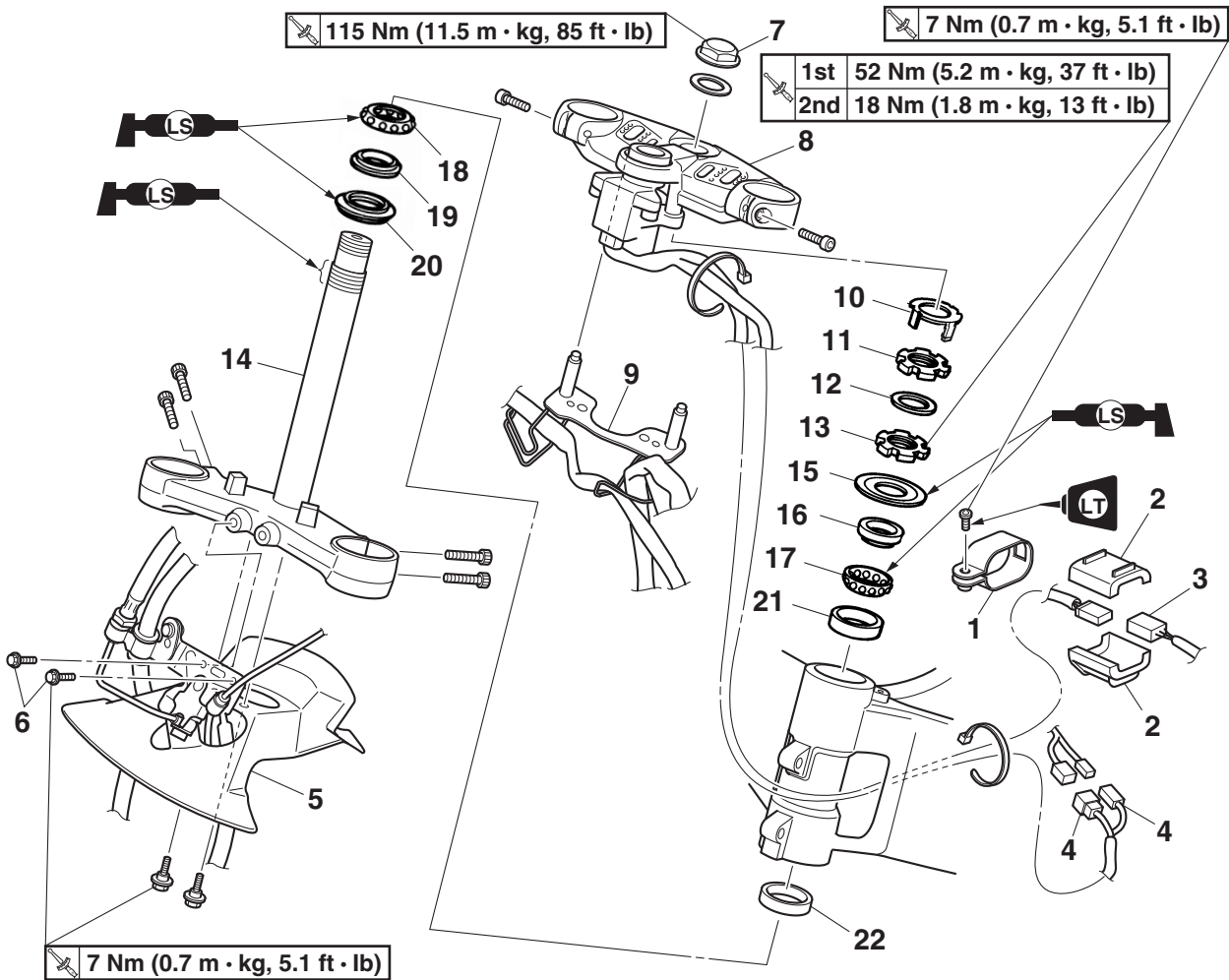
Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Handlebars		Refer to "HANDLEBARS" on page 4-76.
	Front wheel		Refer to "FRONT WHEEL" on page 4-22.
	Front fork legs		Refer to "FRONT FORK" on page 4-82.
1	Immobilizer unit coupler cover holder	1	
2	Immobilizer unit coupler cover	2	
3	Immobilizer unit coupler	1	Disconnect.
4	Main switch coupler	2	Disconnect.
5	Lower bracket cover	1	
6	Brake hose joint bracket bolt	2	
7	Steering stem nut	1	
8	Upper bracket	1	
9	Handlebar bracket	1	
10	Lock washer	1	

STEERING HEAD

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
11	Upper ring nut	1	
12	Rubber washer	1	
13	Lower ring nut	1	
14	Lower bracket	1	
15	Upper bearing cover	1	
16	Upper bearing inner race	1	
17	Upper bearing	1	
18	Lower bearing	1	
19	Lower bearing inner race	1	
20	Dust seal	1	
21	Upper bearing outer race	1	
22	Lower bearing outer race	1	
			For installation, reverse the removal procedure.

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

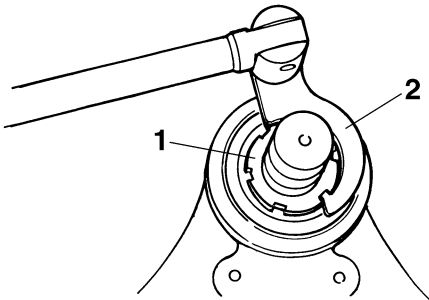
WARNING

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 "1" with a long rod "2" and hammer.

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

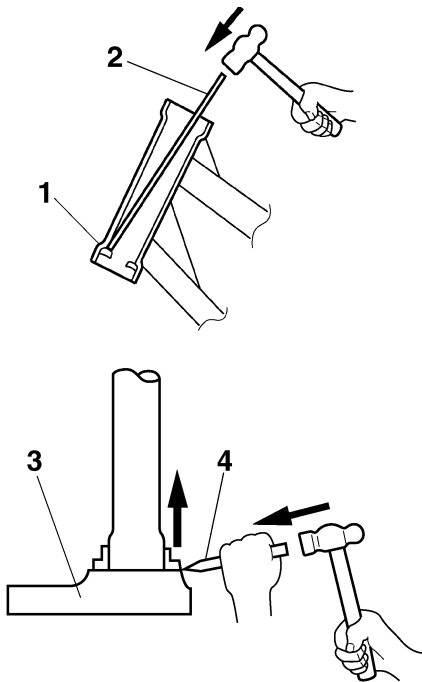
ECA14270

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.



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

EAS23140

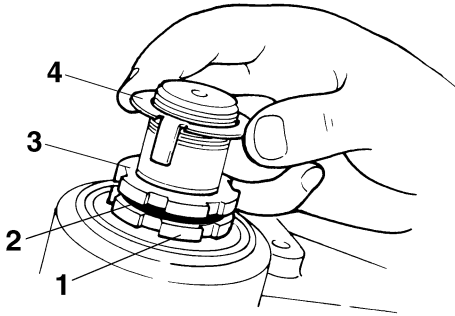
INSTALLING THE STEERING HEAD

1. Lubricate:
 - Upper bearing
 - Lower bearing
 - Bearing races

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

2. Install:
 - Lower 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.



3. Install:
- Upper bracket
 - Steering stem nut

TIP _____
Temporarily tighten the steering stem nut.

4. Install:
- Front fork legs
Refer to "FRONT FORK" on page 4-82.

TIP _____
Temporarily tighten the upper and lower bracket pinch bolts.

5. Tighten:
- Steering stem nut



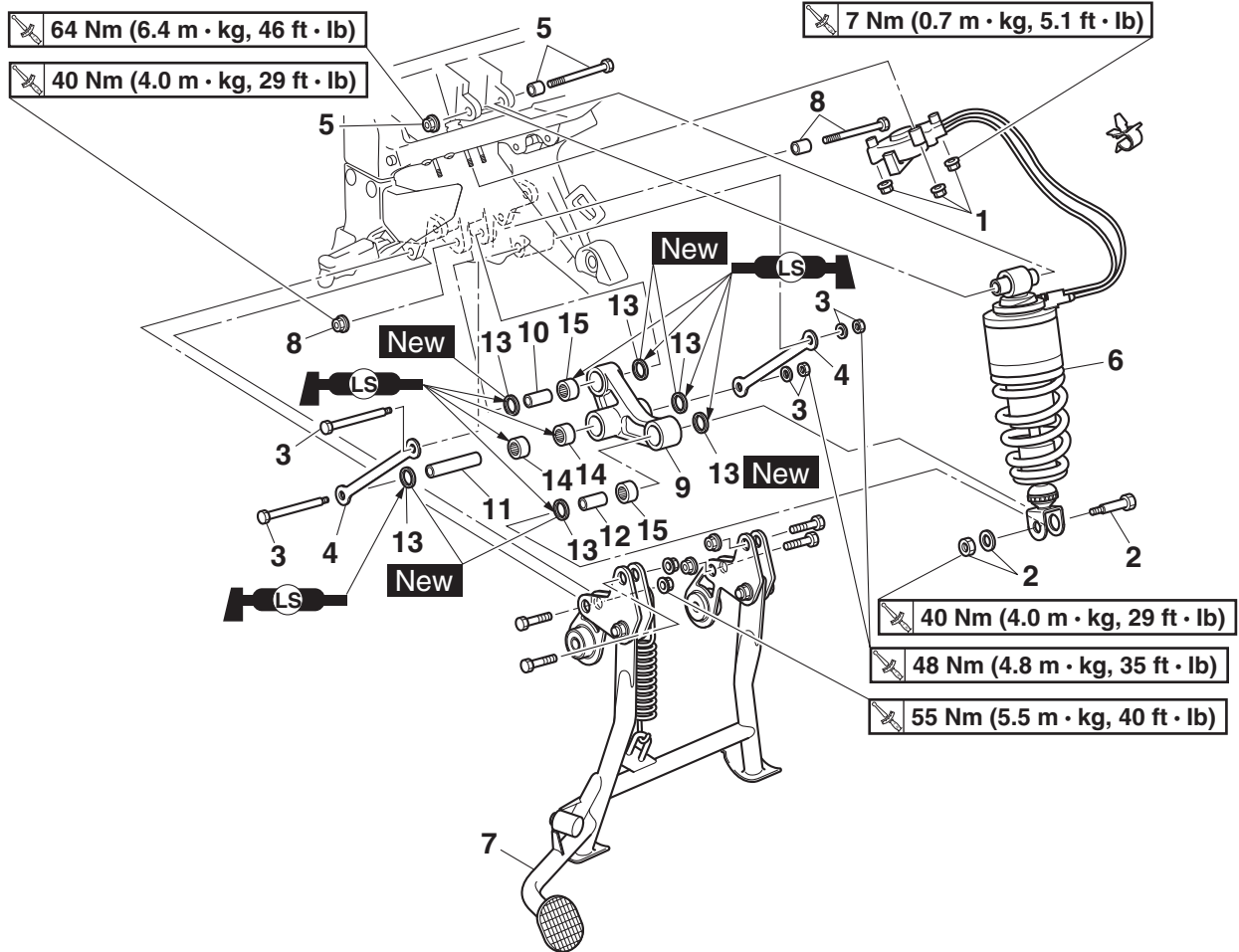
Steering stem nut
115 Nm (11.5 m·kg, 85 ft·lb)

REAR SHOCK ABSORBER ASSEMBLY

EAS23160

REAR SHOCK ABSORBER ASSEMBLY

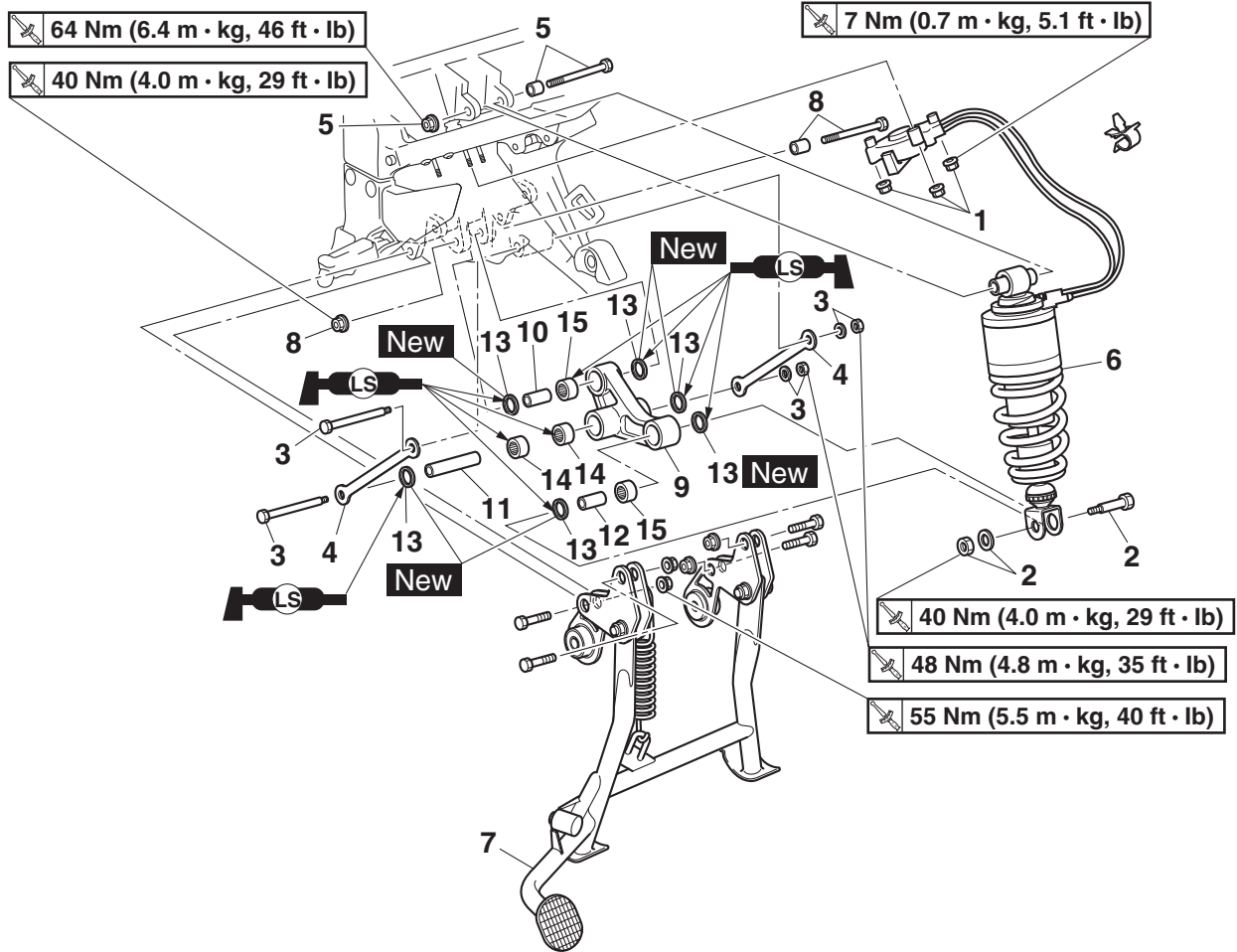
Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Left side cover/Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Rear wheel		Refer to "REAR WHEEL" on page 4-31.
	Mufflers/Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-3.
1	Rear shock absorber spring preload adjusting lever nut	3	
2	Rear shock absorber assembly lower nut/Washer/Bolt	1/1/1	
3	Connecting arm nut/Washer/Bolt	2/2/2	
4	Connecting arm	2	
5	Rear shock absorber assembly upper nut/Bolt/Spacer	1/1/1	
6	Rear shock absorber assembly	1	
7	Centerstand	1	
8	Relay arm nut/Bolt/Spacer	1/1/1	
9	Relay arm	1	
10	Spacer	1	

REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
11	Spacer	1	
12	Spacer	1	
13	Oil seal	6	
14	Bearing	2	
15	Bearing	2	
			For installation, reverse the removal procedure.

REAR SHOCK ABSORBER ASSEMBLY

EAS23180

HANDLING THE REAR SHOCK ABSORBER

EWA13740

WARNING

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

- Do not tamper or attempt to open the rear shock absorber.
- Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.
- Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.

EAS23190

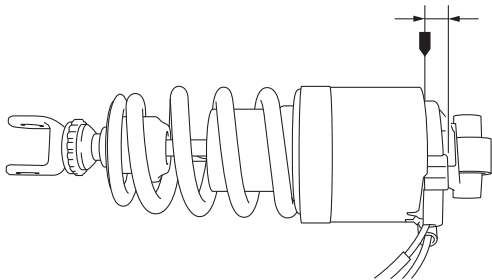
DISPOSING OF A REAR SHOCK ABSORBER

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

EWA13760

WARNING

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



EAS23230

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

TIP

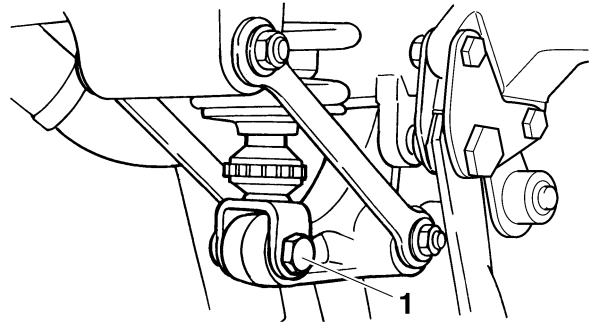
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- Rear shock absorber assembly lower bolt "1"
- Connecting arms

TIP

While removing the connecting arm bolts, hold the swingarm so that it does not drop down.

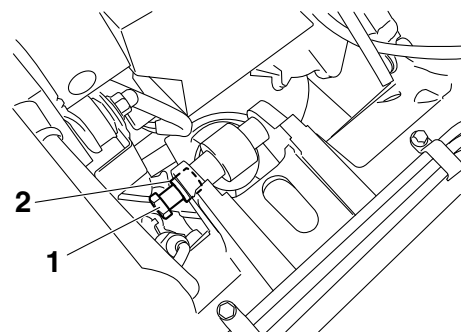


3. Remove:

- Rear shock absorber assembly upper bolt "1"
- Spacer "2"
- Rear shock absorber assembly

TIP

- Partially pull out the rear shock absorber assembly upper bolt, slide the spacer "1" towards the bolt head to create some clearance between the bolt and the frame, and then remove the bolt completely.
- Raise the swingarm and then remove the rear shock absorber assembly from between the swingarm and relay arm.



EAS23240

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:

- Rear shock absorber rod
Bends/damage → Replace the rear shock absorber assembly.

REAR SHOCK ABSORBER ASSEMBLY

- Rear shock absorber
Gas leaks/oil leaks → Replace the rear shock absorber assembly.
- Spring
Damage/wear → Replace the rear shock absorber assembly.
- Bushing
Damage/wear → Replace the rear shock absorber assembly.
- Spacer
Damage/scratches → Replace.
- Bolts
Bends/damage/wear → Replace.

EAS23260

CHECKING THE CONNECTING ARM AND RELAY ARM

1. Check:
 - Connecting arms
 - Relay arm
Damage/wear → Replace.
2. Check:
 - Bearings
 - Oil seals
Damage/pitting → Replace.
3. Check:
 - Spacers
Damage/scratches → Replace.


EAS23270

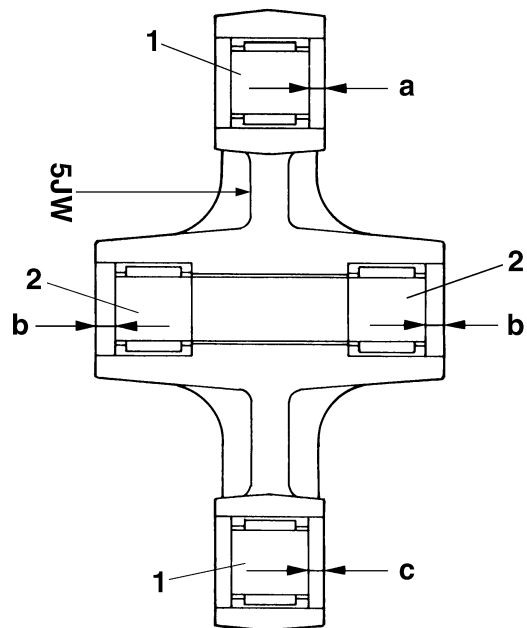
INSTALLING THE RELAY ARM

1. Lubricate:
 - Spacer
 - Bearings

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

2. Install:
 - Bearings “1”, “2”
(to the relay arm)

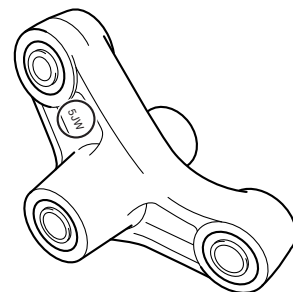
	Installed depth “a” 4.5 mm (0.18 in) Installed depth “b” 3.5–4.5 mm (0.14–0.18 in) Installed depth “c” 4.0 mm (0.16 in)
---	---



3. Install:
 - Relay arm

TIP

Make sure that the embossed mark “5JW” on the relay arm faces to the left.



EAS23310

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Install:
 - Rear shock absorber assembly

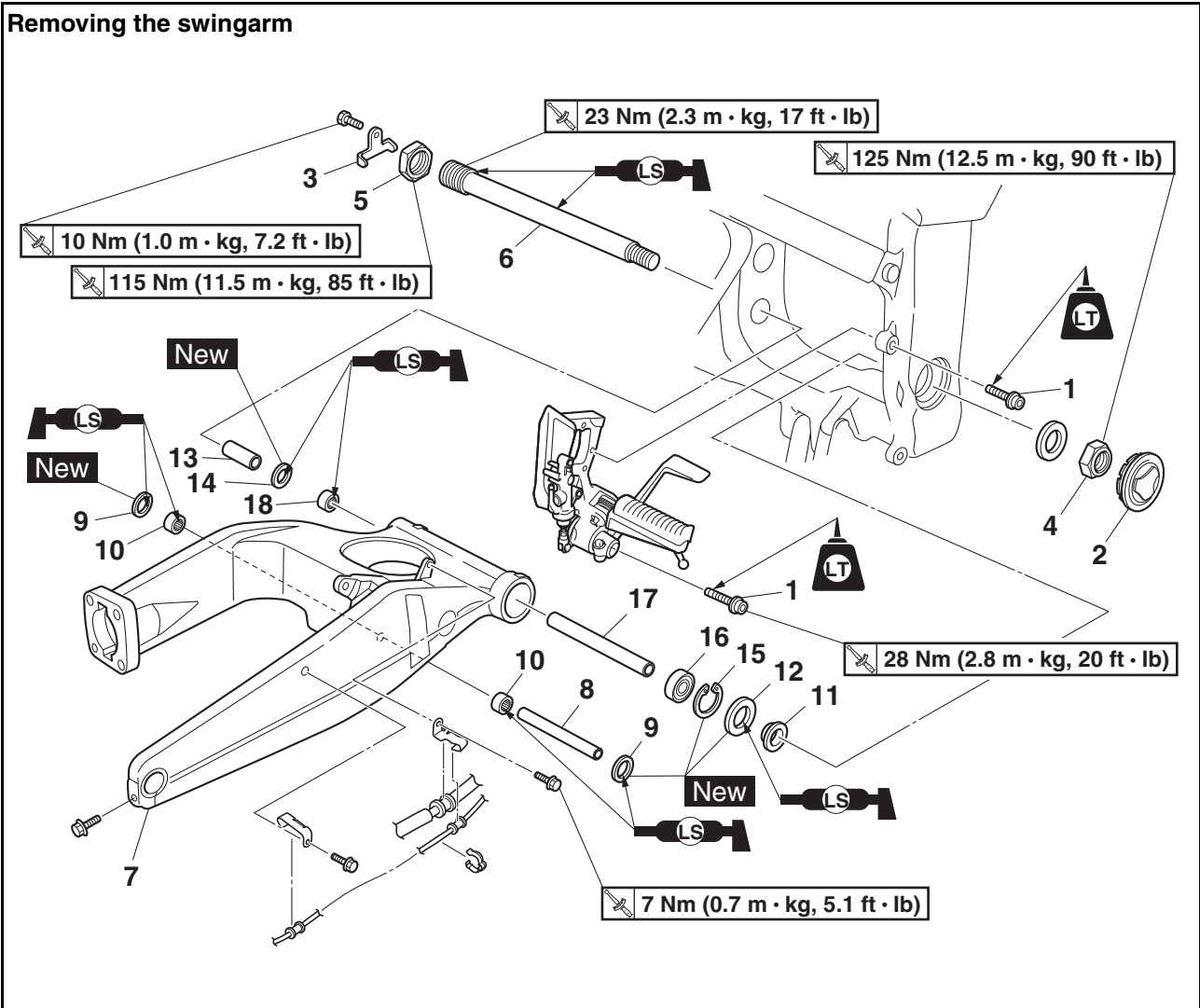
TIP

- Make sure that the warning label on the rear shock absorber assembly faces to the right.
- When installing the rear shock absorber assembly, lift up the swingarm.

EAS23330

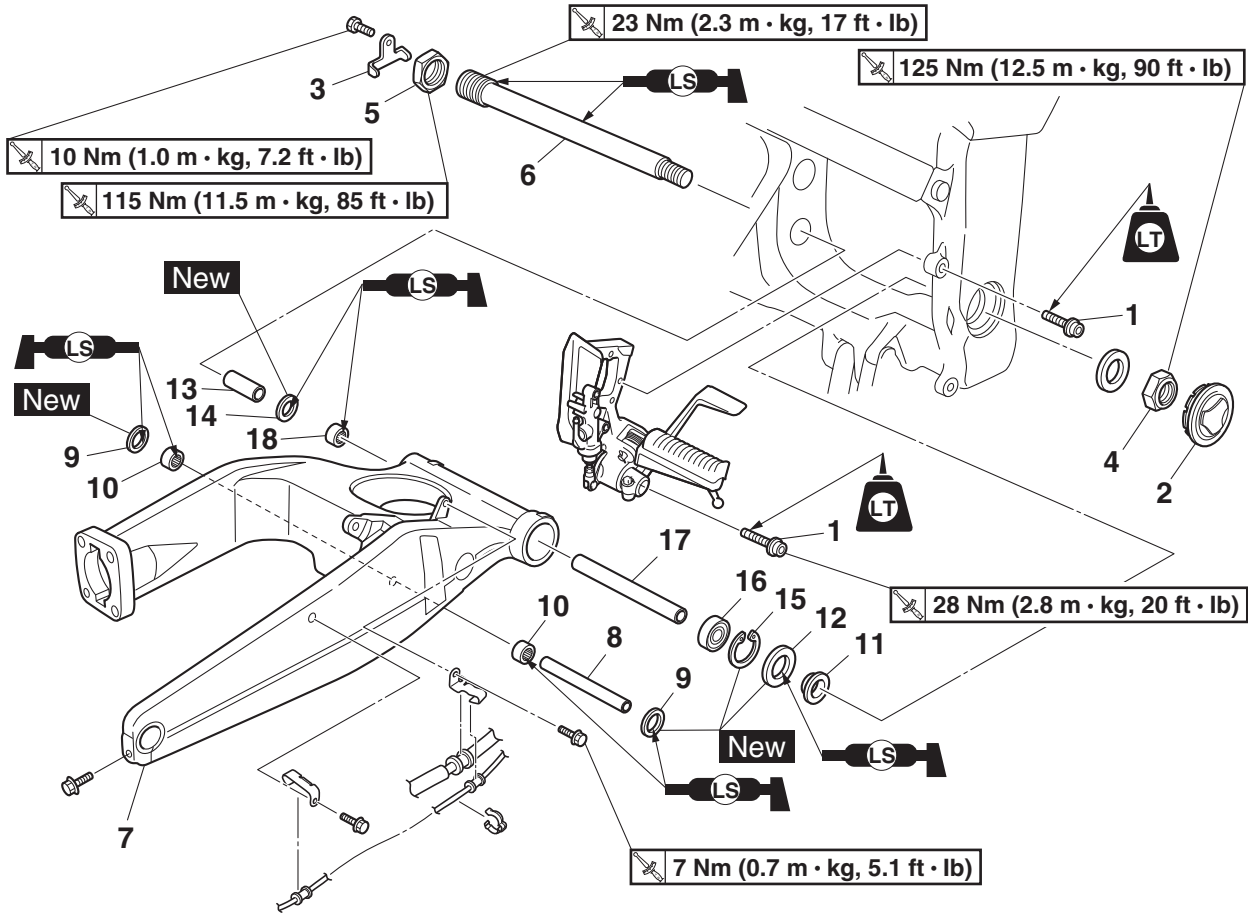
SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Left side cover/Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Rear wheel		Refer to "REAR WHEEL" on page 4-31.
	Rear shock absorber assembly/Connecting arms		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-98.
	Final drive assembly/Universal joint		Refer to "SHAFT DRIVE" on page 4-106.
1	Right footrest assembly bolt	2	
2	Pivot shaft end cover	1	
3	Pivot shaft nut retainer	1	
4	Pivot shaft self-lock nut	1	
5	Pivot shaft nut	1	
6	Pivot shaft	1	
7	Swingarm	1	
8	Spacer	1	
9	Oil seal	2	
10	Bearing	2	
11	Collar	1	

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
12	Oil seal	1	
13	Spacer	1	
14	Oil seal	1	
15	Circlip	1	
16	Bearing	1	
17	Spacer	1	
18	Bearing	1	
			For installation, reverse the removal procedure.

EAS23350

REMOVING THE SWINGARM

- 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.

- Measure:

- Swingarm side play
- Swingarm vertical movement

- Measure the tightening torque of the pivot shaft, pivot shaft self-lock nut, and pivot shaft nut.



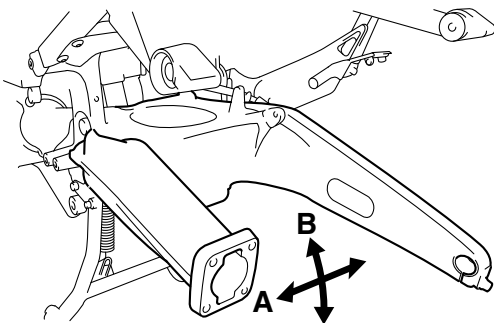
Pivot shaft
23 Nm (2.3 m·kg, 17 ft·lb)
Pivot shaft self-lock nut
125 Nm (12.5 m·kg, 90 ft·lb)
Pivot shaft nut
115 Nm (11.5 m·kg, 85 ft·lb)

- Measure the swingarm side play "A" by moving the swingarm from side to side.
- If the swingarm side play is out of specification, check the spacers, bearings, washers, and dust covers.



Swingarm side play (at the end of the swingarm)
0 mm (0 in)

- Check the swingarm vertical movement "B" by moving the swingarm up and down. If swingarm vertical movement is not smooth or if there is binding, check the spacers, bearings, washers, and dust covers.



EAS23360

CHECKING THE SWINGARM

- Check:

- Swingarm
Bends/cracks/damage → Replace.

- Check:

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

EWA13770

WARNING

Do not attempt to straighten a bent pivot shaft.

- Wash:

- Pivot shaft
- Spacers
- Washer
- Bearings
- Collar



Recommended cleaning solvent
Kerosene

- Check:

- Spacers
- Washer
- Collar
- Oil seals
Damage/wear → Replace.
- Bearings
Damage/pitting → Replace.

EAS23390

INSTALLING THE SWINGARM

- Lubricate:

- Bearings
- Oil seals
- Pivot shaft



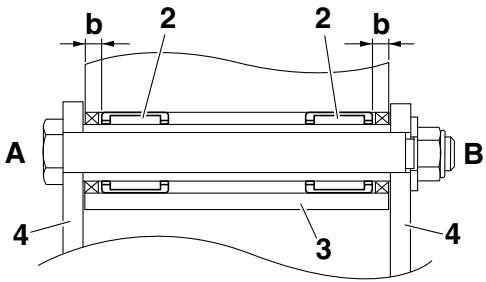
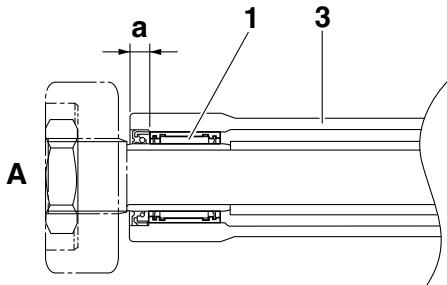
Recommended lubricant
Lithium-soap-based grease

- Install:

- Bearing "1"
- Bearings "2"




Installed depth "a"
7.0 mm (0.28 in)
Installed depth "b"
4.0 mm (0.16 in)



- 3. Swingarm
- 4. Connecting arm
- A. Left side
- B. Right side

- 3. Tighten:
 - Pivot shaft

	Pivot shaft 23 Nm (2.3 m·kg, 17 ft·lb)
---	--

- Pivot shaft nut

	Pivot shaft nut 115 Nm (11.5 m·kg, 85 ft·lb)
---	--

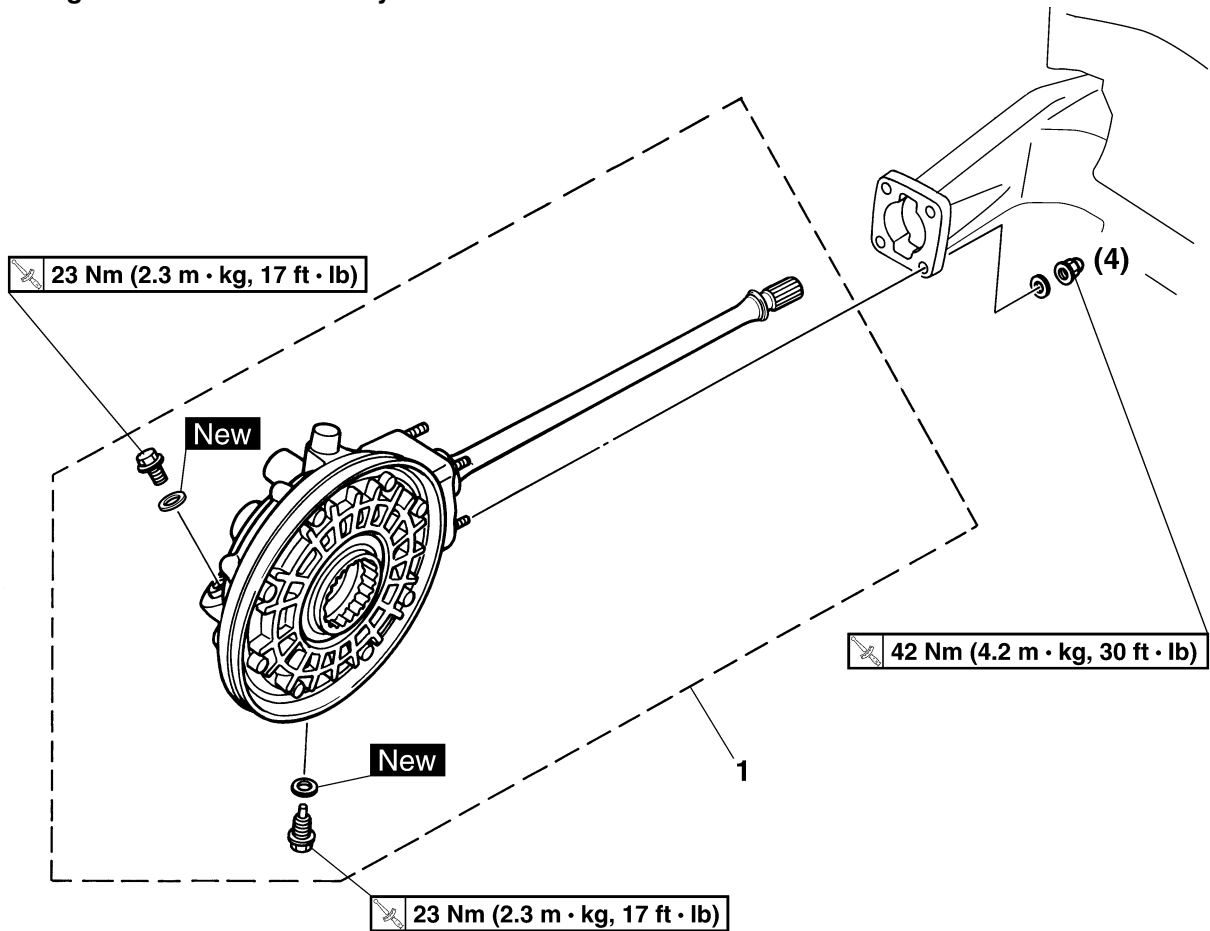
- Pivot shaft self-lock nut

	Pivot shaft self-lock nut 125 Nm (12.5 m·kg, 90 ft·lb)
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EAS23550

SHAFT DRIVE

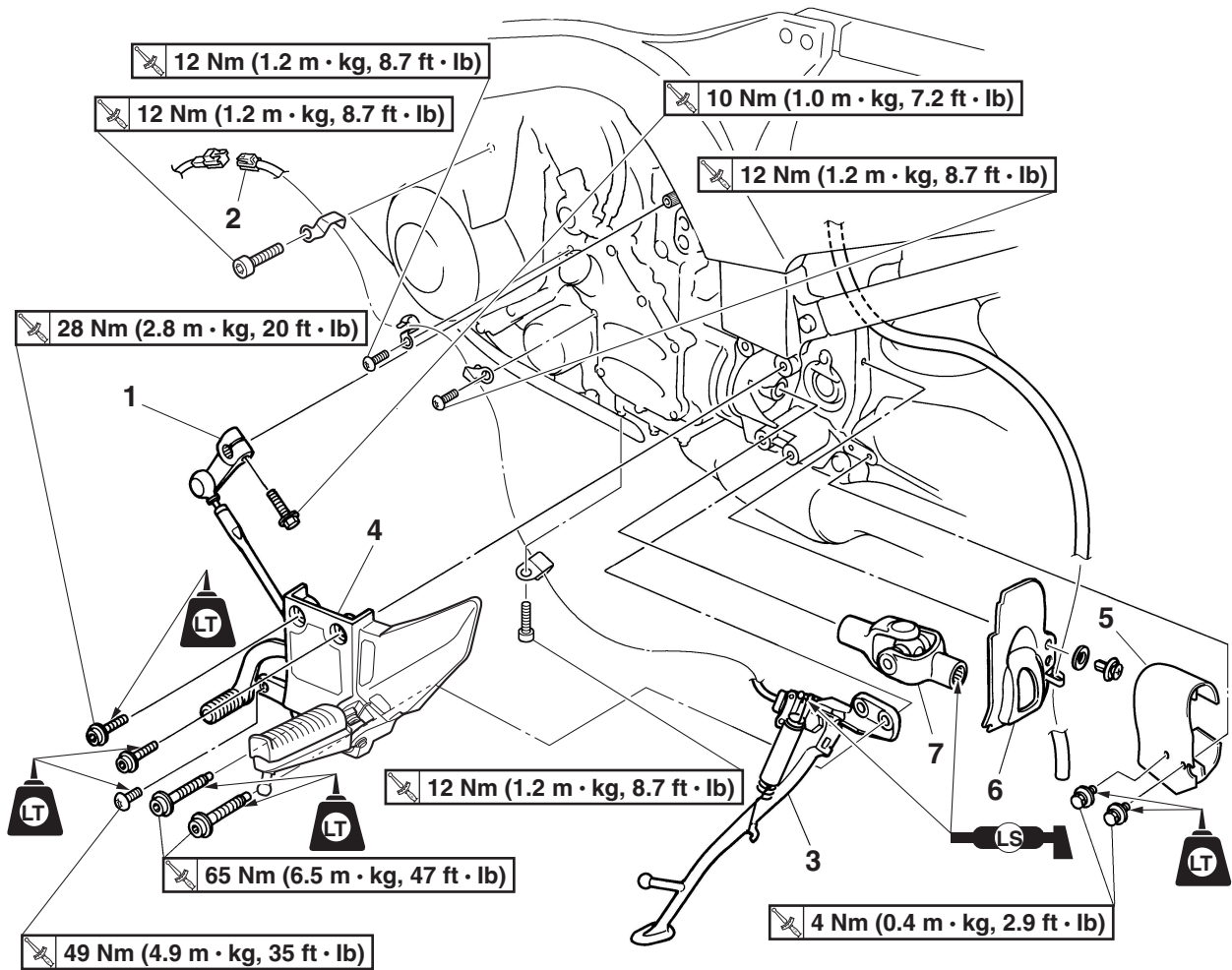
Removing the final drive assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Final gear oil		Drain. Refer to "CHANGING THE FINAL GEAR OIL" on page 3-29.
	Rear wheel		Refer to "REAR WHEEL" on page 4-31.
1	Final drive assembly	1	
			For installation, reverse the removal procedure.

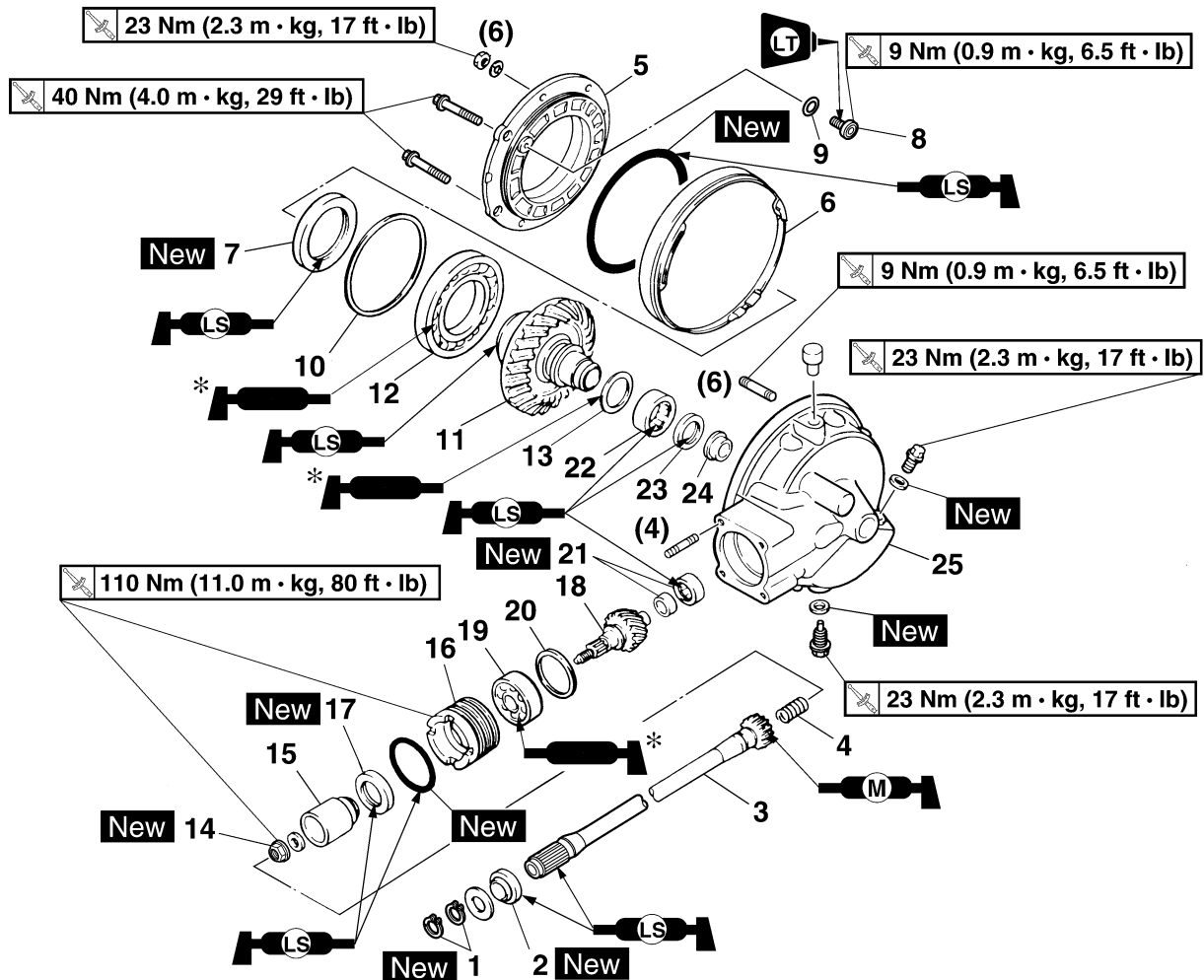
SHAFT DRIVE

Removing the universal joint



Order	Job/Parts to remove	Q'ty	Remarks
	Left side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Final gear oil		Drain. Refer to "CHANGING THE FINAL GEAR OIL" on page 3-29.
	Final drive assembly		Refer to "SHAFT DRIVE" on page 4-106.
1	Shift arm	1	
2	Sidestand switch coupler	1	Disconnect.
3	Sidestand	1	
4	Left footrest assembly	1	
5	Drive shaft dust cover	1	
6	Universal joint dust cover	1	
7	Universal joint	1	
			For installation, reverse the removal procedure.

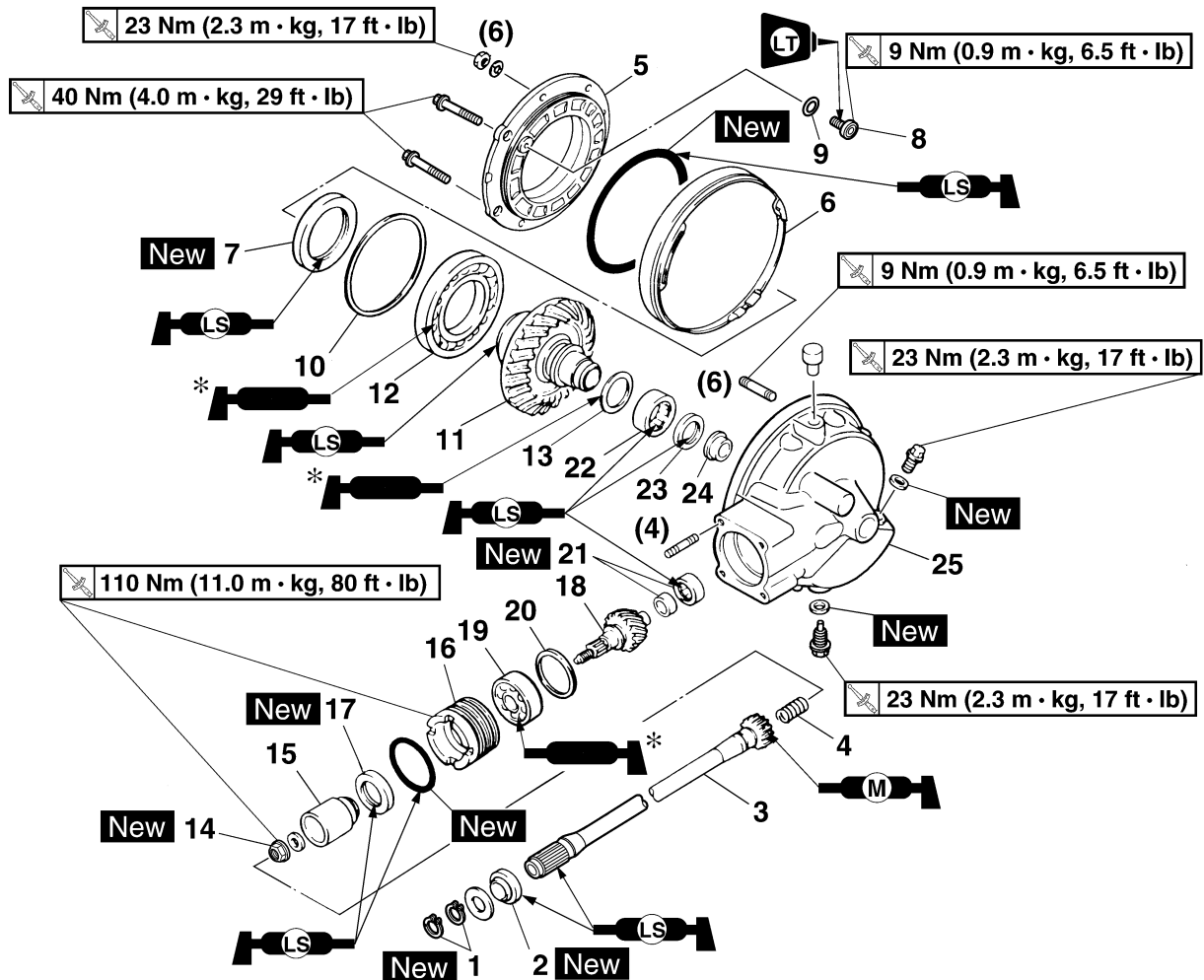
Disassembling the final drive assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	2	
2	Oil seal	1	
3	Drive shaft	1	
4	Spring	1	
5	Ring gear bearing housing	1	
6	Dust cover	1	
7	Oil seal	1	
8	Stopper bolt	1	Left-hand threads
9	Stopper bolt shim		Refer to "ADJUSTING THE RING-GEAR-TO-STOPPER-BOLT CLEARANCE" on page 4-114.
10	Ring gear shim		Refer to "ADJUSTING THE FINAL GEAR BACKLASH" on page 4-113 and "ALIGNING THE FINAL DRIVE PINION GEAR AND RING GEAR" on page 4-116.
11	Ring gear	1	
12	Bearing	1	
13	Thrust washer	1	Refer to "ADJUSTING THE FINAL GEAR BACKLASH" on page 4-113 and "ALIGNING THE FINAL DRIVE PINION GEAR AND RING GEAR" on page 4-116.

SHAFT DRIVE

Disassembling the final drive assembly

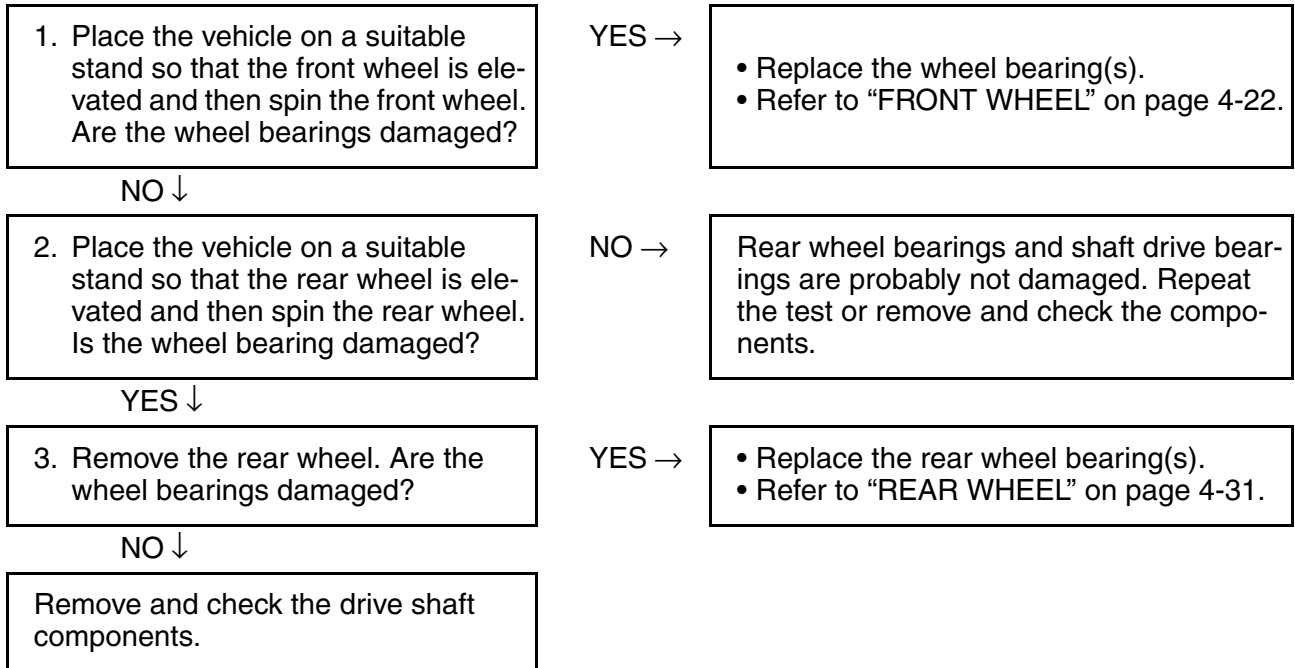


Order	Job/Parts to remove	Q'ty	Remarks
14	Coupling gear nut	1	
15	Coupling gear	1	
16	Bearing retainer	1	Left-hand threads
17	Oil seal	1	
18	Final drive pinion gear	1	
19	Bearing	1	
20	Final drive pinion gear shim		Refer to "ALIGNING THE FINAL DRIVE PINION GEAR AND RING GEAR" on page 4-116.
21	Final drive pinion gear bearing	1	
22	Ring gear bearing	1	
23	Oil seal	1	
24	Collar	1	
25	Final gear case	1	
			For assembly, reverse the disassembly procedure.

* Apply shaft drive gear oil (Part No.: 9079E-SH002-00)

Troubleshooting chart

When causes (A) or (B) shown in the table at the beginning of the "TROUBLESHOOTING" section exist, check the following points.



EAS23570

CHECKING THE FINAL DRIVE OIL FOR CONTAMINATION AND CHECKING THE SHAFT DRIVE FOR LEAKS

1. Drain:
 - Final gear oil (from the final gear case)
Refer to "CHANGING THE FINAL GEAR OIL" on page 3-29.
2. Check:
 - Final gear oil
Large amount of metal particles → Check for bearing seizure.

TIP

A small amount of metal particles in the final gear oil is normal.

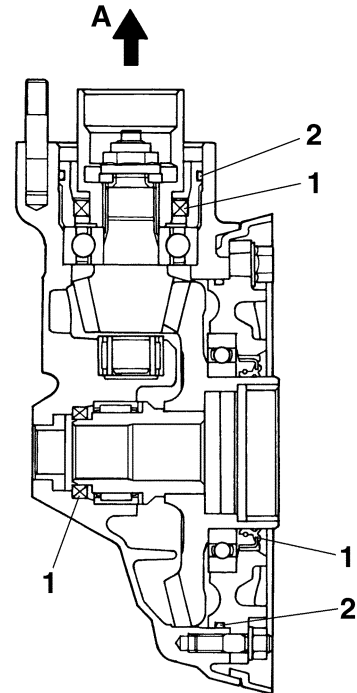
3. Check:
 - Shaft drive housing (for oil leaks)



- a. Thoroughly clean the entire vehicle and then completely dry it.
- b. Apply a leak-locating compound or dry powder spray to the shaft drive.
- c. Test ride the vehicle long enough to locate a leak.
Oil leak → Repair or replace the faulty part(s).

TIP

- What may appear to be an oil leak on a new or fairly new vehicle, may result from the application of a rust preventive coating or excessive seal lubrication.
- Always clean the vehicle and recheck the area where the leak is thought to originate from.



1. Oil seal
2. O-ring
- A. Forward



EAS23580

MEASURING THE FINAL GEAR BACKLASH

1. Secure the final drive assembly in a vise.
2. Remove:
 - Final gear oil drain bolt
3. Drain:
 - Final gear oil (from the final drive assembly)
4. Measure:
 - Final gear backlash
Out of specification → Adjust.

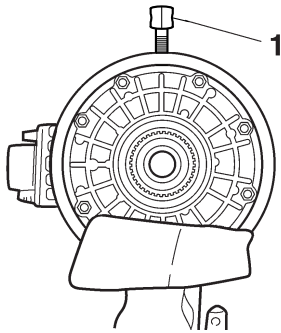


Final gear backlash
0.22–0.45 mm (0.0087–0.0177 in)

- a. Install the ring gear fix bolt (M14) "1", into the final gear oil drain hole.



Ring gear fix bolt (M14)
90890-01524
YM-01524



b. Finger tighten the ring gear fix bolt (M14) until it stops the ring gear from moving.

TIP

Do not overtighten the ring gear fix bolt (M14).

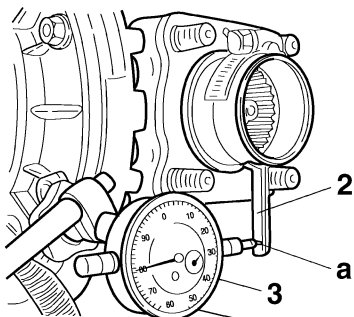
c. Install the final gear backlash band "2" and dial gauge "3".

TIP

Make sure that the dial gauge plunger contacts the groove "a" in the final gear backlash band as shown in the illustration.



Final gear backlash band
90890-01511
Middle drive gear lash tool
YM-01230



- d. Gently rotate the coupling gear from engagement to disengagement.
- e. Record the reading on the dial gauge.
- f. Remove the dial gauge, final gear backlash band, and ring gear fix bolt (M14).
- g. Rotate the final drive pinion gear 90°.
- h. Reinstall the ring gear fix bolt (M14), final gear backlash band, and dial gauge.
- i. Repeat steps (d) to (h) three more times (for a total of four measurements).
- j. If any of the readings are over specification, adjust the final gear backlash.



EAS23590

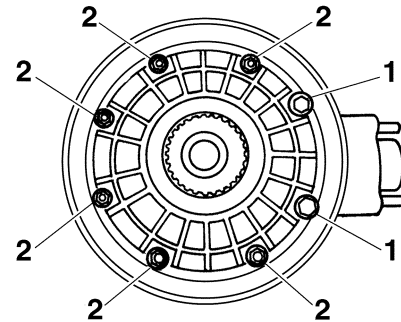
ADJUSTING THE FINAL GEAR BACKLASH

1. Remove:

- Ring gear bearing housing bolts "1"
- Ring gear bearing housing nuts "2"

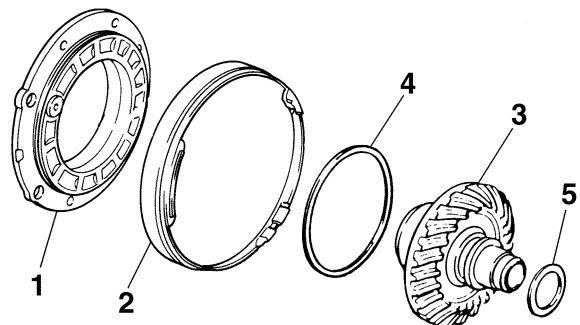
TIP

Working in a crisscross pattern, loosen each bolt and nut 1/4 of a turn. After all of the bolts and nuts are fully loosened, remove them.



2. Remove:

- Ring gear bearing housing "1"
- Dust cover "2"
- Ring gear "3"
- Ring gear shim(s) "4"
- Thrust washer "5"



3. Adjust:


- Final gear backlash




a. Select the suitable shim(s) and thrust washer with the following chart.

Thinner shim	Final gear backlash is increased.
Thicker shim	Final gear backlash is decreased.

- b. If it is necessary to increase the final gear backlash by more than 0.2 mm, reduce the thrust washer thickness by 0.2 mm for every 0.2 mm increase of ring gear shim thickness.
- c. If it is necessary to reduce the final gear backlash by more than 0.2 mm, increase the thrust washer thickness by 0.2 mm for every 0.2 mm decrease of ring gear shim thickness.


	Ring gear shims Thickness (mm) 0.25 0.30 0.40 0.50
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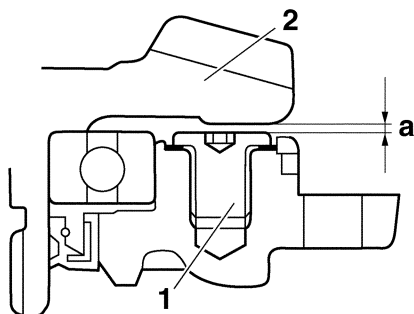
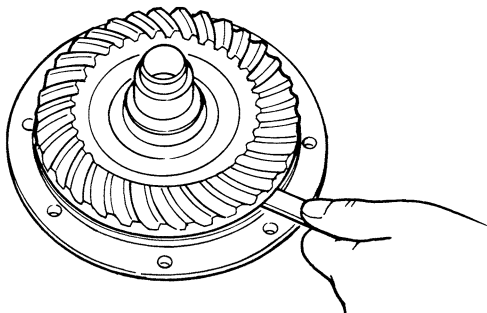
	Thrust washers Thickness (mm) 1.2 1.4 1.6 1.8 2.0
---	---

EAS23600

MEASURING THE RING-GEAR-TO-STOPPER-BOLT CLEARANCE

- Remove:
 - Ring gear bearing housing (along with the ring gear)
Refer to "ADJUSTING THE FINAL GEAR BACKLASH" on page 4-113.
- Measure:
 - Ring-gear-to-stopper-bolt clearance "a"
Out of specification → Adjust.

	Ring-gear-to-stopper-bolt clearance 0.30–0.60 mm (0.0118–0.0236 in)
--	---



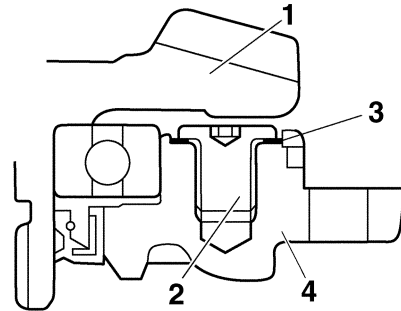
- Stopper bolt
- Ring gear

- Install:
 - Ring gear bearing housing (along with the ring gear)


EAS23610

ADJUSTING THE RING-GEAR-TO-STOPPER-BOLT CLEARANCE


- Remove:
 - Ring gear "1"
 - Stopper bolt "2"
 - Stopper bolt shim(s) "3"
 - Ring gear bearing housing "4"



- Select:
 - Stopper bolt shim(s)

	Stopper bolt shims Thickness (mm) 0.15 0.20
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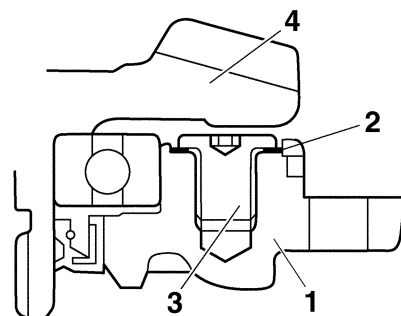
- Install:
 - Ring gear bearing housing "1"
 - Stopper bolt shim(s) "2"
 - Stopper bolt "3"
 - Ring gear "4"

	Stopper bolt 9 Nm (0.9 m·kg, 6.5 ft·lb)
---	---

ECA14320

NOTICE

- The stopper bolt has left-hand threads. To tighten the stopper bolt, turn it counter-clockwise.
- Apply LOCTITE® onto the stopper bolt.



- Measure:
 - Ring-gear-to-stopper-bolt clearance



Ring-gear-to-stopper-bolt clearance
0.30–0.60 mm (0.0118–0.0236 in)

TIP

If the ring-gear-to-stopper-bolt clearance is out of specification, repeat the above procedure.

EAS23620

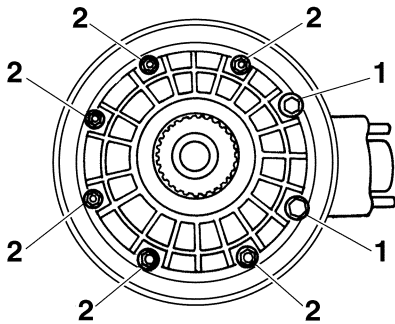
DISASSEMBLING THE FINAL DRIVE ASSEMBLY

1. Remove:

- Ring gear bearing housing bolts “1”
- Ring gear bearing housing nuts “2”

TIP

Working in a crisscross pattern, loosen each bolt and nut 1/4 of a turn. After all of the bolts and nuts are fully loosened, remove them.

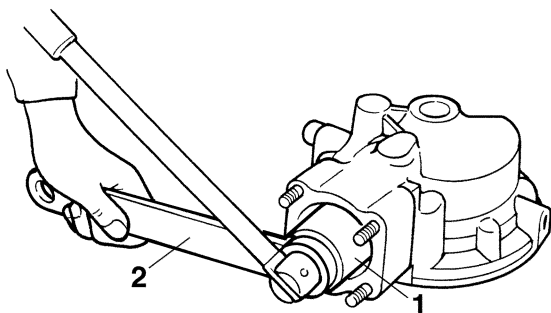


2. Remove:

- Coupling gear nut
 - Coupling gear “1”
- (with the coupling gear/middle shaft tool “2”)



Coupling gear/middle shaft tool
90890-01229
Gear holder
YM-01229



3. Remove:

- Bearing retainer
- (with the bearing retainer wrench “1”)

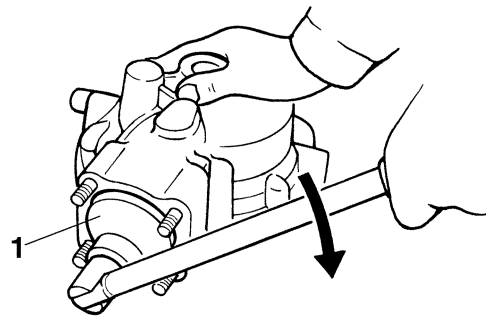


Bearing retainer wrench
90890-04050
Pinion bearing retainer & remover
YM-04050

ECA14330

NOTICE

The bearing retainer has left-hand threads. To loosen the bearing retainer, turn it clockwise.



4. Remove:

- Final drive pinion gear

EWA13800

WARNING

Always use new bearings.

ECA14340

NOTICE

The final drive pinion gear should only be removed if ring gear replacement is necessary.

TIP

Lightly tap on the end of the final drive pinion gear with a soft hammer.

EAS23630

REMOVING AND INSTALLING THE BEARINGS

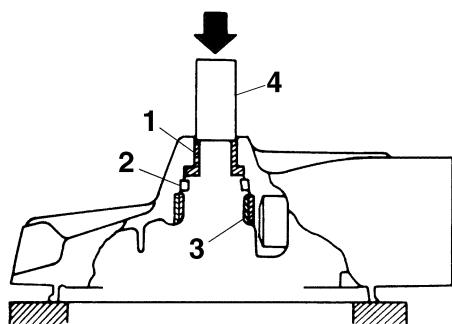
1. Check:

- Bearings
- Damage → Replace.

2. Remove:

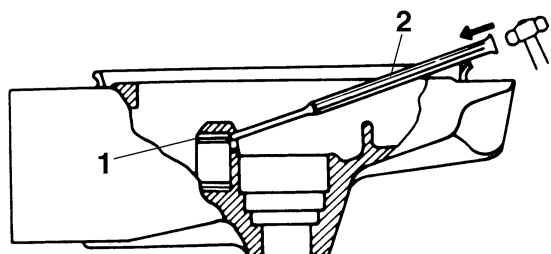
- Collar “1”
- Oil seal “2”
- Bearing “3”

(with an appropriate press tool “4” and an appropriate support for the final gear case)



3. Remove:
- Bearing "1"

- a. Heat the final gear case to approximately 150 °C (302 °F).
- b. Remove the bearing outer races with an appropriately shaped punch "2".



- c. Remove the inner race from the final drive pinion gear.

TIP

The removal of the bearing is a difficult procedure and is rarely necessary.

4. Install:

- Bearing **New**

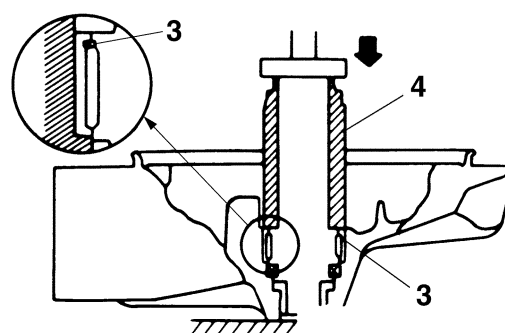
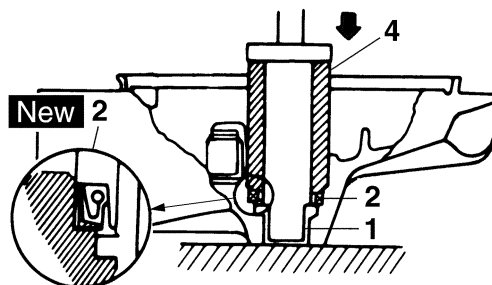
- a. Heat the final gear case to approximately 150 °C (302 °F).
- b. Install the bearing outer races with a socket or appropriate tool that matches the diameter of the races.
- c. Install the inner race onto the final drive pinion gear.

5. Install:

- Collar "1"
- Oil seal "2" **New**
- Bearing "3"
(with an appropriate press tool "4" and press)

TIP

The bearing can be reused, but Yamaha recommends installing a new one.



EAS23640

ALIGNING THE FINAL DRIVE PINION GEAR AND RING GEAR

TIP

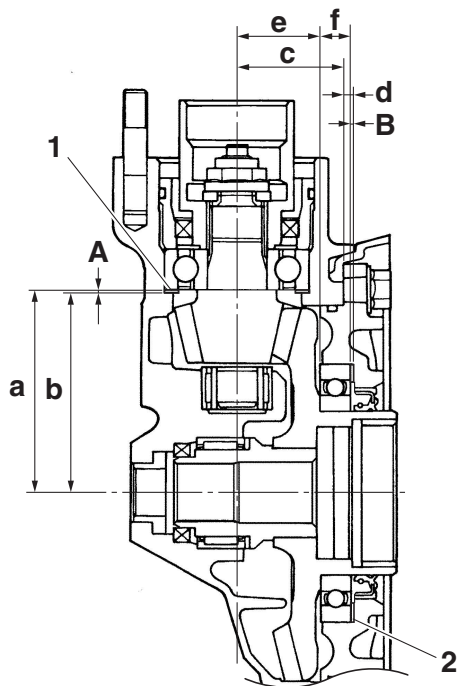
Aligning the final drive pinion gear and ring gear is necessary when any of the following parts are replaced:

- Final gear case
- Ring gear bearing housing
- Any bearing

1. Select:

- Final drive pinion gear shim(s)
- Ring gear shim(s)

- a. Position the final drive pinion gear shim(s) "1" and the ring gear with shim(s) "2". Calculate the respective thicknesses from information marked on the final gear case and the final drive pinion gear.



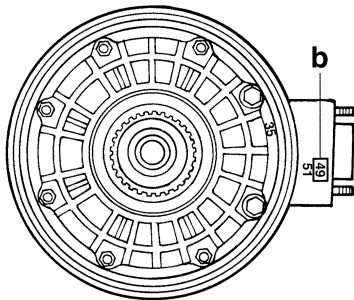
b. To find final drive pinion gear shim thickness "A", use the following formula:

$$\text{Final drive pinion gear shim thickness } A = a - b$$

Where:

$a = 87$

$b =$ a numeral on the final gear case, to be divided by 100 and added to "86".



Example:

If the final gear case is marked "49":

$$\begin{aligned} A &= 87 - (86 + 49/100) \\ &= 87 - (86 + 0.49) \\ &= 87 - 86.49 \\ &= 0.51 \end{aligned}$$

Therefore, the calculated final drive pinion gear shim thickness is 0.51 mm. Shim sizes are supplied in the following thicknesses.



Final drive pinion gear shims
Thickness (mm)
0.30 0.40 0.50

Since the final drive pinion gear shims are only available in 0.10 mm increments, round off to the hundredths digit.

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

In the example above, the calculated final drive pinion gear shim thickness is 0.51 mm. The chart instructs you to round off the 1 to 0. Thus, you should use a 0.50 mm final drive pinion gear shim.

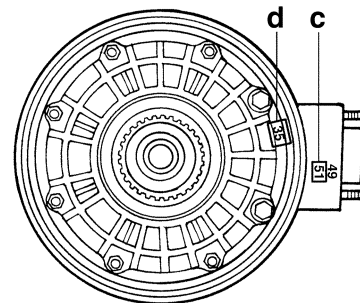
c. To find ring gear shim thickness "B", use the following formula:

$$\text{Ring gear shim thickness } B = c + d - e - f$$

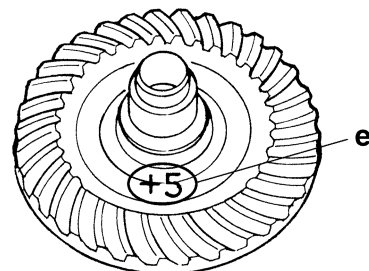
Where:

$c =$ a numeral on the final gear case, to be divided by 100 and added to "45".

$d =$ a numeral usually on the surface of the ring gear bearing housing, to be divided by 100 and added to "3".



$e =$ a numeral (positive or negative) on the inside of the ring gear, to be divided by 100 and added to "35.40".



$f =$ the ring gear bearing thickness constant.



Ring gear bearing thickness
13.00 mm (0.51 in)

Example:

If the final gear case is marked "51", the ring gear bearing housing is marked "35", the ring gear is marked "+ 05", and "f" is 13.00:

$$B = 45.51 + 3.35 - 35.45 - 13$$

$$= 0.41$$

Therefore, the calculated ring gear shim thickness is 0.41 mm.

Shim sizes are supplied in the following thicknesses.



Ring gear shims
Thickness (mm)
0.25 0.30 0.40 0.50

Since the ring gear shims are only available in 0.10 mm increments, round off the hundredths digit.

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

In the example above, the calculated ring gear shim thickness is 0.41 mm. The chart instructs you to round off the 1 to 0. Thus, you should use a 0.40 mm ring gear shim.



2. Install:

- Shims (as calculated)
- Final drive pinion gear
- Bearing retainer
(with the bearing retainer wrench "1")



Bearing retainer
110 Nm (11.0 m·kg, 80 ft·lb)

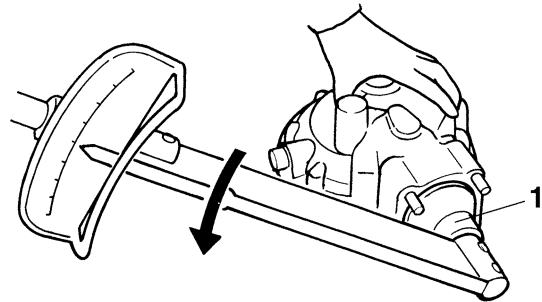
ECA14350

NOTICE

The bearing retainer has left-hand threads. To tighten the bearing retainer, turn it counterclockwise.



Bearing retainer wrench
90890-04050
Pinion bearing retainer & remover
YM-04050



3. Install:

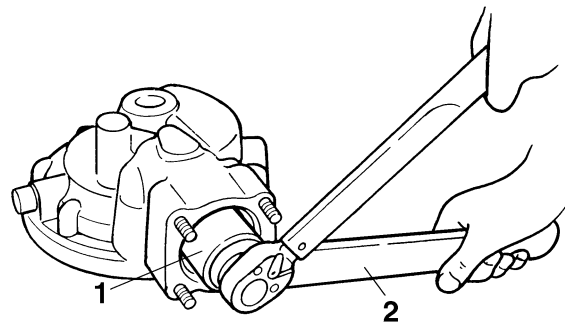
- Coupling gear "1"
- Coupling gear nut **New**
(with the coupling gear/middle shaft tool "2")



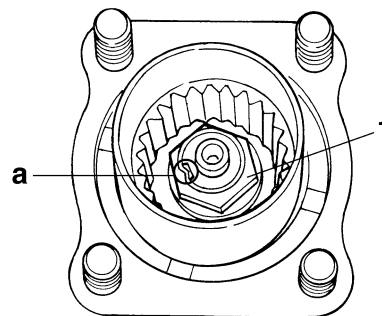
Coupling gear nut
110 Nm (11.0 m·kg, 80 ft·lb)



Coupling gear/middle shaft tool
90890-01229
Gear holder
YM-01229



4. Stake the coupling gear nut "1" at a cutout "a" in the final drive pinion gear.

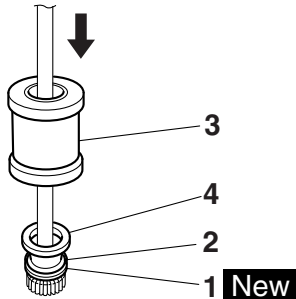


5. Install:

- Ring gear bearing housing
(along with the ring gear, but without the thrust washer)



Fork seal driver weight
90890-01184
Replacement hammer
YM-A9409-7
Fork seal driver attachment
90890-01186
Replacement 27 mm
YM-A9409-1



4. Install:

- Circlip **New**

5. Install:

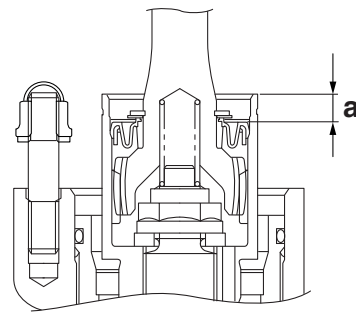
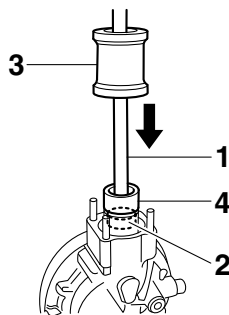
- Drive shaft "1"
(to the final drive pinion gear)
- Oil seal "2"
(to the final gear case with the fork seal driver weight "3" and oil seal installing tool "4")



Fork seal driver weight
90890-01184
Replacement hammer
YM-A9409-7
Oil seal installing tool
90890-01512
YM-01512



Installed depth "a"
8.5–10.0 mm (0.33–0.39 in)



6. Install:

- Universal joint
- Final drive assembly

TIP

Align the drive shaft splines with the driven yoke of the universal joint.

7. Tighten:

- Final drive assembly nuts



Final drive assembly nut
42 Nm (4.2 m·kg, 30 ft·lb)

8. Install:

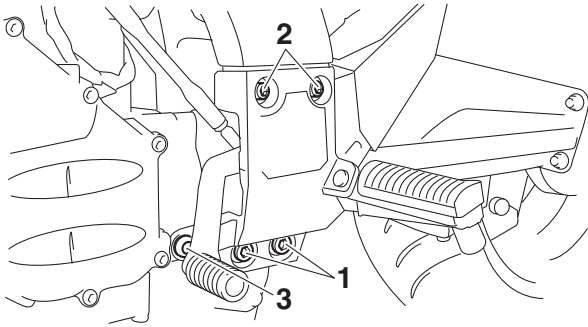
- Sidestand
- Left footrest assembly



Left footrest assembly and side-stand bolt
65 Nm (6.5 m·kg, 47 ft·lb)
LOCTITE®
Left footrest assembly bolt (M8)
28 Nm (2.8 m·kg, 20 ft·lb)
LOCTITE®
Left footrest assembly bolt (M10)
49 Nm (4.9 m·kg, 35 ft·lb)
LOCTITE®

TIP

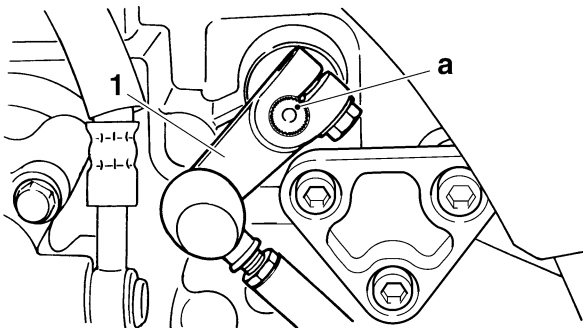
Install the left footrest assembly and sidestand bolts "1", left footrest assembly bolts (M8) "2" and left footrest assembly bolt (M10) "3" temporarily and then tighten them to the specified torques in the proper tightening sequence as shown.



9. Install:
- Shift arm “1”

TIP

Align the punch mark “a” in the shift shaft with the slot in the shift arm.



10. Install:
- Rear wheel
Refer to “REAR WHEEL” on page 4-31.
11. Fill:
- Final gear case
Refer to “CHECKING THE FINAL GEAR OIL LEVEL” on page 3-29.
12. Check:
- Shift pedal position
Refer to “ADJUSTING THE SHIFT PEDAL” on page 5-58.

ENGINE

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EAS1MC1068

ENGINE INSPECTION

EAS20710

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:
 - Valve clearance
Out of specification → Adjust.
Refer to “ADJUSTING THE VALVE CLEARANCE” on page 3-5.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
 - Rider seat
Refer to “GENERAL CHASSIS” on page 4-1.
 - Fuel tank
Refer to “FUEL TANK” on page 7-1.
 - T-bar
Refer to “GENERAL CHASSIS” on page 4-1.
4. Disconnect:
 - Ignition coil couplers
5. Remove:
 - Ignition coils
6. Remove:
 - Spark plug

ECA13340

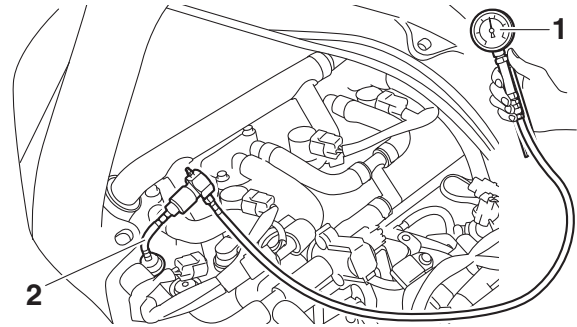
NOTICE

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.

7. Install:
 - Compression gauge “1”
 - Extension “2”



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



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



Standard compression pressure (at sea level)
1600 kPa/400 r/min (16.0 kgf/cm²/400 r/min, 227.6 psi/400 r/min)
Minimum-maximum
1390–1790 kPa (13.9–17.9 kgf/cm², 197.7–254.6 psi)

- 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 kg/cm², 14 psi).

- c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
Carbon deposits → Eliminate.
- d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
Refer to the following table.

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



9. Install:
- Spark plug

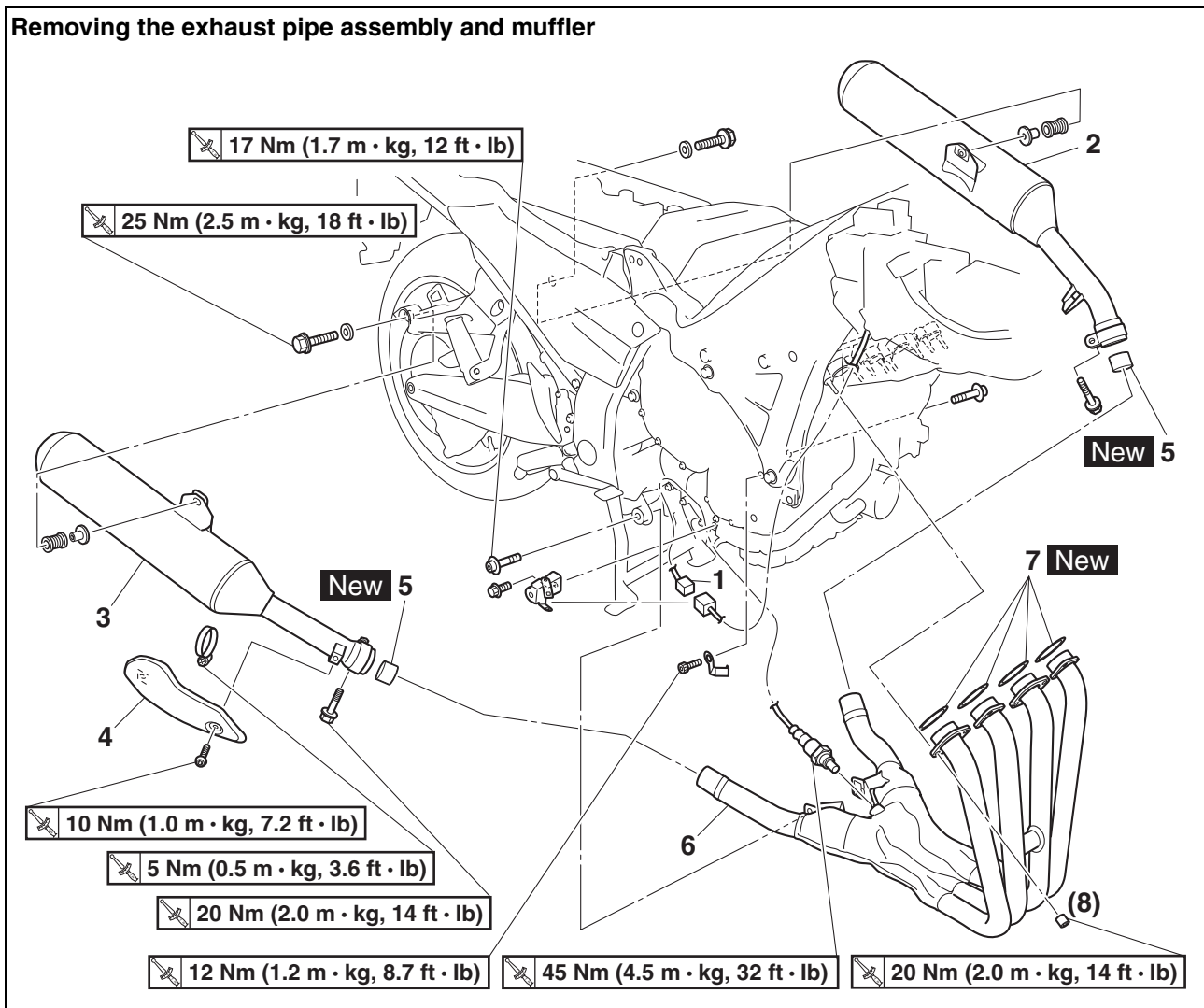
	<p>Spark plug 13 Nm (1.3 m·kg, 9.4 ft·lb)</p>
---	--

10. Install:
- Ignition coils
11. Connect:
- Ignition coil couplers
12. Install:
- T-bar
Refer to “GENERAL CHASSIS” on page 4-1.
 - Fuel tank
Refer to “FUEL TANK” on page 7-1.
 - Rider seat
Refer to “GENERAL CHASSIS” on page 4-1.

EAS23710

ENGINE REMOVAL

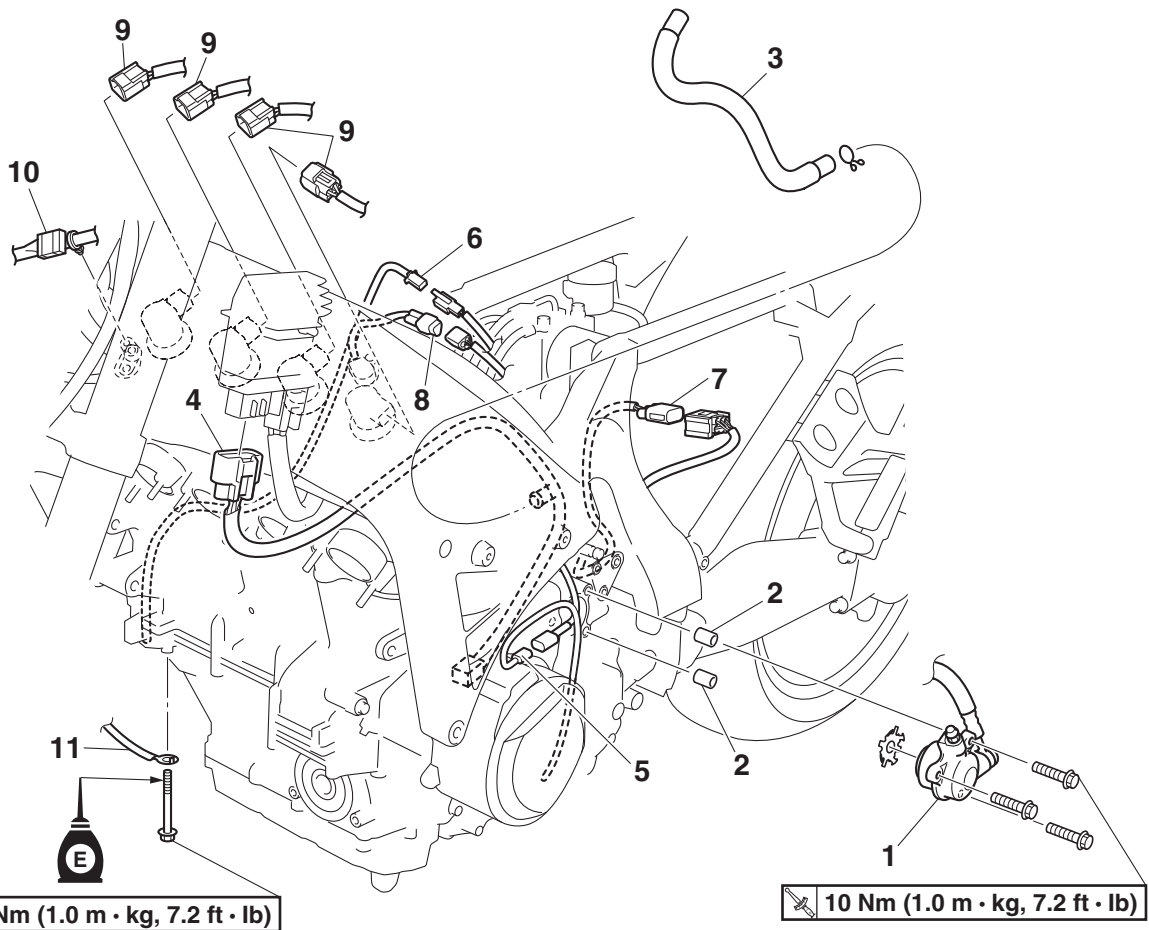
Removing the exhaust pipe assembly and muffler



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/Side cowlings/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Radiator		Refer to "RADIATOR" on page 6-1.
1	O ₂ sensor coupler	1	Disconnect.
2	Left muffler	1	
3	Right muffler	1	
4	Muffler protector	1	
5	Gasket	2	
6	Exhaust pipe assembly	1	
7	Gasket	4	
			For installation, reverse the removal procedure.

ENGINE REMOVAL

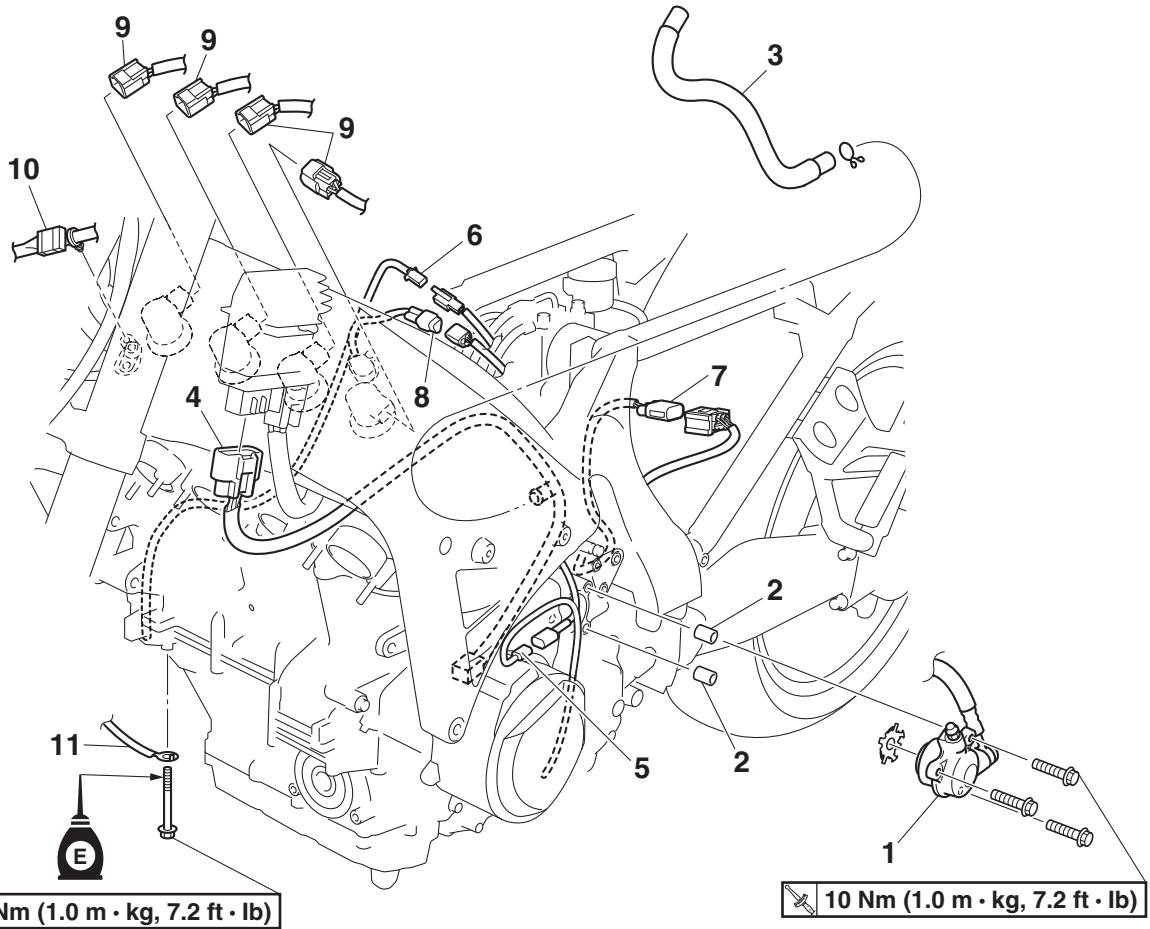
Disconnecting the leads and hose



Order	Job/Parts to remove	Q'ty	Remarks
	Front fender		Refer to "FRONT WHEEL" on page 4-22.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-4.
	Air cut-off valve/Reed valves		Refer to "AIR INDUCTION SYSTEM" on page 7-13.
	Thermostat/Thermostat inlet pipe 1		Refer to "THERMOSTAT" on page 6-6.
	Engine oil/Oil filter cartridge		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Oil cooler		Refer to "OIL COOLER" on page 6-4.
	Water pump		Refer to "WATER PUMP" on page 6-10.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-39.
	Left footrest assembly/Sidestand		Refer to "SHAFT DRIVE" on page 4-106.
1	Clutch release cylinder	1	
2	Dowel pin	2	
3	Crankcase breather hose	1	
4	Stator coil coupler	1	Disconnect.

ENGINE REMOVAL

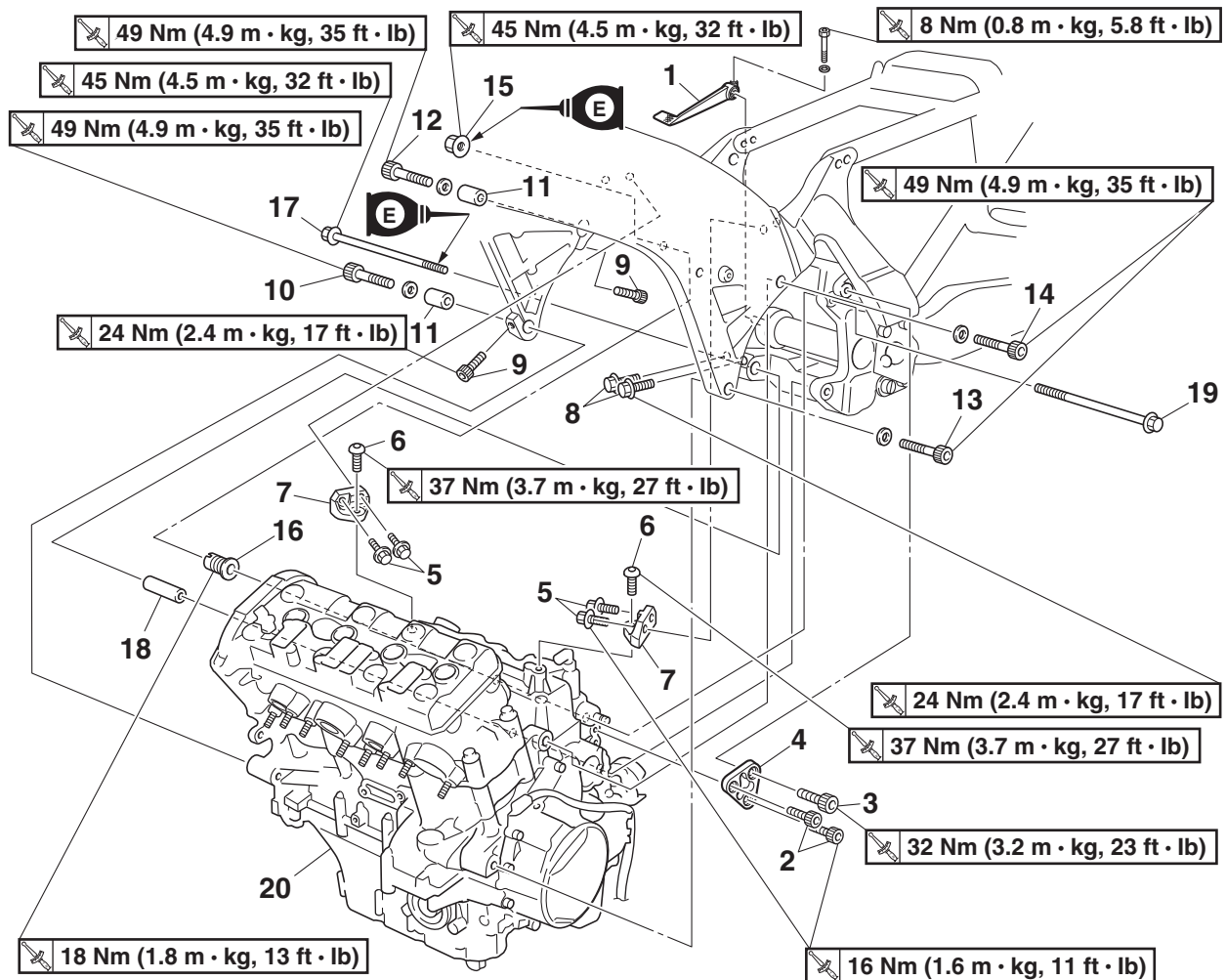
Disconnecting the leads and hose



Order	Job/Parts to remove	Q'ty	Remarks
5	Oil level switch coupler	1	Disconnect.
6	Crankshaft position sensor coupler	1	Disconnect.
7	Gear position switch coupler	1	Disconnect.
8	Cylinder identification sensor coupler	1	
9	Ignition coil coupler	4	
10	Wire harness holder	1	
11	Ground lead	1	Disconnect.
			For installation, reverse the removal procedure.

ENGINE REMOVAL

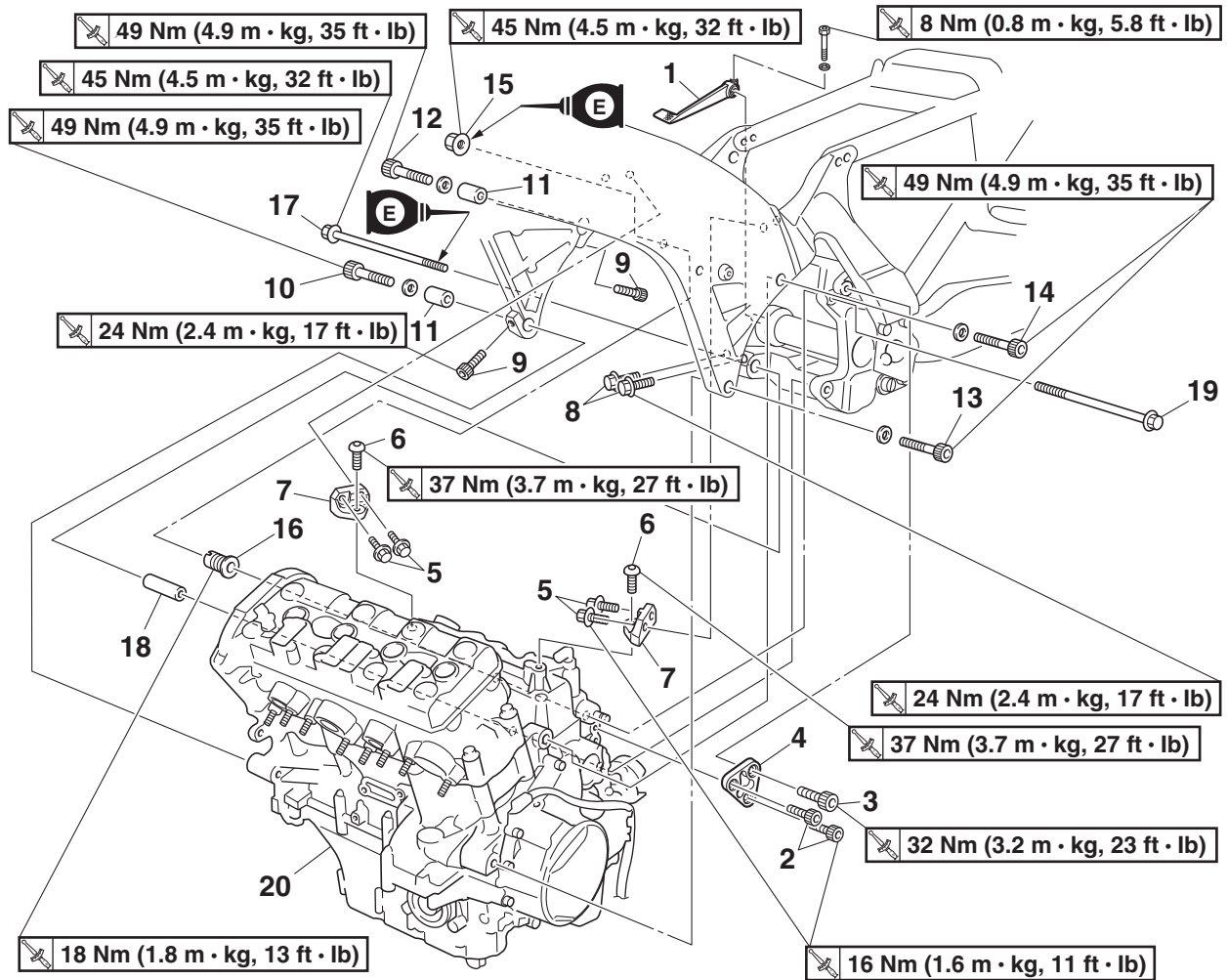
Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
			TIP _____ Place a suitable stand under the engine.
1	Brake pedal	1	
2	Engine bracket and engine bolt (left rear side)	2	
3	Engine bracket and frame bolt (left rear side)	1	
4	Engine bracket (left rear side)	1	
5	Engine bracket and frame bolt (top)	4	
6	Engine bracket and engine bolt (top)	2	
7	Engine bracket (top)	2	
8	Pinch bolt (rear lower side)	2	
9	Pinch bolt (front side)	2	
10	Engine mounting bolt (right front lower side)	1	
11	Spacer	2	
12	Engine mounting bolt (right front upper side)	1	
13	Engine mounting bolt (left front lower side)	1	
14	Engine mounting bolt (left front upper side)	1	
15	Engine mounting nut (rear upper side)	1	

ENGINE REMOVAL

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
16	Spacer bolt	1	Loosen.
17	Engine mounting bolt (rear lower side)	1	
18	Spacer	1	
19	Engine mounting bolt (rear upper side)	1	
20	Engine	1	
			For installation, reverse the removal procedure.

ENGINE REMOVAL

EAS1MC1066

REMOVING THE ENGINE

1. Loosen:

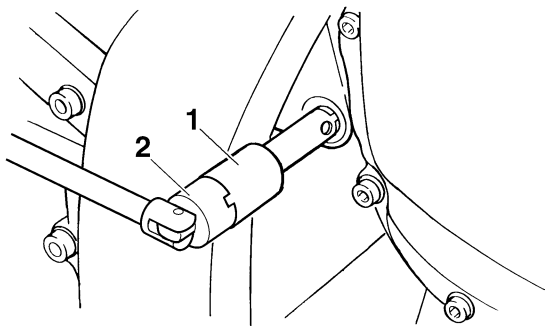
- Spacer bolt

TIP

Loosen the spacer bolt with the pivot shaft wrench "1" and pivot shaft wrench adapter "2".



Pivot shaft wrench
90890-01471
Frame spanner socket
YM-01471
Pivot shaft wrench adapter
90890-01476



EAS23720

INSTALLING THE ENGINE

1. Install:

- Engine

TIP

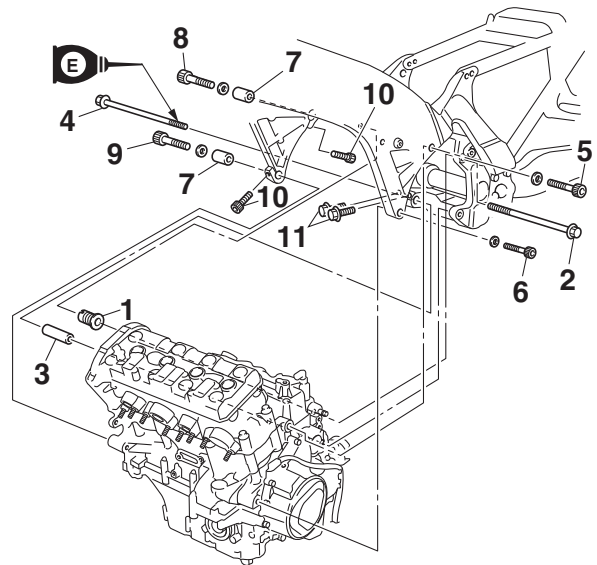
When mounting the engine to the frame, be sure to align the splines on the middle driven shaft with the splines on the universal joint.

2. Install:

- Spacer bolt "1"
- Engine mounting bolt (rear upper side) "2"
- Spacer "3"
- Engine mounting bolt (rear lower side) "4"
- Engine mounting bolt (left front upper side) "5"
- Engine mounting bolt (left front lower side) "6"
- Spacers "7"
- Engine mounting bolt (right front upper side) "8"
- Engine mounting bolt (right front lower side) "9"
- Pinch bolts (front side) "10"
- Pinch bolts (rear lower side) "11"

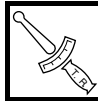
TIP

- Lubricate the engine mounting bolt (rear lower side) threads with engine oil.
- Do not fully tighten the bolts.



3. Tighten:

- Engine mounting bolt (left front upper side) "5"



Engine mounting bolt (left front upper side)
49 Nm (4.9 m·kg, 35 ft·lb)

4. Tighten:

- Engine mounting bolt (rear lower side) "4"



Engine mounting bolt (rear lower side)
45 Nm (4.5 m·kg, 32 ft·lb)

5. Tighten:

- Spacer bolt "1"



Spacer bolt
18 Nm (1.8 m·kg, 13 ft·lb)

TIP

- Tighten the spacer bolt "1" to specification with the pivot shaft wrench and pivot shaft wrench adapter.
- When tightened, the spacer bolt should be flat against the engine surface.

ENGINE REMOVAL



Pivot shaft wrench
90890-01471
Frame spanner socket
YM-01471
Pivot shaft wrench adapter
90890-01476

6. Tighten:

- Engine mounting nut (rear upper side) “12”



Engine mounting nut (rear upper side)
45 Nm (4.5 m·kg, 32 ft·lb)

TIP

Lubricate the engine mounting nut (rear upper side) threads with engine oil.

7. Tighten:

- Engine mounting bolt (left front lower side) “6”
- Engine mounting bolt (right front upper side) “8”
- Engine mounting bolt (right front lower side) “9”



Engine mounting bolt (left front lower side)
49 Nm (4.9 m·kg, 35 ft·lb)
Engine mounting bolt (right front upper side)
49 Nm (4.9 m·kg, 35 ft·lb)
Engine mounting bolt (right front lower side)
49 Nm (4.9 m·kg, 35 ft·lb)

8. Install:

- Engine bracket and engine bolts (top) “13”

9. Tighten:

- Pinch bolts (front side) “10”



Pinch bolt (front side)
24 Nm (2.4 m·kg, 17 ft·lb)

10. Tighten:

- Pinch bolts (rear lower side) “11”



Pinch bolt (rear lower side)
24 Nm (2.4 m·kg, 17 ft·lb)

TIP

Tighten the pinch bolts (rear lower side) one at a time, making sure to tighten the first bolt again after tightening the second bolt.

11. Tighten:

- Engine bracket and engine bolts (top) “13” (temporarily tighten)
- Engine bracket bolts (top) “14” (temporarily tighten)

TIP

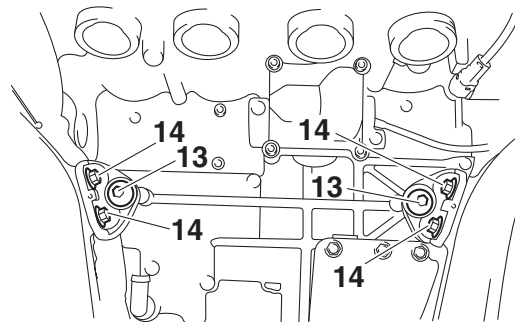
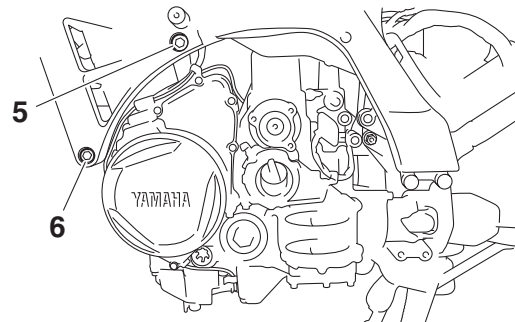
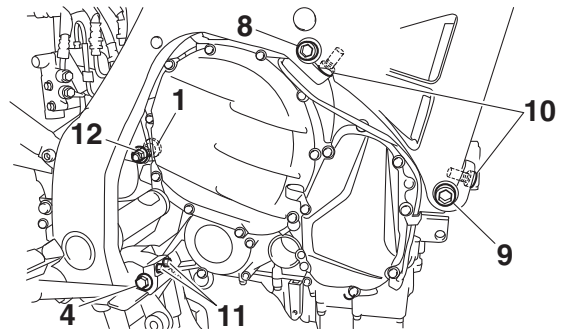
When temporarily tightened, the bolts “13” and “14” should be flat against the engine and frame surface.

12. Tighten:

- Engine bracket and engine bolts (top) “13”
- Engine bracket bolts (top) “14”



Engine bracket and engine bolt (top)
37 Nm (3.7 m·kg, 27 ft·lb)
Engine bracket bolt (top)
16 Nm (1.6 m·kg, 11 ft·lb)



ENGINE REMOVAL

13.Install:

- Engine bracket (left rear side) “1”
- Engine bracket and frame bolt (left rear side) “2”
- Engine bracket and engine bolts (left rear side) “3”

TIP

Do not fully tighten the bolts.

14.Tighten:

- Engine bracket and frame bolt (left rear side) “2”



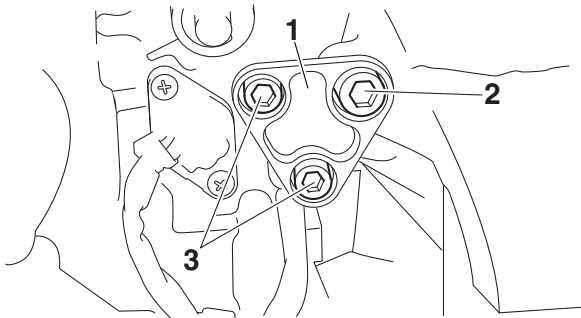
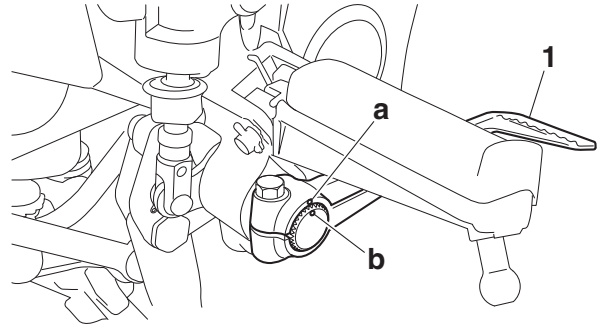
**Engine bracket and frame bolt
(left rear side)**
32 Nm (3.2 m·kg, 23 ft·lb)

15.Tighten:

- Engine bracket and engine bolts (left rear side) “3”



**Engine bracket and engine bolt
(left rear side)**
16 Nm (1.6 m·kg, 11 ft·lb)



16.Install:

- Brake pedal “1”



Brake pedal pinch bolt
8 Nm (0.8 m·kg, 5.8 ft·lb)

TIP

Align the punch mark “a” on the brake pedal with the punch mark “b” on the brake pedal pivot shaft.

EAS23760

CAMSHAFTS

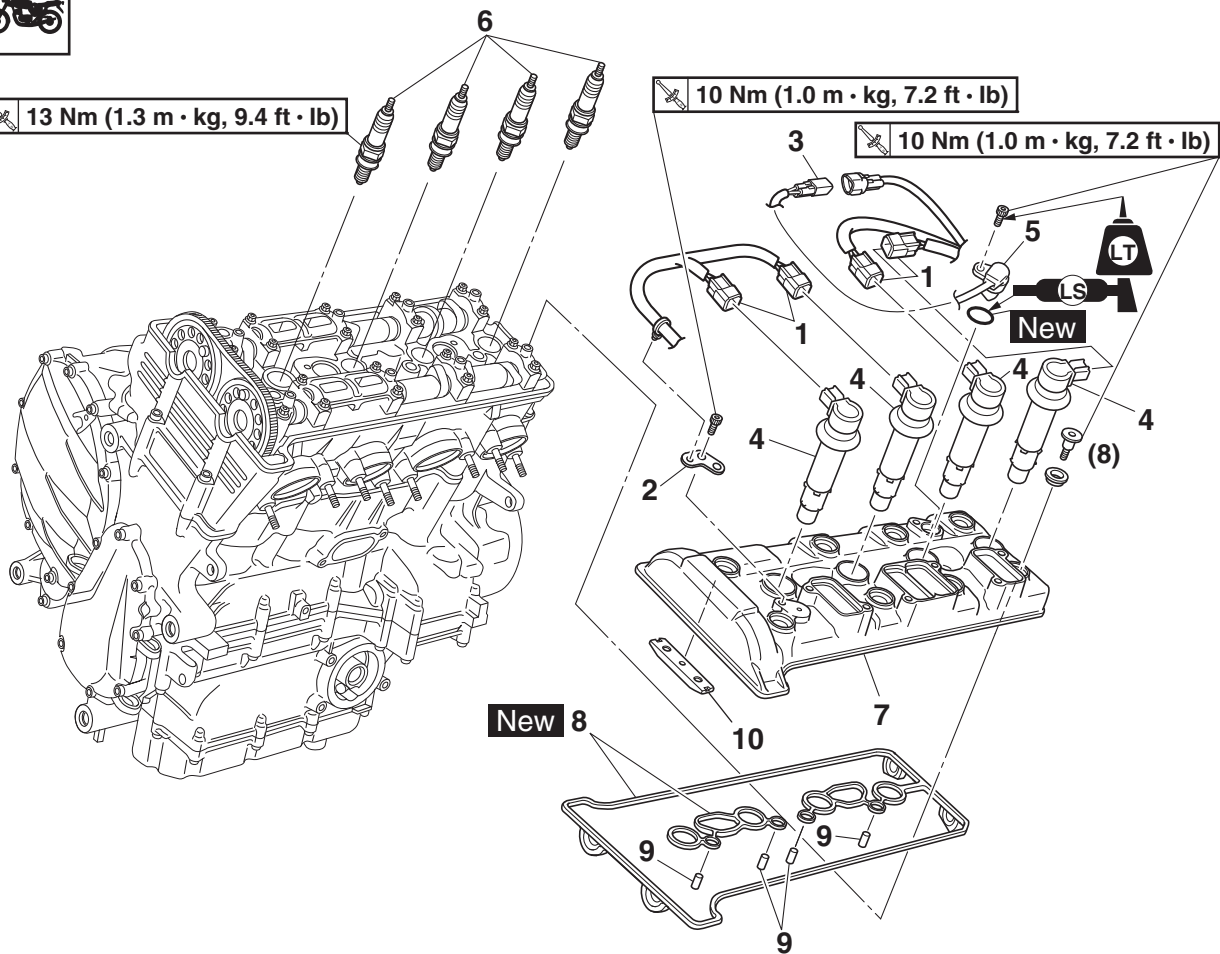
Removing the cylinder head cover



13 Nm (1.3 m · kg, 9.4 ft · lb)

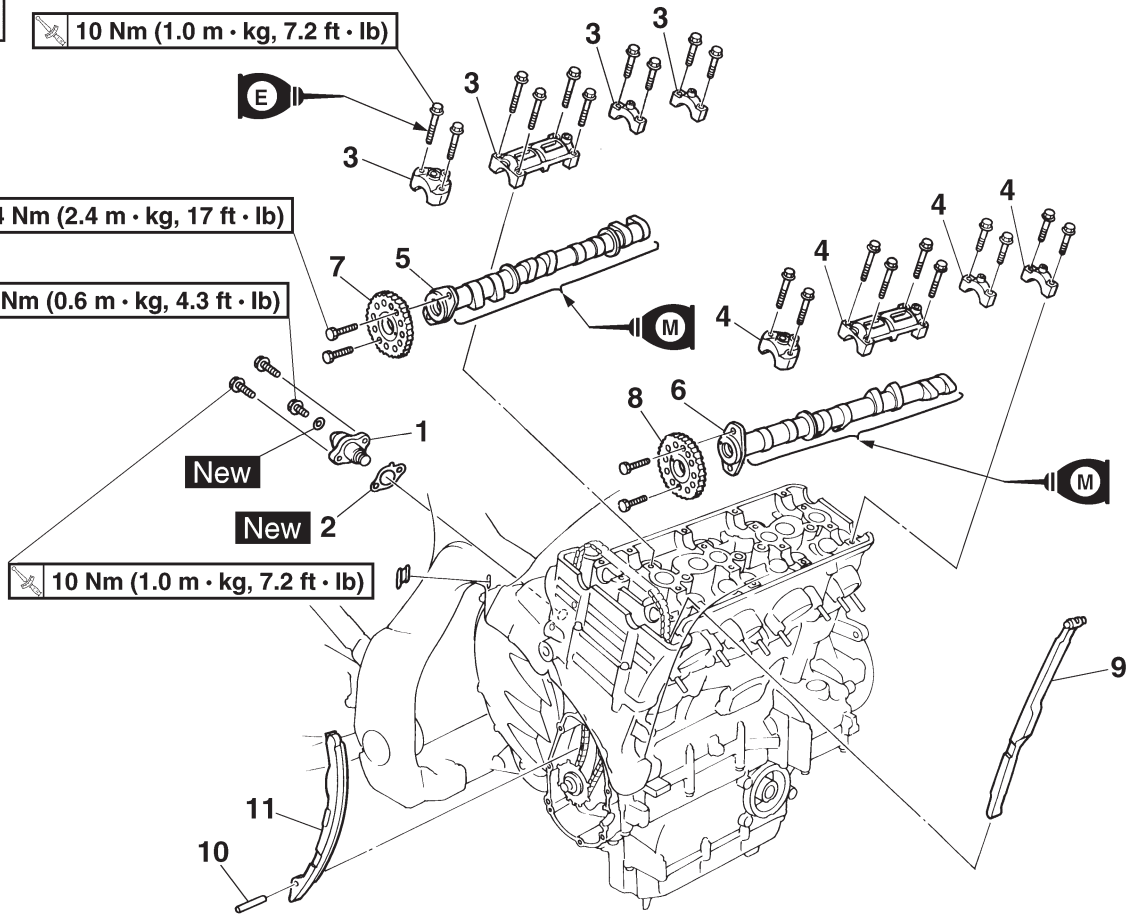
10 Nm (1.0 m · kg, 7.2 ft · lb)

10 Nm (1.0 m · kg, 7.2 ft · lb)



Order	Job/Parts to remove	Q'ty	Remarks
	T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Thermostat inlet pipe 1		Refer to "THERMOSTAT" on page 6-6.
	Air cut-off valve/Reed valves		Refer to "AIR INDUCTION SYSTEM" on page 7-13.
1	Ignition coil coupler	4	Disconnect.
2	Cylinder head cover plate	1	
3	Cylinder identification sensor coupler	1	Disconnect.
4	Ignition coil	4	
5	Cylinder identification sensor	1	
6	Spark plug	4	
7	Cylinder head cover	1	
8	Cylinder head cover gasket	1	
9	Dowel pin	4	
10	Timing chain guide (upper side)	1	
			For installation, reverse the removal procedure.

Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-4.
	Pickup rotor cover		Refer to "PICKUP ROTOR" on page 5-36.
1	Timing chain tensioner	1	
2	Timing chain tensioner gasket	1	
3	Intake camshaft cap	4	
4	Exhaust camshaft cap	4	
5	Intake camshaft	1	
6	Exhaust camshaft	1	
7	Intake camshaft sprocket	1	
8	Exhaust camshaft sprocket	1	
9	Timing chain guide (exhaust side)	1	
10	Pin	1	
11	Timing chain guide (intake side)	1	
			For installation, reverse the removal procedure.

EAS23810

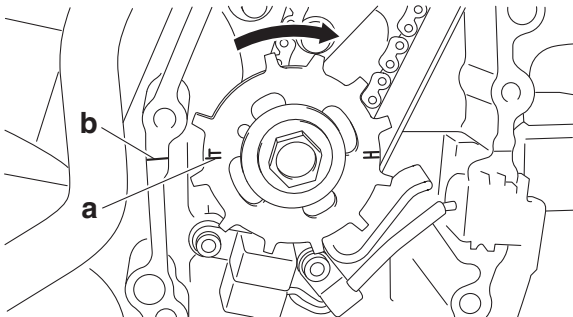
REMOVING THE CAMSHAFTS

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

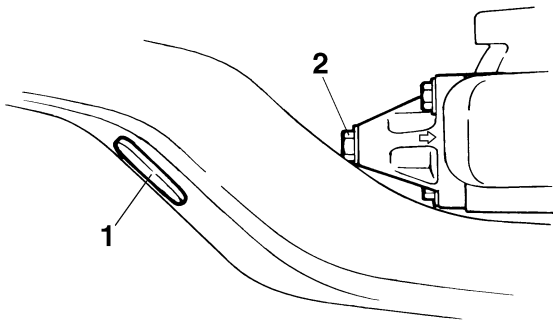
-
- Turn the crankshaft clockwise.
 - When piston #1 is at TDC on the compression stroke, align the “T” mark “a” on the pickup rotor with the crankcase mating surface “b”.

TIP

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



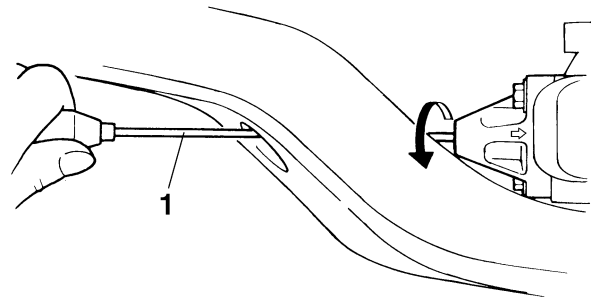
-
- Remove:
 - Rubber cap “1”
 - Timing chain tensioner cap bolt “2”
 - Washer



- Turn the timing chain tensioner rod fully clockwise with a thin screwdriver “1”.

TIP

Make sure that the tensioner rod has been fully set clockwise.



- Remove:
 - Timing chain tensioner
 - Timing chain tensioner gasket
- Remove:
 - Camshaft caps
 - Dowel pins

ECA13720

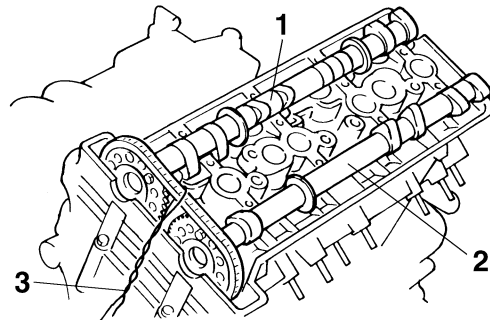
NOTICE

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

- Remove:
 - Intake camshaft “1”
 - Exhaust camshaft “2”

TIP

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



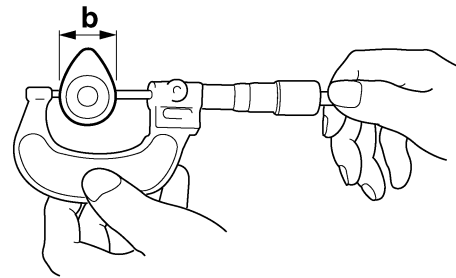
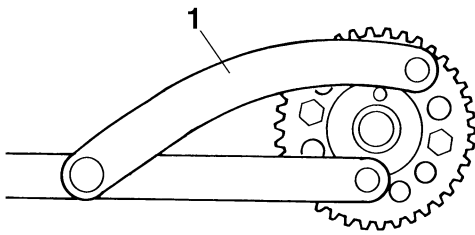
- Remove:
 - Intake camshaft sprocket
 - Exhaust camshaft sprocket

TIP

While holding the camshaft sprockets with the rotor holding tool “1”, loosen the camshaft sprocket bolts.



Rotor holding tool
 90890-01235
Universal magneto & rotor holder
 YU-01235



EAS23850

CHECKING THE CAMSHAFTS

1. Check:
 - Camshaft lobes
Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
 - Camshaft lobe dimensions “a” and “b”
Out of specification → Replace the camshaft.

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



Camshaft runout limit
0.030 mm (0.0012 in)



Camshaft lobe dimensions

Intake A

33.050–33.150 mm (1.3012–1.3051 in)

Limit

32.050 mm (1.2618 in)

Intake B

24.997–25.097 mm (0.9841–0.9881 in)

Limit

23.997 mm (0.9448 in)

Exhaust A

33.050–33.150 mm (1.3012–1.3051 in)

Limit

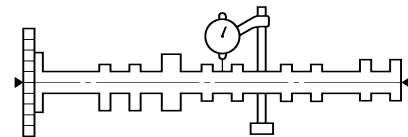
32.950 mm (1.2972 in)

Exhaust B

24.997–25.097 mm (0.9841–0.9881 in)

Limit

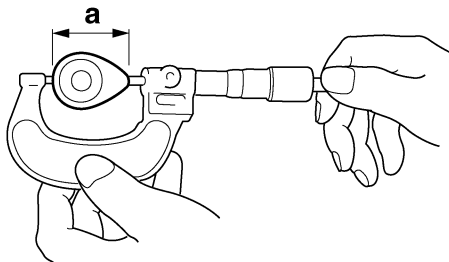
24.897 mm (0.9802 in)



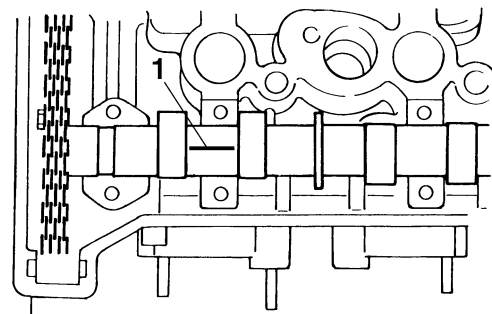
4. Measure:
 - Camshaft-journal-to-camshaft-cap clearance
Out of specification → Measure the camshaft journal diameter.



Camshaft-journal-to-camshaft-cap clearance
0.028–0.062 mm (0.0011–0.0024 in)



- a. Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
- b. Position a strip of Plastigauge® “1” onto the camshaft journal as shown.



- c. Install the dowel pins and camshaft caps.

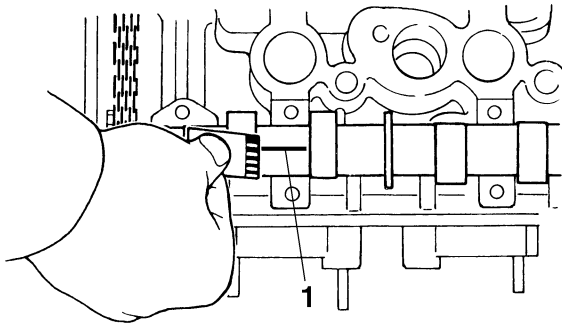
TIP

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.



Camshaft cap bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

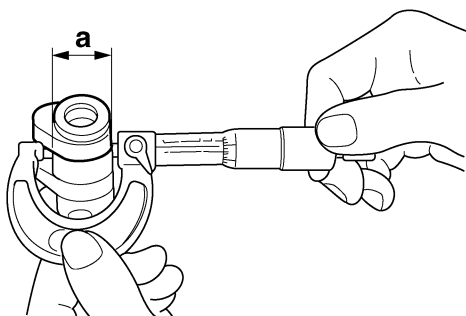
- d. Remove the camshaft caps and then measure the width of the Plastigauge® "1".



5. Measure:
- Camshaft journal diameter "a"
Out of specification → Replace the camshaft.
Within specification → Replace the cylinder head and the camshaft caps as a set.



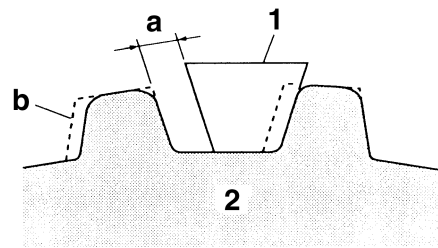
Camshaft journal diameter
24.459–24.472 mm (0.9630–0.9635 in)



EAS23870

CHECKING THE CAMSHAFT SPROCKETS

1. Check:
- Camshaft sprockets
More than 1/4 tooth wear "a" → Replace the camshaft sprockets, timing chain, and crankshaft as a set.



- a. 1/4 tooth
b. Correct
1. Timing chain roller
2. Camshaft sprocket

EAS23950

CHECKING THE TIMING CHAIN GUIDES

1. Check:
- Timing chain guide (exhaust side)
 - Timing chain guide (intake side)
 - Timing chain guide (upper side)
- Damage/wear → Replace the defective part(s).

EAS23970

CHECKING THE TIMING CHAIN TENSIONER

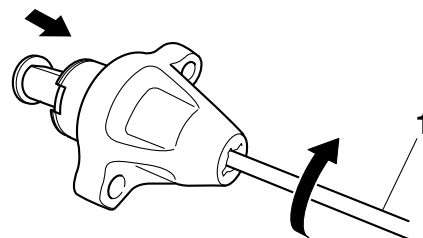
1. Check:
- Timing chain tensioner
Cracks/damage/rough movement → Replace.



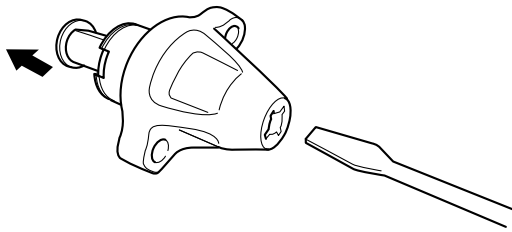
- a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

TIP

While pressing the timing chain tensioner rod, wind it clockwise with a thin screwdriver "1" until it stops.



- b. Remove the screwdriver and slowly release the timing chain tensioner rod.
c. Make sure that the timing chain tensioner rod comes out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.



EAS24010

INSTALLING THE CAMSHAFTS

1. Install:

- Exhaust camshaft sprocket
- Intake camshaft sprocket



Camshaft sprocket bolt
24 Nm (2.4 m·kg, 17 ft·lb)

TIP

- While holding the camshaft sprockets with the rotor holding tool "1", tighten the camshaft sprocket bolts.
- Make sure that the holes "a" in the cylinder-#4 cam lobe and match marks "b" and "c" on the camshaft sprockets are in the position shown in the illustration.

2: Exhaust camshaft sprocket

3: Intake camshaft sprocket

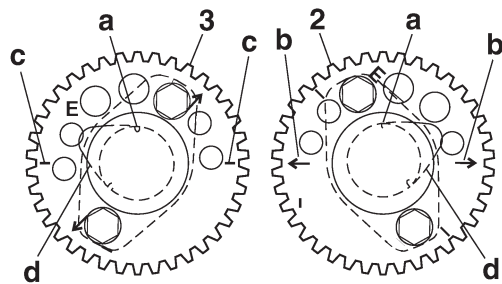
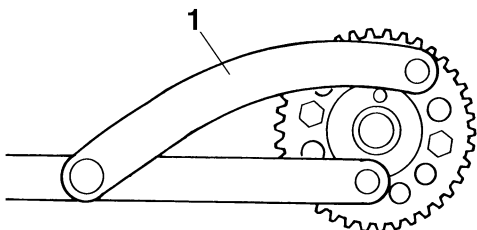
b: Exhaust side "→"

c: Intake side "—"

d: Cylinder-#1 cam lobe



Rotor holding tool
90890-01235
Universal magneto & rotor holder
YU-01235



2. Install:

- Timing chain "1"
 - Exhaust camshaft "2"
 - Intake camshaft "3"
- (with the camshaft sprockets)

ECA13740

NOTICE

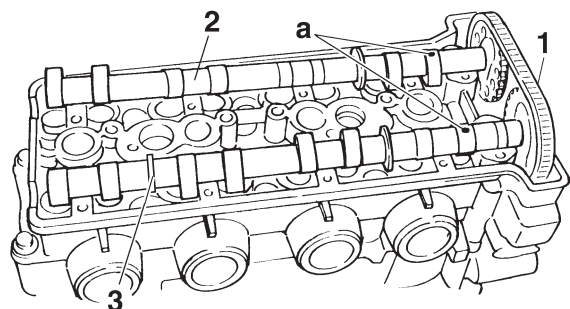
Do not turn the crankshaft when installing the camshaft(s) to avoid damage or improper valve timing.



- a. Install the timing chain onto both camshaft sprockets, and then install the camshafts.

TIP

- Make sure the holes "a" on each camshaft faces up.
 - When installing the timing chain, start with the exhaust camshaft and be sure to keep the timing chain as tight as possible on the exhaust side.
 - Make sure the match marks "b" and "c" on the camshaft sprockets are aligned with the cylinder sprockets are aligned with the cylinder head edge.
- b: Exhaust side "→"
c: Intake side "—"



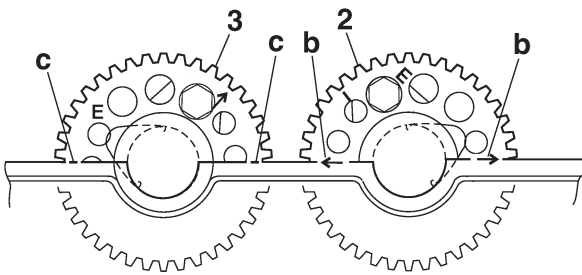
ECA13730

NOTICE

The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.

TIP

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



3. Install:

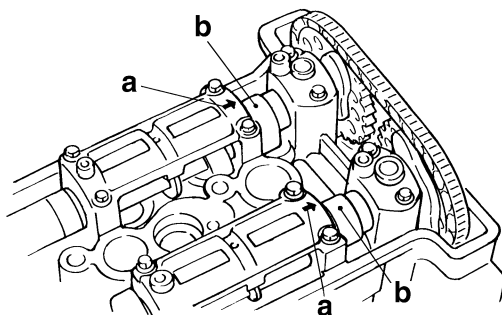
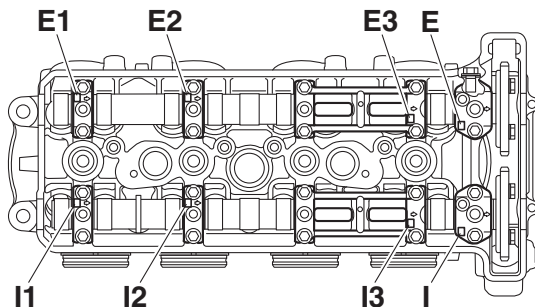
- Exhaust camshaft caps
- Intake camshaft caps

TIP

Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:


“E”, “E1”, “E2”, “E3”: Exhaust
 “I”, “I1”, “I2”, “I3”: Intake

- Make sure the arrow mark “a” on each camshaft points towards the right side of the engine.
- Make sure the holes “b” in the camshafts are aligned with arrow mark “a” on the camshaft caps.



4. Install:

- Camshaft cap bolts

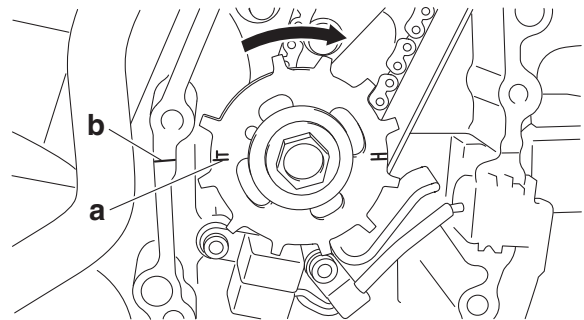
	<p>Camshaft cap bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)</p>
---	--

5. Align:

- “T” mark on the pickup rotor (with the crankcase mating surface)

a. Turn the crankshaft clockwise.

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




6. Install:

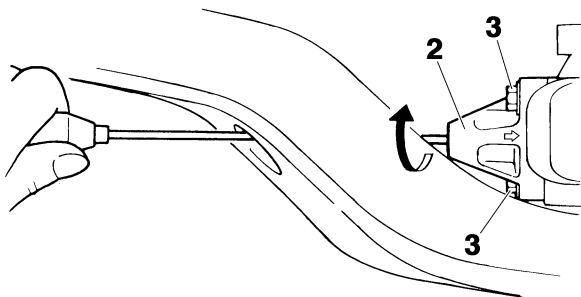
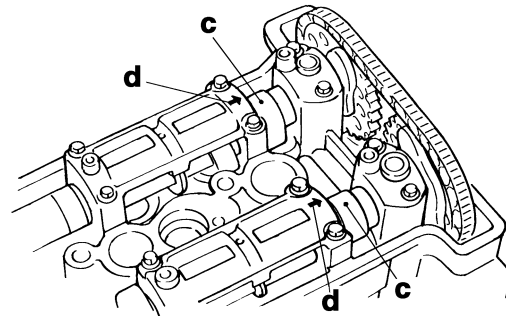
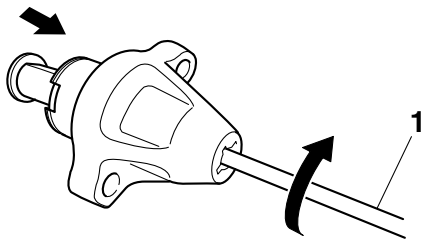
- Timing chain tensioner
- Timing chain tensioner gasket **New**

a. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver “1”.

- b. With the timing chain tensioner rod turned all the way into the timing chain tensioner housing (with the thin screwdriver still installed), install the gasket and the timing chain tensioner “2” onto the cylinder block.**

- c. Tighten the timing chain tensioner bolts “3” to the specified torque.**

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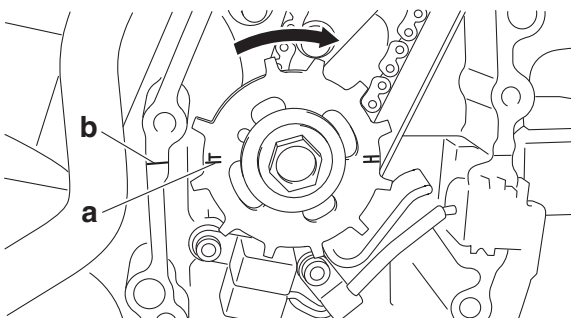


d. Remove the screwdriver, make sure the timing chain tensioner rod releases, and then tighten the cap bolt to the specified torque.


	Timing chain tensioner cap bolt 6 Nm (0.6 m·kg, 4.3 ft·lb)
---	---




7. Turn:
- Crankshaft
(several turns clockwise)
8. Check:
- "T" mark
Make sure the "T" mark "a" on the pickup rotor is aligned with the crankcase mating surface "b".
 - Camshaft holes
Make sure the holes "c" in the camshafts are aligned with the arrow marks "d" on the camshaft caps.
Out of alignment → Adjust.
Refer to the installation steps above.

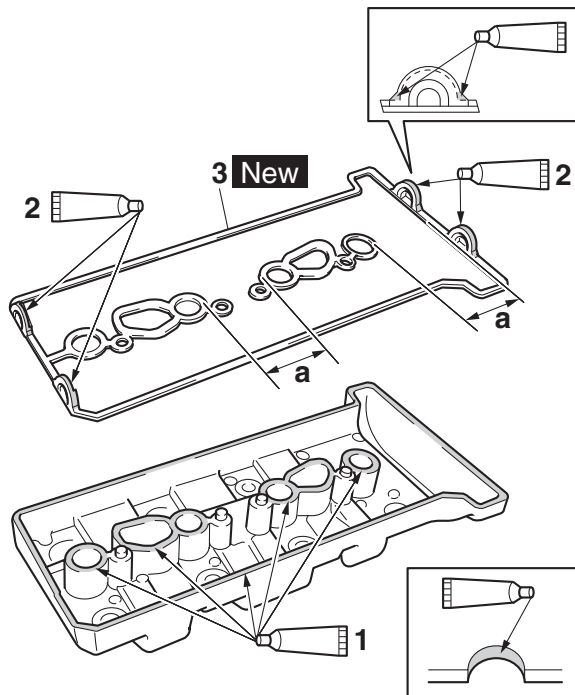


9. Measure:
- Valve clearance
Out of specification → Adjust.
Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.
10. Install:
- Cylinder head cover gasket **New**
 - Cylinder head cover

	Cylinder head cover bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)
---	---

- TIP**
- Apply Three Bond 1514C® "1" onto the mating surfaces of the cylinder head cover and cylinder head cover gasket.
 - Apply Yamaha bond No.1215® "2" onto the mating surfaces of the cylinder head cover gasket and cylinder head.
 - Install a new cylinder head cover gasket "3", and then cut the portions "a".
 - Tighten the cylinder head cover bolts in stages and in a crisscross pattern.

	Yamaha bond No. 1215 90890-85505 (Three Bond No.1215®)
---	---

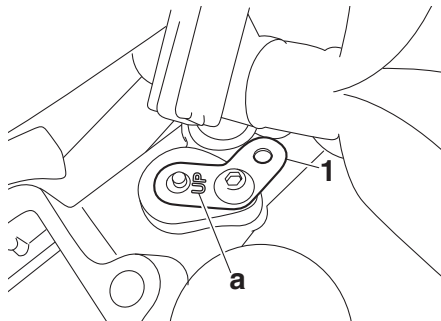


11. Install:

- Cylinder head cover plate "1"

TIP

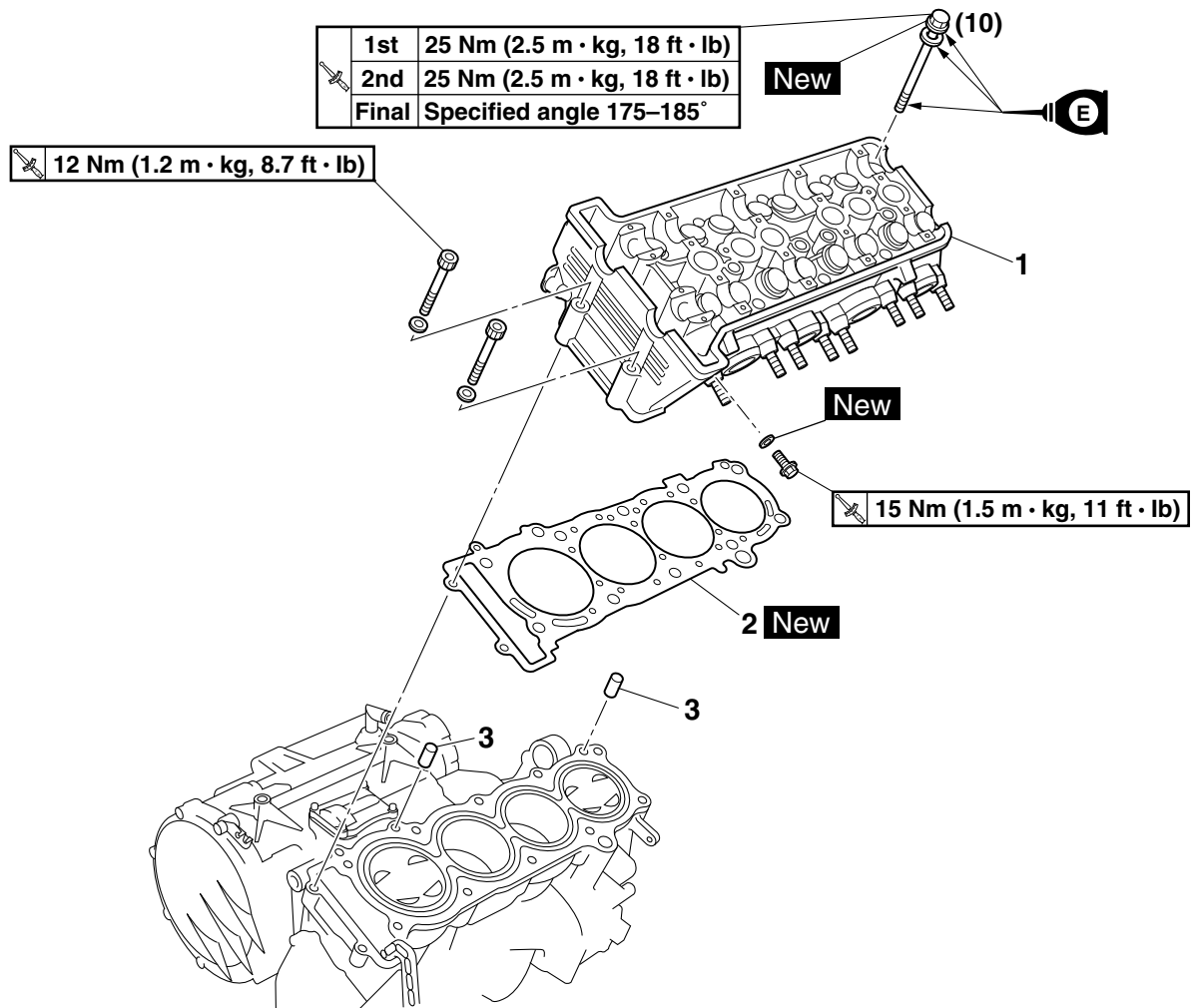
Be sure the "UP" mark "a" is facing up.



EAS24100

CYLINDER HEAD

Removing the cylinder head



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-3.
	Camshafts		Refer to "CAMSHAFTS" on page 5-11.
1	Cylinder head	1	
2	Cylinder head gasket	1	
3	Dowel pin	2	
			For installation, reverse the removal procedure.

CYLINDER HEAD

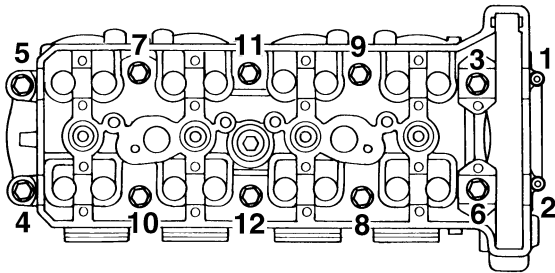
EAS24120

REMOVING THE CYLINDER HEAD

- Remove:
 - Cylinder head bolts

TIP

- Loosen the bolts in the proper sequence as shown.
- Loosen each bolt 1/2 of a turn at a time. After all of the bolts are fully loosened, remove them.



EAS24160

CHECKING THE CYLINDER HEAD

- 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:

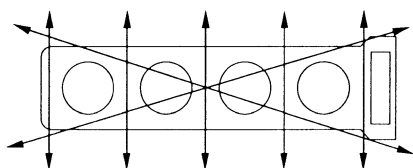
- Cylinder head
Damage/scratches → Replace.
- Cylinder head water jacket
Mineral deposits/rust → Eliminate.

- Measure:

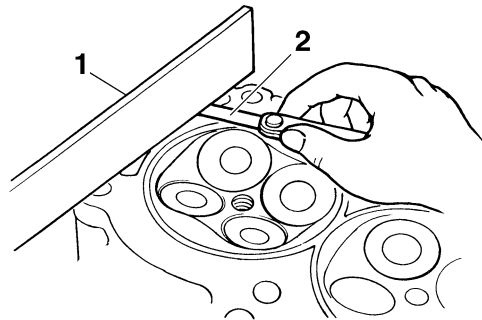
- Cylinder head warpage
Out of specification → Resurface the cylinder head.



Warpage limit
0.10 mm (0.0039 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 a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

TIP

To ensure an even surface, rotate the cylinder head several times.

EAS24240

INSTALLING THE CYLINDER HEAD

- Install:
 - Cylinder head

TIP

Pass the timing chain through the timing chain cavity.

- Tighten:

- Cylinder head bolts (M10) "1"–"10" **New**
- Cylinder head bolts (M6) "11", "12"

EW3P61013



WARNING

Replace the bolts with new ones.

TIP

Tighten the bolts using the following procedure.

- Lubricate the cylinder head bolts and washers with engine oil.
- Install the washer and cylinder head bolts.
- Tighten the cylinder head bolts (M10) in the proper tightening sequence as shown.



Cylinder head bolt (M10)
1st
25 Nm (2.5 m·kg, 18 ft·lb)

- Loosen and retighten the cylinder head bolts in the proper tightening sequence as shown.

CYLINDER HEAD

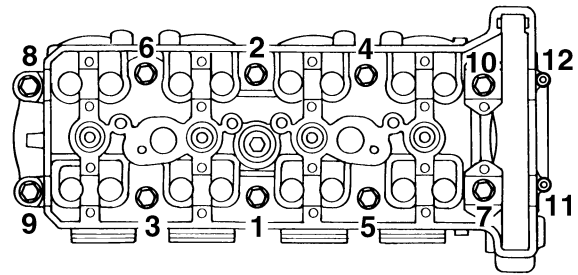


Cylinder head bolt (M10)
2nd
25 Nm (2.5 m·kg, 18 ft·lb)

- e. Tighten the cylinder head bolts further to reach the specified angle 175–185° in the proper tightening sequence as shown.



Cylinder head bolt (M10)
Final
Specified angle 175–185°



EW3P61014

WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then re-tighten it. Instead, replace the bolt with a new one and perform the procedure again.

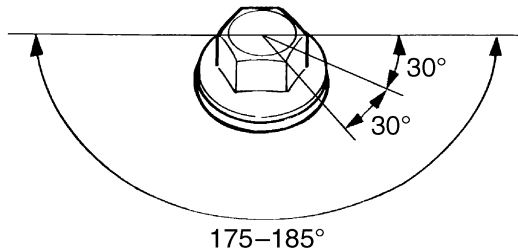
EC3P61033

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.

TIP

On a hexagonal bolt, note that the angle from one corner to another is 60°.



- f. Tighten the cylinder head bolts (M6) in proper tightening sequence as shown.



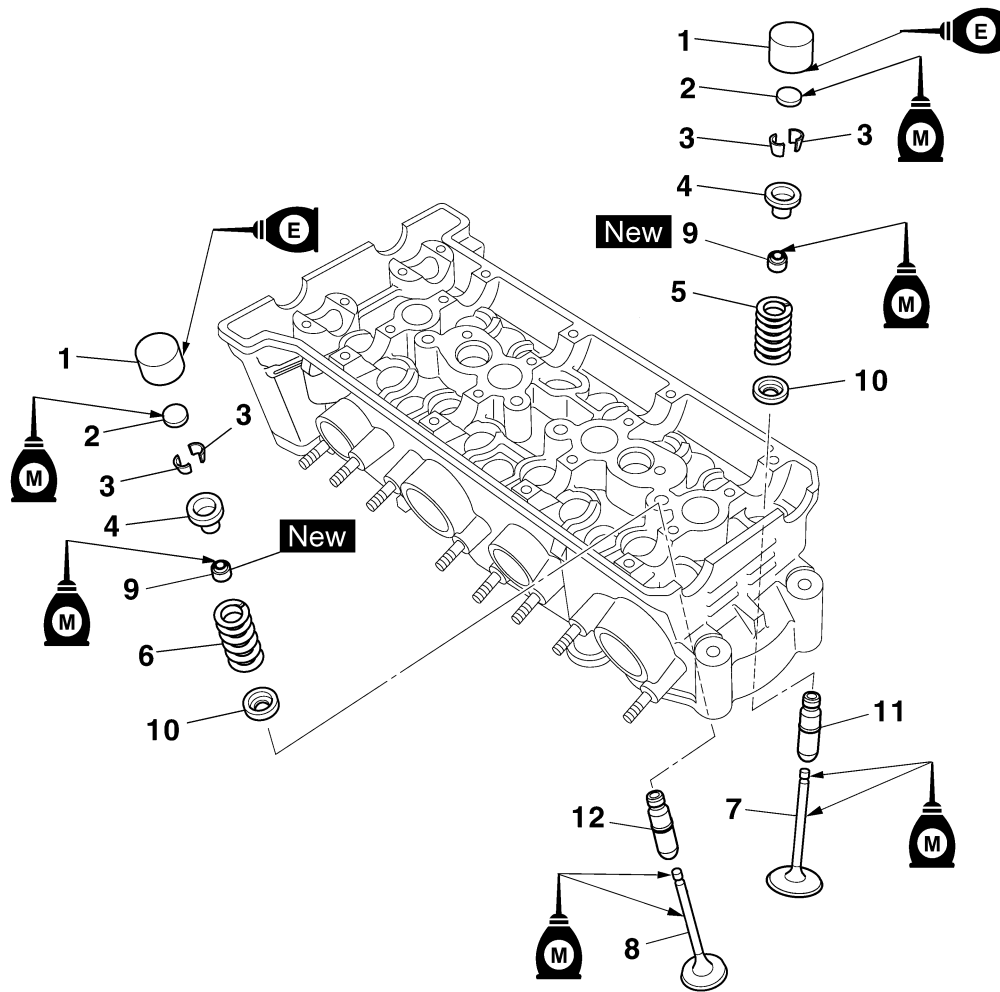
Cylinder head bolt (M6)
12 Nm (1.2 m·kg, 8.7 ft·lb)

VALVES AND VALVE SPRINGS

EAS24270

VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-20.
1	Valve lifter	16	
2	Valve pad	16	
3	Valve cotter	32	
4	Upper spring seat	16	
5	Intake valve spring	8	
6	Exhaust valve spring	8	
7	Intake valve	8	
8	Exhaust valve	8	
9	Valve stem seal	16	
10	Lower spring seat	16	
11	Intake valve guide	8	
12	Exhaust valve guide	8	
			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.

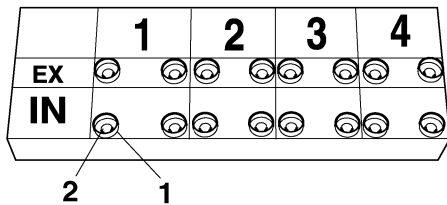
TIP

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Remove:
 - Valve lifter "1"
 - Valve pad "2"

TIP

Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.

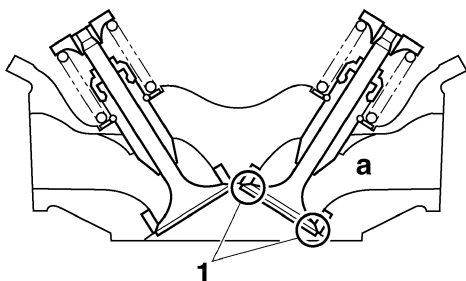


2. Check:
 - Valve sealing
Leakage at the valve seat → Check the valve face, valve seat, and valve seat width. Refer to "CHECKING THE VALVE SEATS" on page 5-26.

- a. Pour a clean solvent "a" into the intake and exhaust ports.
- b. Check that the valves properly seal.

TIP

There should be no leakage at the valve seat "1".



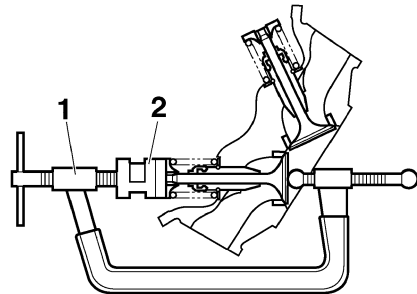
3. Remove:
 - Valve cotters

TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".



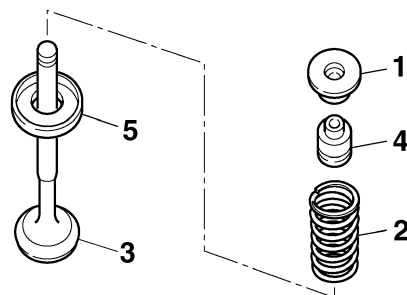
Valve spring compressor
90890-04019
YM-04019
Valve spring compressor attachment
90890-04114
Valve spring compressor adapter 19.5 mm
YM-04114



4. Remove:
 - Upper spring seat "1"
 - Valve spring "2"
 - Valve "3"
 - Valve stem seal "4"
 - Lower spring seat "5"

TIP

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



EAS24290

CHECKING THE VALVES AND VALVE GUIDES

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

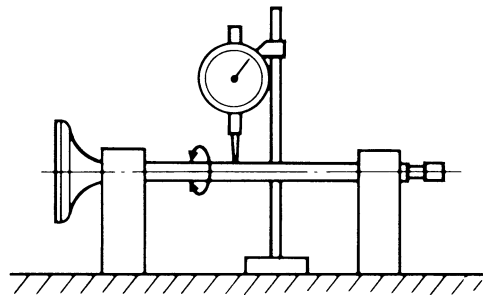
VALVES AND VALVE SPRINGS



Valve guide remover (ø5)
90890-04097
Valve guide remover (5.0 mm)
YM-04097
Valve guide installer (ø5)
90890-04098
Valve guide installer (5.0 mm)
YM-04098
Valve guide reamer (ø5)
90890-04099
Valve guide reamer (5.0 mm)
YM-04099



Valve stem runout
0.010 mm (0.0004 in)



3. Eliminate:

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

4. Check:

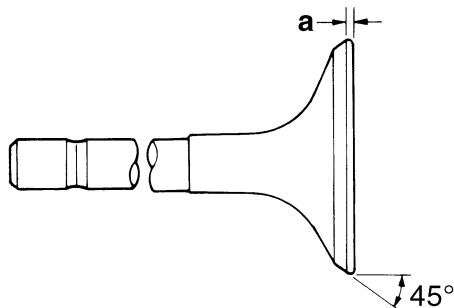
- Valve face
Pitting/wear → Grind the valve face.
- Valve stem end
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.

5. Measure:

- Valve margin thickness D “a”
Out of specification → Replace the valve.



Valve margin thickness D (intake)
0.80–1.20 mm (0.0315–0.0472 in)
Valve margin thickness D (exhaust)
0.50–0.90 mm (0.0197–0.0354 in)



6. Measure:

- Valve stem runout
Out of specification → Replace the valve.

TIP

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

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:

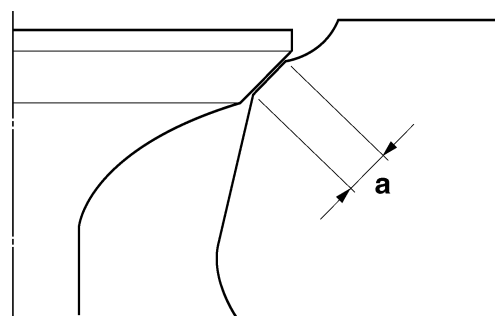
- Valve seat
Pitting/wear → Replace the cylinder head.

3. Measure:

- Valve seat width C “a”
Out of specification → Replace the cylinder head.

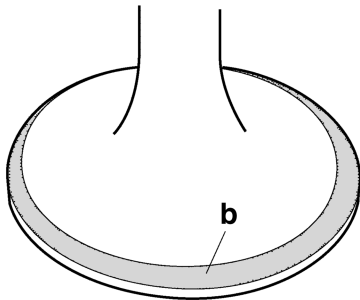


Valve seat width C (intake)
0.90–1.10 mm (0.0354–0.0433 in)
Valve seat width C (exhaust)
0.90–1.10 mm (0.0354–0.0433 in)



- a. Apply Mechanic’s blueing dye (Dykem) “b” onto the valve face.

VALVES AND VALVE SPRINGS



- b. Install the valve into the cylinder head.
- c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- d. Measure the valve seat width.

TIP

Where the valve seat and valve face contacted one another, the blueing will have been removed.



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.

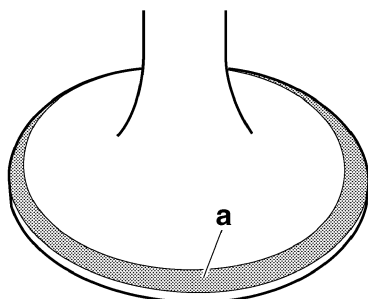


- a. Apply a coarse lapping compound "a" to the valve face.

ECA13790

NOTICE

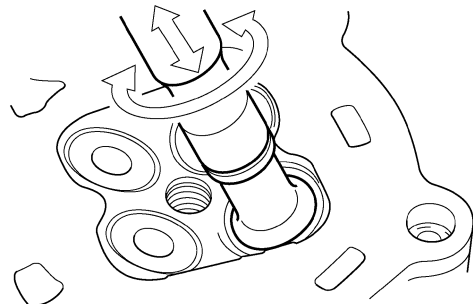
Do not let the lapping compound enter the gap between the valve stem and the valve guide.



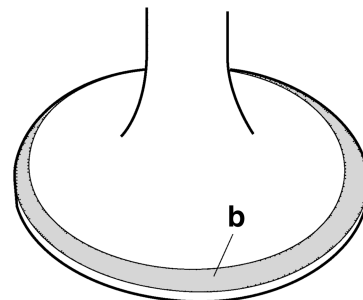
- b. Apply molybdenum disulfide oil onto the valve stem.
- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

TIP

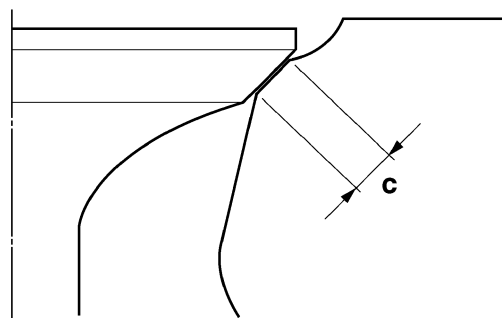
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



- 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 Mechanic's blueing dye (Dykem) "b" onto the valve face.



- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width "c" again. If the valve seat width is out of specification, reface and lap the valve seat.



VALVES AND VALVE SPRINGS

EAS24310

CHECKING THE VALVE SPRINGS

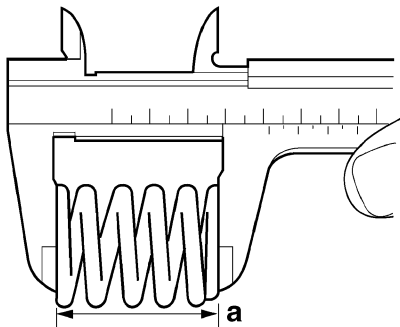
The following procedure applies to all of the valve springs.

1. Measure:

- Valve spring free length "a"
Out of specification → Replace the valve spring.



Free length (intake)
39.73 mm (1.56 in)
Limit
37.74 mm (1.49 in)
Free length (exhaust)
39.73 mm (1.56 in)
Limit
37.74 mm (1.49 in)

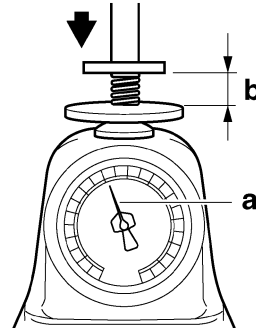


2. Measure:

- Compressed valve spring force "a"
Out of specification → Replace the valve spring.



Installed compression spring force (intake)
136.00–158.00 N (13.87–16.11 kgf, 30.57–35.52 lbf)
Installed compression spring force (exhaust)
136.00–158.00 N (13.87–16.11 kgf, 30.57–35.52 lbf)
Installed length (intake)
33.00 mm (1.30 in)
Installed length (exhaust)
33.00 mm (1.30 in)



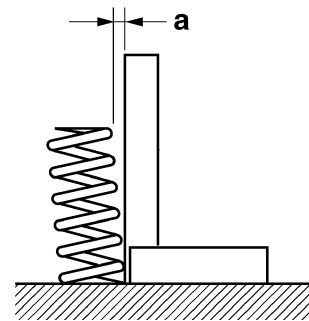
b. Installed length

3. Measure:

- Valve spring tilt "a"
Out of specification → Replace the valve spring.



Spring tilt (intake)
2.5°/1.7 mm (2.5°/0.067 in)
Spring tilt (exhaust)
2.5°/1.7 mm (2.5°/0.067 in)



EAS24320

CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

1. Check:

- Valve lifter
Damage/scratches → Replace the valve lifters and cylinder head.

EAS24340

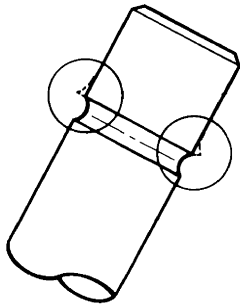
INSTALLING THE VALVES

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

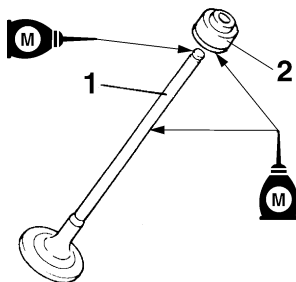
1. Deburr:

- Valve stem end
(with an oil stone)

VALVES AND VALVE SPRINGS

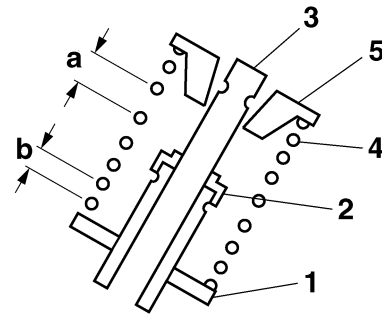
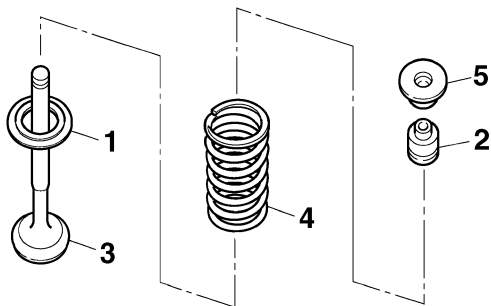


2. Lubricate:
- Valve stem "1"
 - Valve stem end
 - Valve stem seal "2"
- (with the recommended lubricant)



3. 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"



b. Smaller pitch

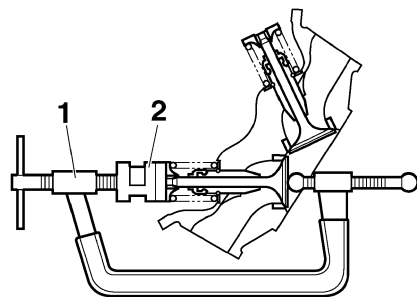
4. Install:
- Valve cotters

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
90890-04114
Valve spring compressor adapter 19.5 mm
YM-04114

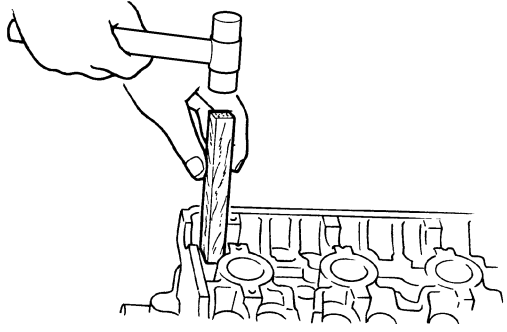


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

NOTICE

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



6. Lubricate:

- Valve lifter
(with the recommended lubricant)



7. Install:

- Valve pad
- Valve lifter

TIP _____

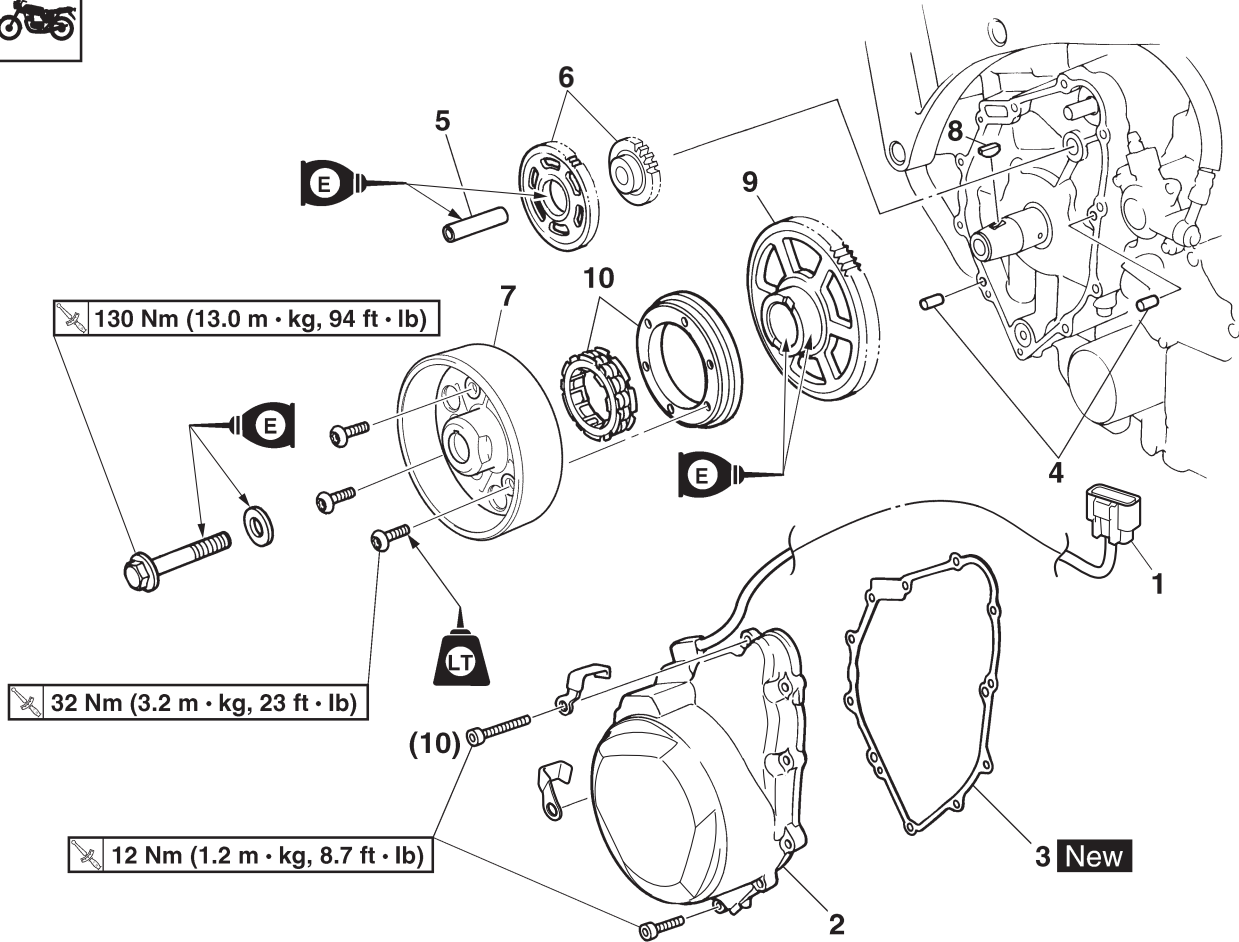
- The valve lifter must move smoothly when rotated with a finger.
 - Each valve lifter and valve pad must be reinstalled in its original position.
-

GENERATOR AND STARTER CLUTCH

EAS24480

GENERATOR AND STARTER CLUTCH

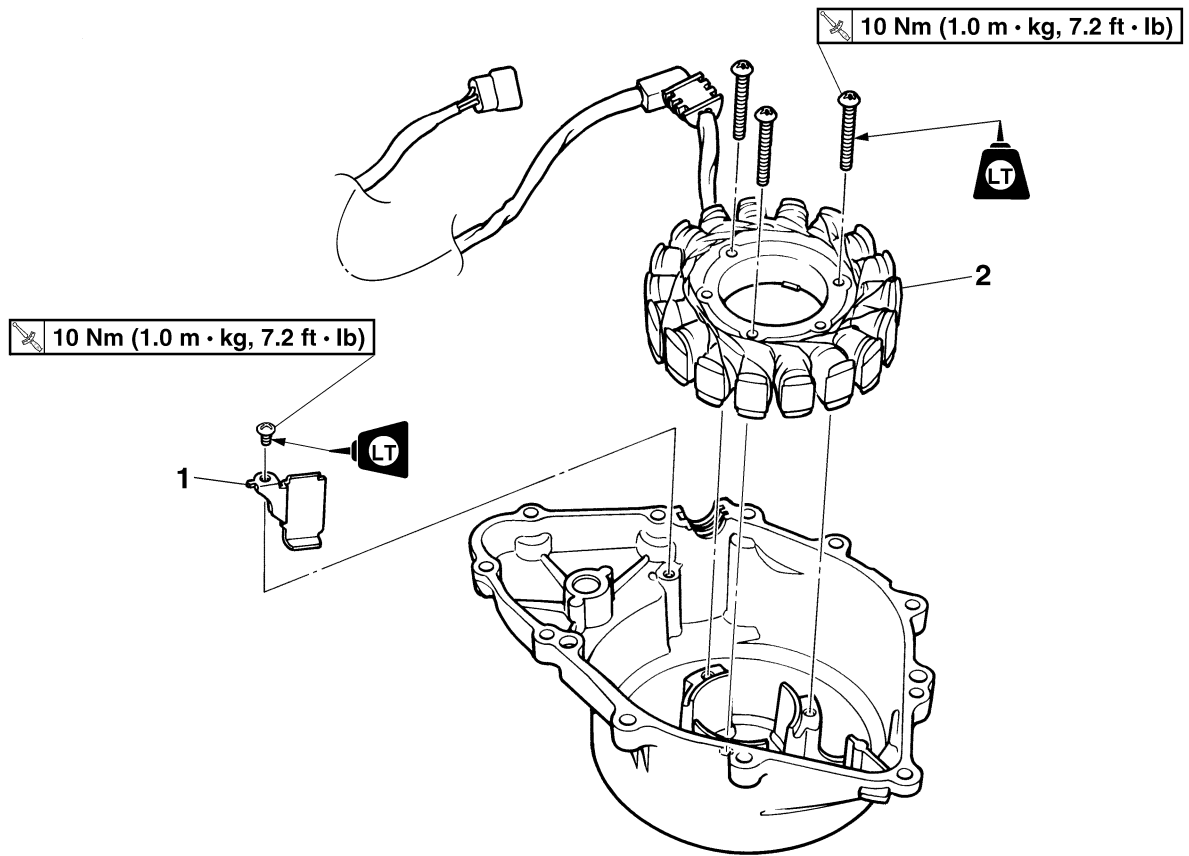
Removing the generator rotor and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Stator coil coupler	1	Disconnect.
2	Generator cover	1	
3	Generator cover gasket	1	
4	Dowel pin	2	
5	Starter clutch idle gear shaft	1	
6	Starter clutch idle gear	1	
7	Generator rotor	1	
8	Woodruff key	1	
9	Starter clutch gear	1	
10	Starter clutch	1	
			For installation, reverse the removal procedure.

GENERATOR AND STARTER CLUTCH

Removing the stator coil assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Stator coil assembly lead holder	1	
2	Stator coil assembly	1	
			For installation, reverse the removal procedure.

GENERATOR AND STARTER CLUTCH

EAS24490

REMOVING THE GENERATOR

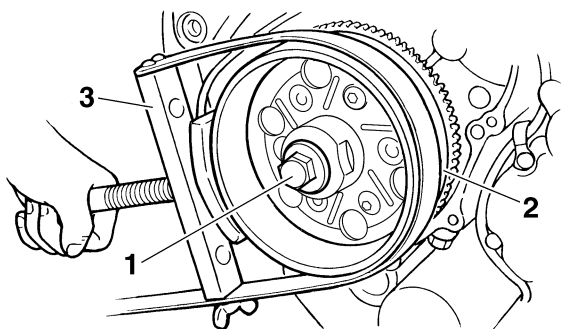
1. Remove:
 - Generator rotor bolt "1"
 - Washer

TIP

While holding the generator rotor "2" with the sheave holder "3", loosen the generator rotor bolt.



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



2. Remove:
 - Generator rotor "1"
 - (with the flywheel puller "2")
 - Woodruff key


ECA13880

NOTICE

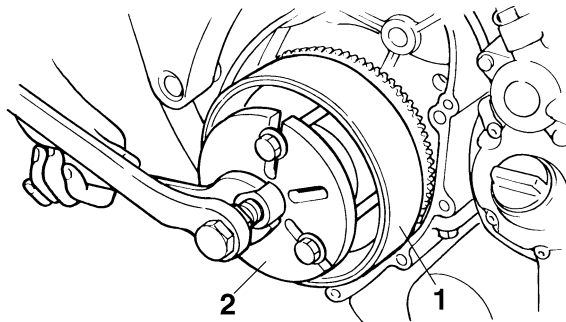
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set's center bolt and the crankshaft.

TIP

Make sure the flywheel puller is centered over the generator rotor.



Flywheel puller
90890-01362
Heavy duty puller
YU-33270-B



EAS24560

REMOVING THE STARTER CLUTCH

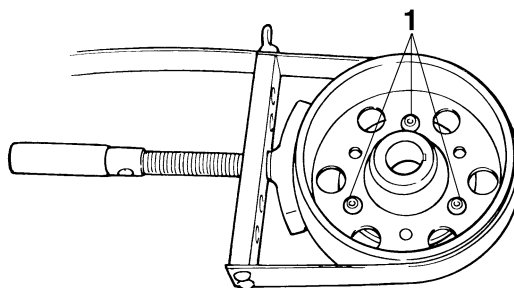
1. Remove:
 - Starter clutch bolts "1"

TIP

While holding the generator rotor with the sheave holder, remove the starter clutch bolts.



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



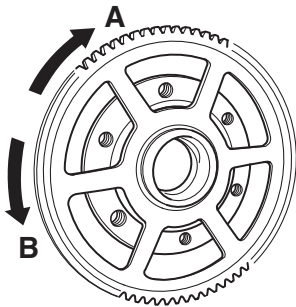
EAS24570

CHECKING THE STARTER CLUTCH

1. Check:
 - Starter clutch rollers
Damage/wear → Replace.
 2. Check:
 - Starter clutch idle gear
 - 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
-
- a. Install the starter clutch gear onto the starter clutch and hold the starter clutch.

GENERATOR AND STARTER CLUTCH

- b. When turning the starter clutch gear clockwise "A", the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
- c. When turning the starter clutch gear counter-clockwise "B", it should turn freely, otherwise the starter clutch is faulty and must be replaced.



EAS24600

INSTALLING THE STARTER CLUTCH

1. Install:

- Starter clutch
- Starter clutch bolts "1"



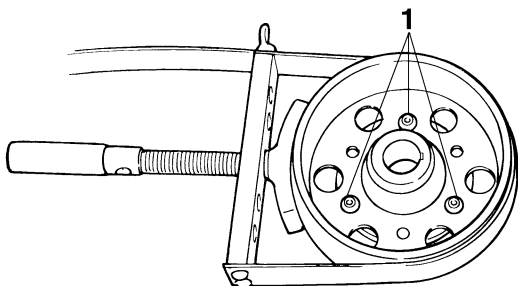
Starter clutch bolt
32 Nm (3.2 m·kg, 23 ft·lb)
LOCTITE®

TIP

While holding the generator rotor with the sheave holder, tighten the starter clutch bolts.



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



EAS24500

INSTALLING THE GENERATOR

1. Install:

- Woodruff key
- Generator rotor

- Washer
- Generator rotor bolt

TIP

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- When installing the generator rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.

2. Tighten:

- Generator rotor bolt "1"



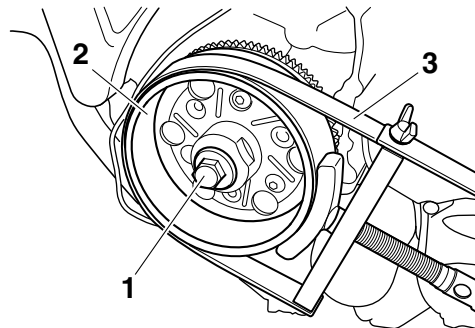
Generator rotor bolt
130 Nm (13.0 m·kg, 94 ft·lb)

TIP

While holding the generator rotor "2" with the sheave holder "3", tighten the generator rotor bolt.



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



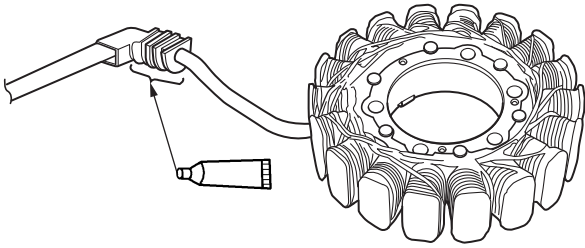
3. Apply:

- Sealant
 (onto the stator coil assembly lead grommet)



Yamaha bond No. 1215
90890-85505
(Three Bond No.1215®)

GENERATOR AND STARTER CLUTCH



4. Install:

- Generator cover gasket **New**
- Generator cover



Generator cover bolt
12 Nm (1.2 m·kg, 8.7 ft·lb)

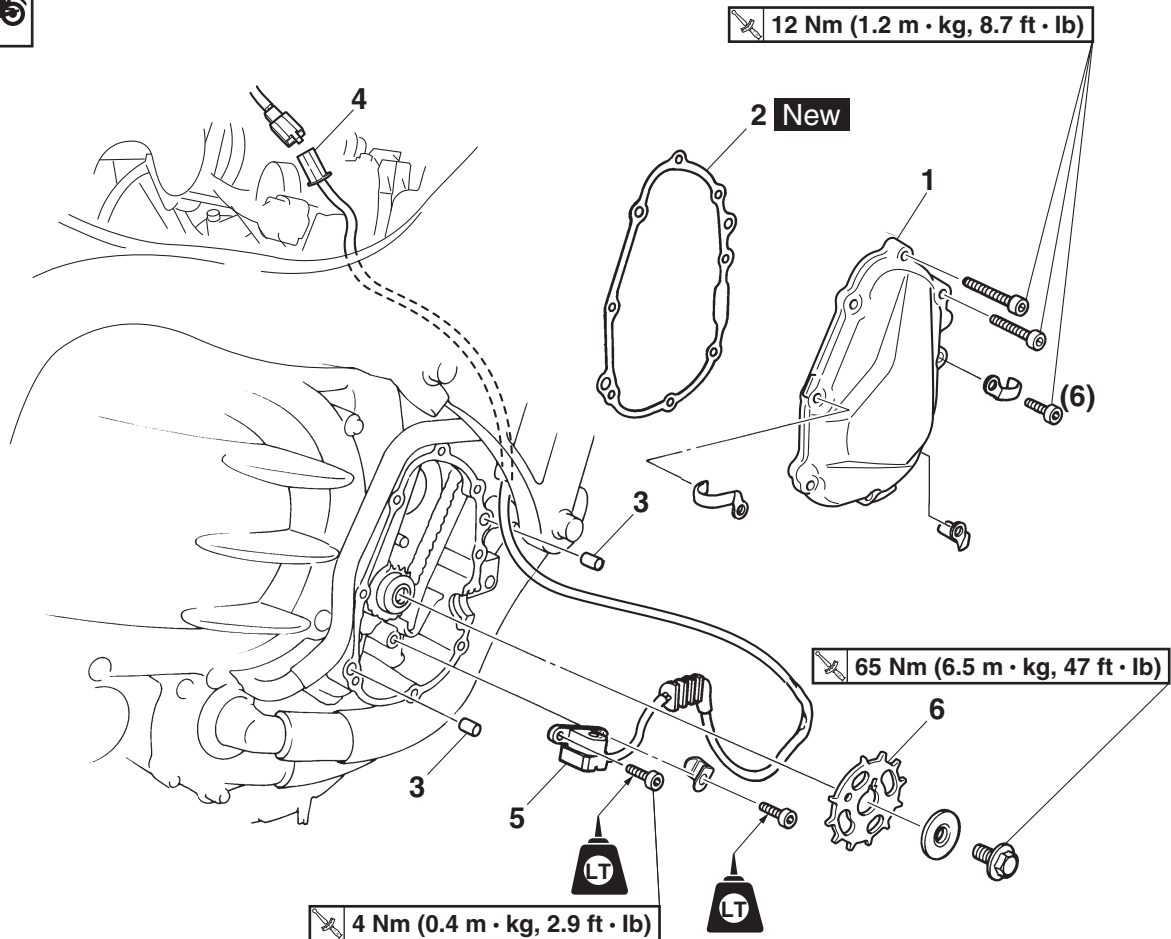
TIP

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

EAS24520

PICKUP ROTOR

Removing the pickup rotor



Order	Job/Parts to remove	Q'ty	Remarks
	Side cowlings/Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Generator cover		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-31.
1	Pickup rotor cover	1	
2	Pickup rotor cover gasket	1	
3	Dowel pin	2	
4	Crankshaft position sensor coupler	1	Disconnect.
5	Crankshaft position sensor	1	
6	Pickup rotor	1	
			For installation, reverse the removal procedure.

PICKUP ROTOR

EAS24530

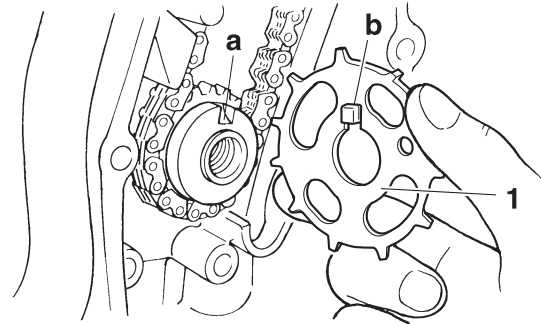
REMOVING THE PICKUP ROTOR

1. Remove:

- Pickup rotor bolt "1"
- Washer "2"
- Pickup rotor "3"

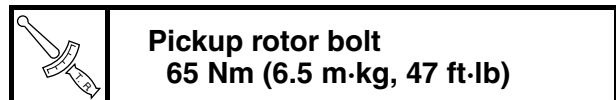
TIP

While holding the generator rotor "4" with the sheave holder "5", loosen the pickup rotor bolt.



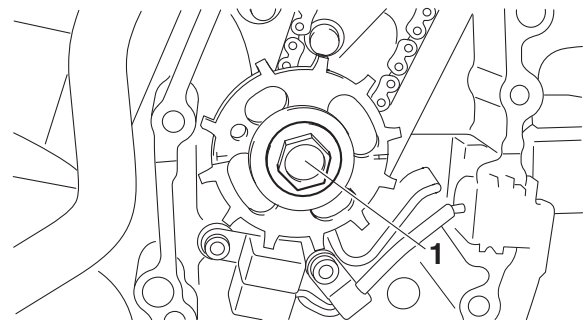
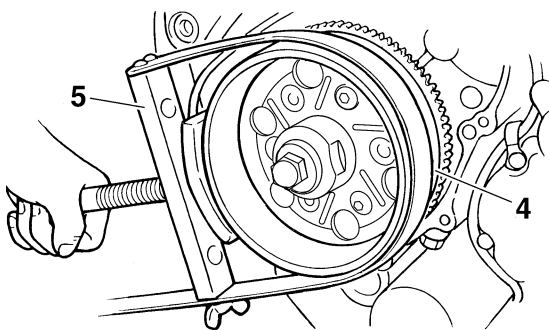
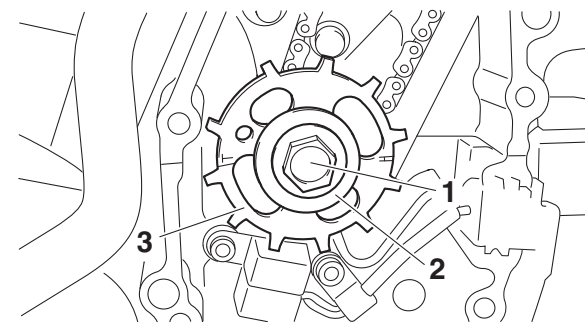
2. Tighten:

- Pickup rotor bolt "1"



TIP

While holding the generator rotor "2" with the sheave holder "3", tighten the pickup rotor bolt.



EAS24540

INSTALLING THE PICKUP ROTOR

1. Install:

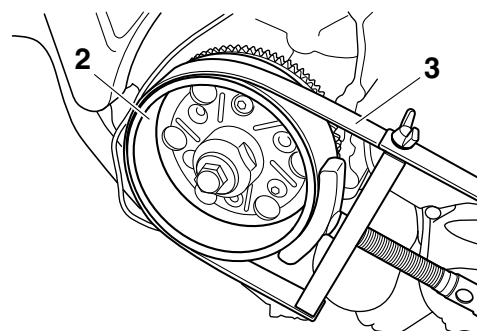
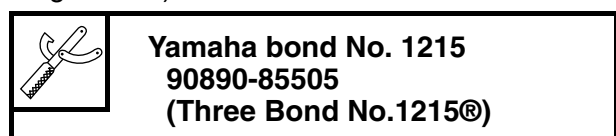
- Pickup rotor "1"
- Washer
- Pickup rotor bolt

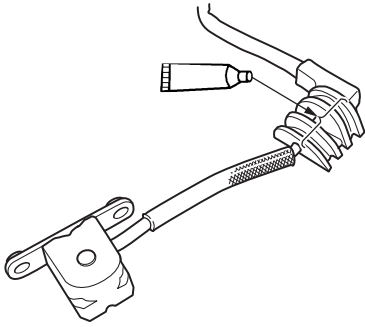
TIP

When installing the pickup rotor, align the groove "a" in the crankshaft sprocket with the projection "b" in the pickup rotor.

3. Apply:

- Sealant
(onto the crankshaft position sensor lead grommet)



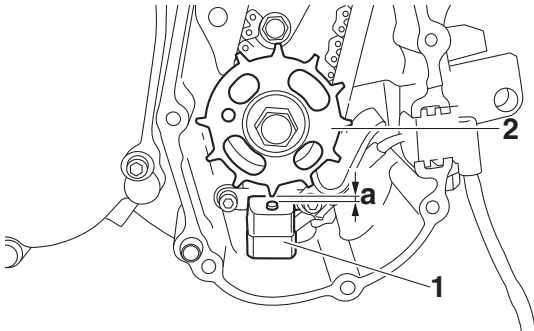


4. Measure:

- Gap (between the crankshaft position sensor "1" and pickup rotor "2") "a"
Out of specification → Reinstall or replace.



Gap (between the crankshaft position sensor and pickup rotor)
0.5 mm (0.02 in)



5. Install:

- Pickup rotor cover gasket **New**
- Pickup rotor cover



Pickup rotor cover bolt
12 Nm (1.2 m·kg, 8.7 ft·lb)

TIP


Tighten the pickup rotor cover bolts in stages and in a crisscross pattern.

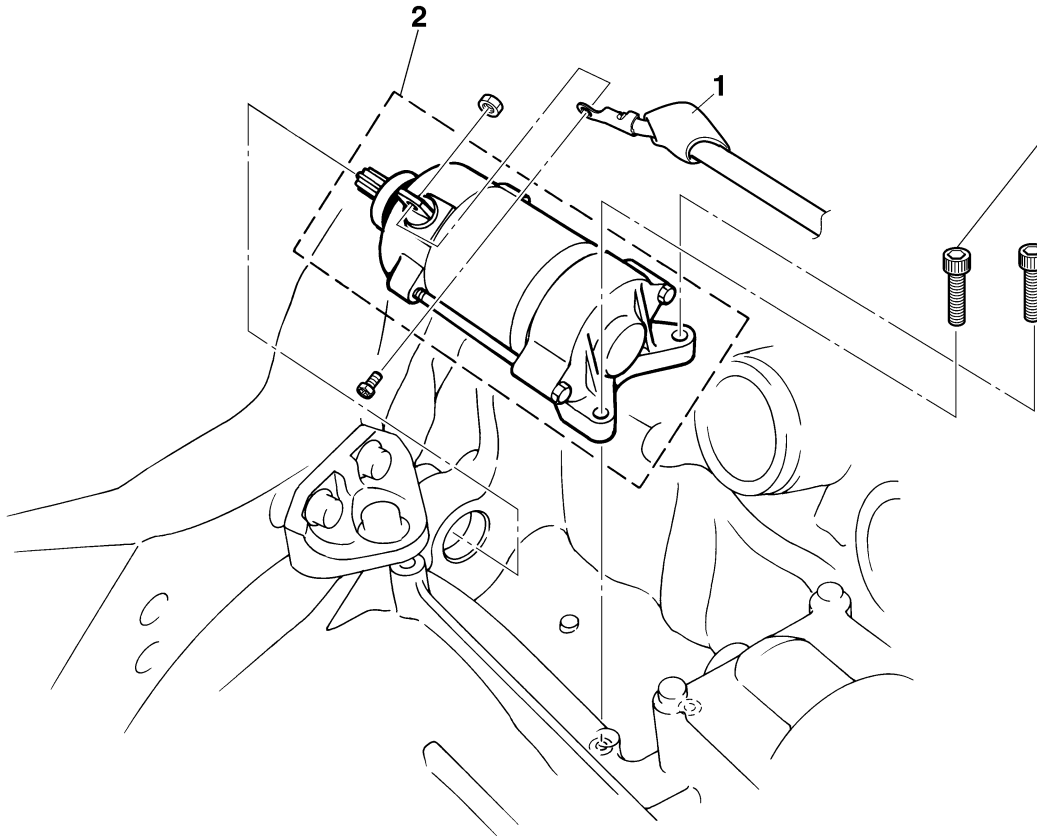
EAS24780

ELECTRIC STARTER

Removing the starter motor



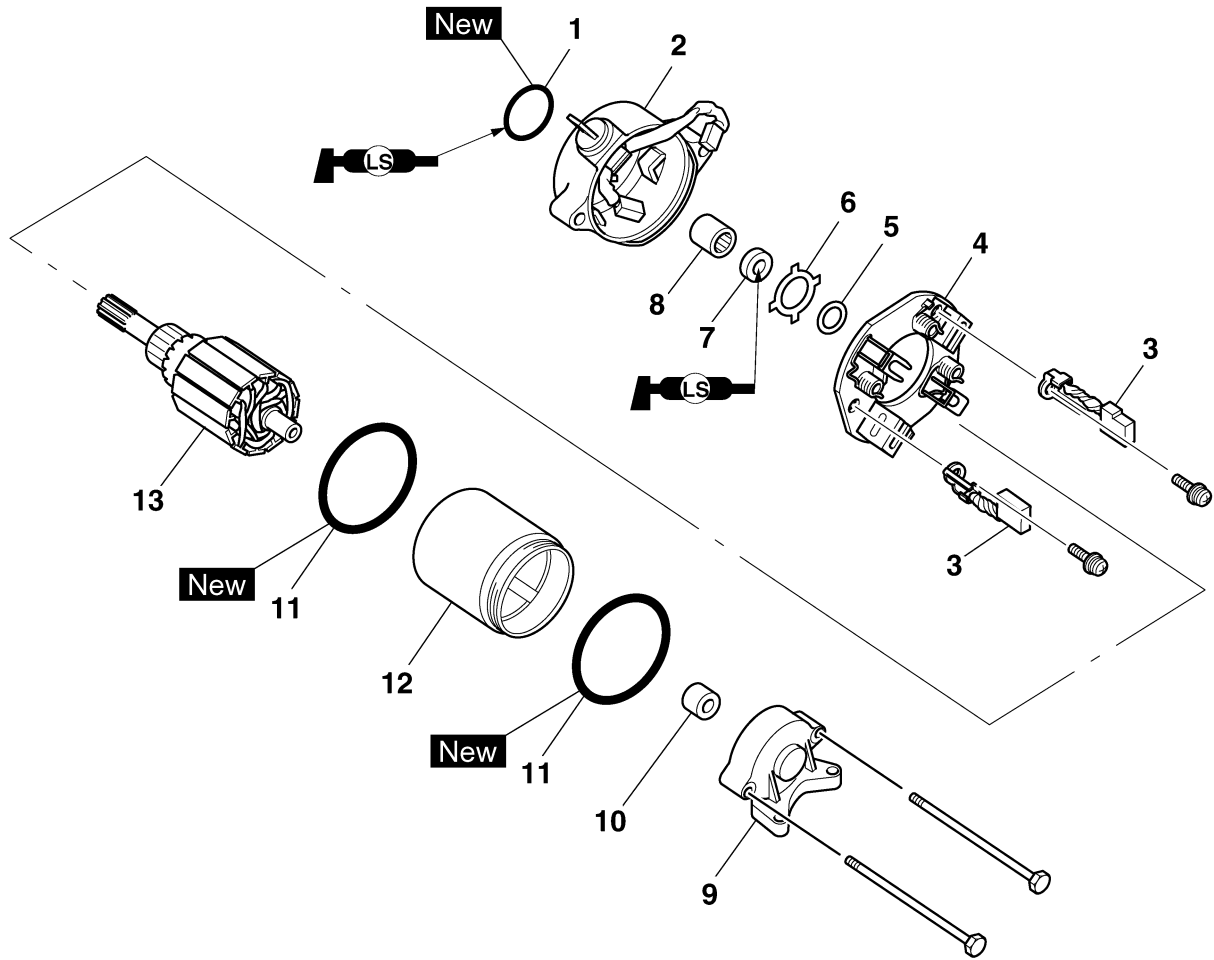
 10 Nm (1.0 m · kg, 7.2 ft · lb)



Order	Job/Parts to remove	Q'ty	Remarks
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-4.
1	Starter motor lead	1	Disconnect.
2	Starter motor assembly	1	
			For installation, reverse the removal procedure.

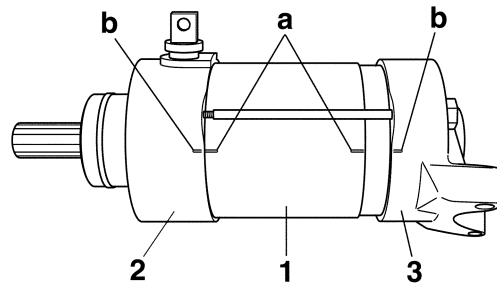
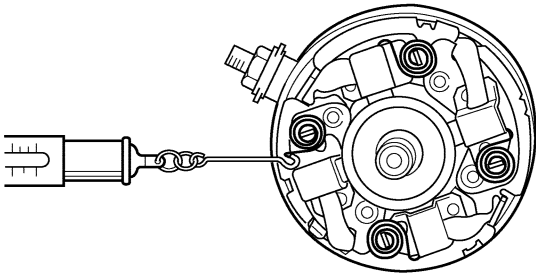
ELECTRIC STARTER

Disassembling the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Starter motor front cover	1	
3	Brush	2	
4	Brush seat (along with brushes)	1	
5	Washer	1	
6	Lock washer	1	
7	Oil seal	1	
8	Bearing	1	
9	Starter motor rear cover	1	
10	Collar	1	
11	O-ring	2	
12	Starter motor yoke	1	
13	Armature assembly	1	
			For assembly, reverse the disassembly procedure.

ELECTRIC STARTER



7. Check:
 - Gear teeth
Damage/wear → Replace the gear.
8. Check:
 - Bearing
 - Oil seal
Damage/wear → Replace the defective part(s).

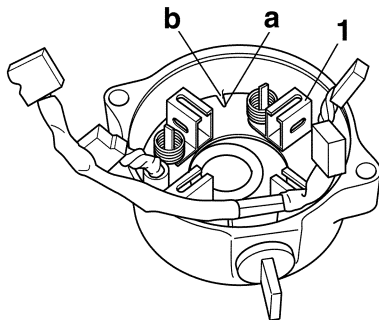
EAS24800

ASSEMBLING THE STARTER MOTOR

1. Install:
 - Brush seat "1"

TIP

Align the slot "a" on the brush seat with the tab "b" in the starter motor front cover.



2. Install:
 - Starter motor yoke "1"
 - Starter motor front cover "2"
 - Starter motor rear cover "3"

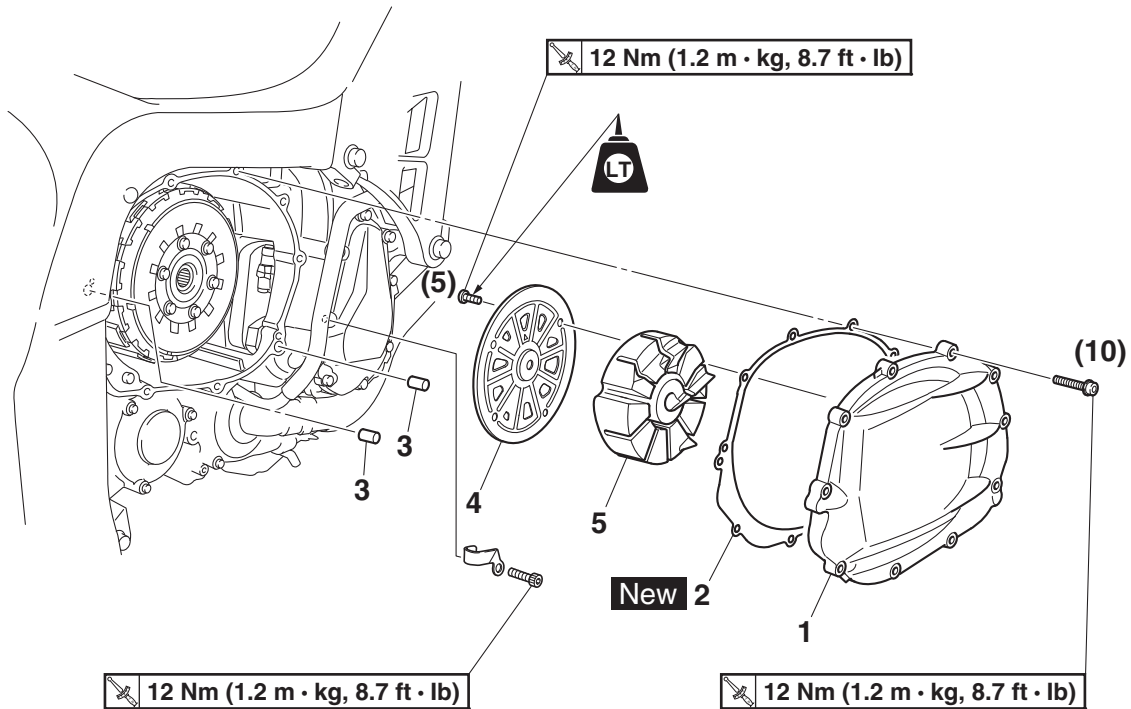
TIP

Align the match marks "a" on the starter motor yoke with the match marks "b" on the starter motor front and rear covers.

EAS25060

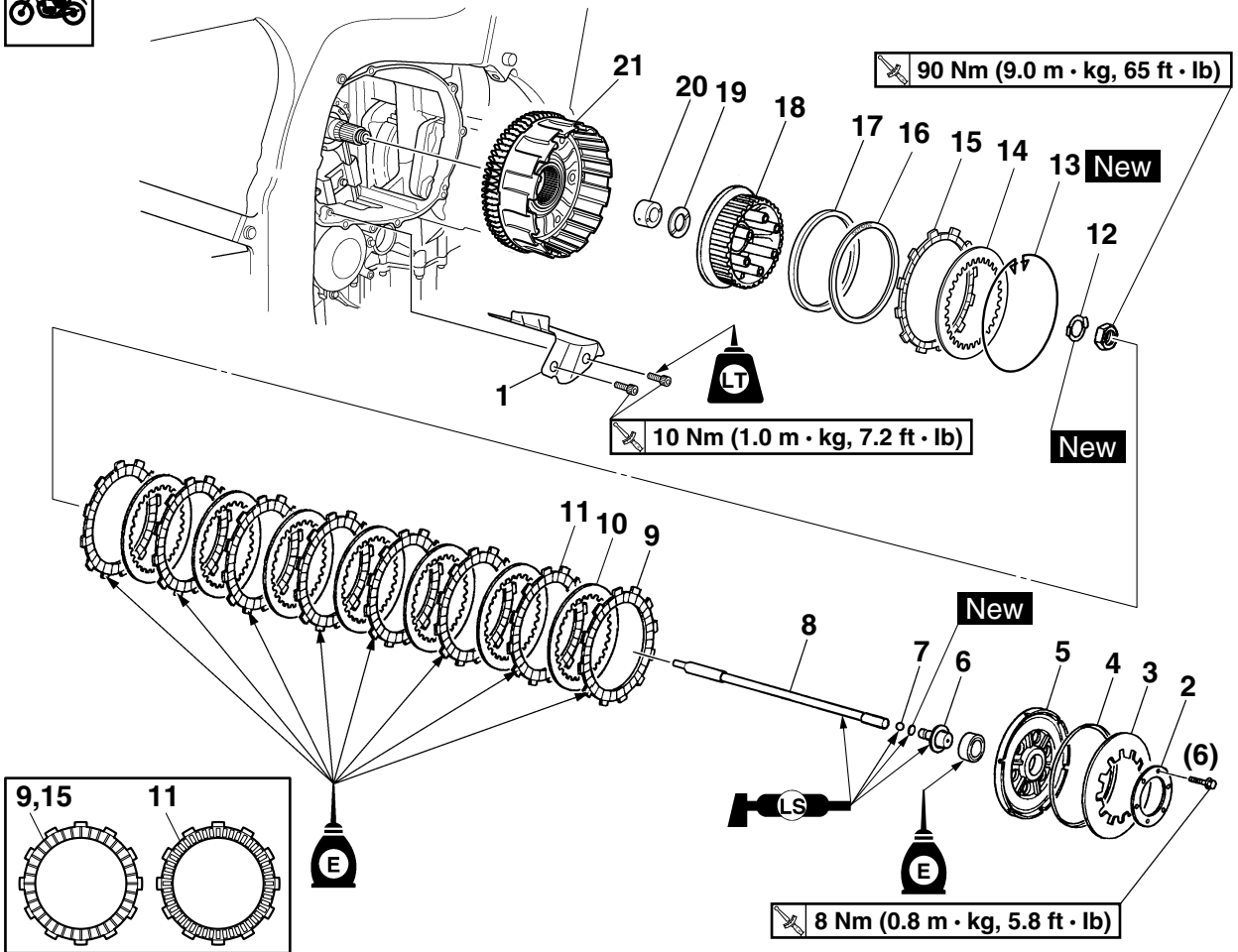
CLUTCH

Removing the clutch cover



Order	Job/Parts to remove	Q'ty	Remarks
	Right side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Clutch cover	1	
2	Clutch cover gasket	1	
3	Dowel pin	2	
4	Damper cover	1	
5	Damper	1	
			For installation, reverse the removal procedure.

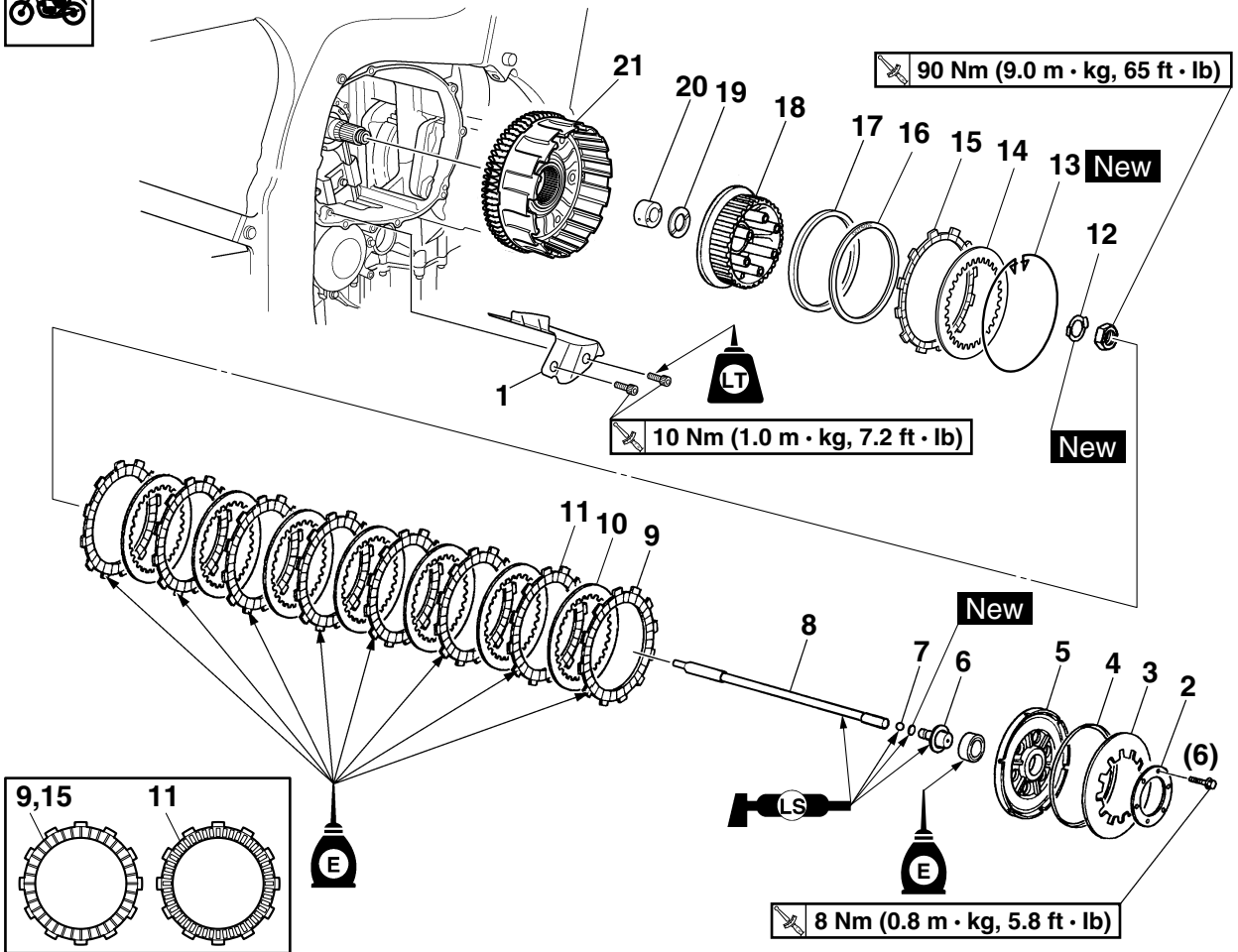
Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
	Rear balancer		Refer to "BALANCERS" on page 5-106.
1	Oil guide plate	1	
2	Clutch spring plate retainer	1	
3	Clutch spring plate	1	
4	Clutch spring plate seat	1	
5	Pressure plate	1	
6	Short clutch push rod	1	
7	Ball	1	
8	Long clutch push rod	1	
9	Friction plate 1	1	Inside diameter: 124 mm (4.88 in)
10	Clutch plate	7	
11	Friction plate 2	7	Inside diameter: 124 mm (4.88 in)
12	Lock washer	1	
13	Wire circlip	1	
14	Clutch plate	1	
15	Friction plate 3	1	Inside diameter: 135 mm (5.31 in)
16	Clutch damper spring	1	

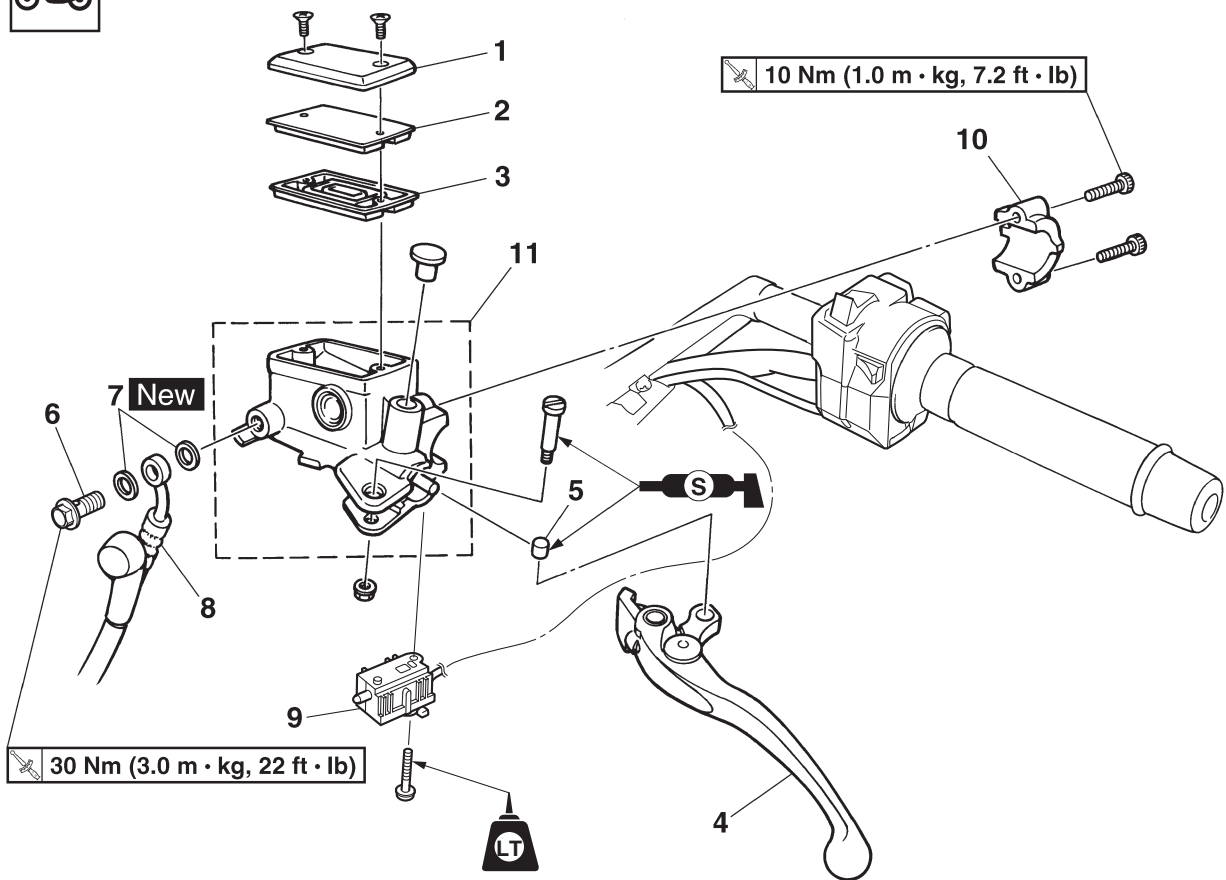
CLUTCH

Removing the clutch



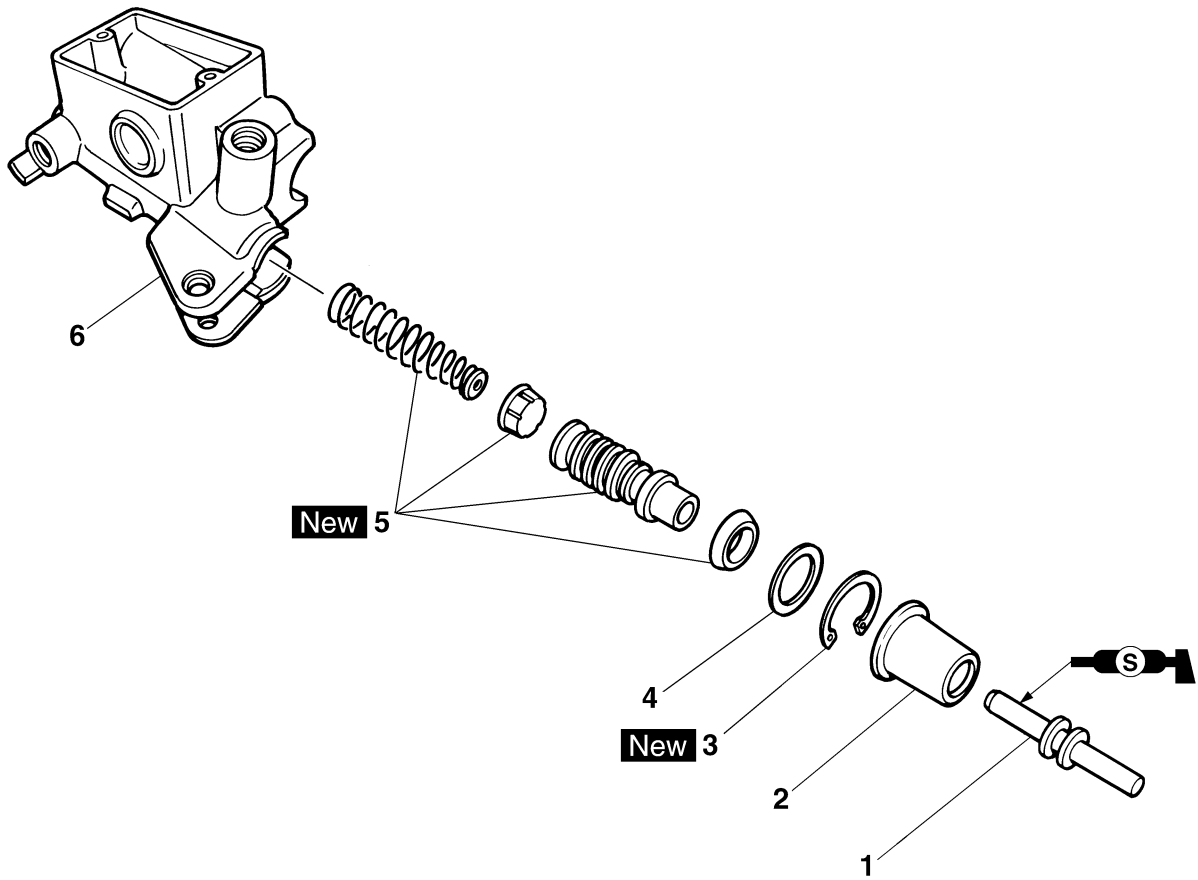
Order	Job/Parts to remove	Q'ty	Remarks
17	Clutch damper spring seat	1	
18	Clutch boss	1	
19	Thrust washer	1	
20	Spacer	1	
21	Clutch housing	1	
			For installation, reverse the removal procedure.

Removing the clutch master cylinder



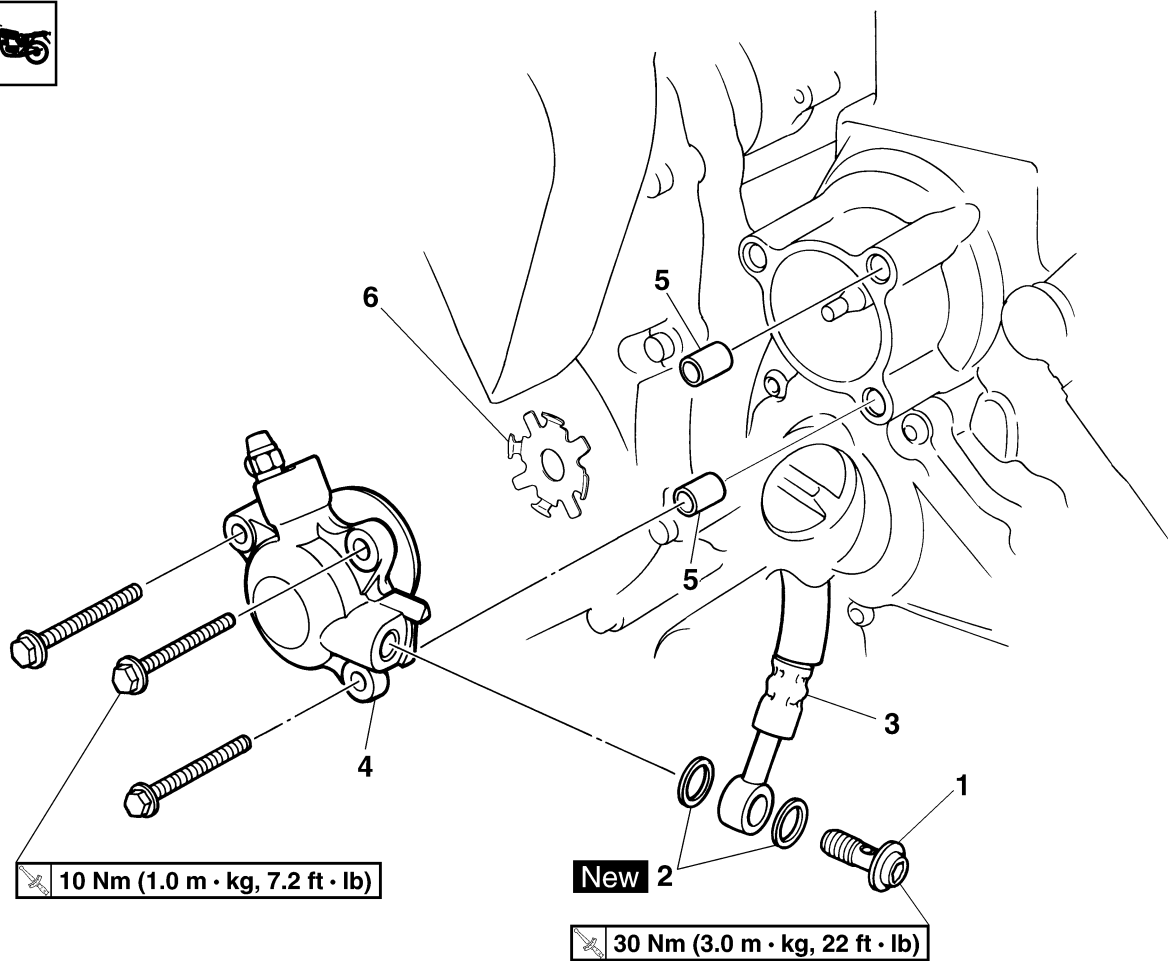
Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-12.
1	Clutch master cylinder reservoir cap	1	
2	Clutch master cylinder reservoir diaphragm holder	1	
3	Clutch master cylinder reservoir diaphragm	1	
4	Clutch lever	1	
5	Clutch master cylinder push rod pin	1	
6	Clutch hose union bolt	1	
7	Copper washer	2	
8	Clutch hose	1	Disconnect.
9	Clutch switch	1	
10	Clutch master cylinder holder	1	
11	Clutch master cylinder	1	
			For installation, reverse the removal procedure.

Disassembling the clutch master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch master cylinder push rod	1	
2	Dust boot	1	
3	Circlip	1	
4	Washer	1	
5	Clutch master cylinder kit	1	
6	Clutch master cylinder body	1	
			For assembly, reverse the disassembly procedure.

Removing the clutch release cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-12.
1	Clutch hose union bolt	1	
2	Copper washer	2	
3	Clutch hose	1	Disconnect.
4	Clutch release cylinder	1	
5	Dowel pin	2	
6	Plate	1	
			For installation, reverse the removal procedure.

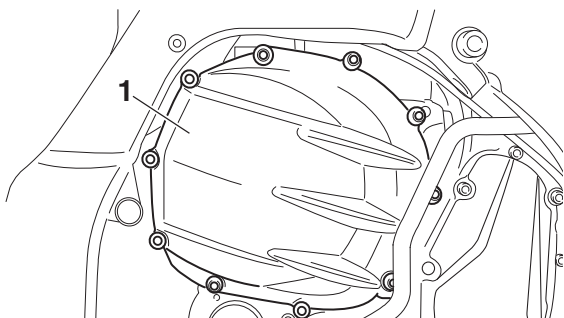
EAS25080

REMOVING THE CLUTCH

1. Remove:
 - Clutch cover "1"

TIP

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



2. Remove:
 - Rear balancer weight
Refer to "BALANCERS" on page 5-106.
3. Remove:
 - Clutch spring bolt

TIP

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

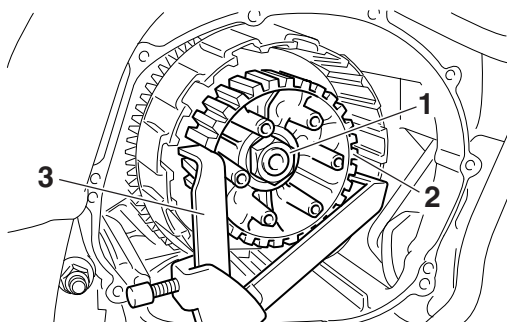
4. Straighten the lock washer tab.
5. Loosen:
 - Clutch boss nut "1"

TIP

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



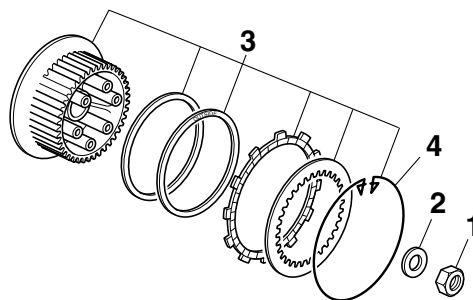
Universal clutch holder
90890-04086
YM-91042



6. Remove:
 - Clutch boss nut "1"
 - Washer "2"
 - Clutch boss assembly "3"

TIP

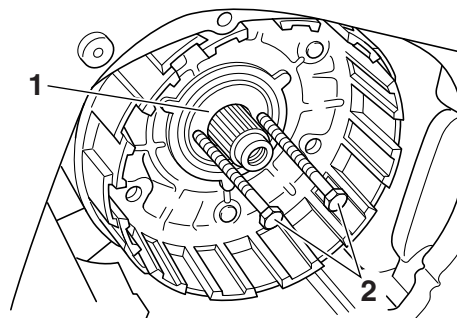
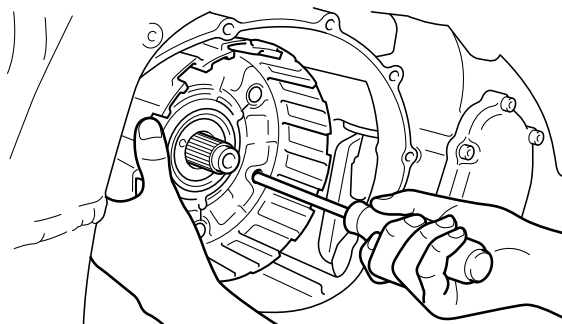
There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip "4" and disassemble the built-in damper unless there is serious clutch chattering.



7. Remove:
 - Spacer "1"
 - Clutch housing

TIP

- Insert a cross-headed screwdriver into one of the holes of the clutch housing and primary driven gear, and then rotate the inner primary driven gear until both primary drive gears are aligned. The teeth of both primary driven gears must be aligned for installation.
- Insert two 5 mm bolts "2" into the spacer and then remove the spacer by pulling on the bolts.



EAS25100

CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

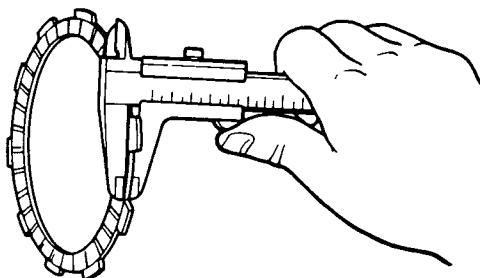
1. Check:
 - Friction plate
Damage/wear → Replace the friction plates as a set.
2. Measure:
 - Friction plate thickness
Out of specification → Replace the friction plates as a set.

TIP

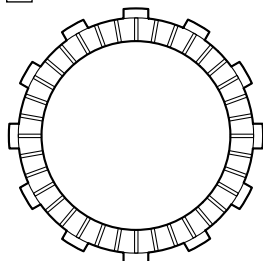
Measure the friction plate at four places.



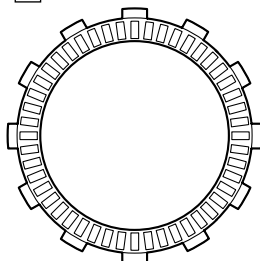
Friction plate 1, 3 thickness
2.90–3.10 mm (0.114–0.122 in)
Wear limit
2.80 mm (0.110 in)
Friction plate 2 thickness
2.92–3.08 mm (0.115–0.121 in)
Wear limit
2.82 mm (0.111 in)



A



B



- A. Friction plate 1, 3
B. Friction plate 2

EAS25110

CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

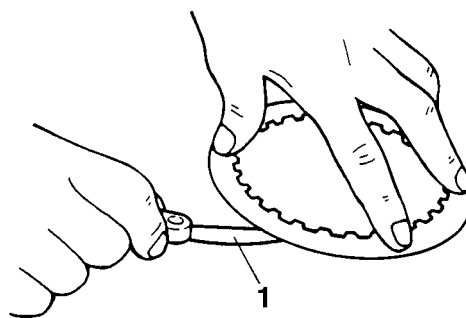
1. Check:
 - Clutch plate
Damage → Replace the clutch plates as a set.
2. Measure:
 - Clutch plate warpage
(with a surface plate and thickness gauge “1”)
Out of specification → Replace the clutch plates as a set.



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



Clutch plate thickness
1.90–2.10 mm (0.075–0.083 in)
Warpage limit
0.10 mm (0.0039 in)



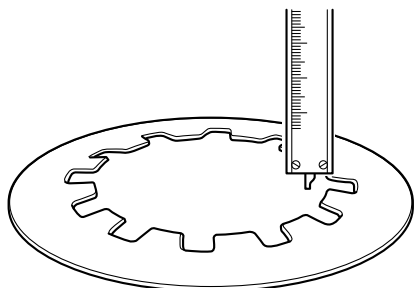
EAS25130

CHECKING THE CLUTCH SPRING PLATE

1. Check:
 - Clutch spring plate retainer
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
6.78 mm (0.27 in)
Minimum height
6.44 mm (0.25 in)



EAS25150

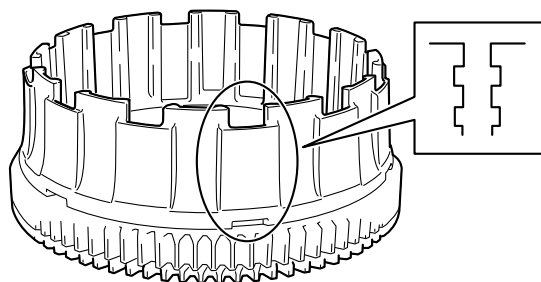
CHECKING THE CLUTCH HOUSING

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

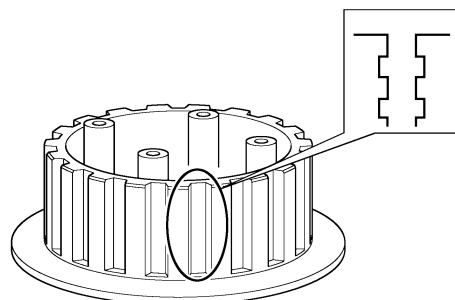
CHECKING THE CLUTCH BOSS

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.

EAS25190

CHECKING THE CLUTCH PUSH RODS

1. Check:

- O-ring
- Short clutch push rod
- Long clutch push rod
- Ball
Cracks/damage/wear → Replace the defective part(s).

2. Measure:

- Long clutch push rod bending limit
Out of specification → Replace the long clutch push rod.



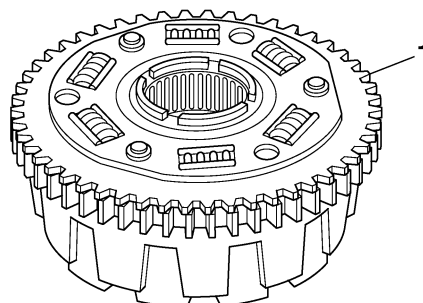
Long clutch push rod bending limit
0.370 mm (0.0146 in)

EAS25210

CHECKING THE PRIMARY DRIVEN GEAR

1. Check:

- Primary driven gear "1"
Damage/wear → Replace the primary drive and primary driven gears as a set.
Excessive noise during operation → Replace the clutch housing and crankshaft as a set.



EAS25250

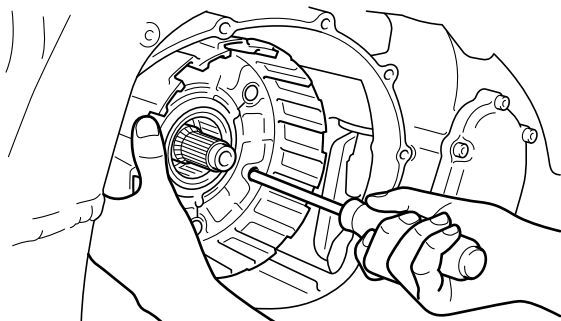
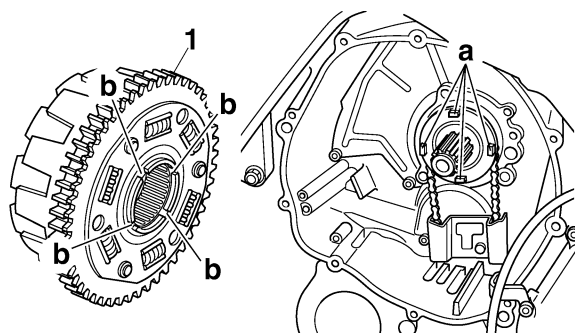
INSTALLING THE CLUTCH

1. Install:

- Clutch housing "1"

TIP

- Make sure that the projections "a" in the clutch housing align with the slots "b" in the oil pump drive sprocket.
- Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.
- Insert a cross-headed screwdriver into one of the holes of the clutch housing and primary driven gear, and then rotate the inner primary driven gear until both primary drive gears are aligned. The teeth of both primary driven gears must be aligned for installation.

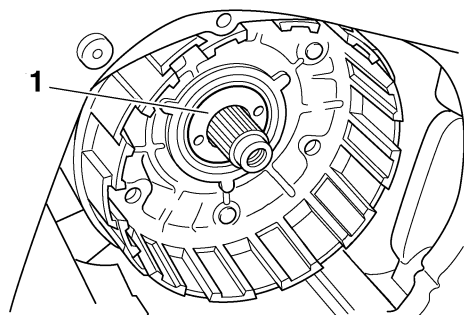


2. Install:

- Spacer "1"

TIP

Install the spacer with the two screw holes facing towards the clutch boss.

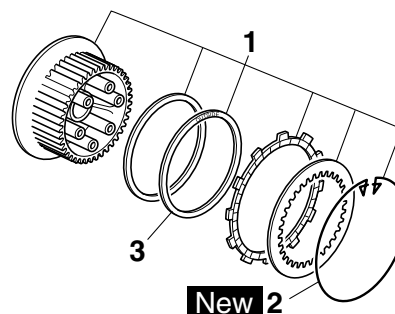


3. Install:

- Clutch boss assembly "1"

TIP

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



4. Install:

- Clutch boss "1"
- Lock washer "2" **New**
- Clutch boss nut "3"



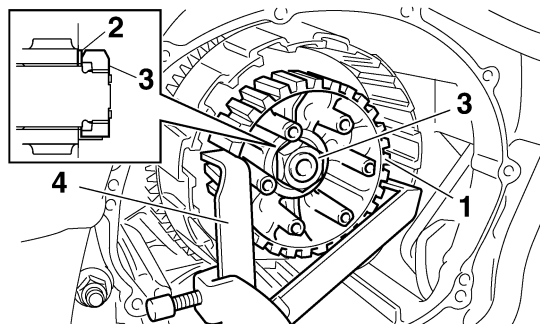
Clutch boss nut
90 Nm (9.0 m·kg, 65 ft·lb)

TIP

- Install the clutch boss nut with its large inner diameter side facing inward as shown in the illustration.
- While holding the clutch boss with the universal clutch holder "4", tighten the clutch boss nut.



Universal clutch holder
90890-04086
YM-91042



- 5. Bend the lock washer tab along a flat side of the nut.

6. Lubricate:

- Friction plates

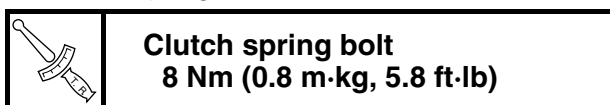
- Clutch plates
(with the recommended lubricant)



7. Install:
- Friction plates
 - Clutch plates

TIP _____
First, install a friction plate and then alternate between a clutch plate and a friction plate.

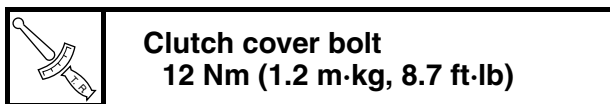
8. Install:
- Clutch spring bolts



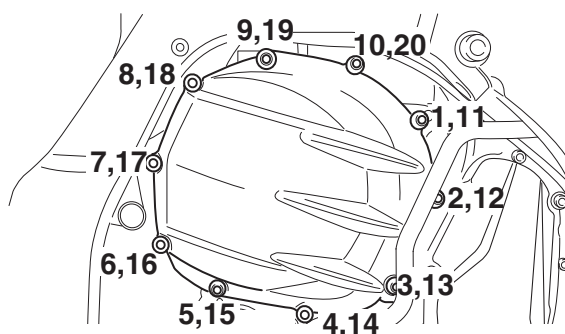
TIP _____
Tighten the clutch spring bolts in stages and in a crisscross pattern.

9. Install:
- Rear balancer weight
Refer to "BALANCERS" on page 5-106.

10. Install:
- Clutch cover



TIP _____
Tighten the clutch cover bolts in the proper tightening sequence as shown.

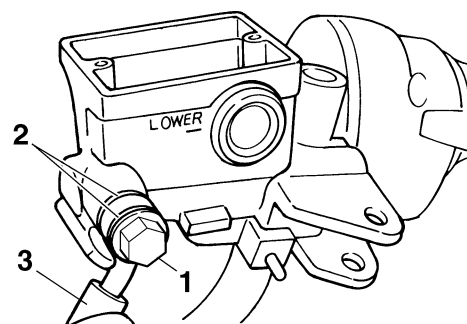


- **Never disassemble clutch components unless absolutely necessary.**
- **If any connection on the hydraulic clutch system is disconnected, the entire clutch system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.**
- **Never use solvents on internal clutch components.**
- **Use only clean or new clutch fluid for cleaning clutch components.**
- **Clutch fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilled fluid immediately.**
- **Avoid clutch fluid coming into contact with the eyes as it can cause serious injury.**
- **First aid for clutch fluid entering the eyes:**
- **Flush with water for 15 minutes and get immediate medical attention.**

TIP _____
Before disassembling the clutch master cylinder, drain the clutch fluid from the entire clutch system.

1. Remove:
- Clutch hose union bolt "1"
 - Copper washers "2"
 - Clutch hose "3"

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



EAS25280

DISASSEMBLING THE CLUTCH MASTER CYLINDER

ECA13840

NOTICE

- **Clutch components rarely require disassembly.**
- **Therefore, always follow these preventive measures:**

EAS25290

CHECKING THE CLUTCH MASTER CYLINDER

Recommended clutch component replacement schedule	
Piston seal	Every two years
Clutch hose	Every four years
Clutch fluid	Every two years and whenever the clutch is disassembled

1. Check:
 - Clutch master cylinder body
Cracks/damage → Replace the clutch master cylinder.
 - Clutch fluid delivery passage (clutch master cylinder body)
Obstruction → Blow out with compressed air.
2. Check:
 - Clutch master cylinder
 - Clutch master cylinder kit
Rust/scratches/wear → Replace the clutch master cylinder and clutch master cylinder kit as a set.
3. Check:
 - Clutch master cylinder reservoir
Cracks/damage → Replace.
 - Clutch master cylinder reservoir diaphragm
Damage/wear → Replace.
4. Check:
 - Clutch hose
Cracks/damage/wear → Replace.

EAS25300

ASSEMBLING THE CLUTCH MASTER CYLINDER

EW3P61015

⚠ WARNING

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



EAS25310

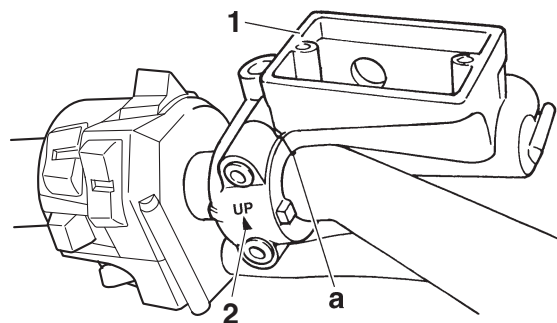
INSTALLING THE CLUTCH MASTER CYLINDER

1. Install:
 - Clutch master cylinder "1"
 - Clutch master cylinder holder "2"

EW3P61016

⚠ WARNING

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



2. Install:
 - Copper washers "1" **New**
 - Clutch hose "2"
 - Clutch hose union bolt "3"



Clutch hose union bolt
30 Nm (3.0 m·kg, 22 ft·lb)

EW3P61017

⚠ WARNING

Proper clutch hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-47.

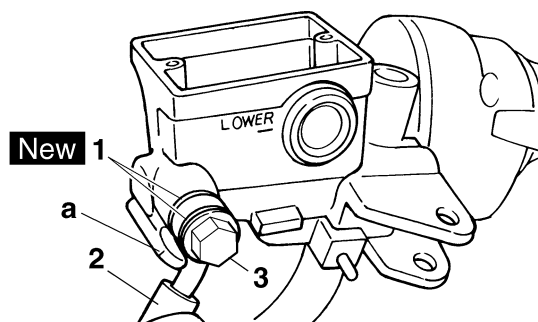
EC3P61034

NOTICE

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

TIP

Turn the handlebars to the left and to the right to make sure the clutch hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



3. Fill:

- Clutch master cylinder reservoir
(with the specified amount of the specified brake and clutch fluid)



EWA1MC1009

WARNING

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

ECA13420

NOTICE

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

TIP

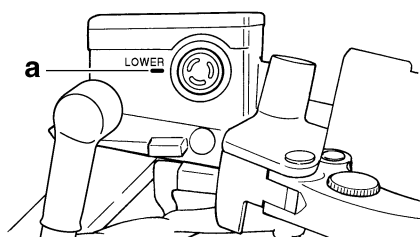
In order to ensure a correct reading of the clutch fluid level, make sure the top of the clutch master cylinder reservoir is horizontal.

4. Bleed:

- Clutch system
Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” on page 3-12.

5. Check:

- Clutch fluid level
Below the minimum level mark “a” → Add the specified brake and clutch fluid to the proper level.
Refer to “CHECKING THE CLUTCH FLUID LEVEL” on page 3-12.



6. Check:

- Clutch lever operation
Soft or spongy feeling → Bleed the clutch system.
Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” on page 3-12.

ET3P61024

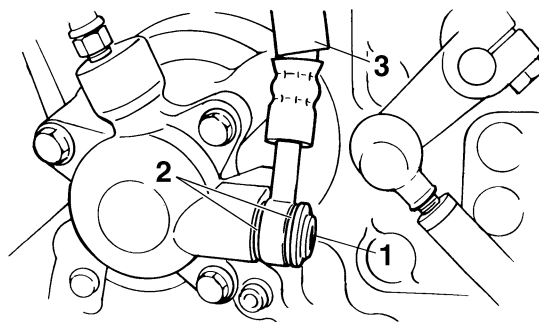
REMOVING THE CLUTCH RELEASE CYLINDER

1. Remove:

- Clutch hose union bolt “1”
- Copper washers “2”
- Clutch hose “3”

TIP

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



EAS25330

CHECKING THE CLUTCH RELEASE CYLINDER

1. Check:

- Clutch release cylinder body
Cracks/damage → Replace the clutch release cylinder.

EAS25340

ASSEMBLING THE CLUTCH RELEASE CYLINDER

EW3P61018

WARNING

- Before installation, all internal clutch components must be cleaned and lubricated with clean or new clutch fluid.
- Never use solvents on internal clutch components as they will cause the piston seal to swell and distort.
- Whenever a clutch release cylinder is disassembled, replace the piston seal.



EAS25350

INSTALLING THE CLUTCH RELEASE CYLINDER

1. Check:

- Copper washers “1” **New**
- Clutch hose “2”
- Clutch hose union bolt “3”



Clutch hose union bolt
30 Nm (3.0 m·kg, 22 ft·lb)

EWA1MC1027



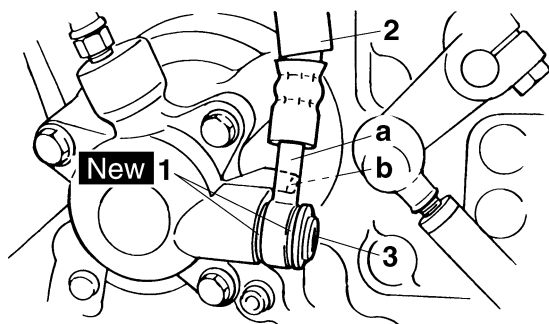
WARNING

Proper clutch hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-47.

EC3P61035



When installing the clutch hose onto the clutch release cylinder, make sure the pipe “a” touches the projection “b” on the clutch release cylinder body.



2. Fill:

- Clutch master cylinder reservoir (with the specified amount of the specified brake and clutch fluid)



Specified brake and clutch fluid
DOT 4

EWA1MC1009



WARNING

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

- When refilling, be careful that water does not enter the clutch master cylinder reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.

ECA13420

NOTICE

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

TIP

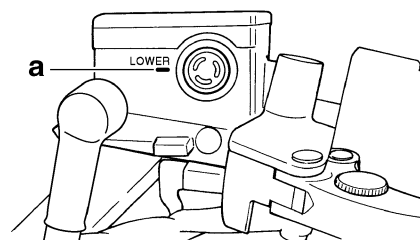
In order to ensure a correct reading of the clutch fluid level, make sure that the top of the clutch master cylinder reservoir is horizontal.

3. Bleed:

- Clutch system
Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” on page 3-12.

4. Check:

- Clutch fluid level
Below the minimum level mark “a” → Add the specified brake and clutch fluid to the proper level.
Refer to “CHECKING THE CLUTCH FLUID LEVEL” on page 3-12.



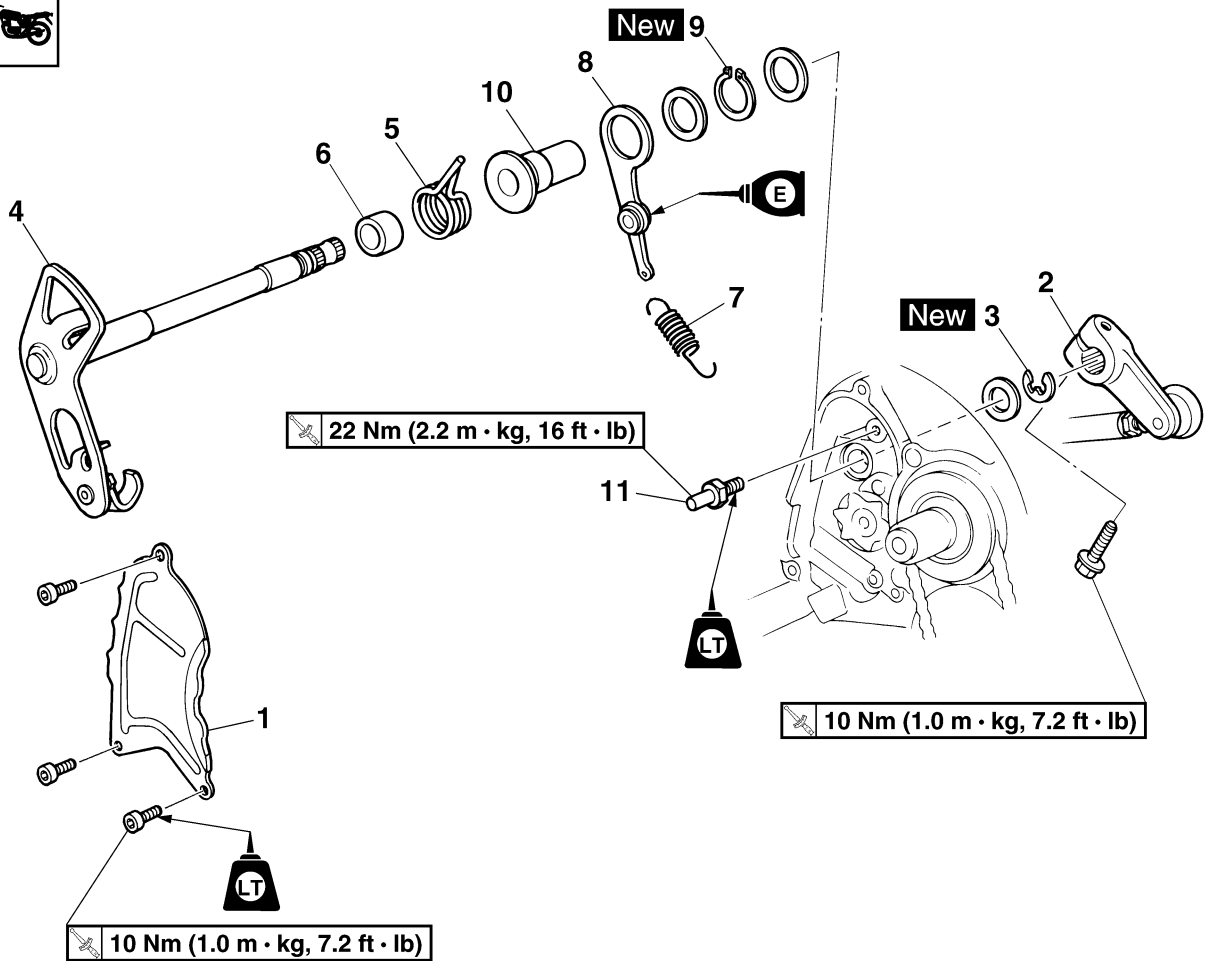
5. Check:

- Clutch lever operation
Soft or spongy feeling → Bleed the clutch system.
Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” on page 3-12.

EAS25410

SHIFT SHAFT

Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch housing		Refer to "CLUTCH" on page 5-43.
1	Oil baffle plate 1	1	
2	Shift arm	1	
3	Circlip	1	
4	Shift shaft	1	
5	Shift shaft spring	1	
6	Spacer	1	
7	Stopper lever spring	1	
8	Stopper lever	1	
9	Circlip	1	
10	Collar	1	
11	Shift shaft spring stopper	1	
			For installation, reverse the removal procedure.

EAS25420

CHECKING THE SHIFT SHAFT

- Check:
 - Shift shaft
Bends/damage/wear → Replace.
 - Shift shaft spring
Damage/wear → Replace.

EAS25430

CHECKING THE STOPPER LEVER

- Check:
 - Stopper lever
Bends/damage → Replace.
Roller turns roughly → Replace the stopper lever.
 - Shift lever spring
Damage/wear → Replace.

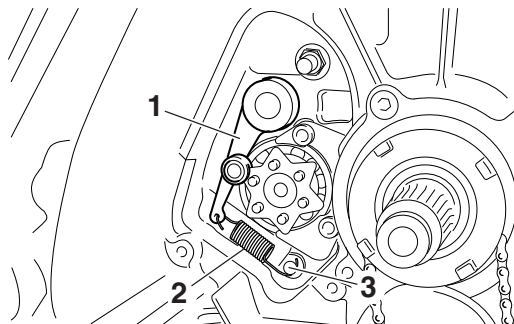
EAS25450

INSTALLING THE SHIFT SHAFT

- Install:
 - Stopper lever "1"
 - Stopper lever spring "2"

TIP

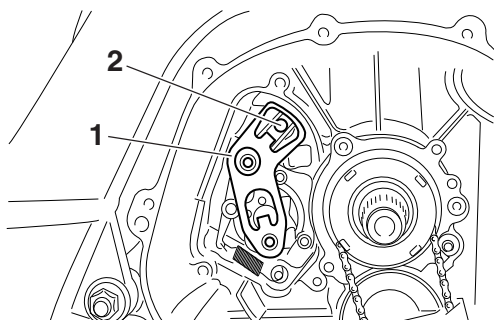
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss "3".
- Mesh the stopper lever with the shift drum segment assembly.



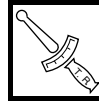
- Install:
 - Shift shaft "1"

TIP

Hook the end of the shift shaft spring onto the shift shaft spring stopper "2".



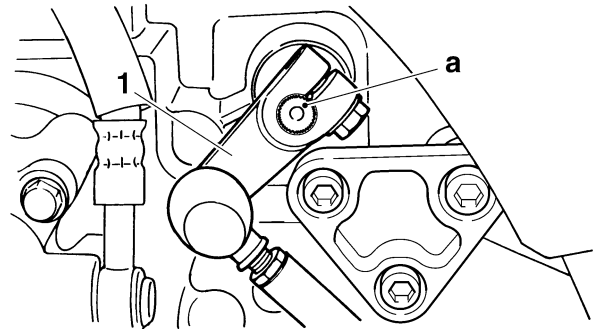
- Install:
 - Shift arm "1"



Shift arm pinch bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

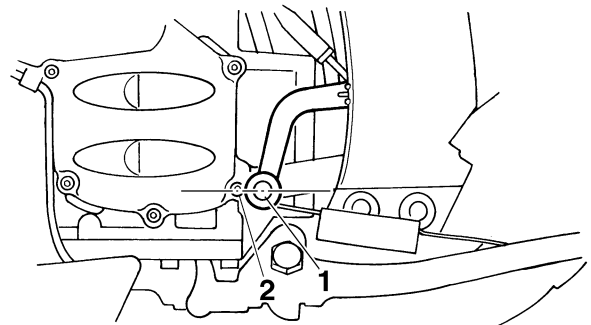
Align the punch mark "a" in the shift shaft with the slot in the shift arm.



EAS21380

ADJUSTING THE SHIFT PEDAL

- Check:
 - Shift pedal position
Check that the center of the shift pedal end "1" is aligned with the center of the middle gear case cover bolt "2" as shown in the illustration when viewed directly from the side.
Incorrect → Adjust.



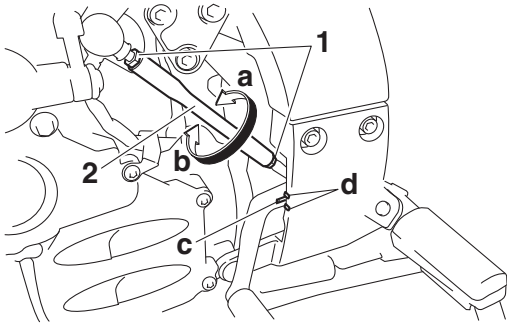
- Adjust:
 - Shift pedal position

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

Direction "a"
Shift pedal is raised.
Direction "b"
Shift pedal is lowered.

TIP

Check that the groove "c" in the shift pedal is between the projections "d" on the frame.



c. Tighten both locknuts to specification.



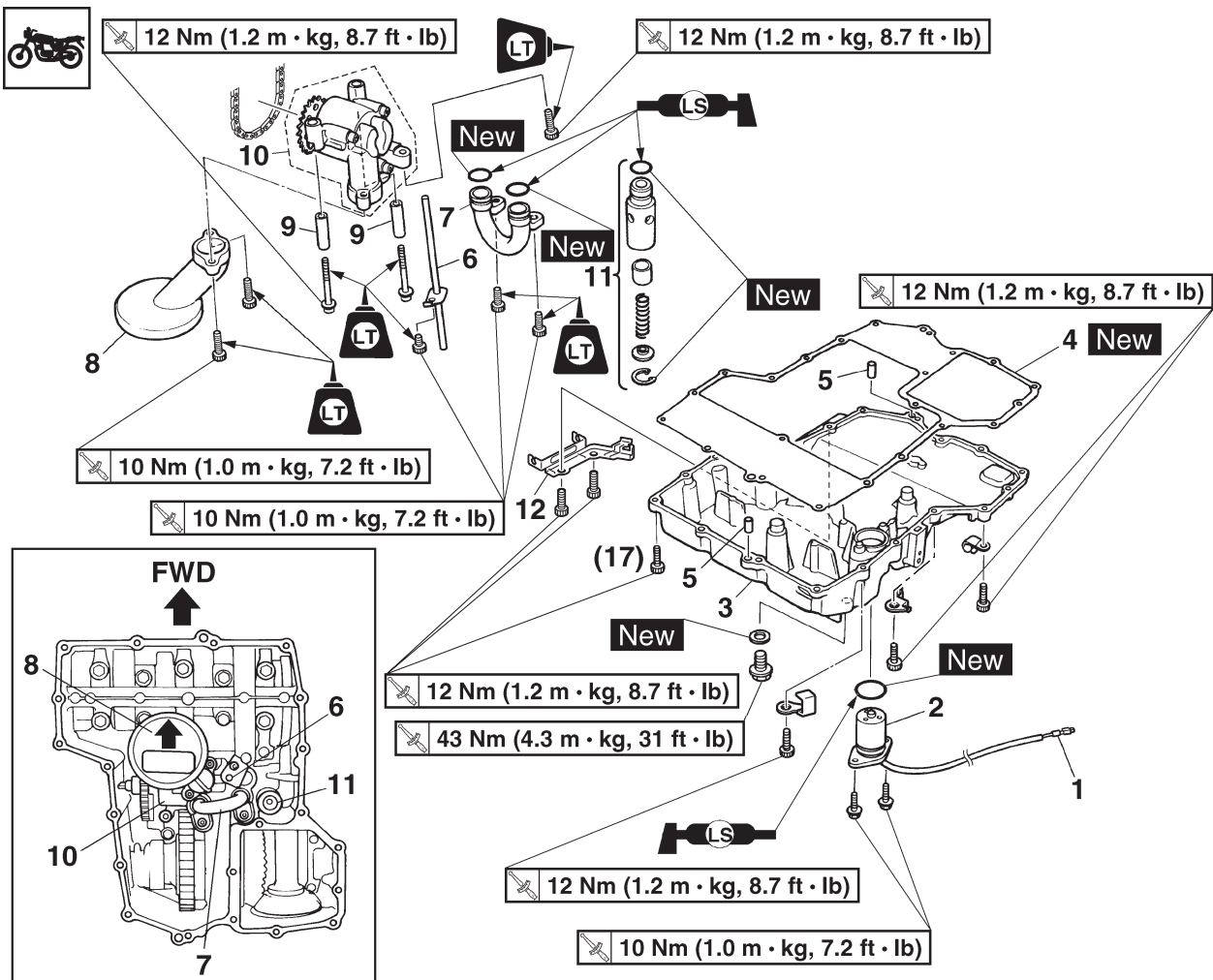
Shift rod locknut
7 Nm (0.7 m·kg, 5.1 ft·lb)



EAS24920

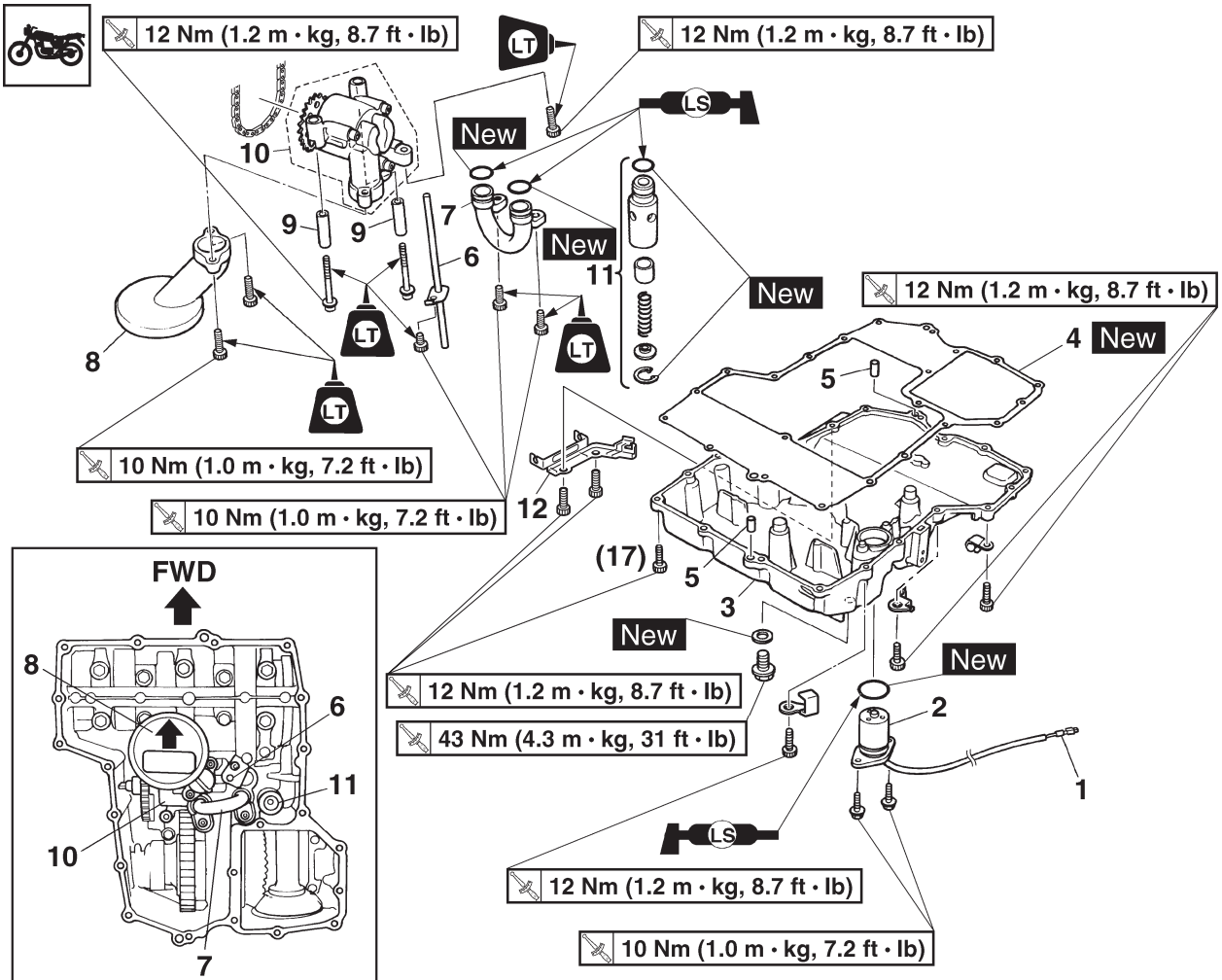
OIL PUMP

Removing the oil pan and oil pump



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-4.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-3.
	Sidestand		Refer to "SHAFT DRIVE" on page 4-106.
	Water pump		Refer to "WATER PUMP" on page 6-10.
1	Oil level switch coupler	1	Disconnect.
2	Oil level switch	1	
3	Oil pan	1	
4	Oil pan gasket	1	
5	Dowel pin	2	
6	Oil delivery pipe 2	1	
7	Oil delivery pipe 3	1	
8	Oil strainer	1	
9	Dowel pin	2	
10	Oil pump	1	

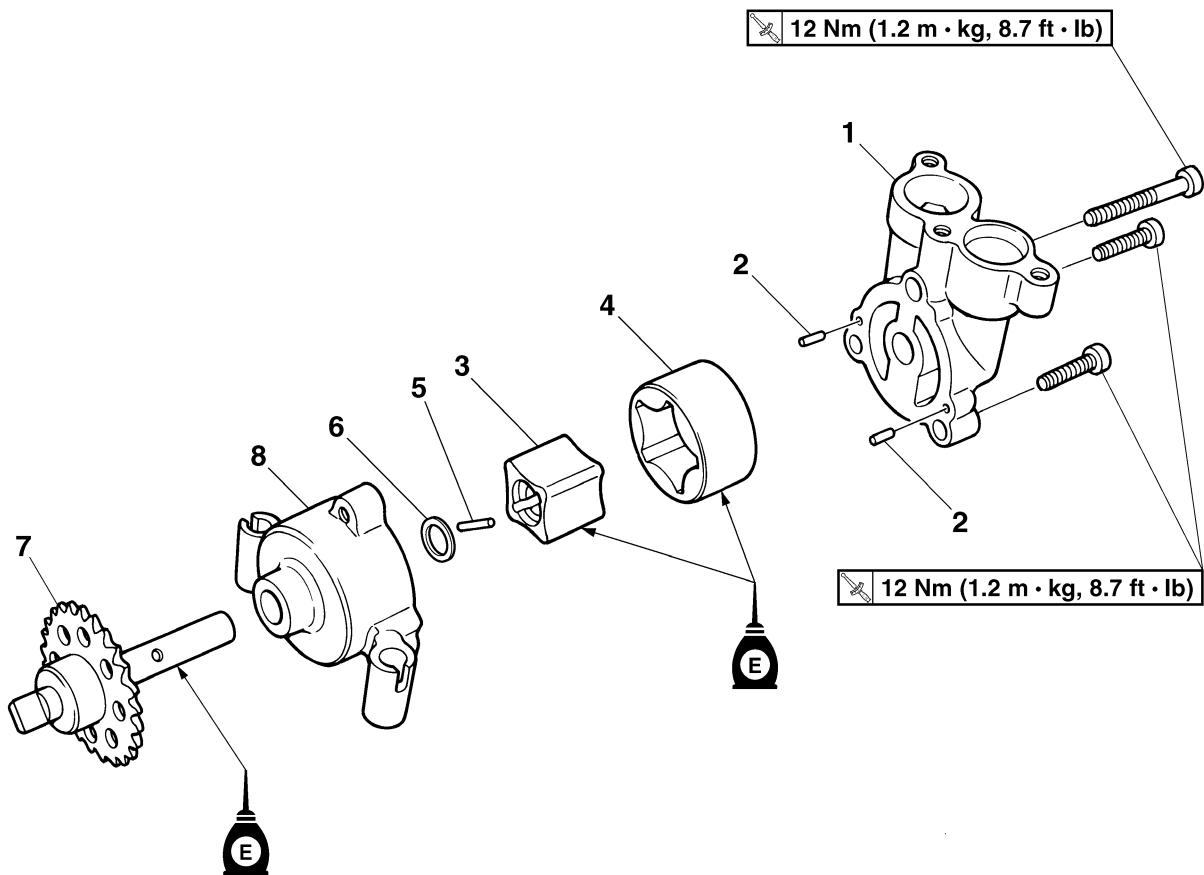
Removing the oil pan and oil pump



Order	Job/Parts to remove	Q'ty	Remarks
11	Relief valve assembly	1	
12	O ₂ sensor lead bracket	1	
			For installation, reverse the removal procedure.

OIL PUMP

Disassembling the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump housing cover	1	
2	Pin	2	
3	Oil pump inner rotor	1	
4	Oil pump outer rotor	1	
5	Pin	1	
6	Washer	1	
7	Oil pump driven sprocket	1	
8	Oil pump housing	1	
			For assembly, reverse the disassembly procedure.

EAS24960

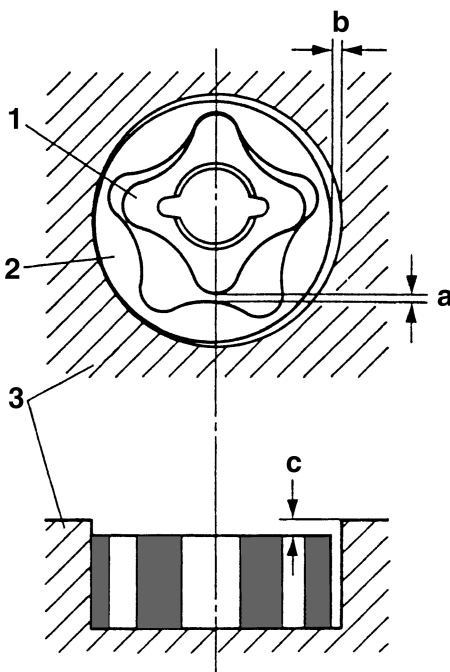
CHECKING THE OIL PUMP

1. Check:

- Oil pump driven sprocket
 - Oil pump housing
 - Oil pump housing cover
- Cracks/damage/wear → Replace the defective part(s).

2. Measure:

- Inner-rotor-to-outer-rotor-tip clearance “a”
 - Outer-rotor-to-oil-pump-housing clearance “b”
 - Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance “c”
- Out of specification → Replace the oil pump.



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



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

Less than 0.12 mm (0.0047 in)

Limit

0.20 mm (0.0079 in)

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

0.09–0.15 mm (0.0035–0.0059 in)

Limit

0.22 mm (0.0087 in)

Oil-pump-housing-to-inner-and-outer-rotor clearance

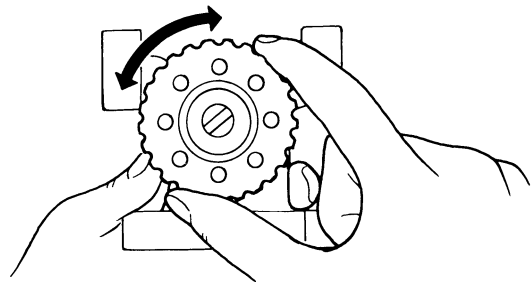
0.06–0.11 mm (0.0024–0.0043 in)

Limit

0.18 mm (0.0071 in)

3. Check:

- Oil pump operation
- Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



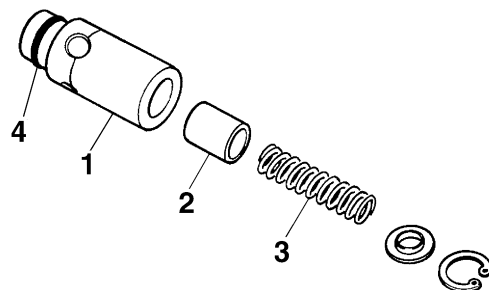
EAS24970

CHECKING THE RELIEF VALVE

1. Check:

- Relief valve body “1”
- Relief valve “2”
- Spring “3”
- O-ring “4”

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



EAS24980

CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes.

1. Check:
 - Oil delivery pipes
Damage → Replace.
Obstruction → Wash and blow out with compressed air.

EAS24990

CHECKING THE OIL STRAINER

1. Check:
 - Oil strainer
Damage → Replace.
Contaminants → Clean with solvent.

EAS25010

ASSEMBLING THE OIL PUMP

1. Lubricate:
 - Inner rotor
 - Outer rotor
 - Oil pump shaft
(with the recommended lubricant)

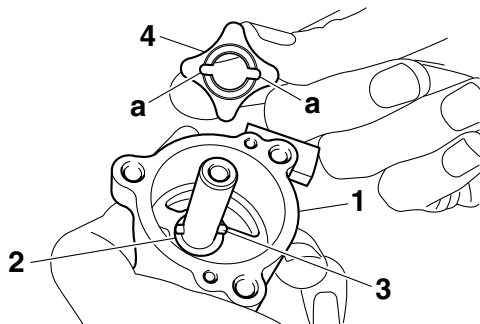


Recommended lubricant
Engine oil

2. Install:
 - Oil pump driven sprocket
 - Oil pump housing "1"
 - Washer "2"
 - Pin "3"
 - Oil pump inner rotor "4"
 - Oil pump outer rotor

TIP

When installing the inner rotor, align the pin "3" in the oil pump shaft with the groove "a" in the inner rotor "4".



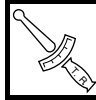
3. Check:
 - Oil pump operation
Refer to "CHECKING THE OIL PUMP" on page 5-63.

EAS25050

INSTALLING THE OIL PAN

1. Install:
 - Oil pan gasket **New**

- Oil pan



Oil pan bolt
12 Nm (1.2 m·kg, 8.7 ft·lb)

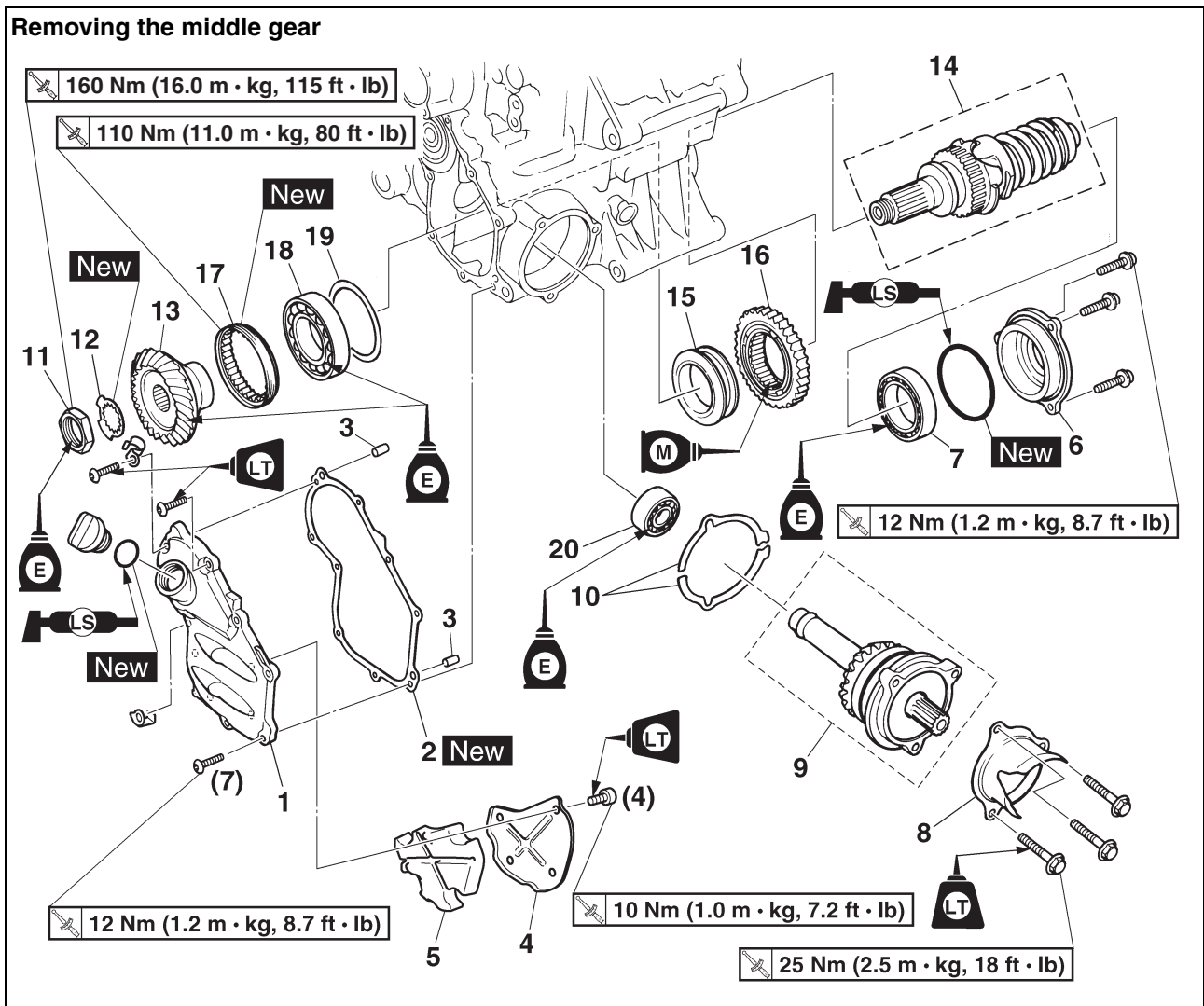
TIP

Tighten the oil pan bolts in stages and in a criss-cross pattern.

EAS25710

MIDDLE GEAR

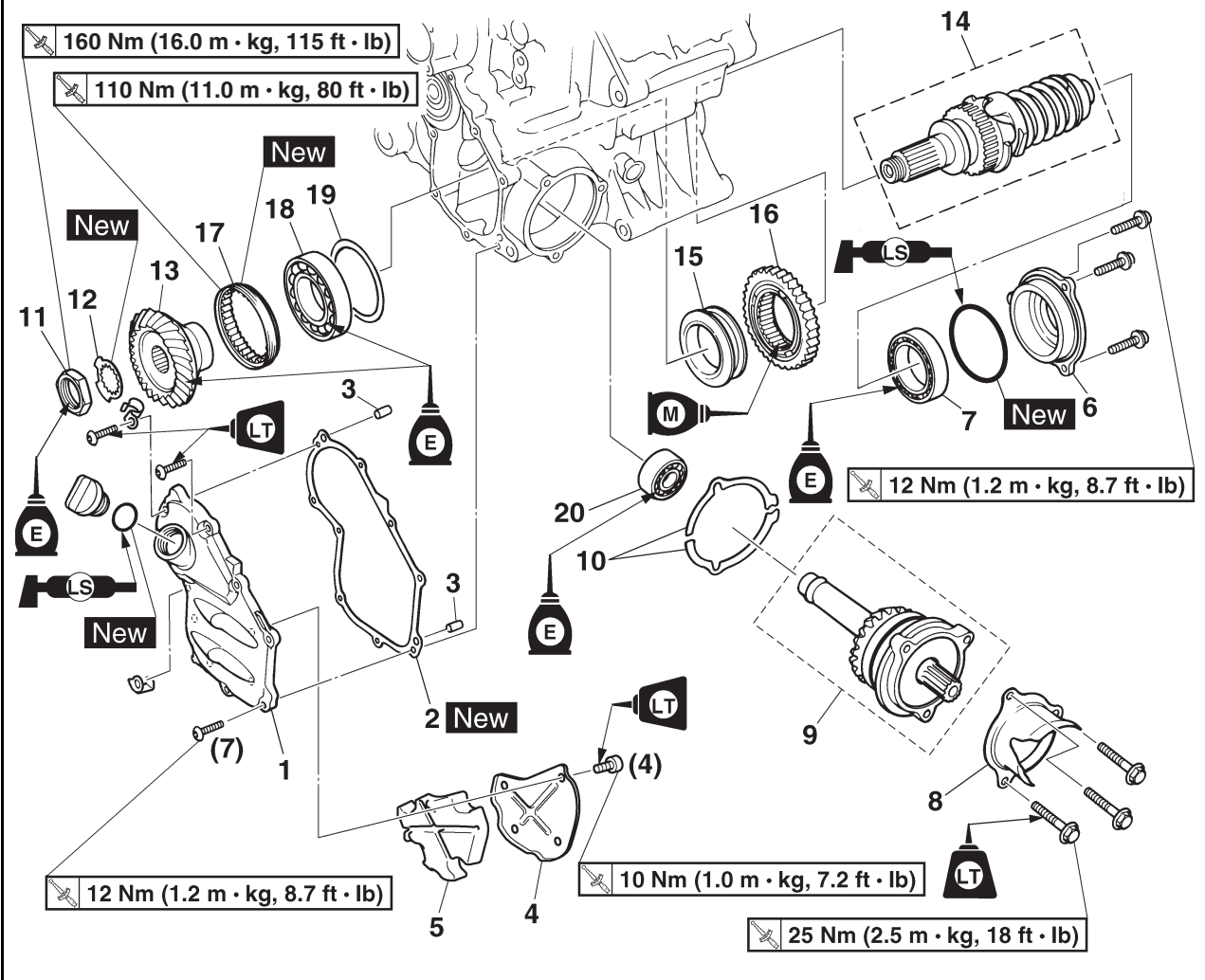
Removing the middle gear



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-3.
	Oil pan/Oil pump		Refer to "OIL PUMP" on page 5-60.
1	Middle gear case cover	1	
2	Middle gear case cover gasket	1	
3	Dowel pin	2	
4	Damper cover	1	
5	Damper	1	
6	Middle drive shaft bearing housing	1	
7	Bearing	1	
8	Middle driven shaft end cover	1	
9	Middle driven shaft assembly	1	
10	Middle driven pinion gear shim		Refer to "ADJUSTING THE MIDDLE GEAR BACKLASH" on page 5-73.
11	Middle drive pinion gear nut	1	
12	Lock washer	1	
13	Middle drive pinion gear	1	

MIDDLE GEAR

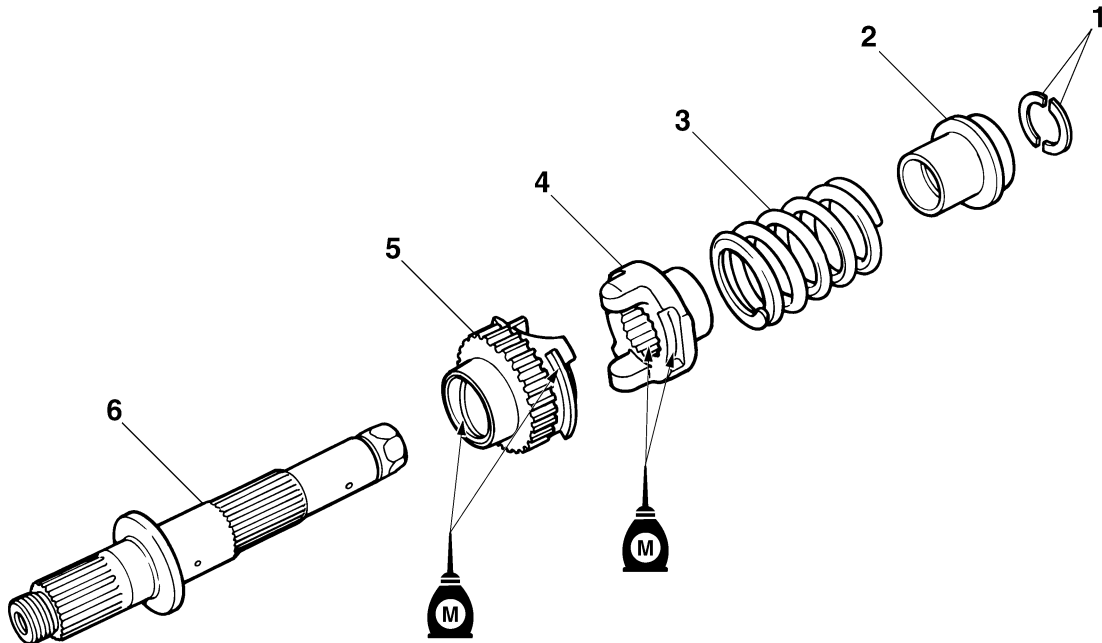
Removing the middle gear



Order	Job/Parts to remove	Q'ty	Remarks
14	Middle drive shaft assembly	1	
15	Spacer	1	
16	Middle driven gear	1	
17	Bearing retainer	1	
18	Bearing	1	
19	Middle drive pinion gear shim		Refer to "ALIGNING THE MIDDLE GEAR" on page 5-74.
20	Bearing	1	
			For installation, reverse the removal procedure.

MIDDLE GEAR

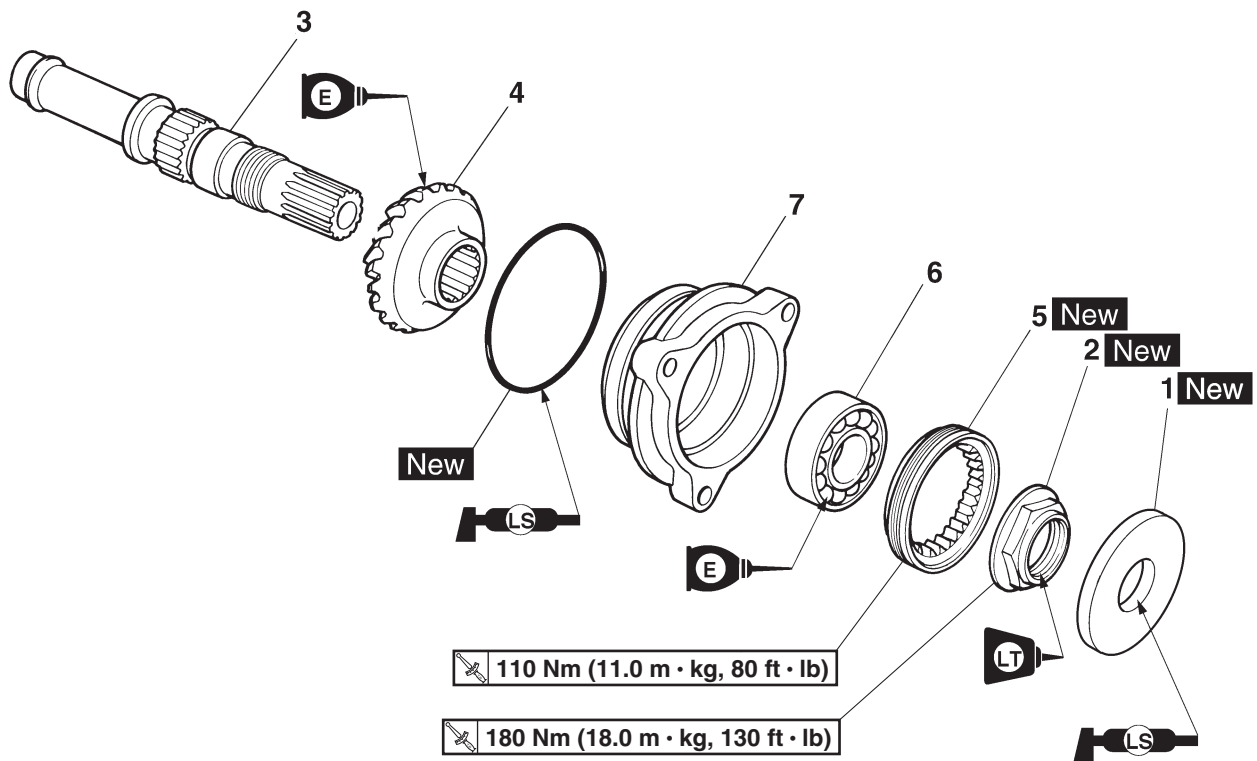
Disassembling the middle drive shaft assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Spring retainer	2	
2	Spring seat	1	
3	Damper spring	1	
4	Damper driven cam	1	
5	Damper drive cam	1	
6	Middle drive shaft	1	
			For assembly, reverse the disassembly procedure.


MIDDLE GEAR

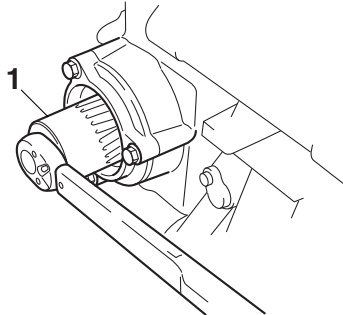
Disassembling the middle driven shaft assembly



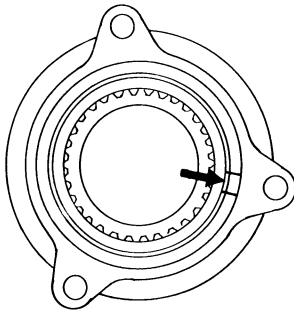
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	1	
2	Middle driven pinion gear nut	1	
3	Middle driven shaft	1	
4	Middle driven pinion gear	1	
5	Bearing retainer	1	
6	Bearing	1	
7	Middle driven shaft bearing housing	1	
			For assembly, reverse the disassembly procedure.

c. Tighten the bearing retainer to specification.

	Bearing retainer 110 Nm (11.0 m·kg, 80 ft·lb)
---	--




d. Lock the threads with a drift punch.



2. Tighten:

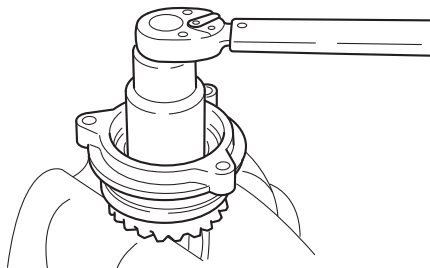
- Middle driven pinion gear nut **New**

a. Tighten the middle driven pinion gear nut to specification.

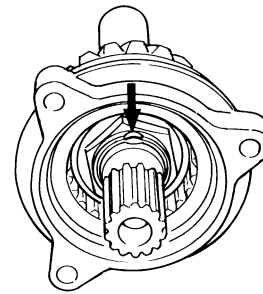
	Middle driven pinion gear nut 180 Nm (18.0 m·kg, 130 ft·lb) LOCTITE®
---	---

TIP

Secure the middle driven shaft in a vise, making sure to tighten the vise jaws onto the flat sections of the shaft.



b. Lock the threads with a drift punch.



EAS25860

INSTALLING THE MIDDLE DRIVE SHAFT ASSEMBLY


1. Tighten:

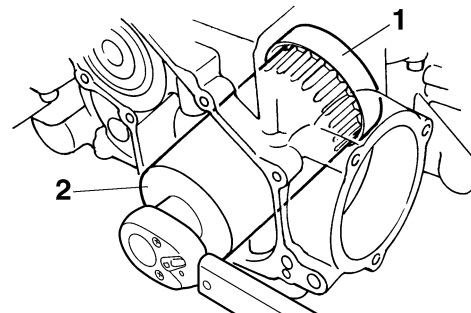
- Bearing retainer "1" **New**

a. Attach the bearing retainer wrench "2".

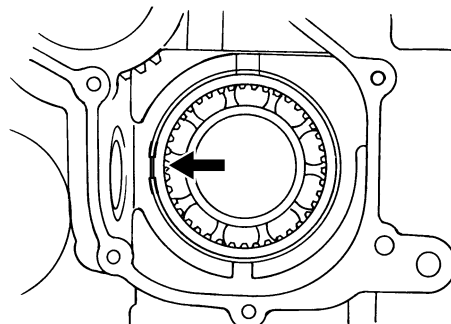
	Bearing retainer wrench 90890-04137 Middle drive shaft bearing retainer wrench YM-04137
---	--

b. Tighten the bearing retainer to specification.

	Bearing retainer 110 Nm (11.0 m·kg, 80 ft·lb)
---	--



c. Lock the threads with a drift punch.



2. Install:

- Lock washer "1" **New**

EAS25880

MEASURING THE MIDDLE GEAR BACKLASH

1. Measure:
 - Middle gear backlash
 Out of specification → Refer to “ADJUSTING THE MIDDLE GEAR BACKLASH” on page 5-73.

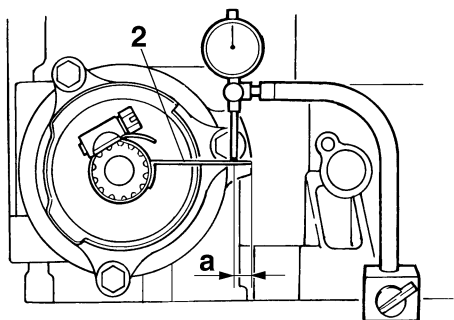
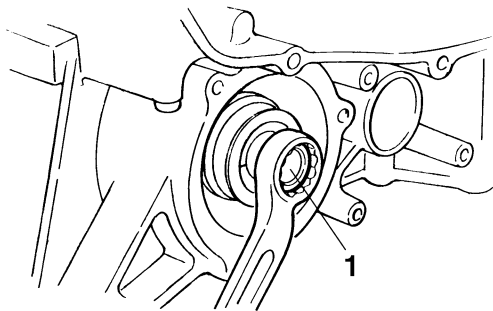


Middle gear backlash
0.10–0.20 mm (0.0039–0.0079 in)

- a. Hold the middle drive shaft “1”.
- b. Install the gear lash measurement tool “2” as shown.
- c. Make sure the dial gauge plunger contacts the measuring point “a” on the gear lash measurement tool as shown.



Gear lash measurement tool
90890-01467
YM-01467



a. 14 mm (0.55 in)

- d. While gently turning the middle driven shaft back and forth, measure the middle gear backlash.

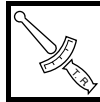
TIP

Measure the middle gear backlash at four positions. Rotate the middle driven shaft 90° each time and observe the reading on the dial gauge.

EAS25900

ADJUSTING THE MIDDLE GEAR BACKLASH

1. Loosen:
 - Middle driven shaft bearing housing bolts
2. Remove:
 - Middle driven pinion gear shim(s)
3. Tighten:
 - Middle driven shaft bearing housing bolts



Middle driven shaft bearing housing bolt
25 Nm (2.5 m·kg, 18 ft·lb)

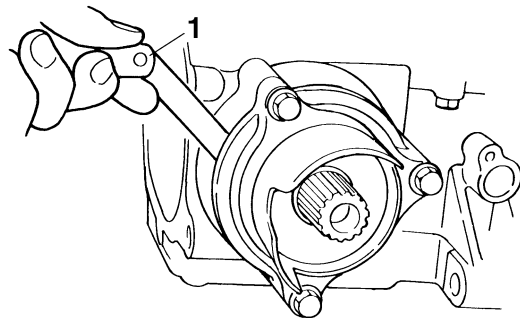
ECA14050

NOTICE

Do not overtighten the middle driven shaft bearing housing bolts or you may obtain too little middle gear backlash and damage the middle gears. If the bolts are overtightened, loosen them until the crankcase-to-middle-driven-shaft-bearing-housing clearance is within specification, as stated below. Then, repeat all of the previous steps.

TIP

- Tighten the middle driven shaft bearing housing bolts carefully, one thread turn at a time only. Push in the middle driven shaft bearing housing and then tighten the bolts to specification.
- After tightening the middle driven shaft bearing housing bolts, loosen them until the clearance between the crankcase and the housing is approximately 2 mm (0.08 in), when measured with a thickness gauge “1”.



4. Hold the middle drive shaft.
5. Turn:
 - Middle driven shaft

TIP

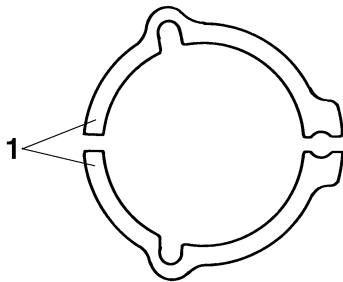
While carefully tightening the middle driven shaft bearing housing bolts in stages and in a criss-cross pattern, turn the middle driven shaft back and forth until the dial gauge reads 0.10–0.20 mm (0.0039–0.0079 in).

6. Measure:

- Crankcase-to-middle-driven-shaft-bearing-housing clearance (with a thickness gauge)

7. Select:

- Middle driven pinion gear shim(s) “1”



a. Shims can only be selected in 0.05 mm increments, therefore round off to the hundredth's digit of the calculated thickness and select the appropriate shims with the following chart.

b. For example, the clearance between the crankcase and the middle driven shaft bearing housing is 0.42 mm. Therefore, the chart instructs you to round off the 2 to 0. Thus, you should use one 0.40 mm shim.

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

Shims are supplied in the following thicknesses.

	Middle driven pinion gear shim
	Thickness (mm) 0.10 0.15 0.20 0.30 0.40 0.50

8. Loosen:

- Middle driven shaft bearing housing bolts

9. Install:

- Middle driven pinion gear shim(s)

10. Tighten:

- Middle driven shaft bearing housing bolts



Middle driven shaft bearing housing bolt
25 Nm (2.5 m·kg, 18 ft·lb)
LOCTITE®

11. Measure:

- Middle gear backlash

Out of specification → Refer to “MEASURING THE MIDDLE GEAR BACKLASH” on page 5-73.

EAS25930

ALIGNING THE MIDDLE GEAR

TIP

Aligning the middle gear is necessary when any of the following parts are replaced:

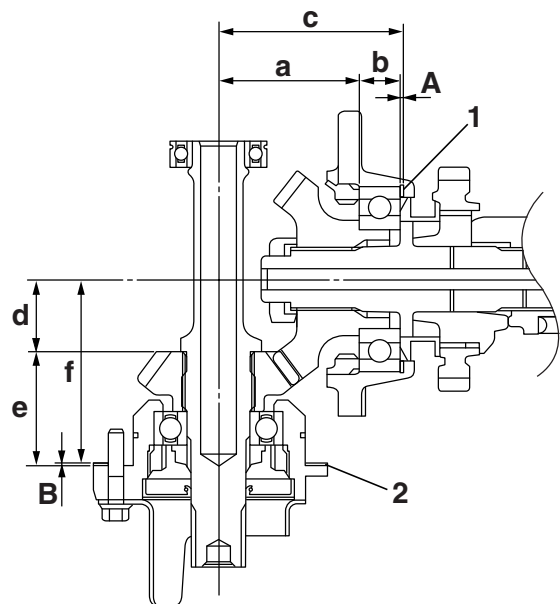
- Crankcase
- Middle drive shaft
- Middle driven shaft bearing housing

1. Select:

- Middle drive pinion gear shim(s) “1”
- Middle driven pinion gear shim(s) “2”

TIP

Select the middle driven gear shim(s) “2” by calculating the middle drive gear shim thickness and then measuring the middle gear backlash.

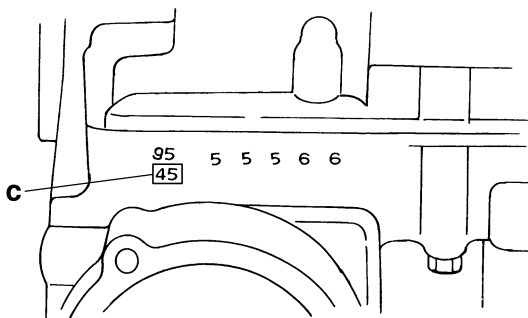


- A. Middle drive pinion gear shim thickness
- B. Middle driven pinion gear shim thickness

- a. Position the middle gears with the appropriate shim(s) that has had its respective thickness calculated from information marked on the crankcase and middle driven pinion gear.
- b. To find middle drive pinion gear shim thickness "A", use the following formula.

Middle drive pinion gear shim thickness
 $A = c - a - b$

"a" = 65.00
 "b" = 18.94
 "c" = a numeral on the lower crankcase, to be divided by 100 and added to "84"



Example:
 "a" is 65.00
 "b" is 18.94
 If the lower crankcase is marked "45"
 "c" is 84.45 (i.e., 84.00 + 0.45 = 84.45)
 $A = 84.45 - 65.00 - 18.94 = 0.51$
 Round off to the hundredths digit and select the appropriate shim(s).

TIP
 In the above example, the calculated number is 0.51. The chart instructs you to round off the 1 to 0. Thus, the shim thickness is 0.50 mm.

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

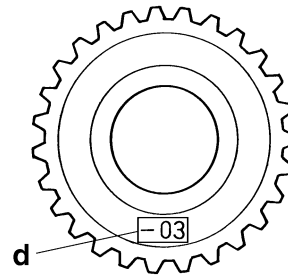
Shims are supplied in the following thicknesses.

Middle drive pinion gear shim Thickness (mm)
0.15 0.30 0.40 0.50

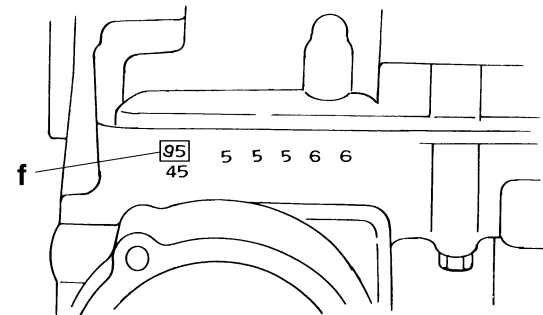
- c. To find middle driven pinion gear shim thickness "B", use the following formula.

Middle driven pinion gear shim thickness
 $B = d + e - f$

"d" = a numeral on the middle driven pinion gear, to be divided by 100 and either added to or subtracted from "34"



"e" = Measured value
 "f" = a numeral on the lower crankcase, to be divided by 100 and added to "87".



Example:
 If the middle driven pinion gear is marked "-03"
 "d" is 33.97 (i.e., 34.00 + (-0.03) = 33.97)
 "e" is 54.49
 If the lower crankcase is marked "95"
 "f" is 87.95 (i.e., 87.00 + 0.95 = 87.95)
 $B = 33.97 + 54.49 - 87.95 = 0.51$
 Round off to the hundredths digit and select the appropriate shim(s).

TIP
 In the above example, the calculated number is 0.51. The chart instructs you to round off the 1 to 0. Thus, the shim thickness is 0.50 mm.

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

Shims are supplied in the following thicknesses.



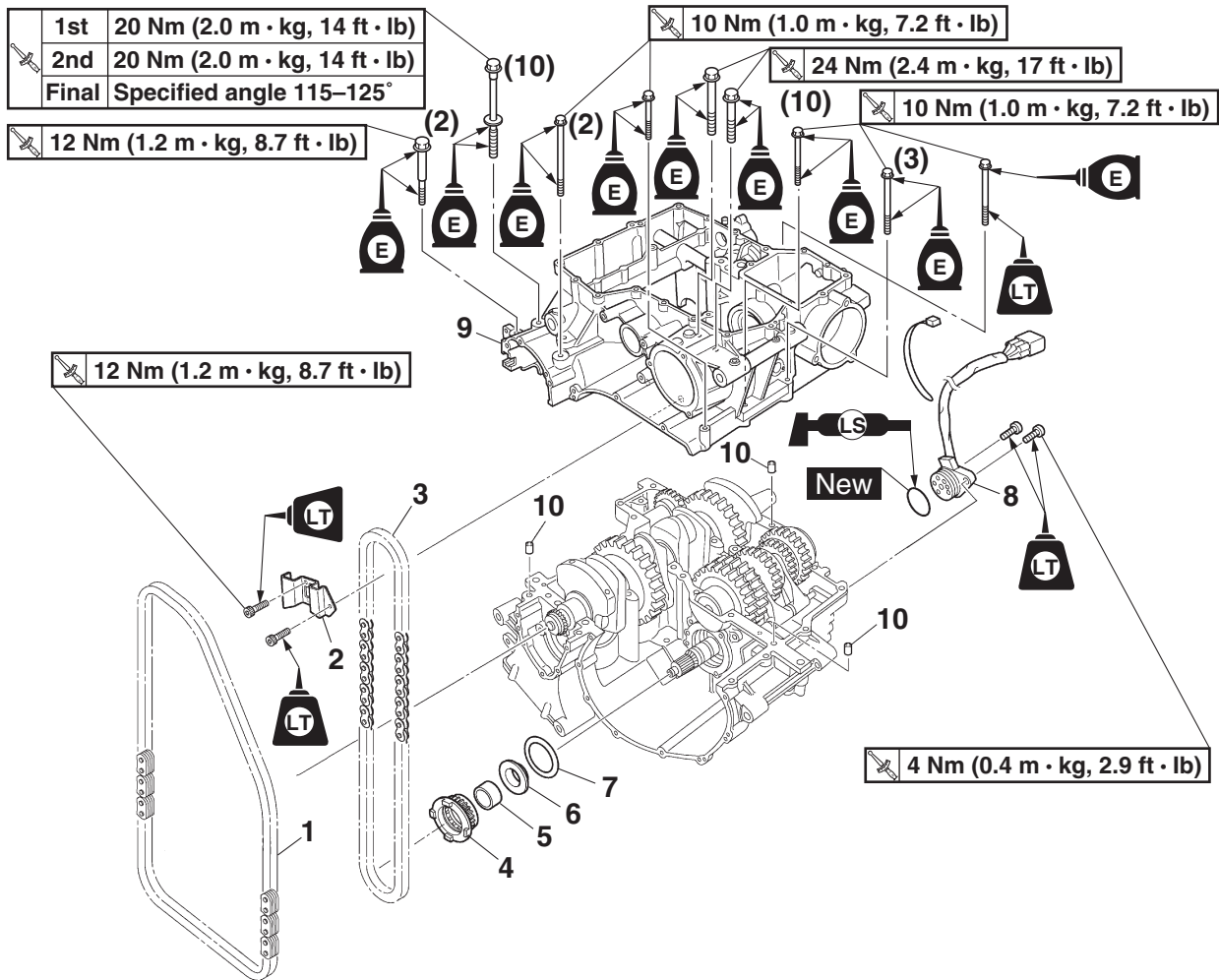
Middle driven pinion gear shim
Thickness (mm)
0.10 0.15 0.20 0.30 0.40 0.50



EAS25540

CRANKCASE

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-3.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-20.
	Starter clutch		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-31.
	Pickup rotor		Refer to "PICKUP ROTOR" on page 5-36.
	Oil pump		Refer to "OIL PUMP" on page 5-60.
	Middle drive shaft assembly		Refer to "MIDDLE GEAR" on page 5-65.
	Clutch housing		Refer to "CLUTCH" on page 5-43.
1	Timing chain	1	
2	Oil pump drive chain guide	1	
3	Oil pump drive chain	1	
4	Oil pump drive sprocket	1	
5	Spacer	1	
6	Collar	1	
7	Spring washer	1	
8	Gear position switch	1	

CRANKCASE

Separating the crankcase

1st	20 Nm (2.0 m · kg, 14 ft · lb)
2nd	20 Nm (2.0 m · kg, 14 ft · lb)
Final	Specified angle 115–125°

12 Nm (1.2 m · kg, 8.7 ft · lb)

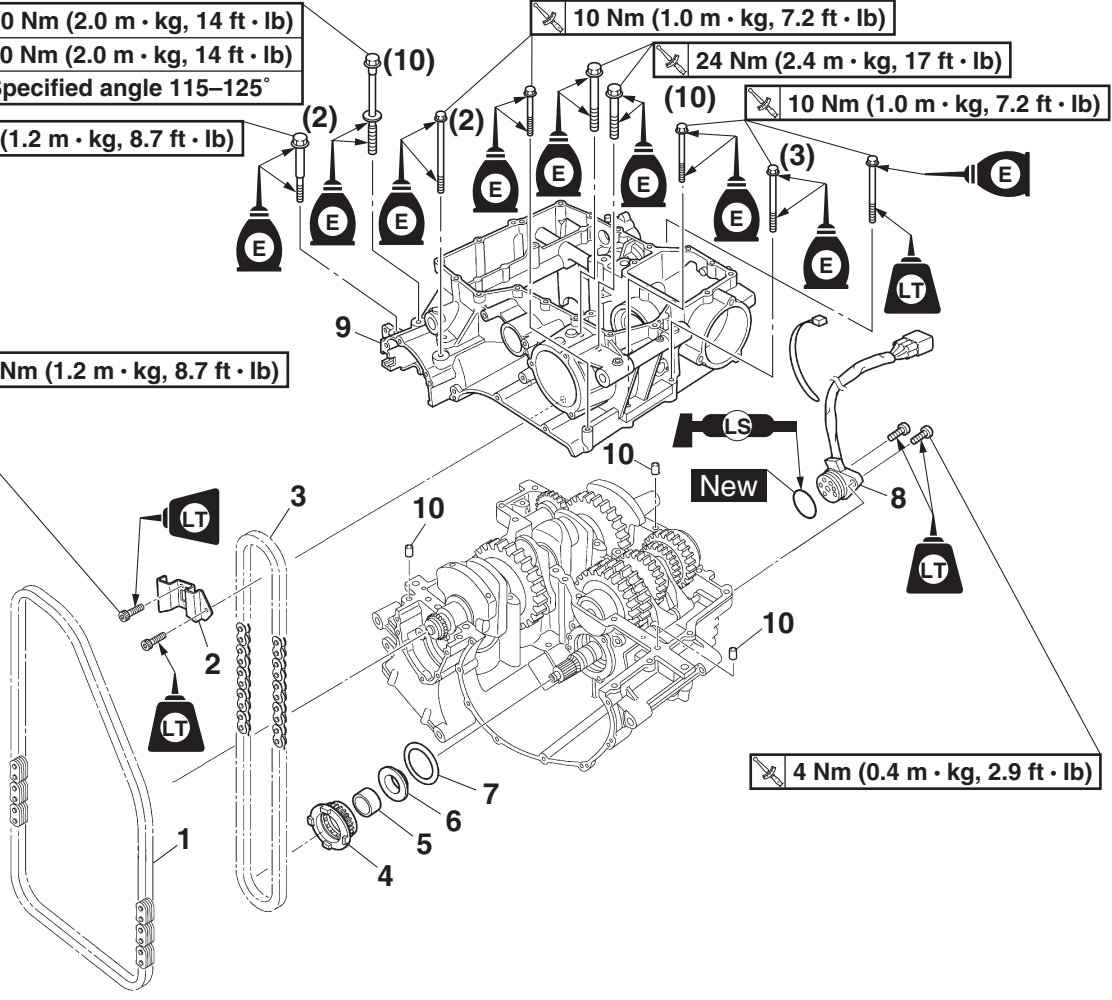
12 Nm (1.2 m · kg, 8.7 ft · lb)

10 Nm (1.0 m · kg, 7.2 ft · lb)

24 Nm (2.4 m · kg, 17 ft · lb)

10 Nm (1.0 m · kg, 7.2 ft · lb)

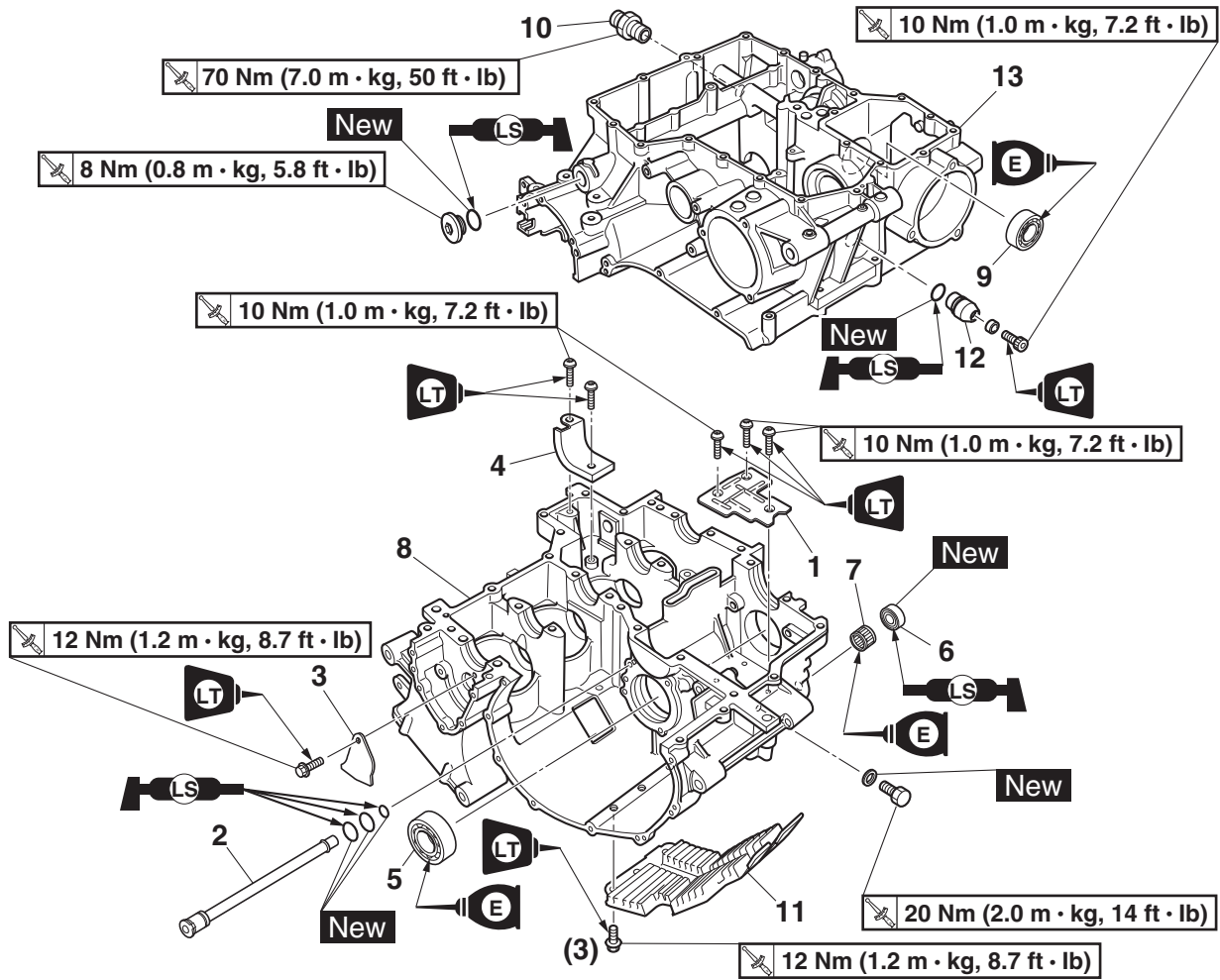
4 Nm (0.4 m · kg, 2.9 ft · lb)



Order	Job/Parts to remove	Q'ty	Remarks
9	Lower crankcase	1	
10	Dowel pin	3	
			For installation, reverse the removal procedure.

CRANKCASE

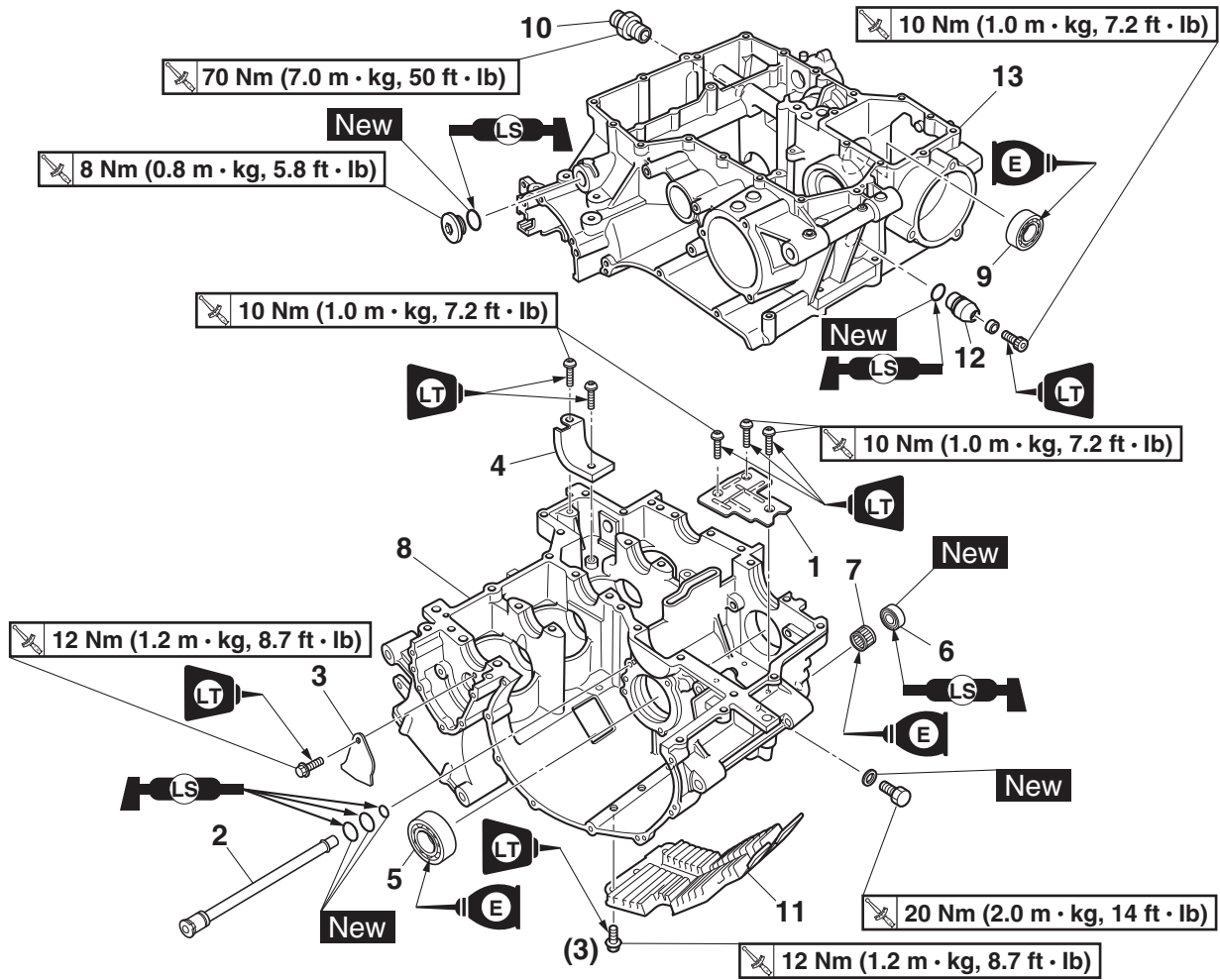
Removing the oil baffle plate and bearings



Order	Job/Parts to remove	Q'ty	Remarks
	Connecting rod		Refer to "CONNECTING RODS AND PISTONS" on page 5-85.
	Crankshaft/Crankshaft journal bearings		Refer to "CRANKSHAFT" on page 5-93.
	Transmission		Refer to "TRANSMISSION" on page 5-97.
1	Oil baffle plate 2	1	
2	Oil delivery pipe 1	1	
3	Upper crankcase plate	1	
4	Oil baffle plate 3	1	
5	Bearing	1	
6	Oil seal	1	
7	Bearing	1	
8	Upper crankcase	1	
9	Bearing	1	
10	Oil filter cartridge bolt	1	
11	Upper crankcase damper	1	
12	Crankcase plug	1	

CRANKCASE

Removing the oil baffle plate and bearings



Order	Job/Parts to remove	Q'ty	Remarks
13	Lower crankcase	1	
			For installation, reverse the removal procedure.

EAS25550

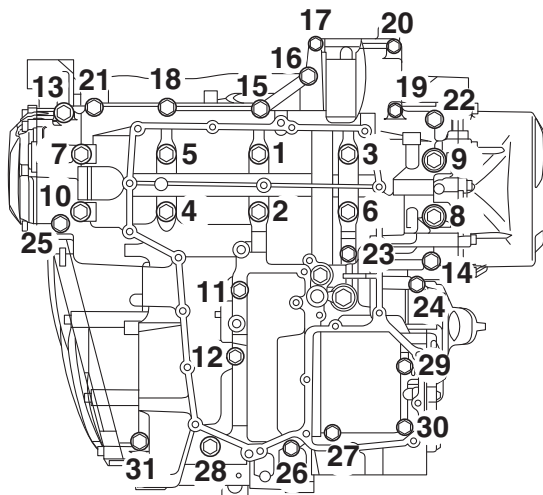
DISASSEMBLING THE CRANKCASE

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

TIP

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

- M9 × 115 mm bolts: “1”–“10”
- M8 × 65 mm bolt: “11”
- M8 × 50 mm bolt: “12”
- M6 × 80 mm bolts: “23”, “25”
- M6 × 65 mm shoulder bolts: “13”, “14”
- M6 × 65 mm bolts: “19”, “22”, “24”, “26”
- M6 × 55 mm bolts: “15”–“18”, “20”, “21”, “27”–“30”
- M6 × 45 mm bolt: “31”



3. Remove:
 - Lower crankcase

ECA13900

NOTICE

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase

mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.

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.

EAS25600

CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes.

1. Check:
 - Oil delivery pipe
Damage → Replace.
Obstruction → Wash and blow out with compressed air.

ET3P61026

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 seal
Damage/wear → Replace.

EAS25620

CHECKING THE TIMING CHAIN AND OIL PUMP DRIVE CHAIN

1. Check:
 - Timing chain
Damage/stiffness → Replace the timing chain and camshaft sprockets as a set.
 - Oil pump drive chain
Damage/stiffness → Replace the oil pump drive chain, oil pump drive sprocket and oil pump shaft as a set.
2. Check:
 - Oil pump drive sprocket
Cracks/damage/wear → Replace the oil pump drive sprocket and the oil pump drive chain as a set.

EAS25680

ASSEMBLING THE CRANKCASE

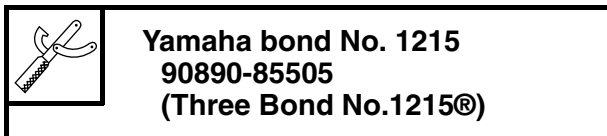
1. Lubricate:

- Crankshaft journal bearings
(with the recommended lubricant)



2. Apply:

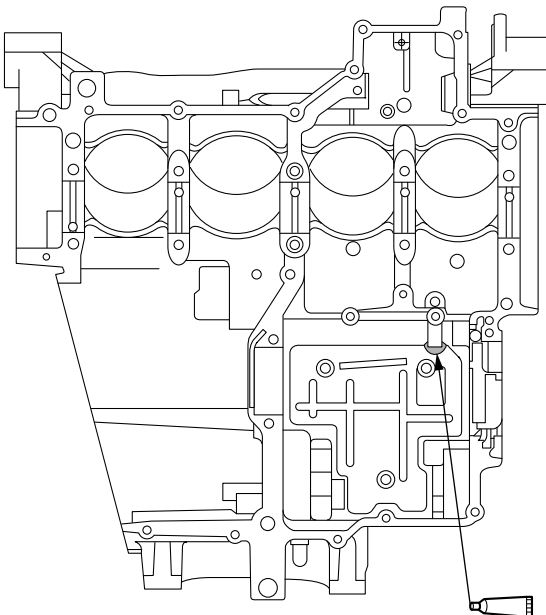
- Sealant
(onto the crankcase mating surfaces and oil baffle plate 2)



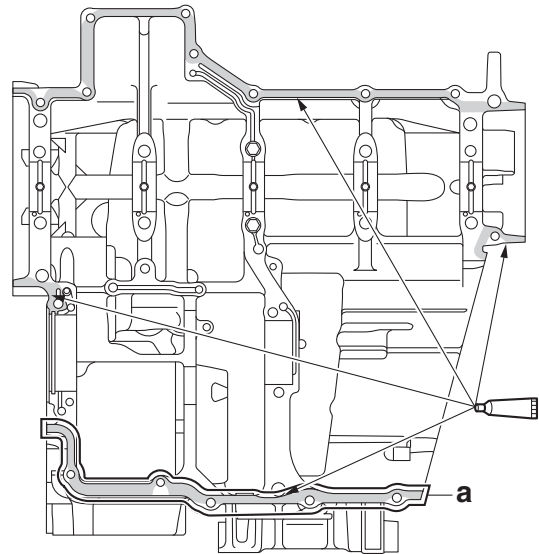
TIP

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

A



B



A. Upper crankcase

B. Lower crankcase

a. Apply two coats of sealant to the area shown in the illustration.

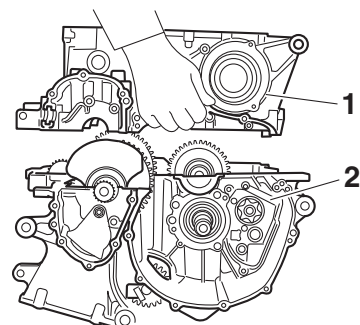
3. Install:

- Dowel pins

4. Set the shift drum assembly and transmission gears in the neutral position.

5. Install:

- Lower crankcase "1"
(onto the upper crankcase "2")



ECA13980

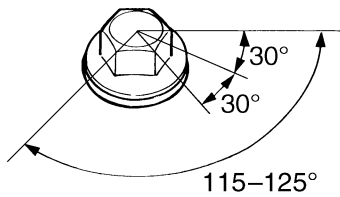
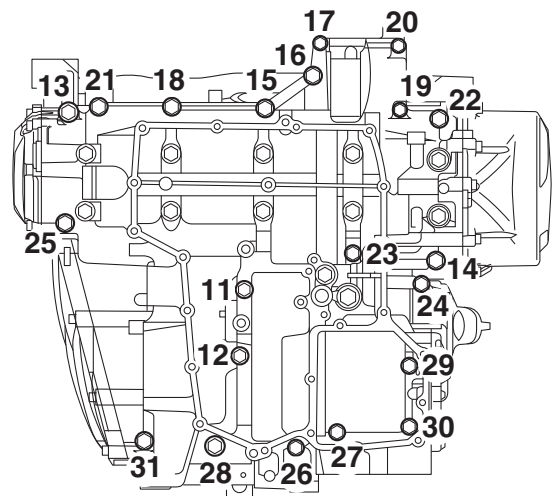
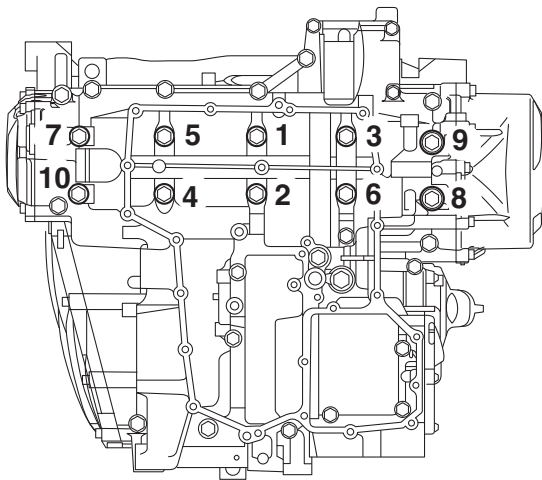
NOTICE

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

6. Install:

- Crankcase bolts

CRANKCASE



8. Tighten:

- Crankcase bolts “11”–“31”



Crankcase bolt “11”, “12”
24 Nm (2.4 m·kg, 17 ft·lb)
Crankcase bolt “13”, “14”
12 Nm (1.2 m·kg, 8.7 ft·lb)
Crankcase bolt “15”–“31”
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

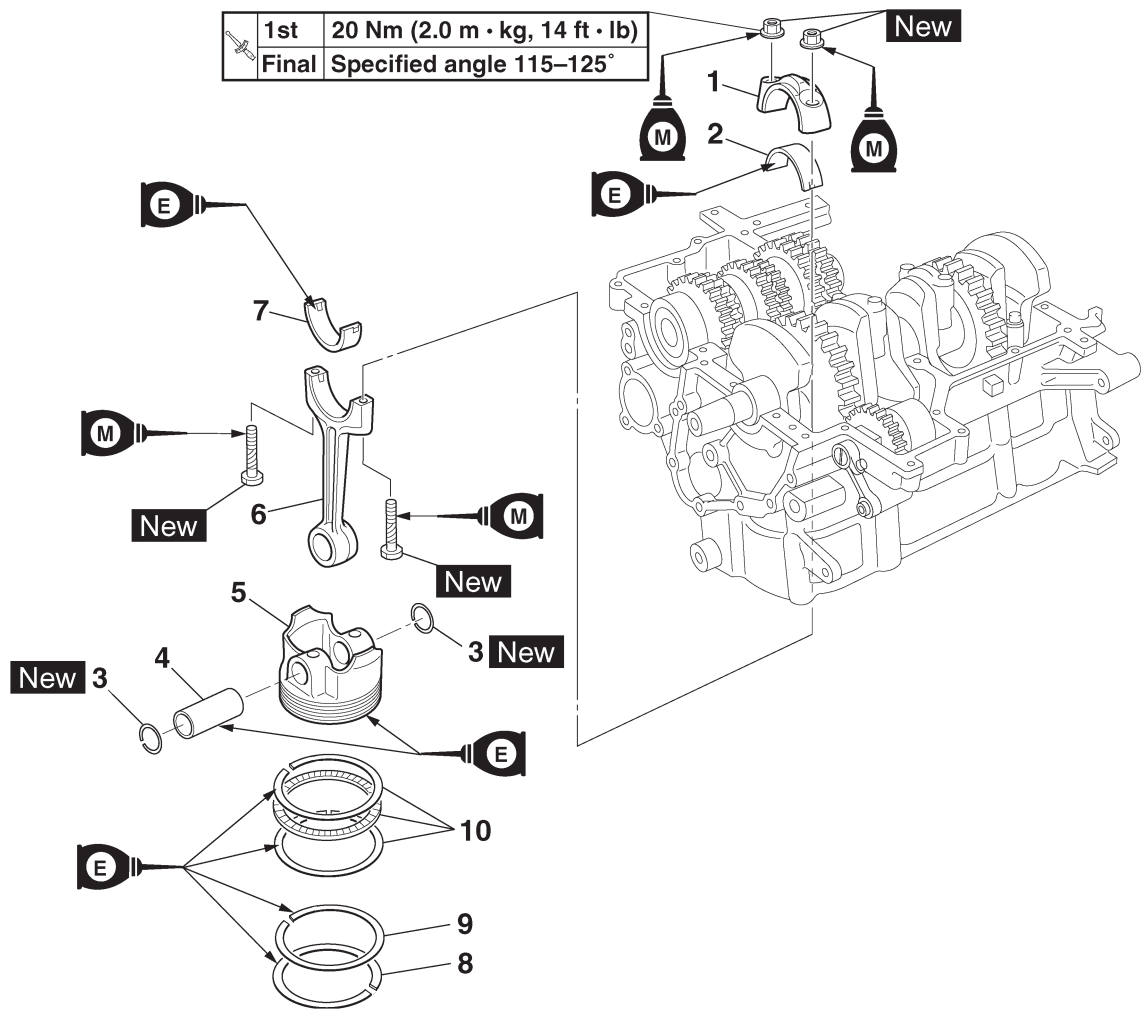
Tighten the crankcase bolts in the proper tightening sequence as shown.

CONNECTING RODS AND PISTONS

ET3P61027

CONNECTING RODS AND PISTONS

Removing the connecting rods and pistons



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-77.
1	Connecting rod cap	4	
2	Big end lower bearing	4	
3	Piston pin clip	8	
4	Piston pin	4	
5	Piston	4	
6	Connecting rod	4	
7	Big end upper bearing	4	
8	Top ring	4	
9	2nd ring	4	
10	Oil ring	4	
			For installation, reverse the removal procedure.

CONNECTING RODS AND PISTONS

EAS26030

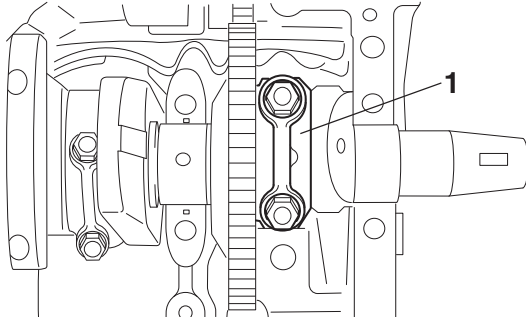
REMOVING THE CONNECTING RODS AND PISTONS

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

1. Remove:
 - Connecting rod cap "1"

TIP

Identify the position of each connecting rod so that it can be reinstalled in its original place.



2. Remove:
 - Big end bearings (from the connecting rods and connecting rod caps)

TIP

Identify the position of each big end bearing so that it can be reinstalled in its original place.

3. Remove:
 - Piston pin clips "1"
 - Piston pin "2"
 - Piston "3"
 - Connecting rod "4"

ECA13810

NOTICE

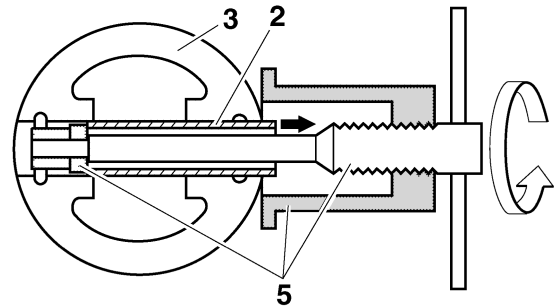
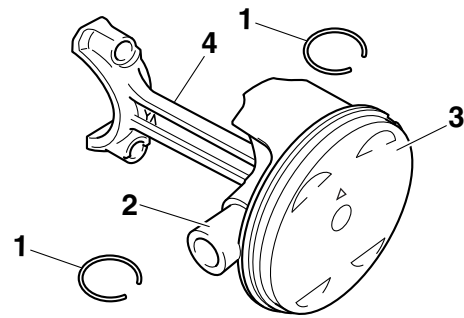
Do not use a hammer to drive the piston pin out.

TIP

- For reference during installation, put an identification mark on each piston crown.
- Before removing the piston pin, deburr the piston pin clip's 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 "5".



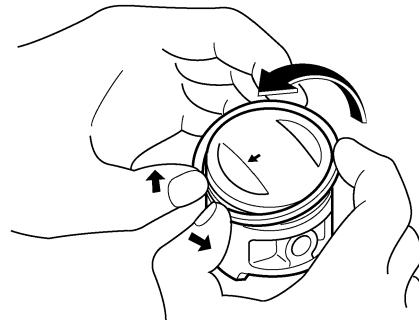
**Piston pin puller set
90890-01304
Piston pin puller
YU-01304**



4. 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.

1. Check:
 - Piston wall
 - Cylinder wall


Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
 - Piston-to-cylinder clearance

CONNECTING RODS AND PISTONS

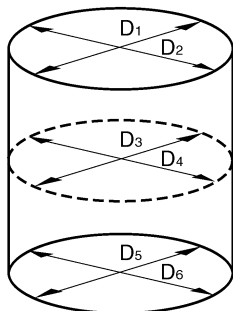
a. Measure cylinder bore "C" with the cylinder bore gauge.

TIP


Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

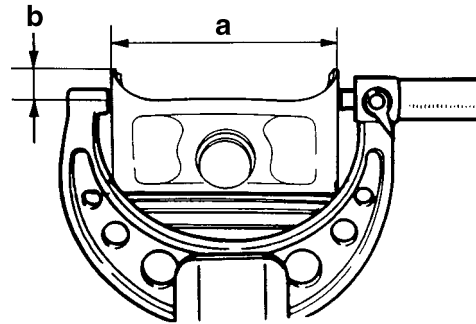
	Bore
	79.000–79.010 mm (3.1102–3.1106 in)
	Taper limit
	0.050 mm (0.0020 in)
	Out of round limit
	0.050 mm (0.0020 in)

"C" = maximum of D ₁ –D ₆
"T" = maximum of D ₁ or D ₂ - maximum of D ₅ or D ₆
"R" = maximum of D ₁ , D ₃ or D ₅ - minimum of D ₂ , D ₄ or D ₆




- b. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.
- c. Measure piston skirt diameter "D" "a" with the micrometer.

	Piston Diameter D
	78.965–78.980 mm (3.1089–3.1094 in)



- b. 5 mm (0.20 in) from the bottom edge of the piston
- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

<ul style="list-style-type: none"> • Piston-to-cylinder clearance = Cylinder bore "C" - Piston skirt diameter "D"
--

	Piston-to-cylinder clearance
	0.020–0.045 mm (0.0008–0.0018 in)
	Limit
	0.150 mm (0.0059 in)

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

EAS24430

CHECKING THE PISTON RINGS


1. Measure:


- Piston ring side clearance
Out of specification → Replace the piston and piston rings as a set.

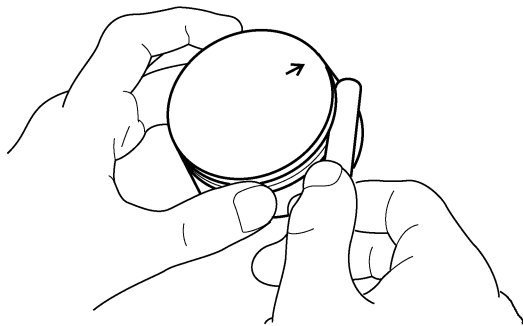
TIP

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

CONNECTING RODS AND PISTONS

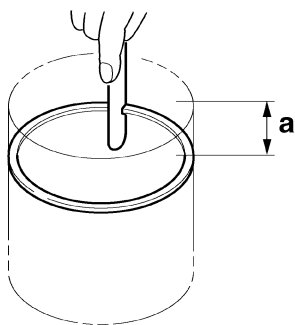
	Piston ring Top ring Ring side clearance 0.030–0.070 mm (0.0012–0.0028 in) Limit 0.120 mm (0.0047 in) 2nd ring Ring side clearance 0.020–0.060 mm (0.0008–0.0024 in) Limit 0.120 mm (0.0047 in)
---	--

	Piston ring Top ring End gap (installed) 0.20–0.30 mm (0.0079–0.0118 in) Limit 0.55 mm (0.0217 in) 2nd ring End gap (installed) 0.35–0.45 mm (0.0138–0.0177 in) Limit 0.80 mm (0.0315 in) Oil ring End gap (installed) 0.20–0.70 mm (0.0079–0.0276 in)
---	---



2. Install:
- Piston ring (into the cylinder)

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



a. 5 mm (0.20 in)

3. Measure:
- Piston ring end gap
 Out of specification → Replace the piston ring.


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

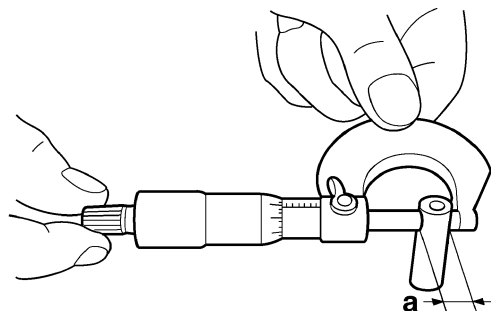
EAS24440

CHECKING THE PISTON PIN

The following procedure applies to all of the piston pins.

1. Check:
 - Piston pin
 Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
 - Piston pin outside diameter "a"
 Out of specification → Replace the piston pin.

	Piston pin outside diameter 18.991–19.000 mm (0.7477–0.7480 in) Limit 18.971 mm (0.7469 in)
---	---



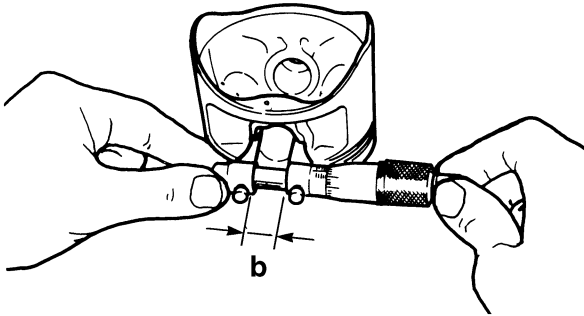
3. Measure:
- Piston pin bore diameter "b"
 Out of specification → Replace the piston.

CONNECTING RODS AND PISTONS



Piston pin bore inside diameter
19.004–19.015 mm (0.7482–
0.7486 in)

Limit
19.045 mm (0.7498 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)

ET3P61028

CHECKING THE CONNECTING RODS

1. Measure:

- Crankshaft-pin-to-big-end-bearing clearance
Out of specification → Replace the big end bearings.



Oil clearance
0.031–0.048 mm (0.0012–0.0019
in)

The following procedure applies to all of the connecting rods.

ECA13930

NOTICE

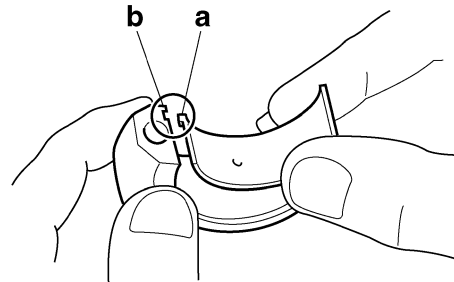
Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

- a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rod halves.

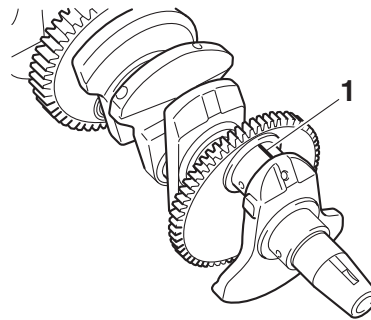
- b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

TIP

Align the projections “a” on the big end bearings with the notches “b” in the connecting rod and connecting rod cap.



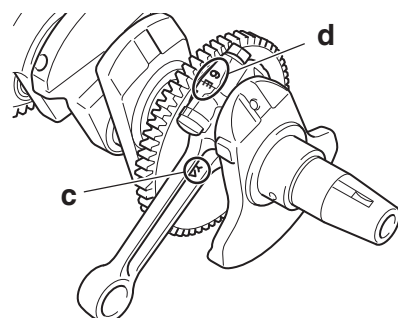
- c. Put a piece of Plastigauge® “1” on the crankshaft pin.



- d. Assemble the connecting rod halves.

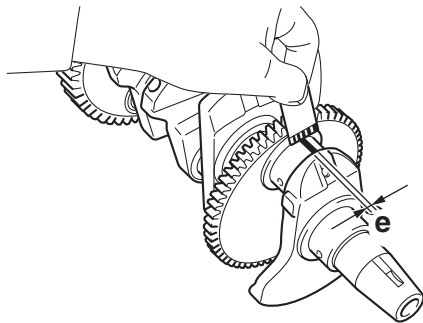
TIP

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads and nut seats with molybdenum disulfide grease.
- Make sure the “Y” mark “c” on the 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.



CONNECTING RODS AND PISTONS

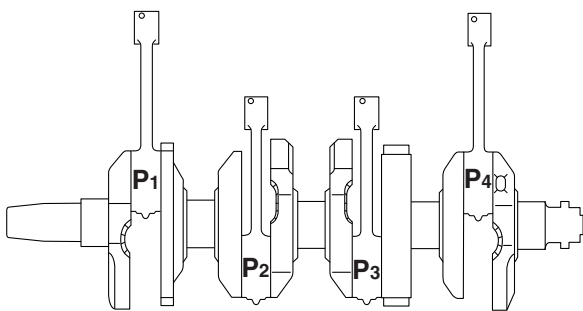
- e. Tighten the connecting rod nuts.
Refer to "INSTALLING THE CONNECTING RODS AND PISTONS" on page 5-90.
- f. Remove the connecting rod and big end bearings.
Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-86.
- g. Measure the compressed Plastigauge® width "e" on the crankshaft pin.
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



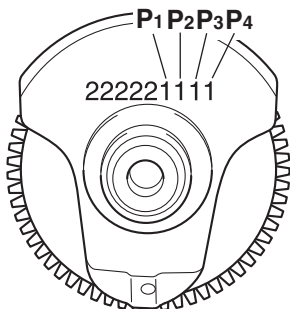
2. Select:
- Big end bearings (P₁-P₄)

TIP

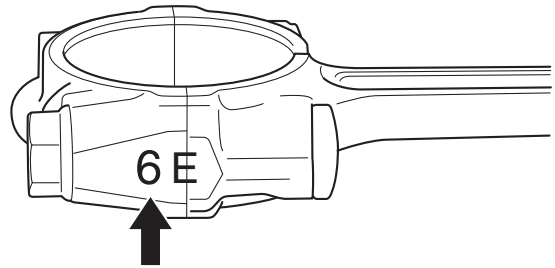
- The numbers "A" stamped into the crankshaft web and the numbers "B" on the connecting rods are used to determine the replacement big end bearing sizes.
- P₁-P₄ refer to the bearings shown in the crankshaft illustration.



A



B



For example, if the connecting rod P₁ and the crankshaft web P₁ numbers are 6 and 1 respectively, then the bearing size for P₁ is:

P ₁ (connecting rod) - P ₁ (crankshaft)
=
6 - 1 = 5 (yellow)



Bearing color code

- 1.Blue 2.Black 3.Brown 4.Green
5.Yellow 6.Pink

EAS26170

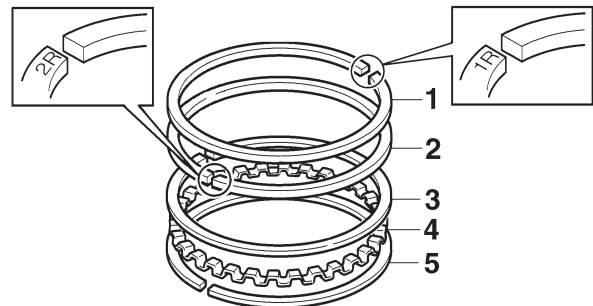
INSTALLING THE CONNECTING RODS AND PISTONS

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

1. Install:
 - Top ring "1"
 - 2nd ring "2"
 - Upper oil ring rail "3"
 - Oil ring expander "4"
 - Lower oil ring rail "5"

TIP

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

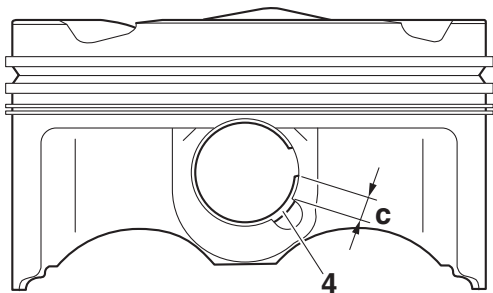
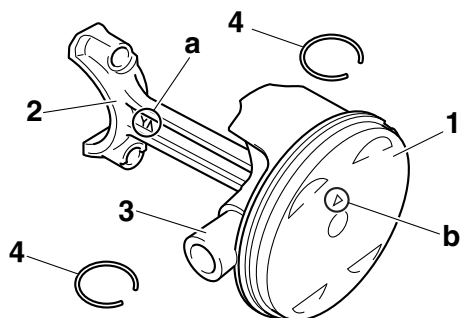


2. Install:
 - Piston "1"
 - (onto the respective connecting rod "2")
 - Piston pin "3"
 - Piston pin clips "4" **New**

CONNECTING RODS AND PISTONS

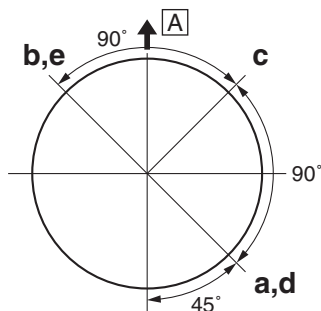
TIP

- Apply engine oil onto the piston pin.
- Make sure that the “Y” mark “a” on the connecting rod is facing to the left when the punch mark “b” on the piston is pointing up. Refer to the illustration.
- When installing a piston pin clips so that the clip ends are 3 mm (0.12 in) “c” or more from the cutout in the piston.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).



3. Offset:

- Piston ring end gaps



- a. Top ring
- b. 2nd ring
- c. Upper oil ring rail
- d. Oil ring expander
- e. Lower oil ring rail
- A. Exhaust side

4. Lubricate:

- Piston

- Piston rings
- Cylinder
(with the recommended lubricant)



5. Lubricate:

- Bolt threads
- Nut seats
(with the recommended lubricant)



6. Lubricate:

- Crankshaft pins
- Big end bearings
- Connecting rod inner surface
(with the recommended lubricant)



7. Install:

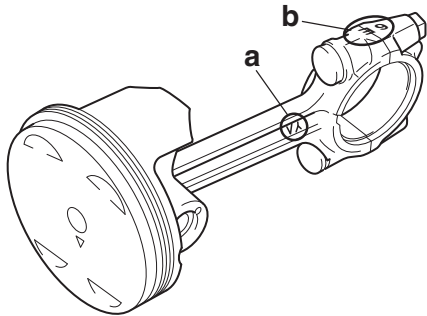
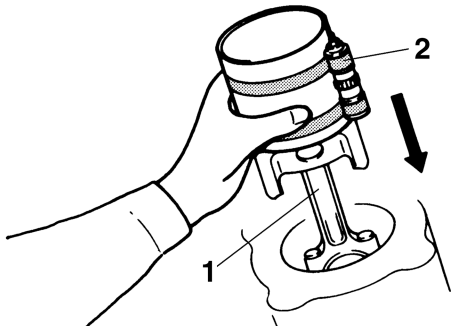
- Big end bearings
- Connecting rod assembly “1”
(into the cylinder and onto the crankshaft pin)
- Connecting rod cap
(onto the crankshaft pin)

TIP

- Align the projections on the big end bearings with the notches in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- While compressing the piston rings with piston ring compressor “2”, install the connecting rod assembly “1” into the cylinder with the other hand.
- Make sure the “Y” marks “a” on the connecting rods face towards the left side of the crankshaft.
- Make sure the characters “b” on both the connecting rod and connecting rod cap are aligned.



CONNECTING RODS AND PISTONS



8. Tighten:
- Connecting rod nuts “1”

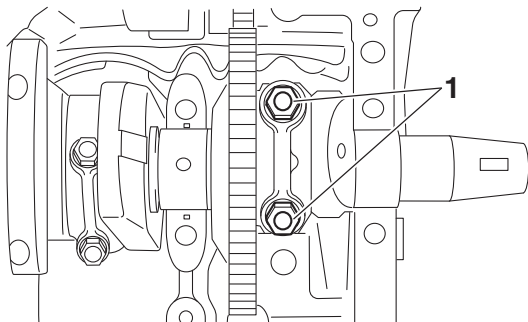
EW3P61019

WARNING

Replace the connecting rod bolts and nuts with new ones.

TIP

Tighten the connecting rod nuts using the following procedure.

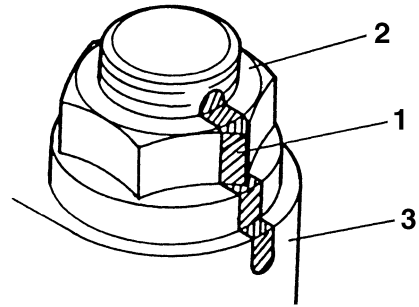


- a. Tighten the connecting rod nuts with a torque wrench.



Connecting rod nut (1st)
20 Nm (2.0 m·kg, 14 ft·lb)

- b. Put a mark “1” on the corner of the connecting rod nut “2” and the connecting rod “3”.



- c. Tighten the connecting rod nuts further to reach the specified angle 115–125°.



Connecting rod nut (final)
Specified angle 115–125°

EWA13400

WARNING

If the connecting rod nut is tightened more than the specified angle, do not loosen the nut and then retighten it. Instead, replace the connecting rod bolt and nut with a new one and perform the procedure again.

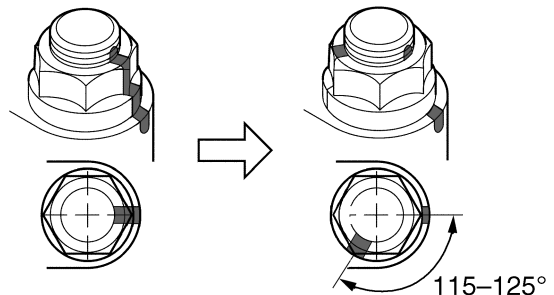
ECA13950

NOTICE

Do not use a torque wrench to tighten the connecting rod nut to the specified angle.

TIP

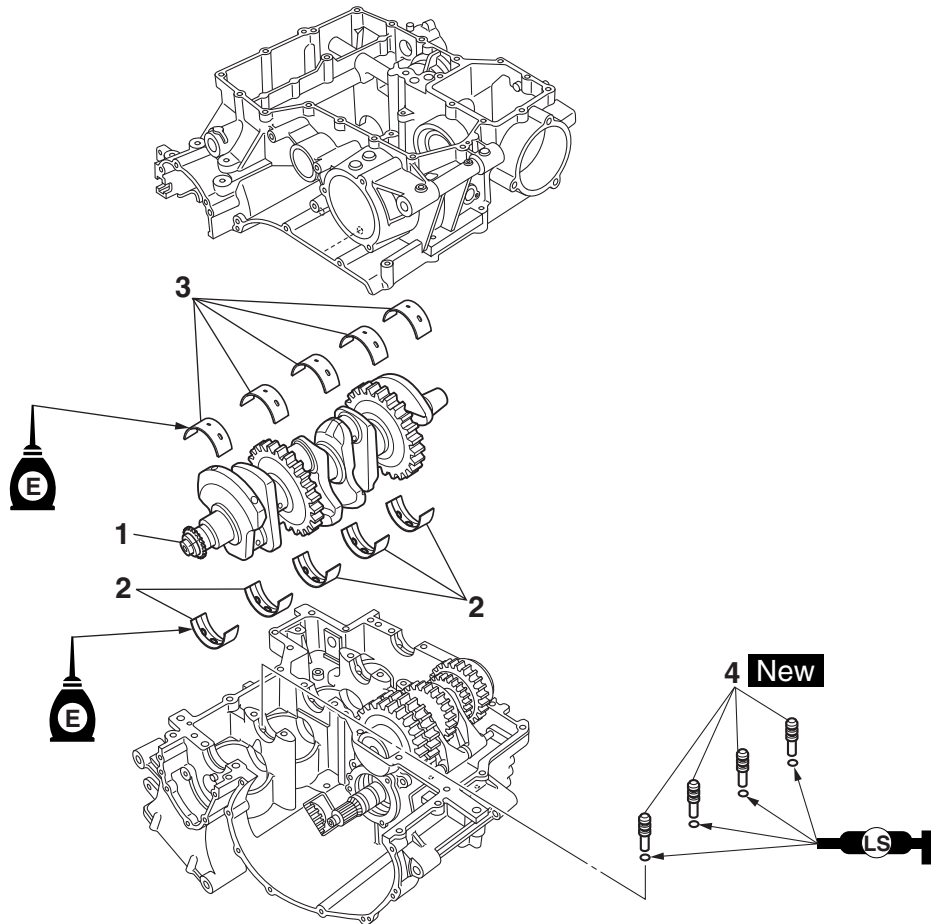
On a hexagonal nut, note that the angle from one corner to another is 60°.



EAS25950

CRANKSHAFT

Removing the crankshaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-77.
	Front balancer weight		Refer to "BALANCERS" on page 5-106.
	Connecting rod caps		Refer to "CONNECTING RODS AND PISTONS" on page 5-85.
1	Crankshaft	1	
2	Crankshaft journal upper bearing	5	
3	Crankshaft journal lower bearing	5	
4	Oil nozzle	4	
			For installation, reverse the removal procedure.

EAS26040

REMOVING THE CRANKSHAFT JOURNAL BEARINGS

- Remove:
 - Crankshaft journal upper bearings (from the upper crankcase)
 - Crankshaft journal lower bearings (from the lower crankcase)

TIP

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

ET3P61029

CHECKING THE OIL NOZZLES

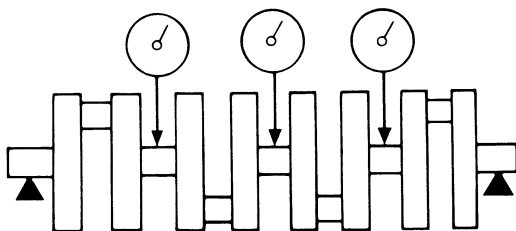
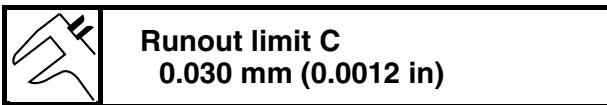
The following procedure applies to all of the oil nozzles.

- Check:
 - Oil nozzle
Damage/wear → Replace the oil nozzle.
 - Oil passage
Obstruction → Blow out with compressed air.

EAS26070

CHECKING THE CRANKSHAFT

- Measure:
 - Crankshaft runout
Out of specification → Replace the crankshaft.



- Check:
 - Crankshaft journal surfaces
 - Crankshaft pin surfaces
 - Bearing surfaces
Scratches/wear → Replace the crankshaft.
- Measure:
 - Crankshaft-journal-to-crankshaft-journal-bearing clearance
Out of specification → Replace the crankshaft journal bearings.



Journal oil clearance
0.027–0.045 mm (0.0011–0.0018 in)

ECA13920

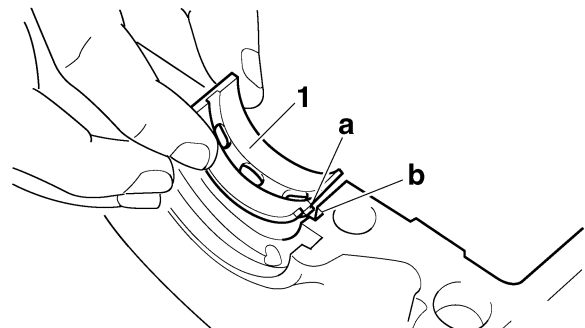
NOTICE

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

- Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
- Place the upper crankcase upside down on a bench.
- Install the crankshaft journal upper bearings "1" and the crankshaft into the upper crankcase.

TIP

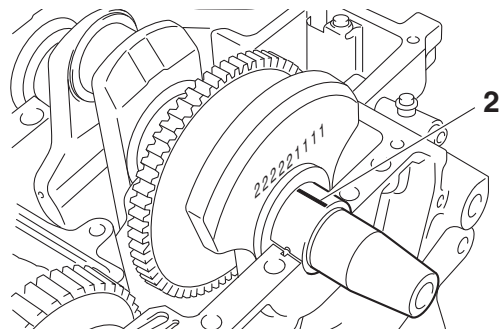
Align the projections "a" on the crankshaft journal upper bearings with the notches "b" in the upper crankcase.



- Put a piece of Plastigauge® "2" on each crankshaft journal.

TIP

Do not put the Plastigauge® over the oil hole in the crankshaft journal.

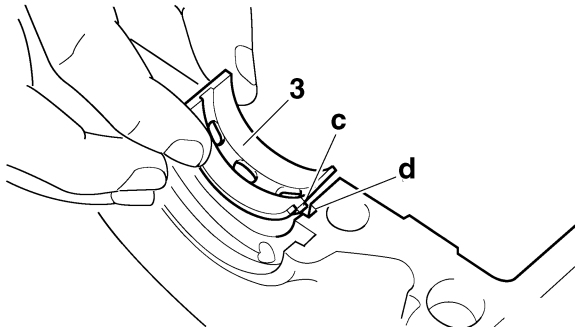


CRANKSHAFT

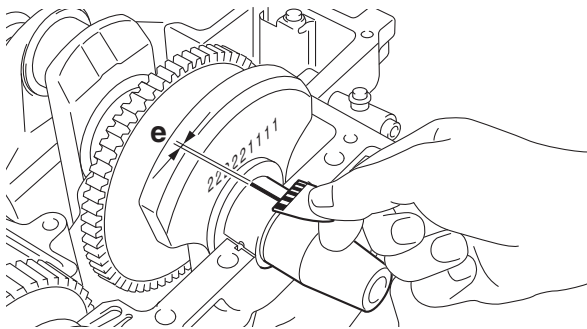
- e. Install the crankshaft journal lower bearings "3" into the lower crankcase and assemble the crankcase halves.

TIP

- Align the projections "c" of the crankshaft journal lower bearings with the notches "d" in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



- f. Tighten the bolts to specification in the tightening sequence cast on the crankcase. Refer to "CRANKCASE" on page 5-77.
- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- h. Measure the compressed Plastigauge® width "e" on each crankshaft journal. If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.



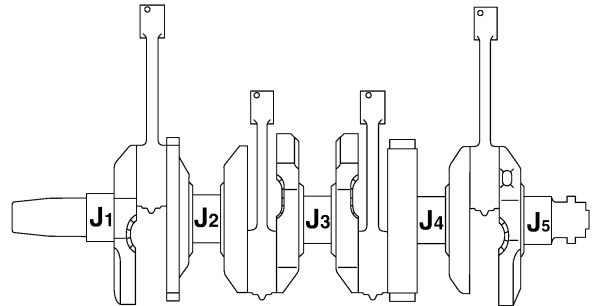
4. Select:

- Crankshaft journal bearings (J₁-J₅)

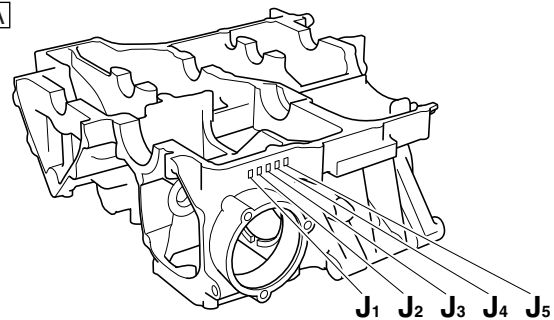
TIP

- The numbers "A" stamped into the lower crankcase and the numbers "B" stamped into the crankshaft web are used to determine the replacement crankshaft journal bearing sizes.
- J₁-J₅ refer to the bearings shown in the lower crankcase and crankshaft web illustration.

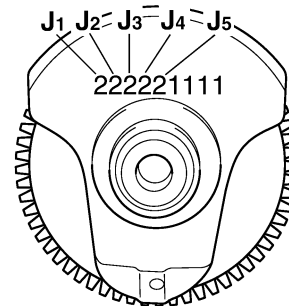
- If J₁-J₅ are the same, use the same size for all of the bearings.



A



B



For example, if the lower crankcase J₁ and crankshaft web J₁ numbers are 6 and 2 respectively, then the bearing size for J₁ is:

$$\begin{aligned}
 & J_1 \text{ (crankcase)} - J_1 \text{ (crankshaft web)} + 2 \\
 & = \\
 & 6 - 2 + 2 = 6 \text{ (pink)}
 \end{aligned}$$



Bearing color code
2.Black 3.Brown 4.Green 5.Yellow 6.Pink 7.Red 8.White

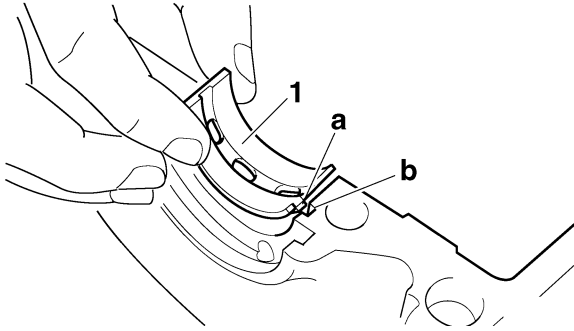
EAS26200

INSTALLING THE CRANKSHAFT

1. Install:
- Crankshaft journal upper bearings (into the upper crankcase)
 - Crankshaft journal lower bearings (into the lower crankcase)

TIP

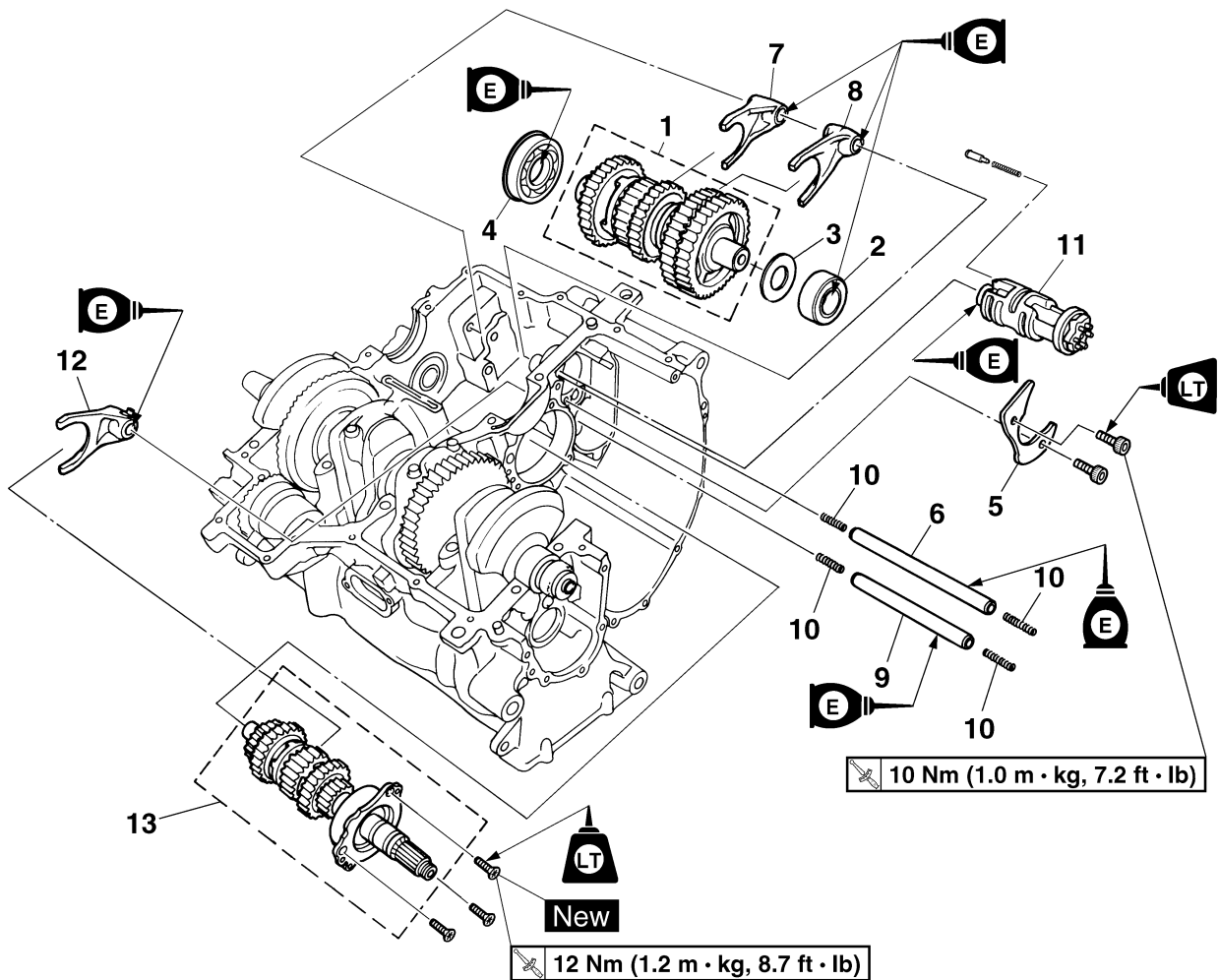
- Align the projections “a” on the crankshaft journal bearings “1” with the notches “b” in the crankcases.
 - Be sure to install each crankshaft journal bearing in its original place.
-



EAS26240

TRANSMISSION

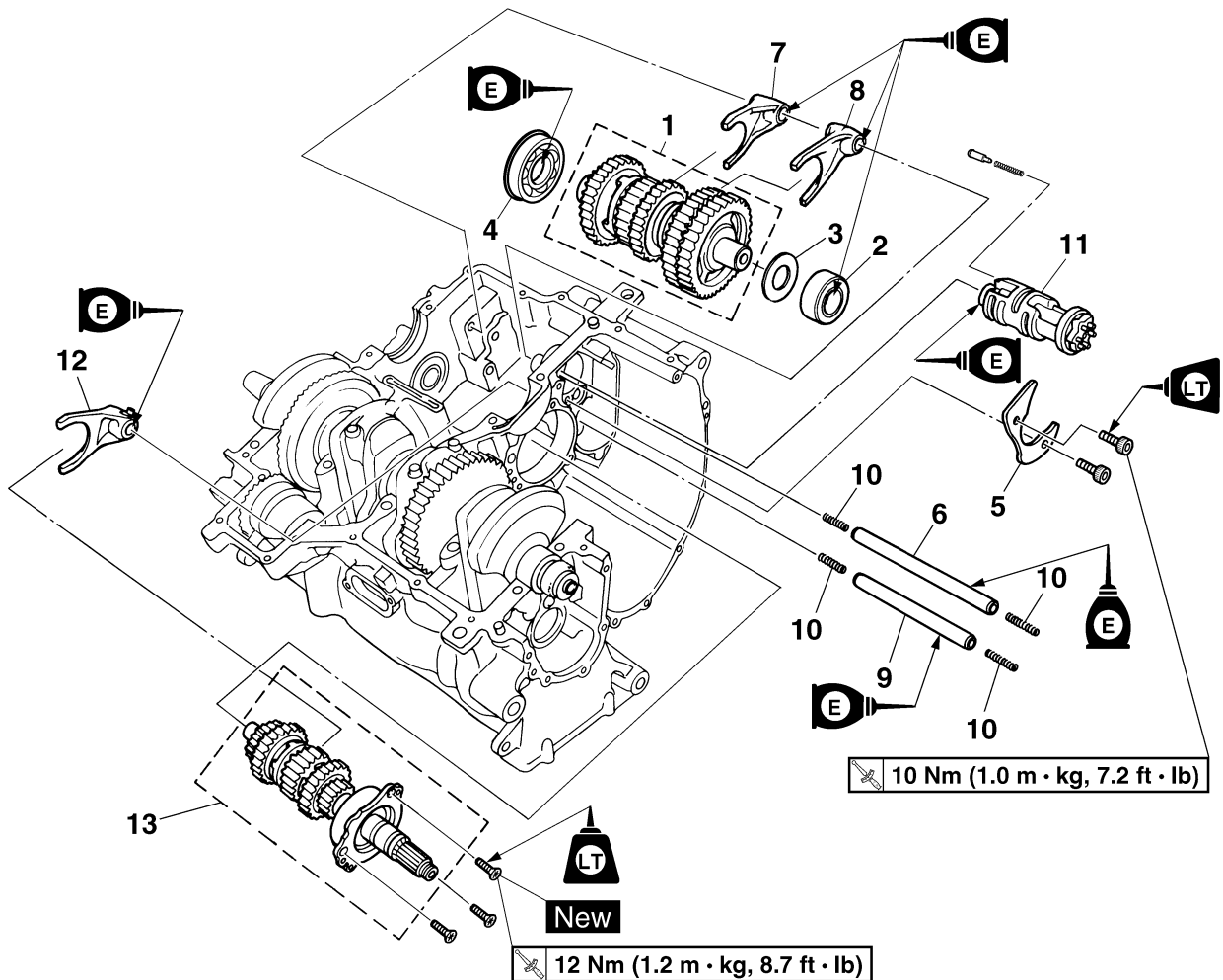
Removing the transmission, shift drum assembly, and shift forks



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-77.
	Stopper lever		Refer to "SHIFT SHAFT" on page 5-57.
1	Drive axle assembly	1	
2	Bearing	1	
3	Washer	1	
4	Bearing	1	
5	Shift drum retainer	1	
6	Long shift fork guide bar	1	
7	Shift fork-L	1	
8	Shift fork-R	1	
9	Short shift fork guide bar	1	
10	Spring	4	
11	Shift drum assembly	1	
12	Shift fork-C	1	

TRANSMISSION

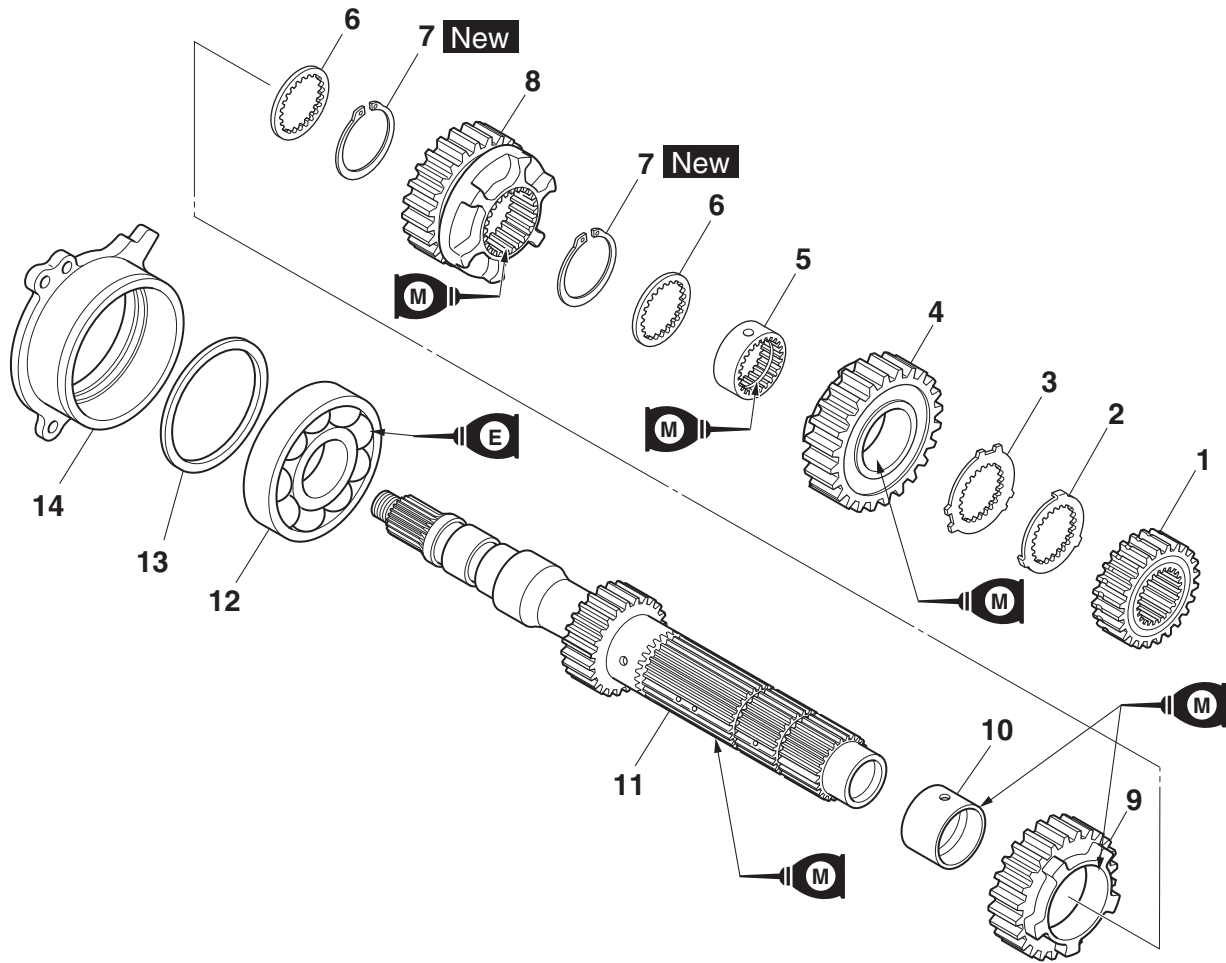
Removing the transmission, shift drum assembly, and shift forks



Order	Job/Parts to remove	Q'ty	Remarks
13	Main axle assembly	1	
			For installation, reverse the removal procedure.

TRANSMISSION

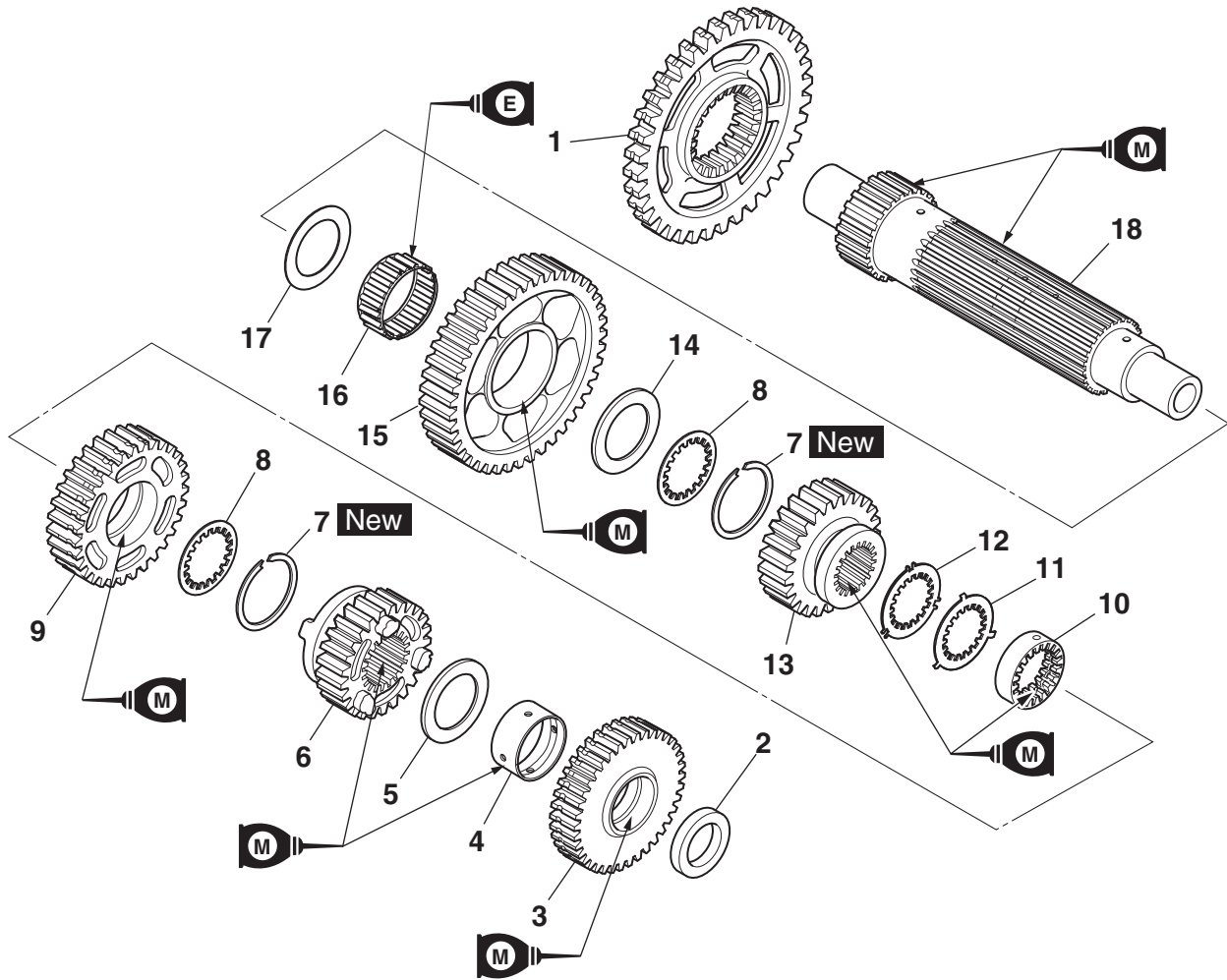
Disassembling the main axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	2nd pinion gear	1	
2	Toothed lock washer	1	
3	Toothed lock washer retainer	1	
4	5th pinion gear	1	
5	Toothed spacer	1	
6	Toothed washer	2	
7	Circlip	2	
8	3rd pinion gear	1	
9	4th pinion gear	1	
10	Collar	1	
11	Main axle/1st pinion gear	1	
12	Bearing	1	
13	Washer	1	
14	Main axle bearing housing	1	
			For assembly, reverse the disassembly procedure.

TRANSMISSION

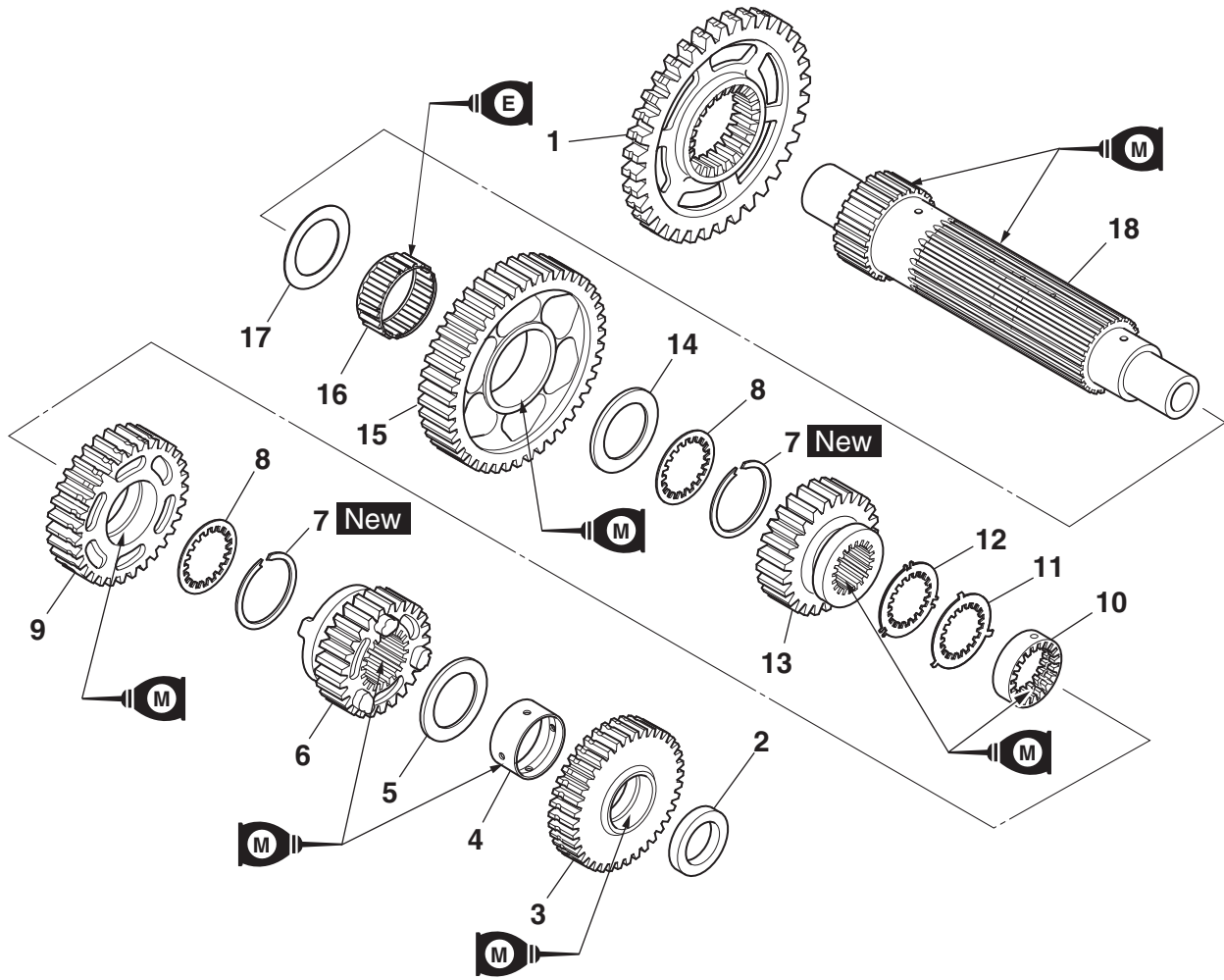
Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Middle drive gear	1	
2	Washer	1	
3	2nd wheel gear	1	
4	Collar	1	
5	Washer	1	
6	5th wheel gear	1	
7	Circlip	2	
8	Toothed washer	2	
9	3rd wheel gear	1	
10	Toothed spacer	1	
11	Toothed lock washer	1	
12	Toothed lock washer retainer	1	
13	4th wheel gear	1	
14	Washer	1	
15	1st wheel gear	1	
16	Bearing	1	
17	Washer	1	

TRANSMISSION

Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
18	Drive axle	1	
			For assembly, reverse the disassembly procedure.

EAS26250

REMOVING THE TRANSMISSION

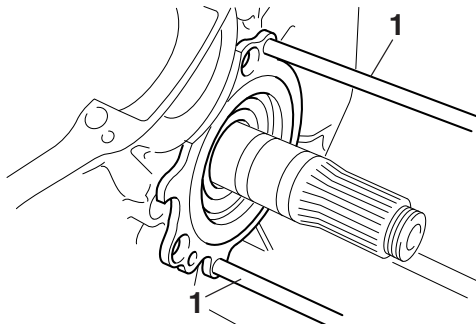
- Remove:
 - Main axle assembly

TIP

Remove the main axle assembly with the slide hammer bolts "1" and weight.



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

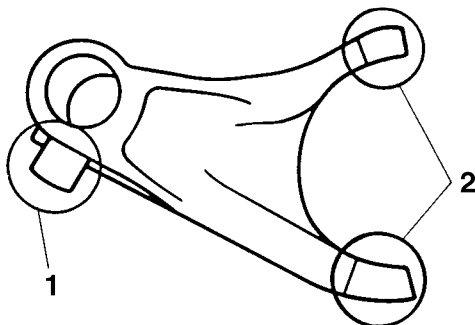


EAS26260

CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

- Check:
 - Shift fork cam follower "1"
 - Shift fork pawl "2"
 Bends/damage/scoring/wear → Replace the shift fork.



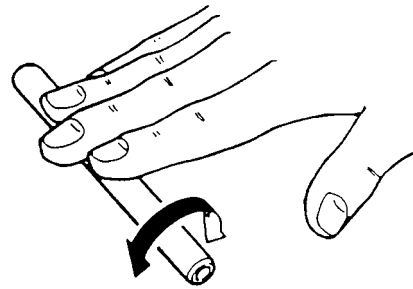
- Check:
 - Shift fork guide bar
 Roll the shift fork guide bar on a flat surface.
Bends → Replace.

EWA12840

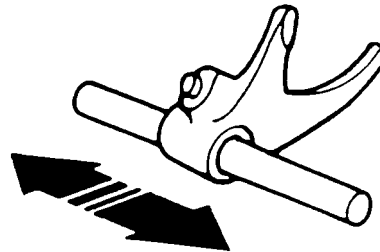


WARNING

Do not attempt to straighten a bent shift fork guide bar.



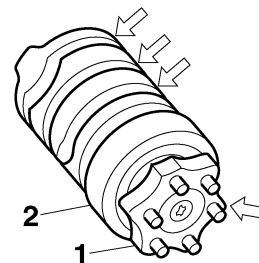
- Check:
 - Shift fork movement (along the shift fork guide bar)
 Rough movement → Replace the shift forks and shift fork guide bar as a set.



EAS26270

CHECKING THE SHIFT DRUM ASSEMBLY


- Check:
 - Shift drum groove
 - Shift drum segment "1"
 - Shift drum bearing "2"
 Damage/scratches/wear → Replace the shift drum assembly.
Damage/wear → Replace the shift drum assembly.
Damage/pitting → Replace the shift drum assembly.



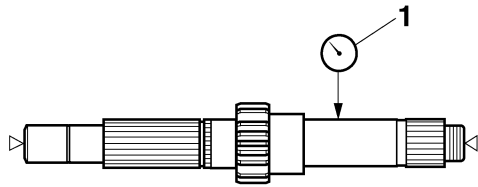
EAS26300

CHECKING THE TRANSMISSION


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



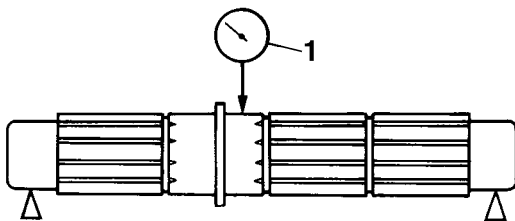
Main axle runout limit
0.08 mm (0.0032 in)



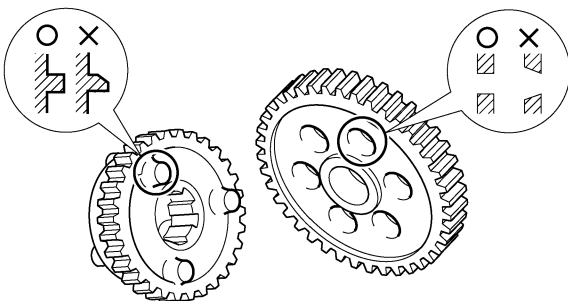
2. Measure:
- Drive axle runout (with a centering device and dial gauge "1")
Out of specification → Replace the drive axle.



Drive axle runout limit
0.08 mm (0.0032 in)



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



4. Check:
- Transmission gear engagement (each pinion gear to its respective wheel gear)

Incorrect → Reassemble the transmission axle assemblies.

5. Check:
- Transmission gear movement
Rough movement → Replace the defective part(s).
6. Check:
- Circlips
Bends/damage/looseness → Replace.

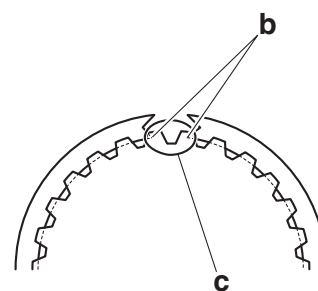
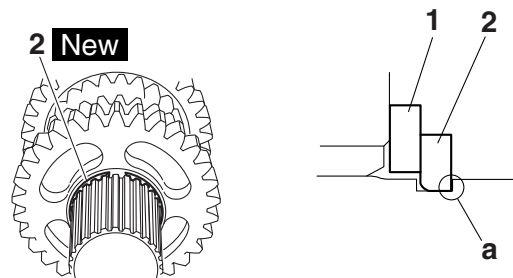
ET3P61030

ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:
- Toothed washer "1"
 - Circlip "2" **New**

TIP

- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the toothed washer and gear. (For main axle)
- Install the circlip so that both ends "b" rest on the sides of a spline "c" with both axles aligned.



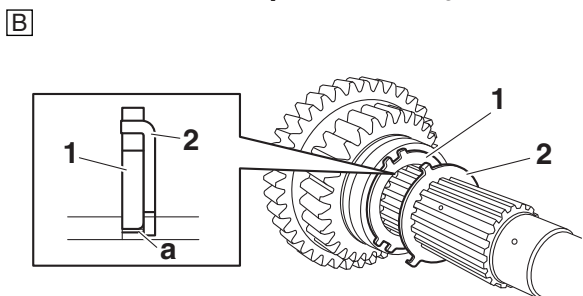
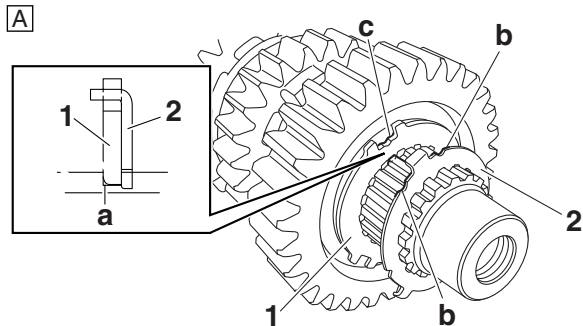
2. Install:
- Toothed lock washer retainer "1"
 - Toothed lock washer "2"

TIP

- With the toothed lock washer retainer "1" in the groove "a" in the axle, align the projection on the retainer with an axle spline, and then install the toothed lock washer "2".

TRANSMISSION

- Be sure to align the projection on the toothed lock washer that is between the alignment marks “b” with the alignment mark “c” on the retainer.

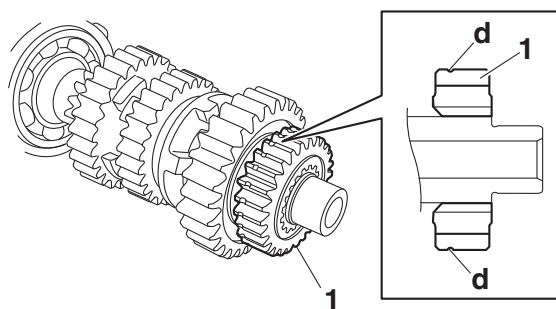


- A. Main axle
B. Drive axle

3. Install:
- 2nd pinion gear “1”

TIP

Make sure that the side of the 2nd pinion gear with the groove “d” is facing inward as shown in the illustration.



EAS26350

INSTALLING THE TRANSMISSION

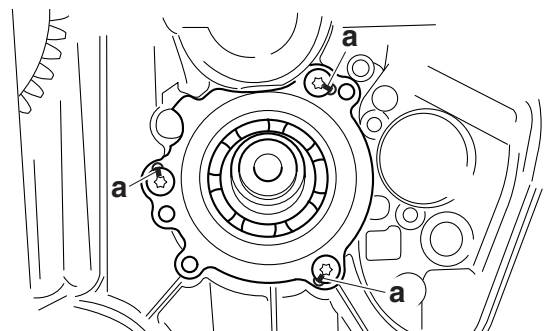
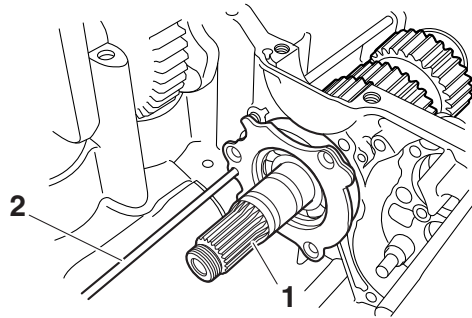
1. Install:
- Main axle assembly “1”
 - Main axle assembly screws



Main axle assembly screw
12 Nm (1.2 m·kg, 8.7 ft·lb)
LOCTITE®

TIP

- When installing the main axle assembly, use a pin “2” to align the bearing housing hole with the corresponding hole in the upper crankcase.
- Stake the main axle assembly screws at a cut-out “a” in the main axle bearing housing.



2. Install:
- Shift fork-C
 - Shift drum assembly
 - Springs
 - Short shift fork guide bar
 - Shift fork-R
 - Shift fork-L
 - Long shift fork guide bar

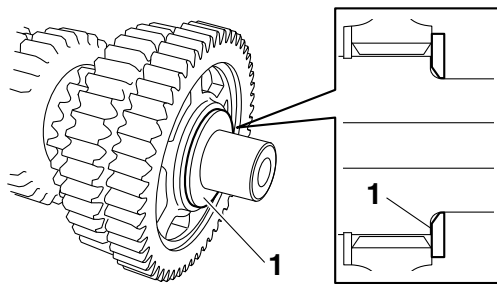
TIP

The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: “R”, “C”, “L”.

3. Install:
- Washer “1”

TIP

Install the washer with its chamfered side facing towards the drive axle assembly as shown in the illustration.

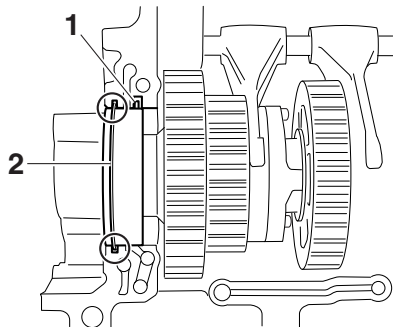


4. Install:

- Drive axle assembly

TIP _____

- The bearing pin “1” must face towards the rear of the upper crankcase.
 - Make sure the bearing circlip “2” is inserted into the groove in the upper crankcase.
-



5. Check:

- Transmission
Rough movement → Repair.

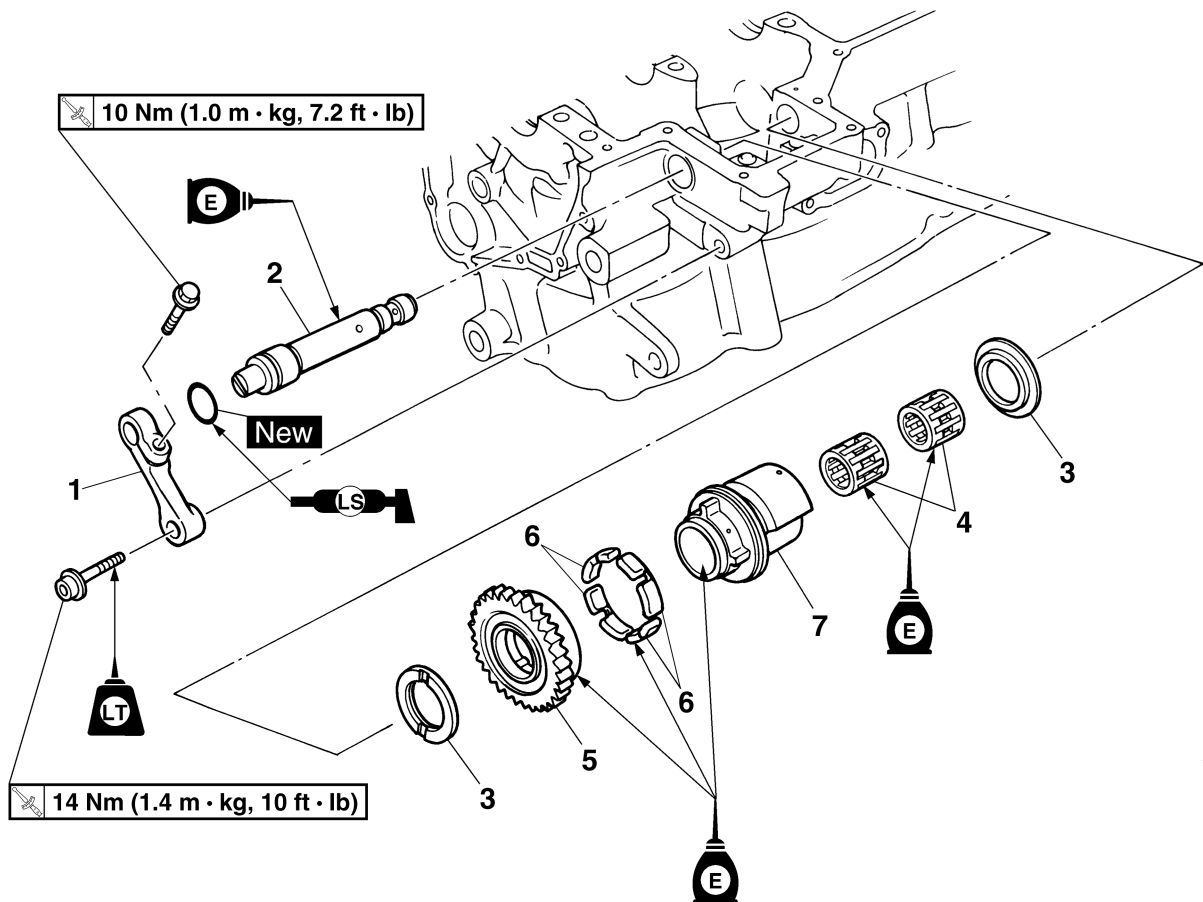
TIP _____

Oil each gear, shaft, and bearing thoroughly.

ET3P61031

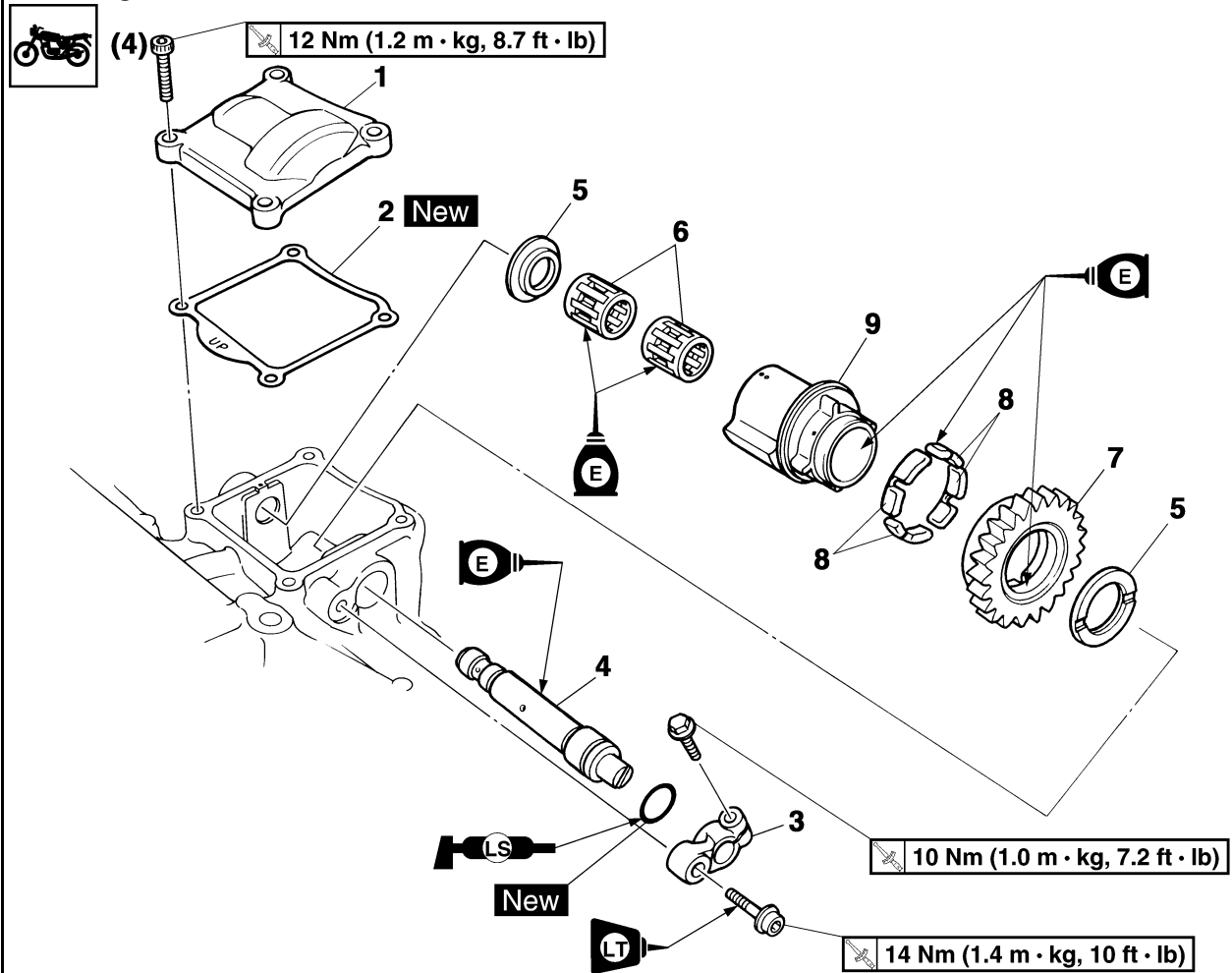
BALANCERS

Removing the front balancer



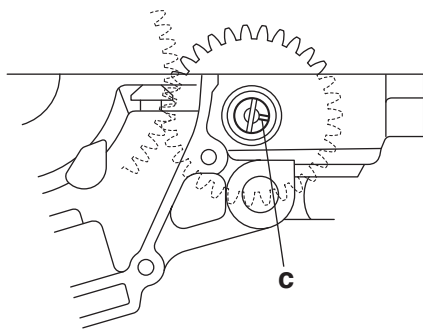
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-77.
1	Front balancer lever	1	
2	Front balancer shaft	1	
3	Washer	2	
4	Bearing	2	
5	Front balancer gear	1	
6	Damper	4	
7	Front balancer weight	1	
			For installation, reverse the removal procedure.

Removing the rear balancer



Order	Job/Parts to remove	Q'ty	Remarks
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-4.
	Pickup rotor cover		Refer to "PICKUP ROTOR" on page 5-36.
	Clutch cover		Refer to "CLUTCH" on page 5-43.
1	Rear balancer cover	1	
2	Rear balancer cover gasket	1	
3	Rear balancer lever	1	
4	Rear balancer shaft	1	
5	Washer	2	
6	Bearing	2	
7	Rear balancer gear	1	
8	Damper	4	
9	Rear balancer weight	1	
			For installation, reverse the removal procedure.

BALANCERS

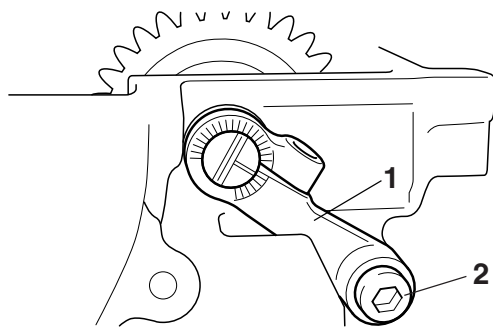


4. Install:

- Front balancer lever "1"
- Front balancer lever bolt "2"


TIP

- Apply locking agent (LOCTITE®) to the threads of the balancer lever bolt.
- Temporarily tighten the balancer lever bolt.



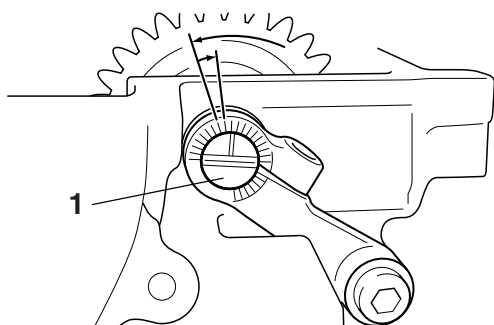
5. Tighten:

- Front balancer shaft "1"

	Front balancer shaft 0.4 Nm (0.04 m·kg, 0.29 ft·lb)
---	--

TIP


Tighten the balancer shaft to the specified torque by turning it counterclockwise, and then turn it one mark back on the balancer lever scale.



6. Tighten:

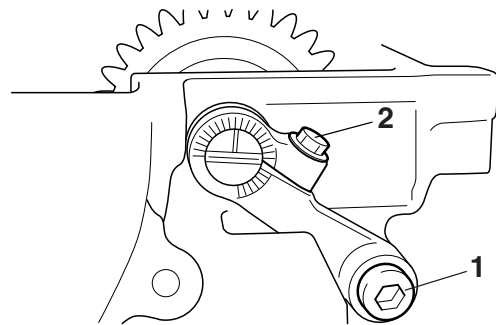
- Front balancer lever bolt "1"

- Front balancer shaft pinch bolt "2"

	Front balancer lever bolt 14 Nm (1.4 m·kg, 10 ft·lb)
	Front balancer shaft pinch bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

Make sure that the balancer shaft does not rotate.



7. Start the engine and check that there is no abnormal noise coming from the balancer gear. If noise is abnormal, adjust the gear lash by turning the balancer shaft.

TIP

With each adjustment, turn the balancer shaft one scale.

Clockwise	Gear lash decreased
Counterclockwise	Gear lash increased

ET3P61033

INSTALLING THE REAR BALANCER

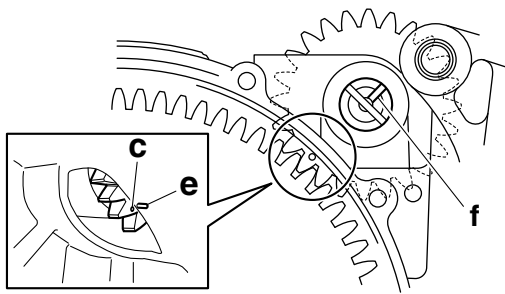
1. Install:

- Rear balancer gear "1"
- Dampers "2"
- Rear balancer weight "3"
- Bearings
- Washers


TIP

- Install the dampers onto the balancer gear so that the middle section "a" of each damper is positioned to the outside of the gear projections as shown in the illustration.
- Align the punch mark "b" in the balancer weight with the mark "c" in the balancer gear.

BALANCERS



- Rear balancer shaft pinch bolt "2"

	Rear balancer lever bolt
	14 Nm (1.4 m·kg, 10 ft·lb)
	Rear balancer shaft pinch bolt
	10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP _____

Make sure that the balancer shaft does not rotate.

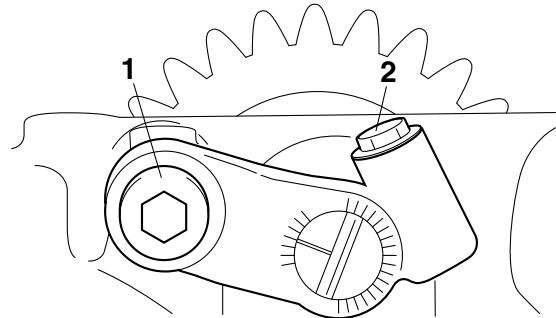


4. Install:

- Rear balancer lever "1"
- Rear balancer lever bolt "2"

TIP _____

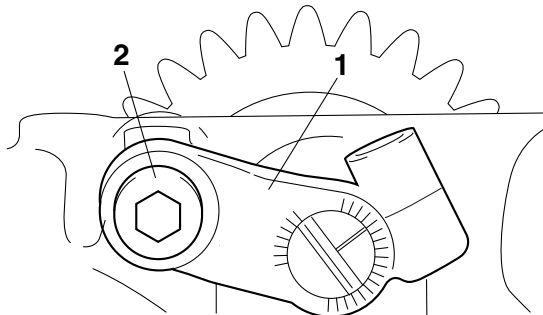
- Apply locking agent (LOCTITE®) to the threads of the balancer lever bolt.
- Temporarily tighten the balancer lever bolt.



7. Start the engine and check that there is no abnormal noise coming from the balancer gear. If noise is abnormal, adjust the gear lash by turning the balancer shaft.


TIP _____

With each adjustment, turn the balancer shaft one scale.



5. Tighten:

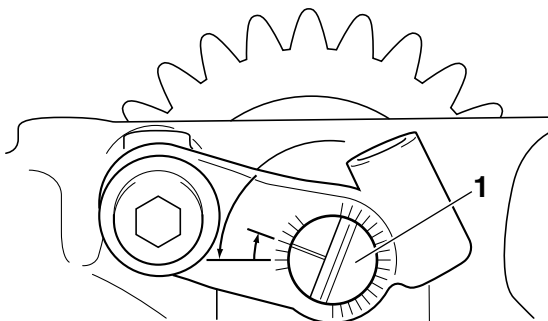
- Rear balancer shaft "1"

	Rear balancer shaft
	0.4 Nm (0.04 m·kg, 0.29 ft·lb)

TIP _____

Tighten the balancer shaft to the specified torque by turning it counterclockwise, and then turn it two marks back on the balancer lever scale.

Clockwise	Gear lash decreased
Counterclockwise	Gear lash increased



6. Tighten:

- Rear balancer lever bolt "1"

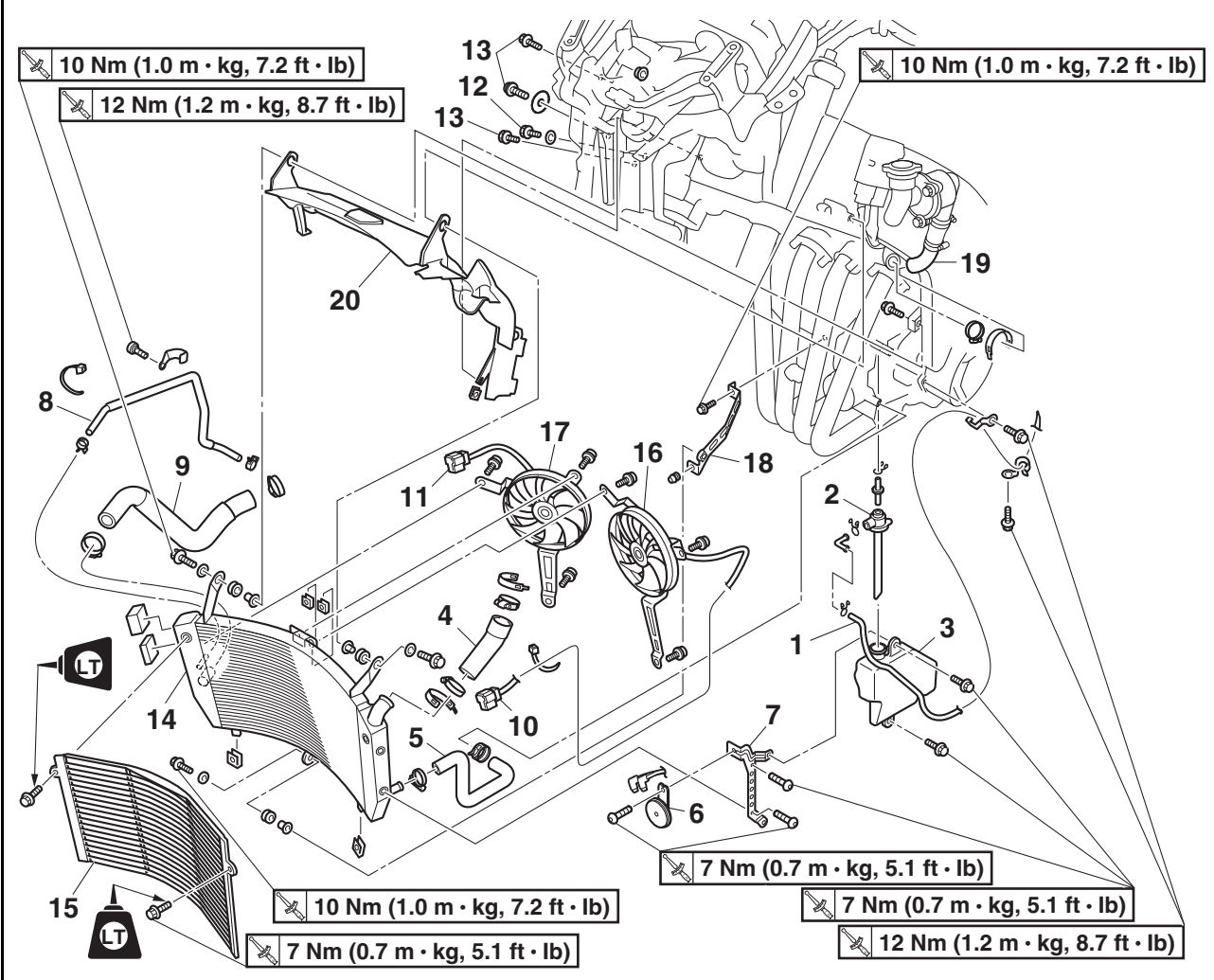
COOLING SYSTEM

RADIATOR	6-1
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EAS26380

RADIATOR

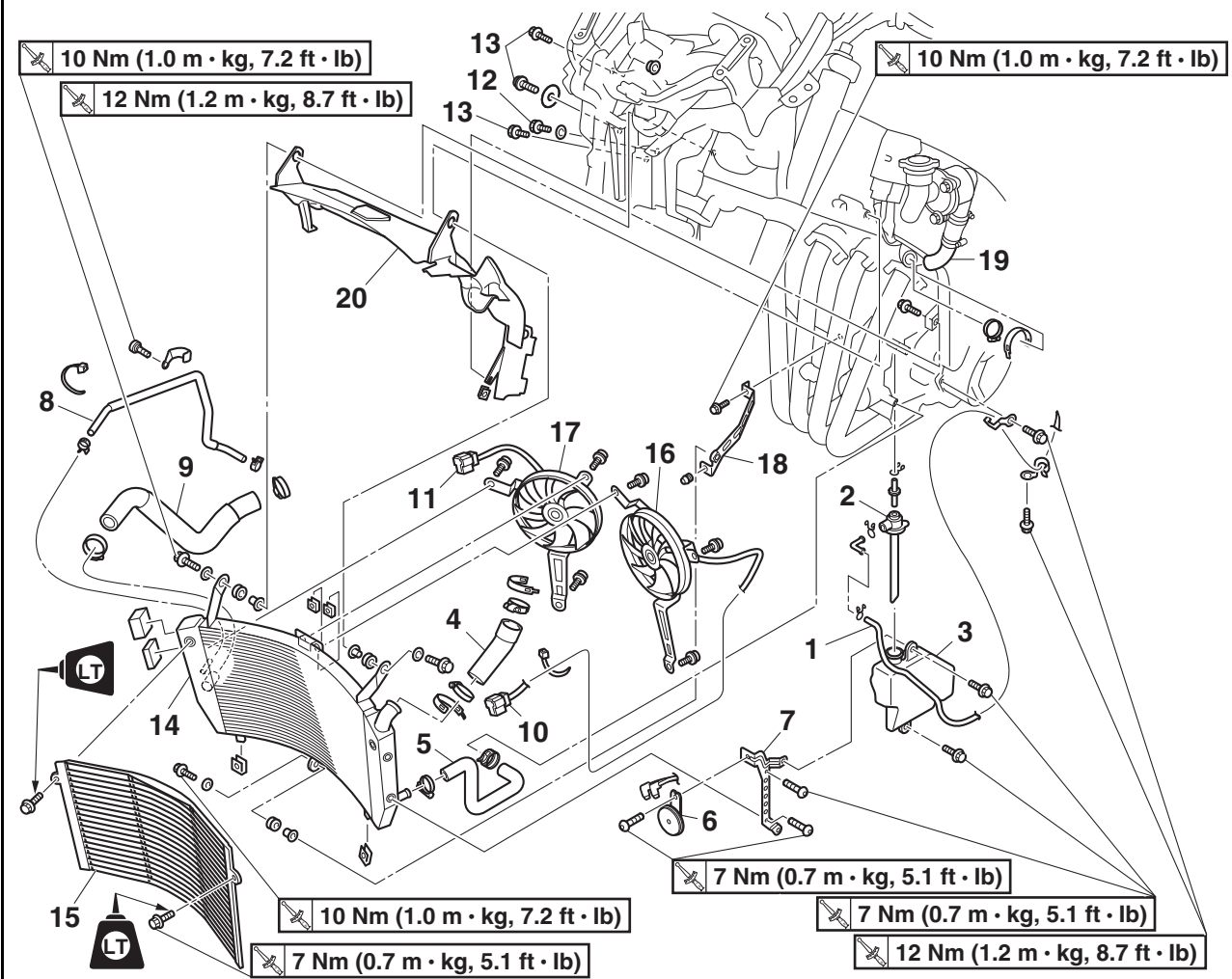
Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Side cowlings/Battery		Refer to "GENERAL CHASSIS" on page 4-1.
1	Coolant reservoir breather hose	1	
2	Coolant reservoir cap	1	
3	Coolant reservoir	1	
4	Radiator inlet hose	1	
5	Oil cooler outlet hose	1	
6	Horn	1	
7	Coolant reservoir bracket	1	
8	Water pump breather hose	1	
9	Radiator outlet hose	1	
10	Left radiator fan motor coupler	1	Disconnect.
11	Right radiator fan motor coupler	1	Disconnect.
12	Air guide bolt	1	

RADIATOR

Removing the radiator

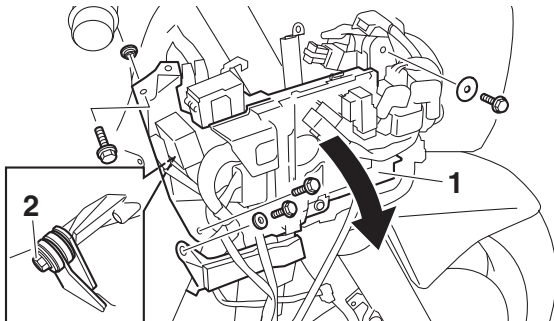


Order	Job/Parts to remove	Q'ty	Remarks
13	Electrical components tray bolt	3	
14	Radiator	1	
15	Radiator cover	1	
16	Left radiator fan motor	1	
17	Right radiator fan motor	1	
18	Radiator bracket	1	
19	Thermostat assembly	1	
20	Air deflector	1	
			For installation, reverse the removal procedure.

EAS1MC1032

REMOVING THE RADIATOR

1. Pull the top of electrical components tray "1" slightly outward as shown in the illustration and then remove the radiator bolt "2".



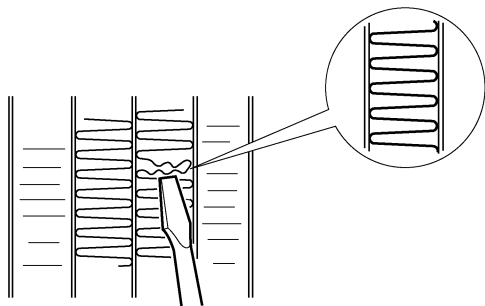
EAS26390

CHECKING THE RADIATOR

1. Check:
 - Radiator fins
 - Obstruction → Clean.
 - Apply compressed air to the rear of the radiator.
 - Damage → Repair or replace.

TIP

Straighten any flattened fins with a thin, flat-head screwdriver.



2. Check:
 - Radiator hoses
 - Cracks/damage → Replace.
3. Measure:
 - Radiator cap opening pressure
 - Below the specified pressure → Replace the radiator cap.

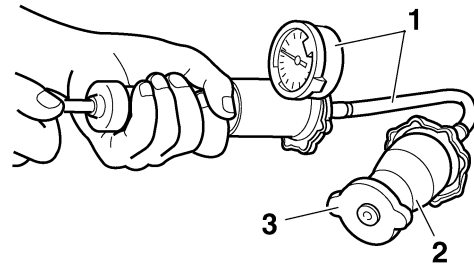


Radiator cap opening pressure
93.3–122.7 kPa (0.93–1.23
kgf/cm², 13.5–17.8 psi)

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



Radiator cap tester
90890-01325
Mityvac cooling system tester kit
YU-24460-A
Radiator cap tester adapter
90890-01352
Pressure tester adapter
YU-33984



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



4. Check:
 - Radiator fans
 - Damage → Replace.
 - Malfunction → Check and repair.

Refer to "COOLING SYSTEM" on page 8-29.

EAS26400

INSTALLING THE RADIATOR

1. Fill:
 - Cooling system
 - (with the specified amount of the recommended coolant)

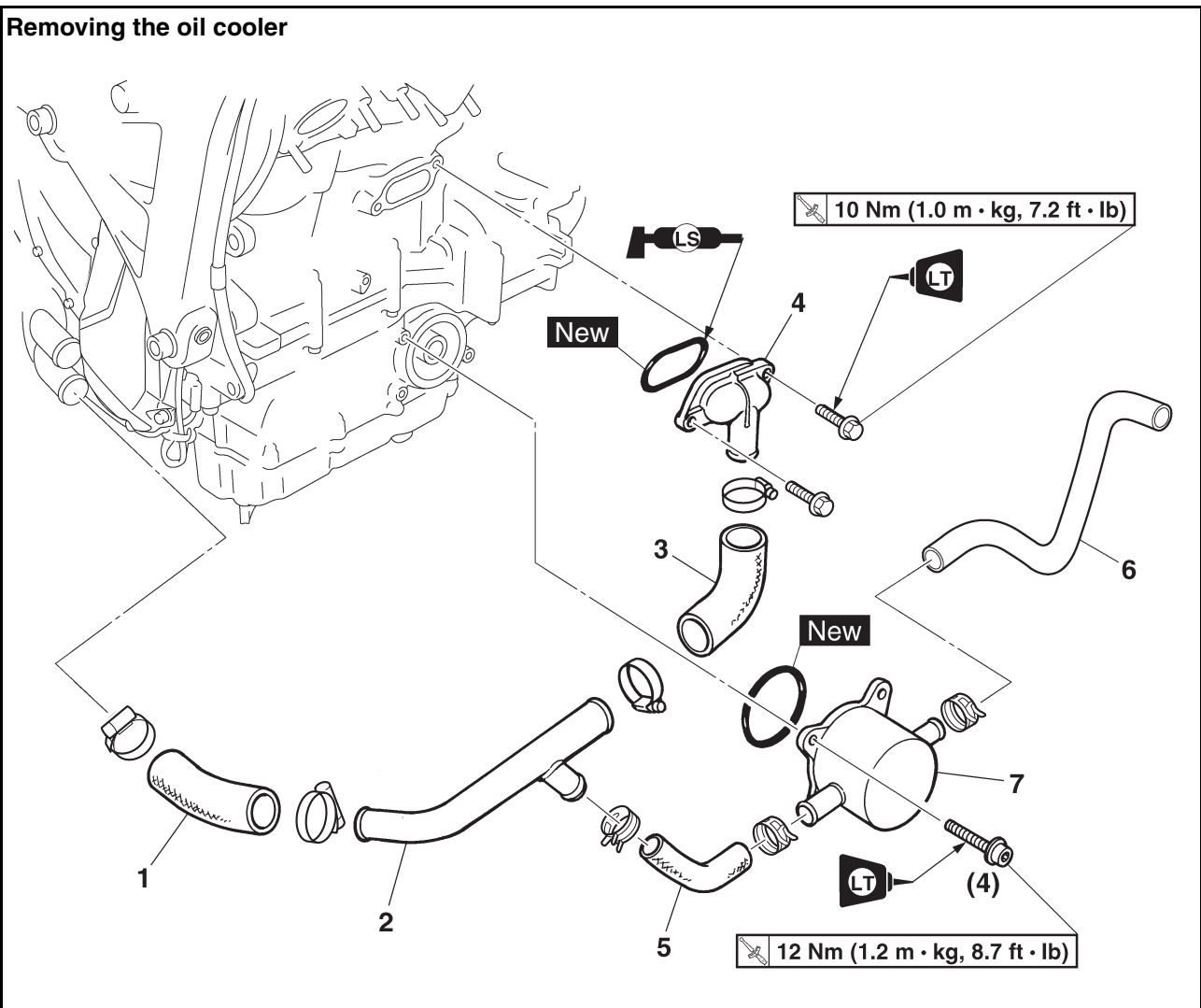
Refer to "CHANGING THE COOLANT" on page 3-27.
2. Check:
 - Cooling system
 - Leaks → Repair or replace any faulty part.
3. Measure:
 - Radiator cap opening pressure
 - Below the specified pressure → Replace the radiator cap.

Refer to "CHECKING THE RADIATOR" on page 6-3.

EAS26410

OIL COOLER

Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Radiator		Refer to "RADIATOR" on page 6-1.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-3.
1	Water pump outlet hose	1	
2	Water pump outlet pipe	1	
3	Water jacket joint inlet hose	1	
4	Water jacket joint	1	
5	Oil cooler inlet hose	1	
6	Oil cooler outlet hose	1	
7	Oil cooler	1	
			For installation, reverse the removal procedure.

EAS26420

CHECKING THE OIL COOLER

1. Check:
 - Oil cooler
Cracks/damage → Replace.
2. Check:
 - Oil cooler inlet hose
 - Oil cooler outlet hose
 - Water pump outlet hose
 - Water pump outlet pipe
 - Water jacket joint inlet hose
Cracks/damage/wear → Replace.

EAS26430

INSTALLING THE OIL COOLER

1. Clean:
 - Mating surfaces of the oil cooler and the crankcase
(with a cloth dampened with lacquer thinner)
2. Install:
 - O-ring **New**
 - Oil cooler



Oil cooler bolt
12 Nm (1.2 m·kg, 8.7 ft·lb)
LOCTITE®

TIP

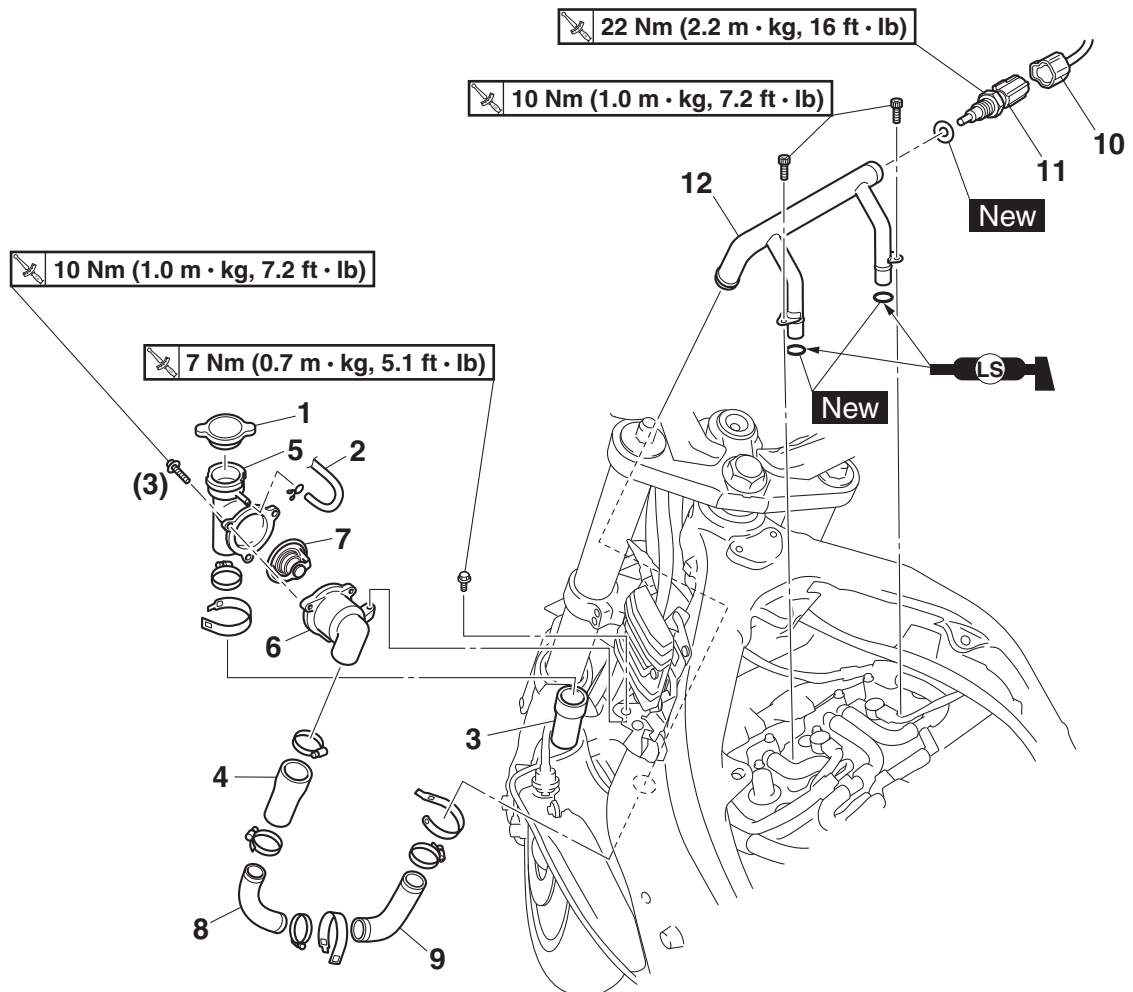
Make sure the O-ring is positioned properly.

3. Fill:
 - Cooling system
(with the specified amount of the recommended coolant)
Refer to “CHANGING THE COOLANT” on page 3-27.
 - Crankcase
(with the specified amount of the recommended engine oil)
Refer to “CHANGING THE ENGINE OIL” on page 3-24.
4. Check:
 - Cooling system
Leaks → Repair or replace any faulty part.
5. Measure:
 - Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to “CHECKING THE RADIATOR” on page 6-3.

EAS26440

THERMOSTAT

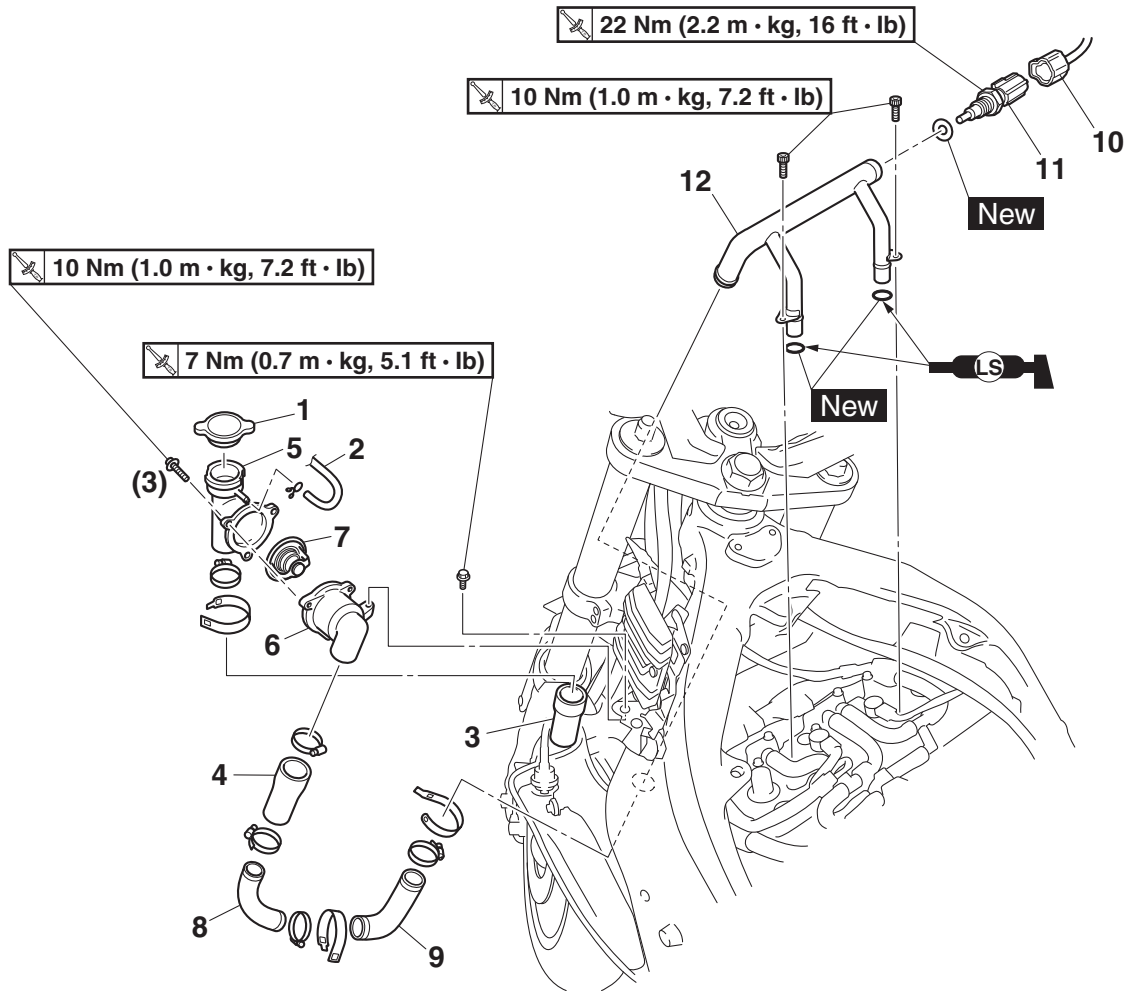
Removing the thermostat assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Left side cowling/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Radiator cap	1	
2	Coolant reservoir hose	1	Disconnect.
3	Radiator inlet hose	1	Disconnect.
4	Thermostat inlet hose 2	1	
5	Thermostat cover/radiator filler pipe	1	
6	Thermostat housing	1	
7	Thermostat	1	
8	Thermostat inlet pipe 2	1	
9	Thermostat inlet hose 1	1	
10	Coolant temperature sensor coupler	1	Disconnect.
11	Coolant temperature sensor	1	

THERMOSTAT

Removing the thermostat assembly

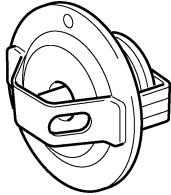


Order	Job/Parts to remove	Q'ty	Remarks
12	Thermostat inlet pipe 1	1	
			For installation, reverse the removal procedure.

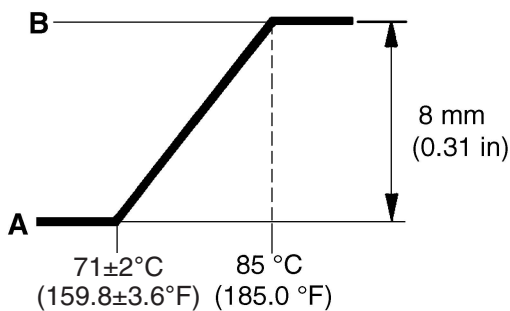
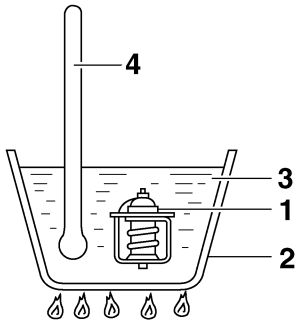
EAS26450

CHECKING THE THERMOSTAT

- Check:
 - Thermostat
Does not open at 69.0–73.0 °C (156.20–163.40 °F) → Replace.



- Suspend the thermostat "1" in a container "2" filled with water.
- Slowly heat the water "3".
- Place a thermometer "4" in the water.
- While stirring the water, observe the thermostat and thermometer's indicated temperature.



- Fully closed
- Fully open

TIP

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

- Check:
 - Thermostat housing
Cracks/damage → Replace.
- Check:
 - Thermostat hoses
 - Thermostat pipes
 - Radiator inlet hose
 - Thermostat cover/radiator filler pipe

EAS26490

INSTALLING THE THERMOSTAT ASSEMBLY

- Install:
 - Copper washer **New**
 - Coolant temperature sensor



Coolant temperature sensor
22 Nm (2.2 m·kg, 16 ft·lb)

EC3P61019

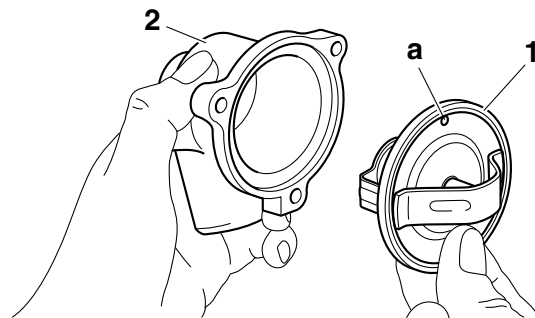
NOTICE

Use extreme care when handling the coolant temperature sensor. Replace any part that was dropped or subjected to a strong impact.

- Install:
 - Thermostat "1"
 - Thermostat housing "2"

TIP

Install the thermostat with its breather hole "a" facing up.



- Fill:
 - Cooling system
(with the specified amount of the recommended coolant)
Refer to "CHANGING THE COOLANT" on page 3-27.
- Check:
 - Cooling system
Leaks → Repair or replace any faulty part.

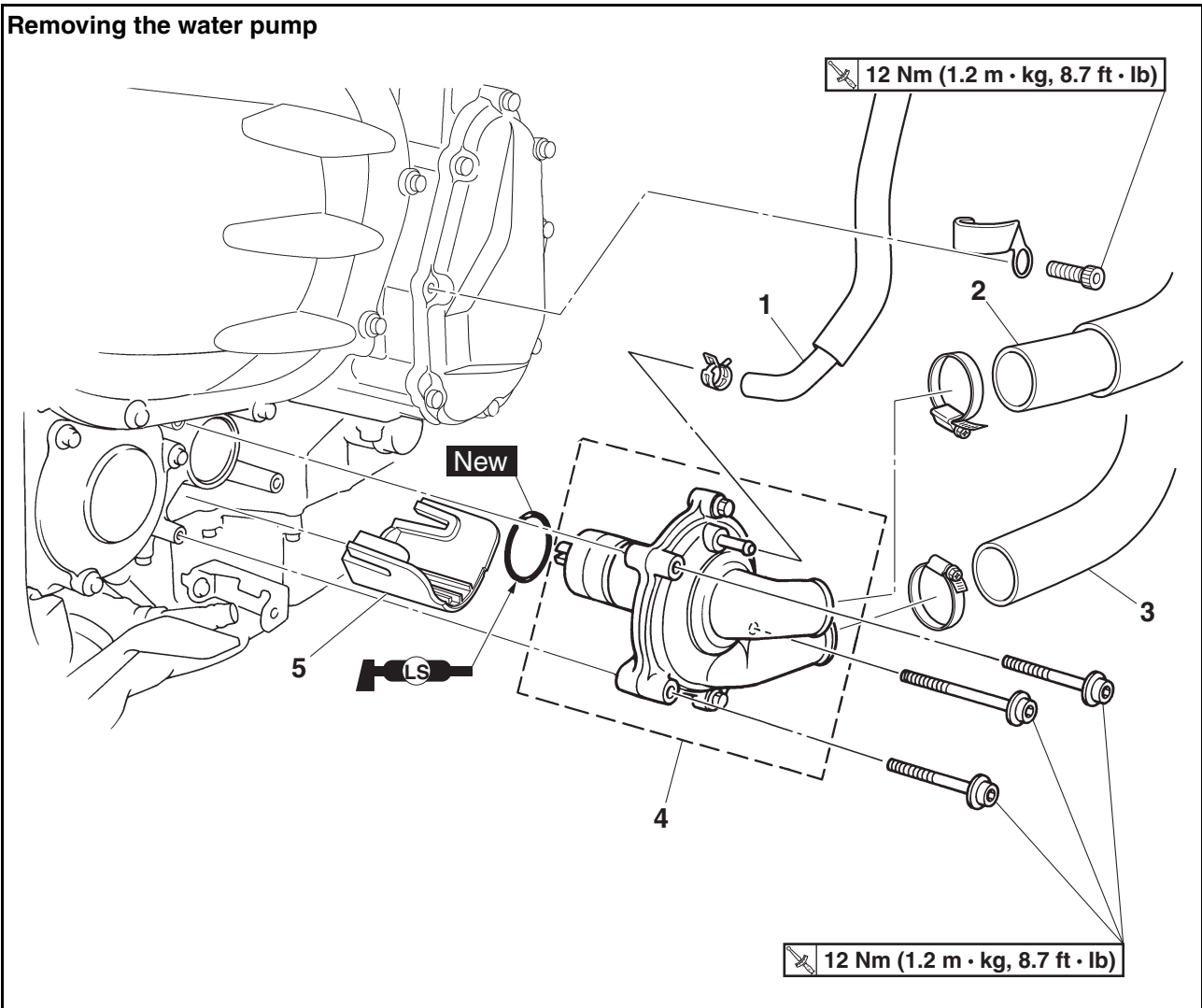
5. Measure:

- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to “CHECKING THE RADIATOR” on page 6-3.

EAS26500

WATER PUMP

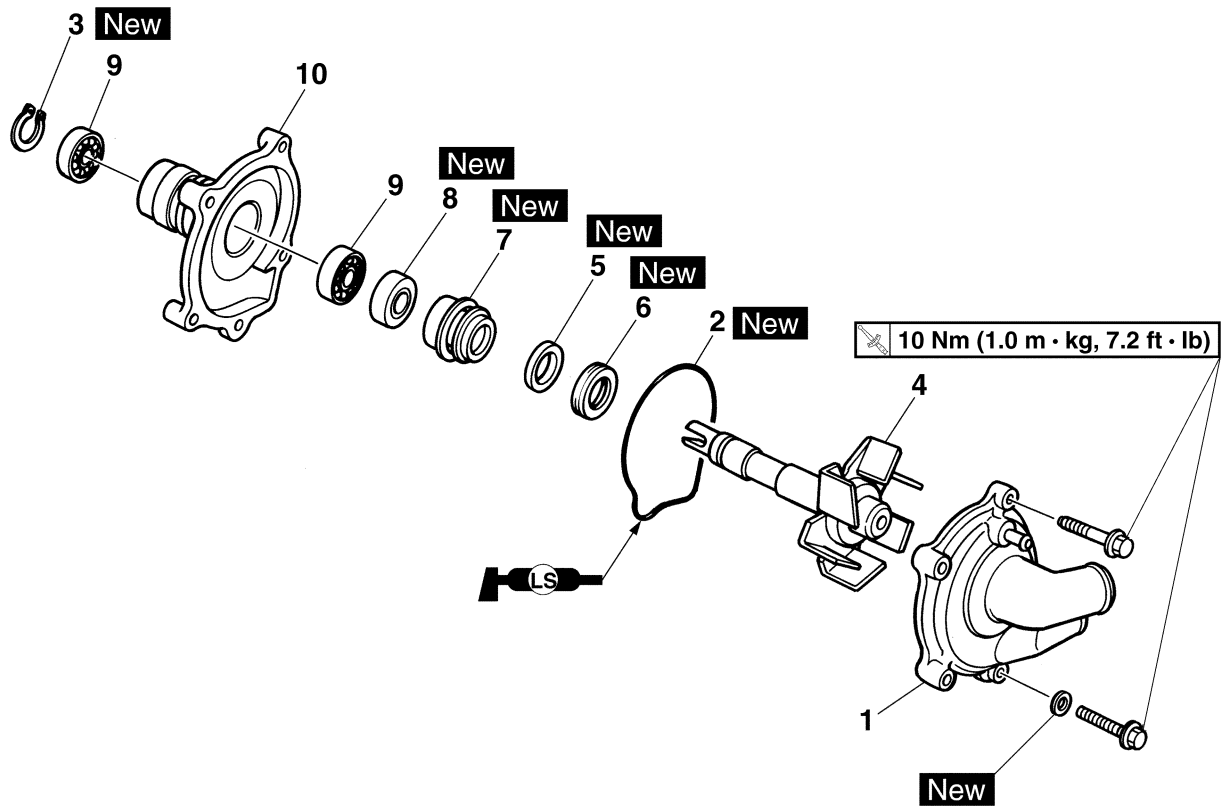
Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
	Right side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
1	Water pump breather hose	1	Disconnect.
2	Radiator outlet hose	1	Disconnect.
3	Water pump outlet hose	1	Disconnect.
4	Water pump assembly	1	
5	Water pump tray	1	
			For installation, reverse the removal procedure.

WATER PUMP

Disassembling the water pump



Order	Job/Parts to remove	Q'ty	Remarks
1	Water pump housing cover	1	
2	O-ring	1	
3	Circlip	1	
4	Impeller shaft	1	
5	Rubber damper holder	1	
6	Rubber damper	1	
7	Water pump seal	1	
8	Oil seal	1	
9	Bearing	2	
10	Water pump housing	1	
			For assembly, reverse the disassembly procedure.

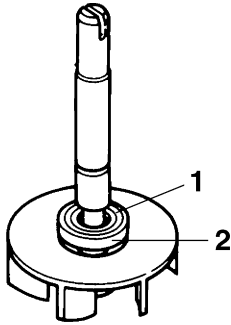
EAS26510

DISASSEMBLING THE WATER PUMP

- Remove:
 - Rubber damper holder "1"
 - Rubber damper "2"
(from the impeller, with a thin, flat-head screwdriver)

TIP

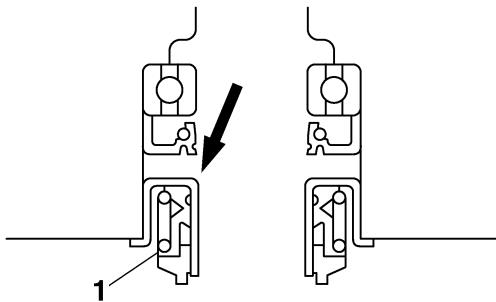
Do not scratch the impeller shaft.



- Remove:
 - Water pump seal "1"

TIP

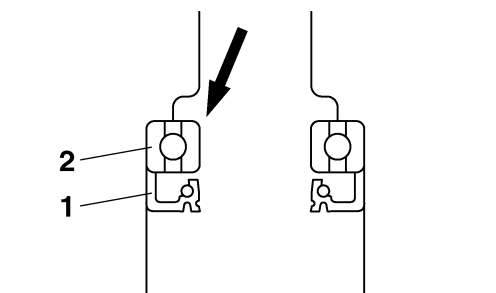
Remove the water pump seal from the inside of the water pump housing.



- Remove:
 - Oil seal "1"
 - Bearing "2"

TIP

Remove the bearing and oil seal from the inside of the water pump housing.



EAS26540

CHECKING THE WATER PUMP

- Check:
 - Water pump housing cover
 - Water pump housing
 - Impeller shaft
Cracks/damage/wear → Replace.
- Check:
 - Bearing
Rough movement → Replace.

EAS26560

ASSEMBLING THE WATER PUMP

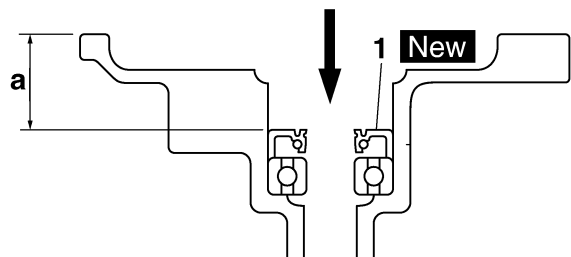
- Install:
 - Oil seal "1" **New**
(into the water pump housing)

TIP

- Before installing the oil seal, apply tap water or coolant onto its outer surface.
- Install the oil seal with a socket that matches its outside diameter.



Installed depth of oil seal "a"
20.7–21.2 mm (0.81–0.83 in)



- Install:
 - Water pump seal "1" **New**

ECA14080

NOTICE

Never lubricate the water pump seal surface with oil or grease.

TIP

- Install the water pump seal with the special tools.
- Before installing the water pump seal, apply Yamaha bond No.1215 (Three Bond No.1215®) "2" to the water pump housing "3".

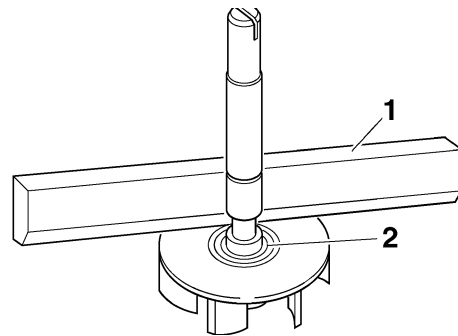
WATER PUMP



Mechanical seal installer
90890-04078
Water pump seal installer
YM-33221-A
Middle driven shaft bearing driver
90890-04058
Middle drive bearing installer 40 & 50 mm
YM-04058
Yamaha bond No. 1215
90890-85505
(Three Bond No.1215®)



Impeller shaft tilt limit
0.15 mm (0.006 in)

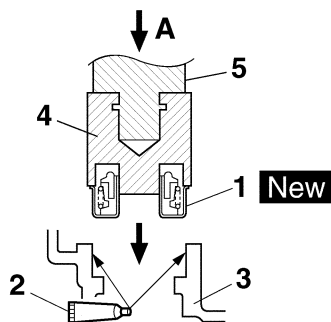


1. Straightedge
2. Impeller

5. Install:
- Impeller "1"
 - Circlip **New**

TIP

After installation, check that the impeller shaft rotates smoothly.

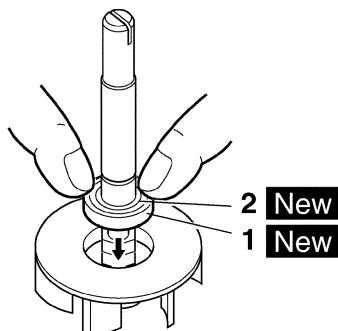
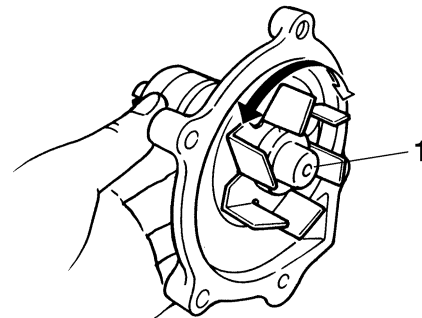


- A. Push down
4. Mechanical seal installer
5. Middle driven shaft bearing driver

3. Install:
- Rubber damper "1" **New**
 - Rubber damper holder "2" **New**

TIP

Before installing the rubber damper, apply tap water or coolant onto its outer surface.



4. Measure:
- Impeller shaft tilt
- Out of specification → Repeat steps (3) and (4).

ECA14090

NOTICE

Make sure the rubber damper and rubber damper holder are flush with the impeller.

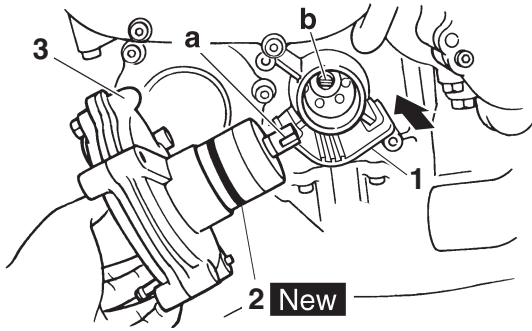
EAS26580

INSTALLING THE WATER PUMP

1. Install:
- Water pump tray "1"
 - O-ring "2" **New**
 - Water pump assembly "3"

TIP

- Install the water pump tray completely onto the crankcase.
- Align the slit "a" on the impeller shaft with the projection "b" on the oil pump driven sprocket.
- Lubricate the O-ring with a thin coat of lithium soap base grease.



2. Fill:

- Cooling system
(with the specified amount of the recommended coolant)
Refer to “CHANGING THE COOLANT” on page 3-27.

3. Check:

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

4. Measure:

- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to “CHECKING THE RADIATOR” on page 6-3.

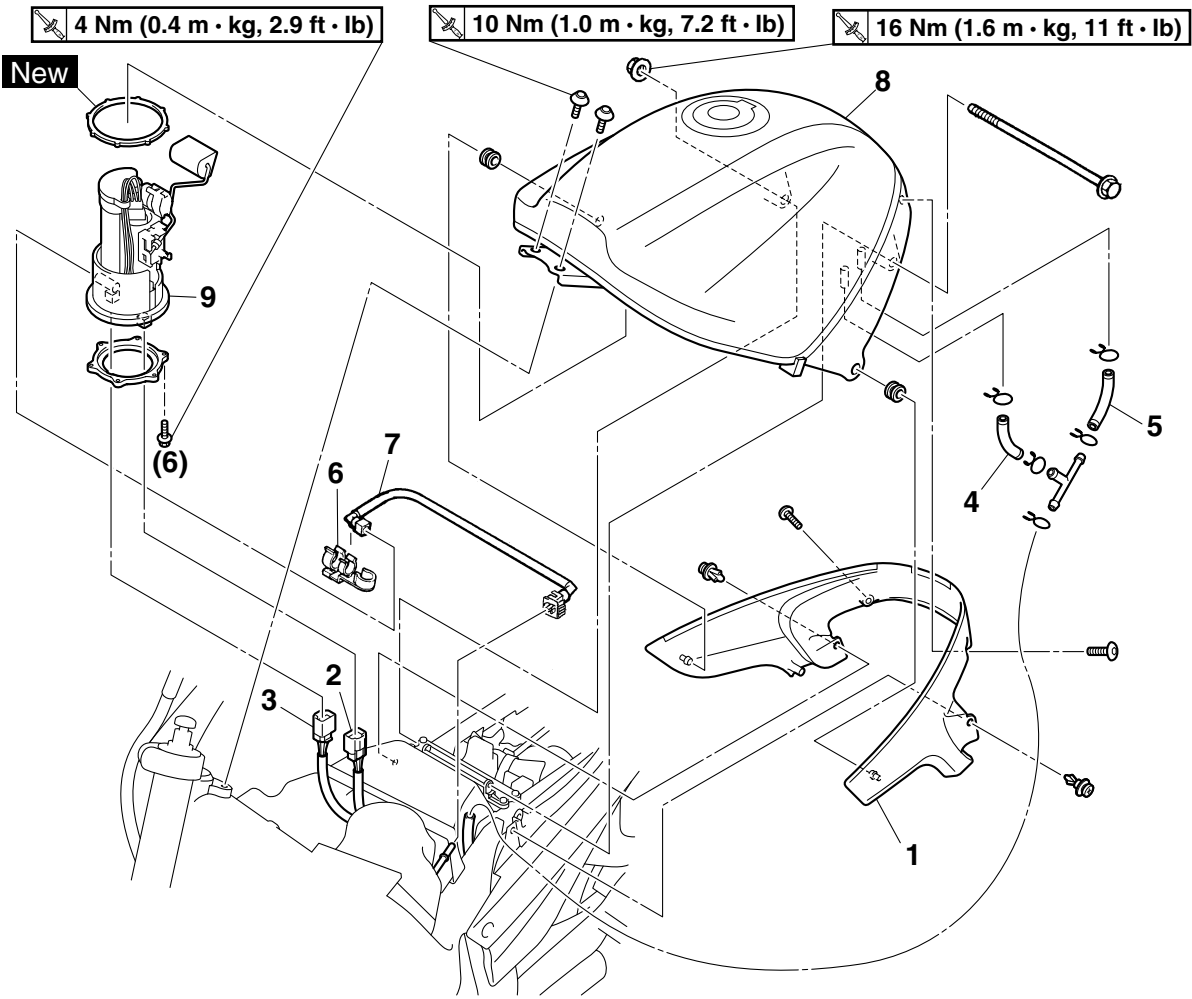
FUEL SYSTEM

FUEL TANK	7-1
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EAS26620

FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Fuel tank panel	1	
2	Fuel sender coupler	1	Disconnect.
3	Fuel pump coupler	1	Disconnect.
4	Fuel tank breather hose	1	
5	Fuel tank overflow hose	1	
6	Fuel hose holder	1	
7	Fuel hose	1	
8	Fuel tank	1	
9	Fuel pump	1	
			For installation, reverse the removal procedure.

EAS26630

REMOVING THE FUEL TANK

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

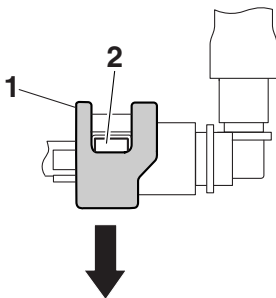
EW3P61012

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 remove the fuel hose from the fuel rail, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown, press the two buttons “2” on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.



3. Remove:
 - Fuel tank

TIP

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

EAS26640

REMOVING THE FUEL PUMP

1. Remove:
 - Fuel pump

ECA14720

NOTICE

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

EAS26670

CHECKING THE FUEL PUMP BODY

1. Check:
 - Fuel pump body
Obstruction → Clean.
 - Cracks/damage → Replace fuel pump assembly.

EAS26700

INSTALLING THE FUEL PUMP

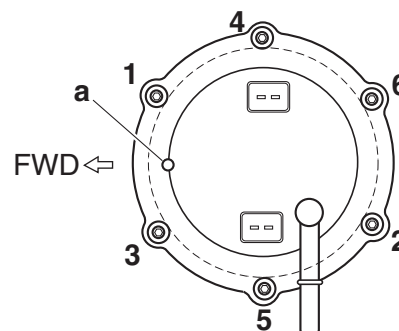
1. Install:
 - Fuel pump



Fuel pump bolt
4 Nm (0.4 m·kg, 2.9 ft·lb)

TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump as shown in the illustration.
- Align the projection “a” on the fuel pump with the slot in the fuel pump bracket.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



ET3P61018

INSTALLING THE FUEL TANK

1. Install:
 - Fuel hose (fuel rail side)

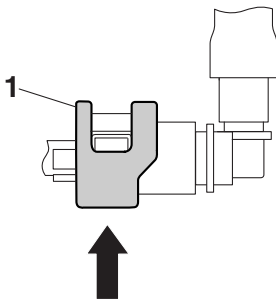
EC3P61007

NOTICE

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

TIP

- Install the fuel hose securely onto the fuel rail until a distinct “click” is heard.
- To install the fuel hose onto the fuel rail, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown.



2. Install:

- Fuel hose (fuel pump side)
- Fuel hose holder

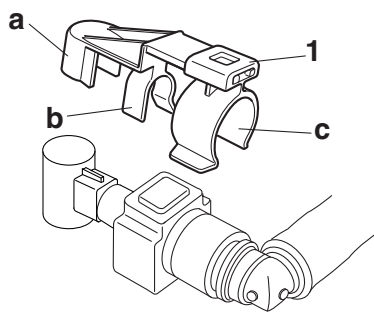
EC3P61008

NOTICE

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

TIP

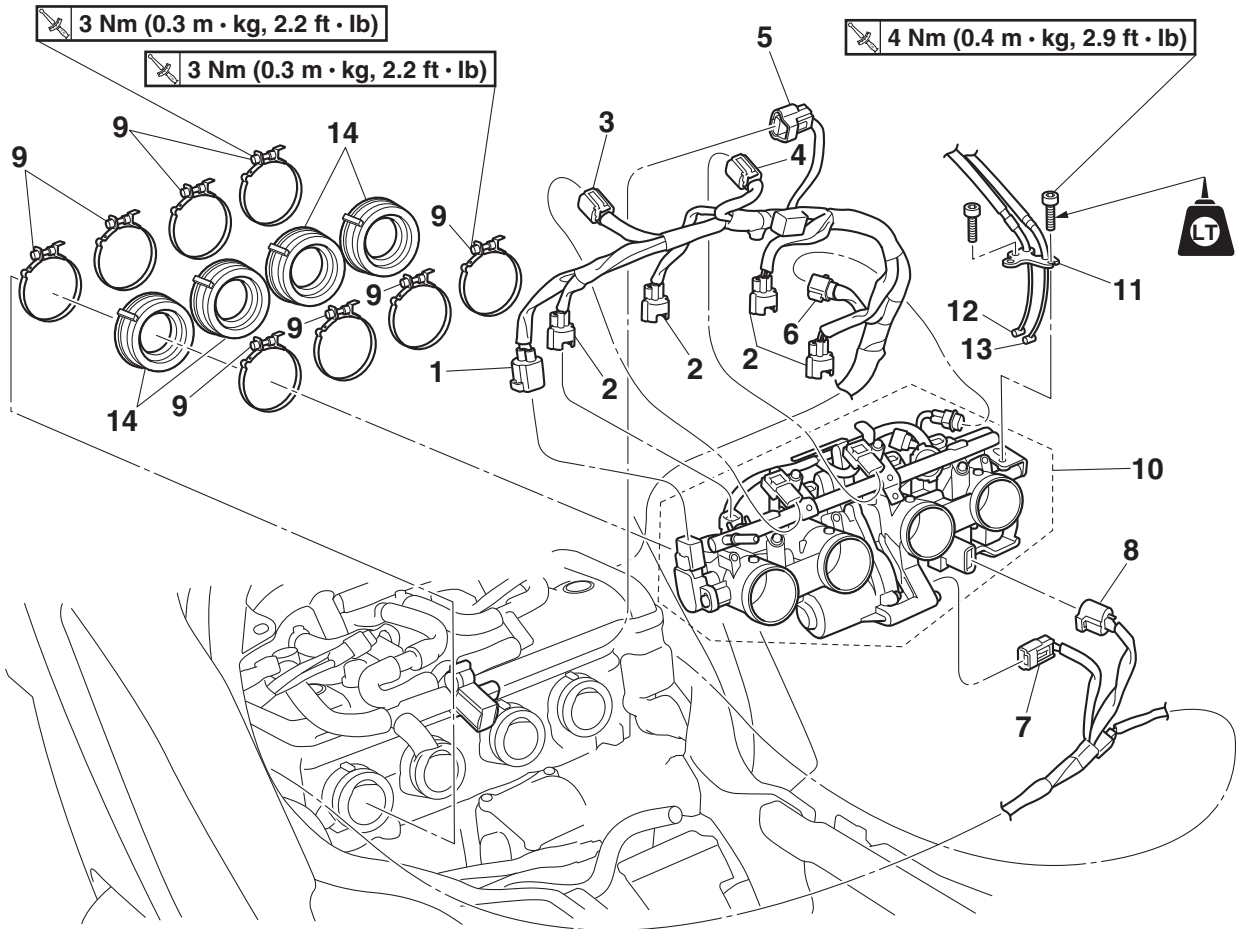
- Install the fuel hose connector securely onto the fuel tank until a distinct “click” is heard, and then make sure that it does not come loose.
- After installing the fuel hose holder “1”, make sure that the sections “a”, “b”, and “c” of the holder are installed securely.



EAS26970

THROTTLE BODIES

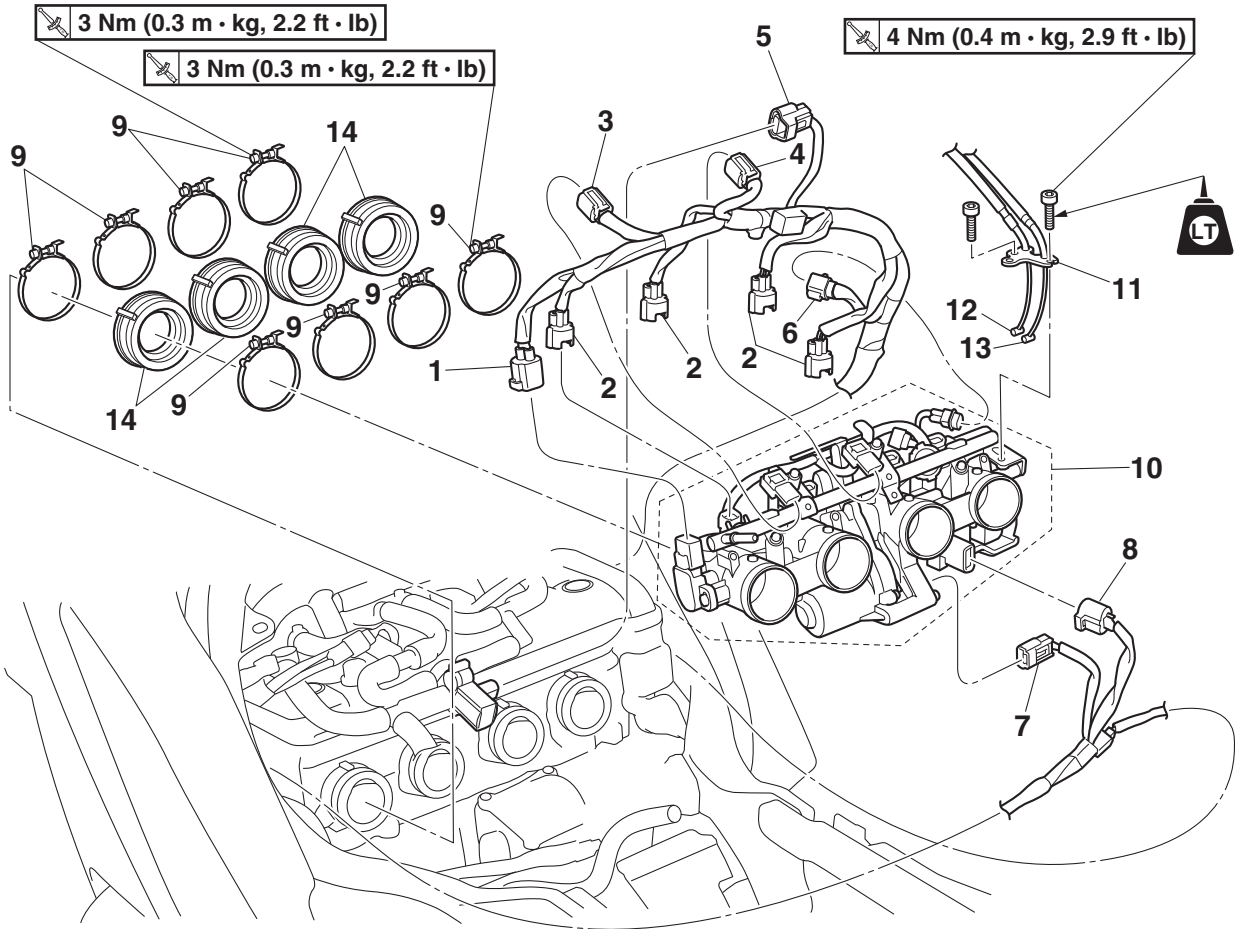
Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/T-bar/Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Throttle position sensor coupler	1	Disconnect.
2	Injector coupler	4	Disconnect.
3	Atmospheric pressure sensor coupler	1	Disconnect.
4	Intake air pressure sensor coupler	1	Disconnect.
5	Air cut-off valve coupler	1	Disconnect.
6	Grip cancel switch coupler	1	Disconnect.
7	Throttle servo motor coupler	1	Disconnect.
8	Accelerator position sensor coupler	1	Disconnect.
9	Throttle body joint clamp screw	8	Loosen.
10	Throttle bodies	1	
11	Throttle cable holder	1	
12	Throttle cable (decelerator cable)	1	Disconnect.
13	Throttle cable (accelerator cable)	1	Disconnect.

THROTTLE BODIES

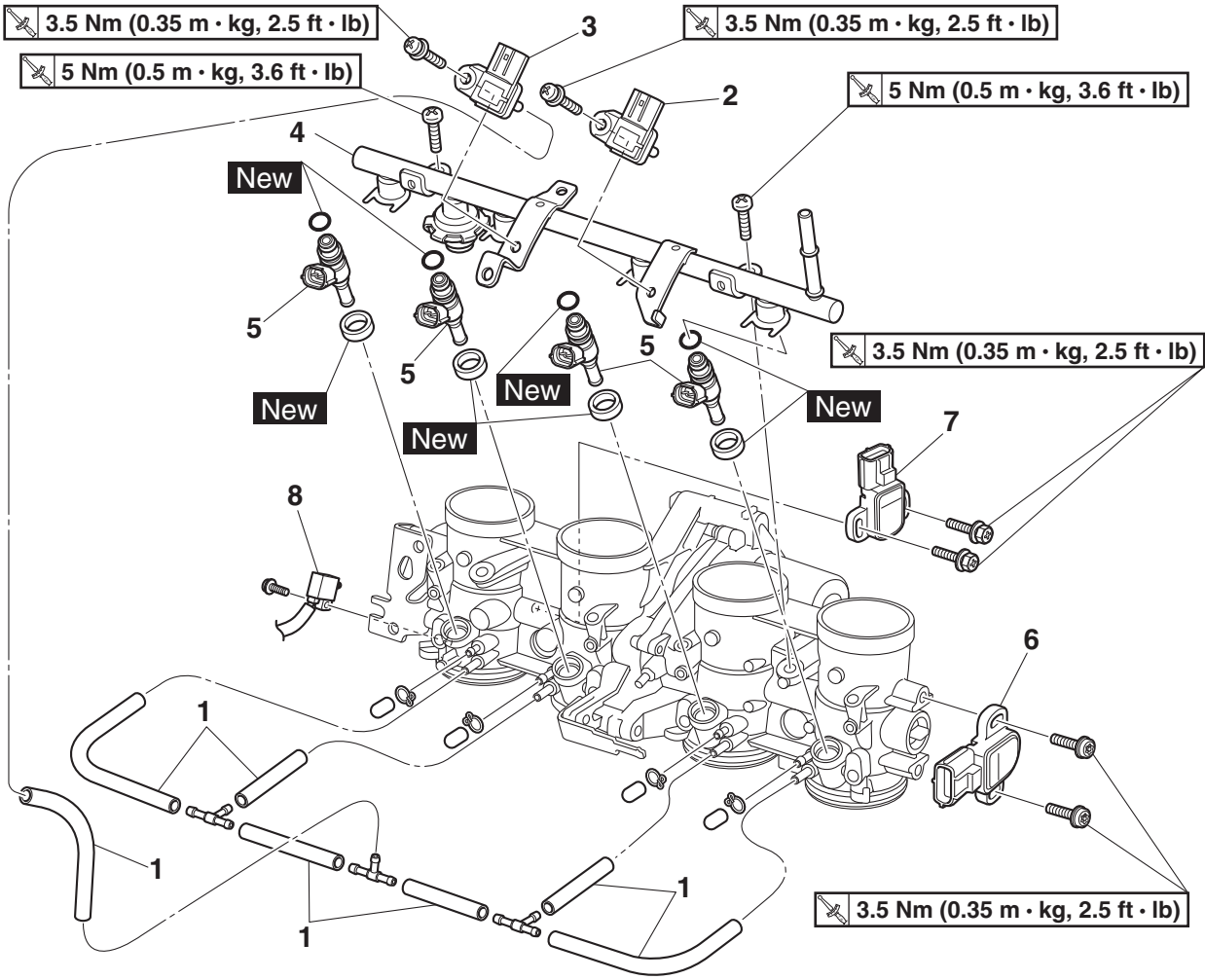
Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
14	Throttle body joint	4	
			For installation, reverse the removal procedure.

THROTTLE BODIES

Removing the injectors



Order	Job/Parts to remove	Q'ty	Remarks
1	Negative pressure hose	7	
2	Atmospheric pressure sensor	1	
3	Intake air pressure sensor	1	
4	Fuel rail	1	
5	Injector	4	
6	Throttle position sensor	1	
7	Accelerator position sensor	1	
8	Grip cancel switch	1	
			For installation, reverse the removal procedure.

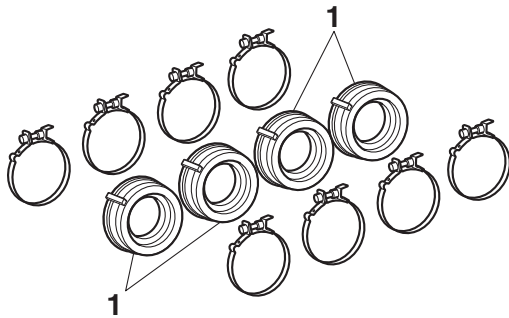
THROTTLE BODIES

5. Adjust:
- Throttle bodies synchronizing
Out of specification → Replace the throttle bodies.
Refer to “SYNCHRONIZING THE THROTTLE BODIES” on page 3-8.

EAS21010

CHECKING THE THROTTLE BODY JOINTS

1. Check:
- Throttle body joints “1”
Cracks/damage → Replace.



EAS1MC1067

REPLACING THE THROTTLE BODIES

1. Remove the throttle bodies from the vehicle.
2. Install a new throttle bodies to the vehicle.
3. Reset:
 - ISC (idle speed control) learning values
Use the diagnostic code number “67”.
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.
4. Adjust:
 - Throttle bodies synchronizing
Refer to “SYNCHRONIZING THE THROTTLE BODIES” on page 3-8.
5. Place the vehicle on the centerstand so that the rear wheel is elevated.
6. Check:
 - Engine idling speed
Start the engine, warm it up, and then measure the engine idling speed.



EAS1MC1073

INSTALLING THE INJECTORS

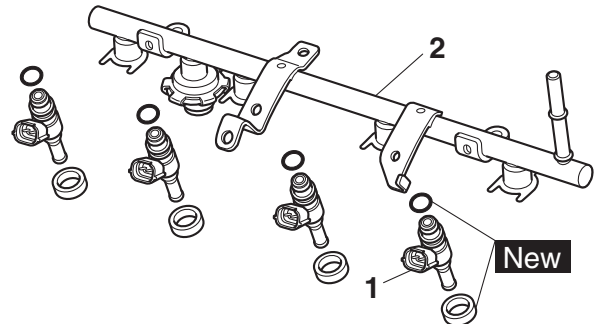
ECA1MC1022

NOTICE

- Always use new O-rings and seals.
- When checking the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rail, O-rings, or seals.

- Be careful not to twist or pinch the O-rings when installing the injectors.
- If an injector is subject to strong shocks or excessive force, replace it.
- If installing the original fuel rail and screws, remove the white paint marks using a cleaning solvent. Otherwise, paint chips on the screw seats could prevent the screws from being tightened.

1. Install new O-rings and seals onto the end of each injector.
2. Install the injectors “1” to the fuel rail “2”.



Fuel rail screw
5 Nm (0.5 m·kg, 3.6 ft·lb)

3. Install the injector assemblies to the throttle bodies.
4. Check the injector pressure after the injectors are installed to the throttle bodies.
Refer to “CHECKING THE INJECTOR PRESSURE” on page 7-9.

EAS1MC1074

CHECKING THE INJECTOR PRESSURE

TIP

- After installing the injectors, perform the following steps to check the injector pressure.
- Do not allow any foreign materials to enter the fuel lines.

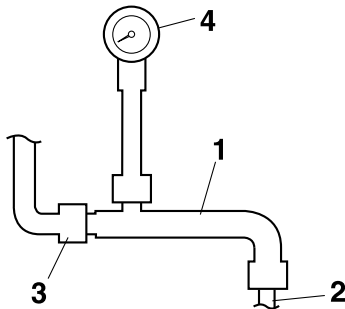
1. Check:
 - Injector pressure

- a. Connect the injector pressure adapter “1” to the fuel rail “2”, and then connect an air compressor “3” to the adapter.
- b. Connect the pressure gauge “4” to the injector pressure adapter “1”.

THROTTLE BODIES



Pressure gauge
 90890-03153
 YU-03153
Fuel injector pressure adapter
 90890-03210
 YU-03210



- c. Close the valve on the injector pressure adapter.
- d. Apply air pressure with the air compressor.
- e. Open the valve on the injector pressure adapter until the specified pressure is reached.



Specific air pressure
 490 kPa (4.9 kgf/cm², 69.7 psi)

ECA1MC1023

NOTICE

Never exceed the specified air pressure or damage could occur.

- f. Close the valve on the injector pressure adapter.
- g. Check that the specified air pressure is held for about one minute.
 Pressure drops → Check the pressure gauge and adapter.
 Check the seals and O-rings, and then reinstall.
 Replace the fuel injectors.



EAS1MC1075

CHECKING THE FUEL PRESSURE

1. Check:
 - Fuel pressure

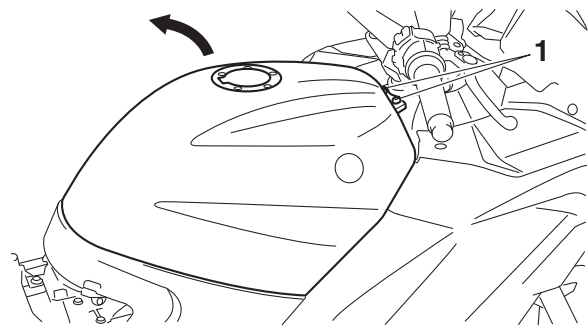


- a. Remove the fuel tank bolts "1" and lift up the fuel tank.

ECA1MC1024

NOTICE

When lifting up the fuel tank, be careful not to pull the fuel tank breather/overflow hose.



- b. Disconnect the fuel hose "2" from the fuel rail.

EWA1MC1018

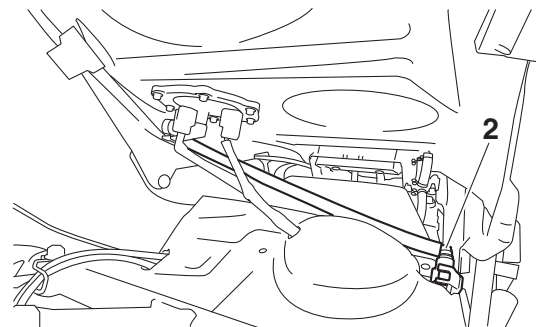
WARNING

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 hose.

ECA1MC1025

NOTICE

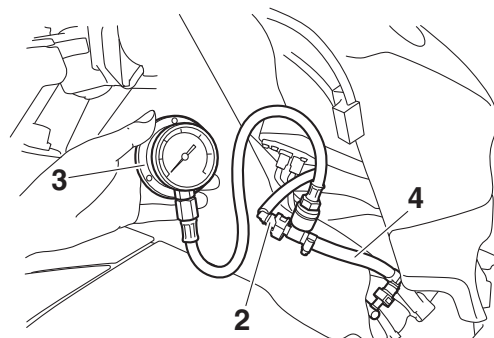
Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.



- c. Connect the pressure gauge "3" and adapter "4" to the fuel hose "2".



Pressure gauge
 90890-03153
 YU-03153
Fuel pressure adapter
 90890-03176
 YM-03176



- d. Start the engine.
- e. Measure the fuel line pressure.



Fuel line pressure (at idle)
300.0–390.0 kPa (3.00–3.90
kgf/cm², 43.5–56.6 psi)

Faulty → Replace the fuel pump.



EAS1MC1076

ADJUSTING THE THROTTLE POSITION SENSOR

EWA1MC1019

⚠ WARNING

- Handle the throttle position sensor with special care.
- Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

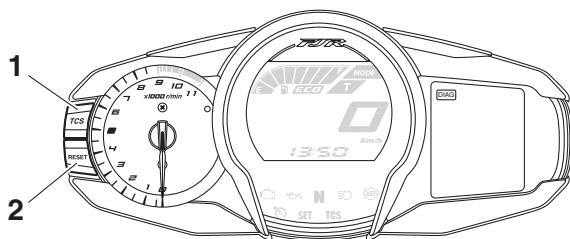
1. Check:
 - Throttle position sensor
 Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-187.
2. Adjust:
 - Throttle position sensor angle

TIP

Before adjusting the throttle position sensor, the throttle bodies must be removed.



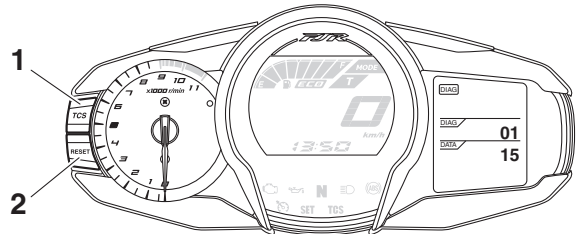
- a. Temporarily tighten the throttle position sensor screws.
- b. Check that the throttle valves are fully closed.
- c. Turn the main switch to “OFF”.
- d. Connect the throttle position sensor to the wire harness.
- e. Simultaneously press and hold the “TCS” button “1” and “RESET” button “2”, turn the main switch to “ON”, and continue to press the buttons for 8 seconds more.



TIP

All displays on the multi-function meter right display disappear and “DIAG” appears.

- f. Simultaneously press the “TCS” button “1” and “RESET” button “2” for 2 seconds or more to set the diagnostic mode.



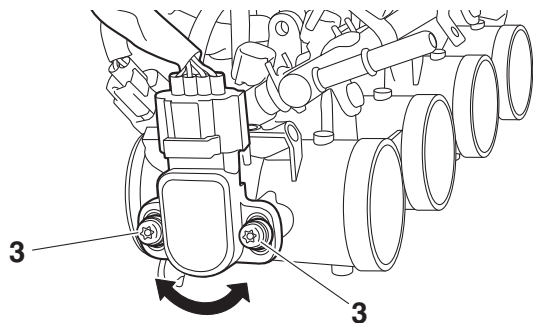
TIP

The diagnostic code number “01” appears on the multi-function meter right display.

- g. Diagnostic code number “01” is selected.
- h. Adjust the position of the throttle position sensor angle so that 12–21 can appear in the meter display.
- i. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws “3”.



Throttle position sensor screw
3.5 Nm (0.35 m·kg, 2.5 ft·lb)



EAS1MC1077

ADJUSTING THE ACCELERATOR POSITION SENSOR

EWA1MC1003

⚠ WARNING

- Handle the accelerator position sensor with special care.
- Never subject the accelerator position sensor to strong shocks. If the accelerator position sensor is dropped, replace it.

1. Check:
 - Accelerator position sensor
 Refer to “CHECKING THE ACCELERATOR POSITION SENSOR” on page 8-188.

THROTTLE BODIES

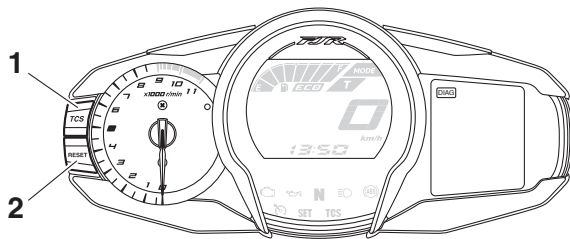
2. Adjust:

- Accelerator position sensor angle

TIP

Before adjusting the accelerator position sensor, the throttle bodies must be removed.

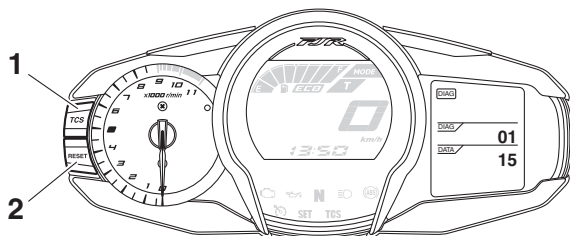
- Temporary tighten the accelerator position sensor bolts.
- Check that the throttle valves are fully closed.
- Turn the main switch to “OFF”.
- Connect the accelerator position sensor to the wire harness.
- Connect the throttle cables to the throttle bodies.
- Simultaneously press and hold the “TCS” button “1” and “RESET” button “2”, turn the main switch to “ON”, and continue to press the buttons for 8 seconds more.



TIP

All displays on the multi-function meter right display disappear and “DIAG” appears.

- Simultaneously press the “TCS” button “1” and “RESET” button “2” for 2 seconds or more to set the diagnostic mode.



TIP

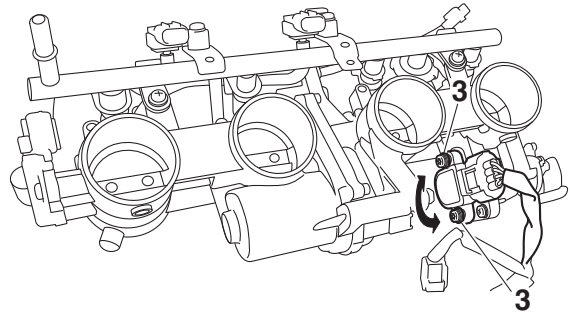
The diagnostic code number “01” appears on the multi-function meter right display.

- Diagnostic code number “14” is selected.
- Turn the throttle grip to the fully closed position.

- Adjust the position of the accelerator position sensor angle so that 12–22 can appear in the meter display.
- After adjusting the accelerator position sensor angle, tighten the accelerator position sensor bolts “3”.



**Accelerator position sensor bolt
3.5 Nm (0.35 m·kg, 2.5 ft·lb)**

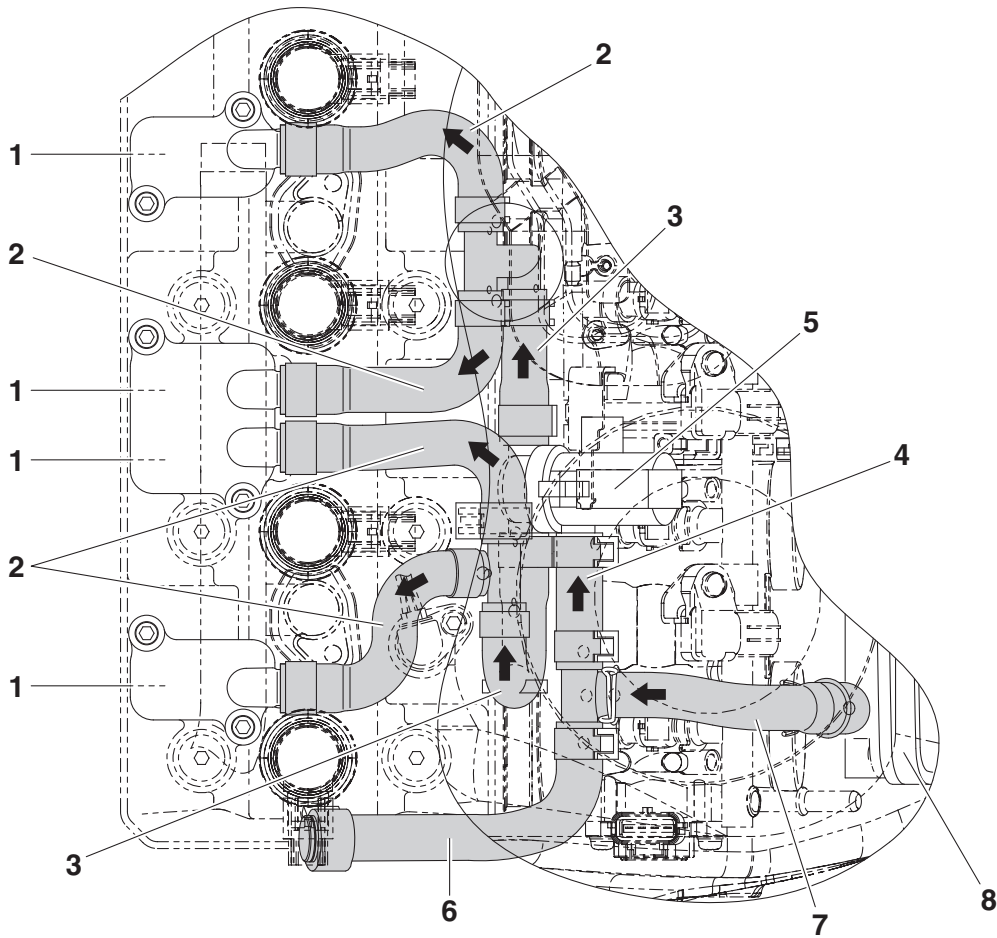
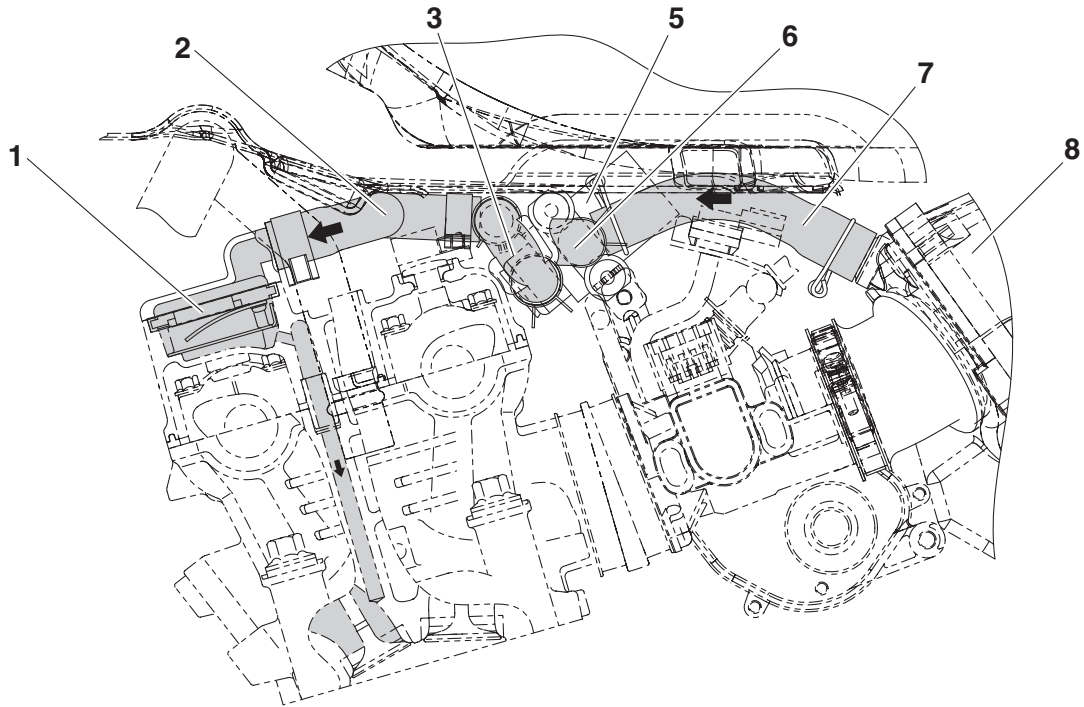


- Turn the throttle grip to the fully open position.
- Check the meter display value. If the meter display value is not 97–107, adjust the accelerator position sensor angle.
- Select the diagnostic code number “15”.
- Turn the throttle grip to the fully closed position.
- Check the meter display value. If the meter display value is not 10–24, adjust the accelerator position sensor angle.
- Turn the throttle grip to the fully open position.
- Check the meter display value. If the meter display value is not 95–109, adjust the accelerator position sensor angle.
- Repeat steps (h) to (r) until the meter display values are within the specified ranges.
- If the meter display values are not within the specified ranges after repeating steps (h) to (r) several times, replace the accelerator position sensor.



EAS27040

AIR INDUCTION SYSTEM

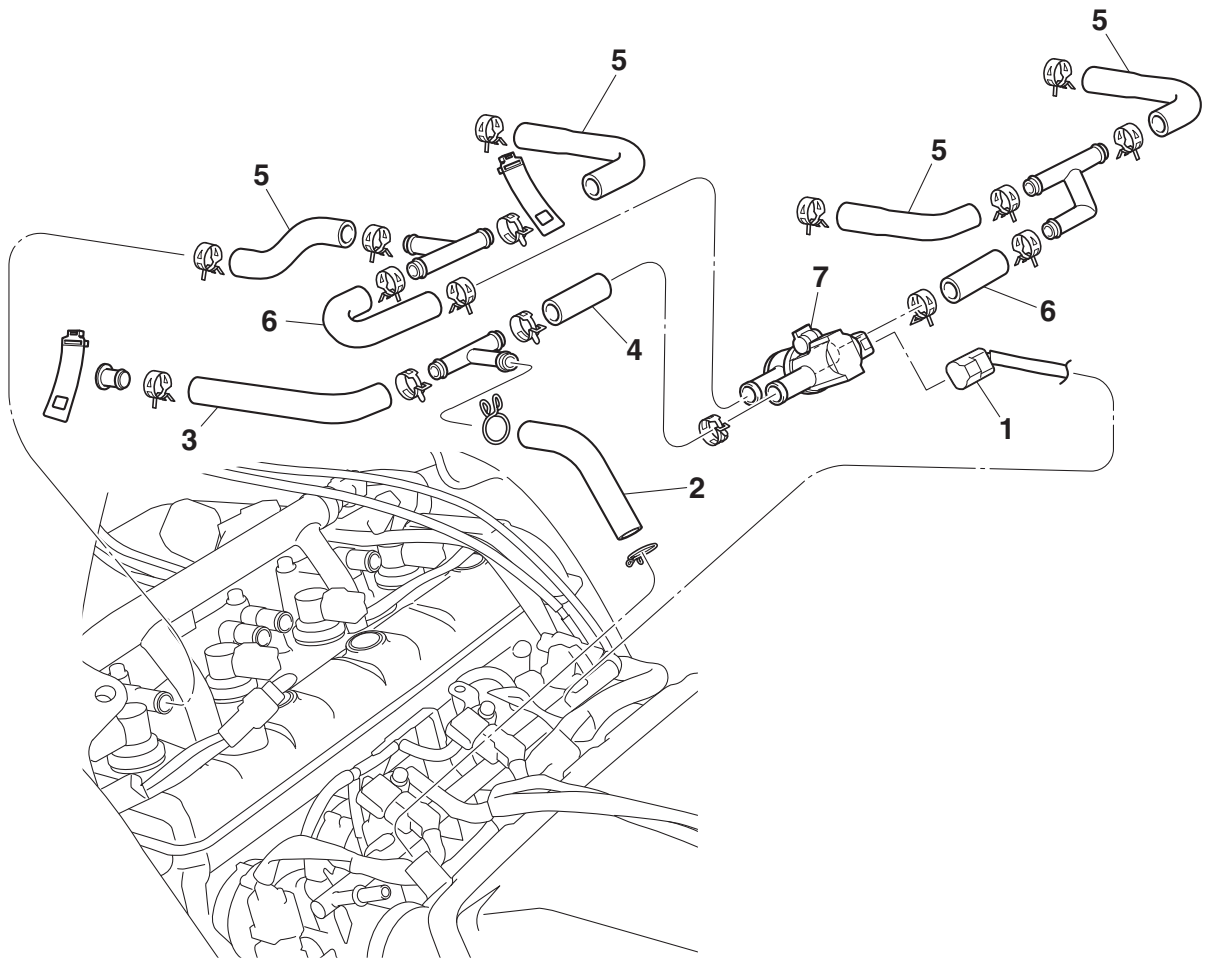


AIR INDUCTION SYSTEM

1. Reed valve assembly
2. Air induction system hose (3-way joint to reed valve cover)
3. Air induction system hose (air cut-off valve to 3-way joint)
4. Air induction system hose (3-way joint to air cut-off valve)
5. Air cut-off valve
6. Air induction system hose (3-way joint to hose plug)
7. Air induction system hose (air filter case joint assembly to 3-way joint)
8. Air filter case joint assembly

AIR INDUCTION SYSTEM

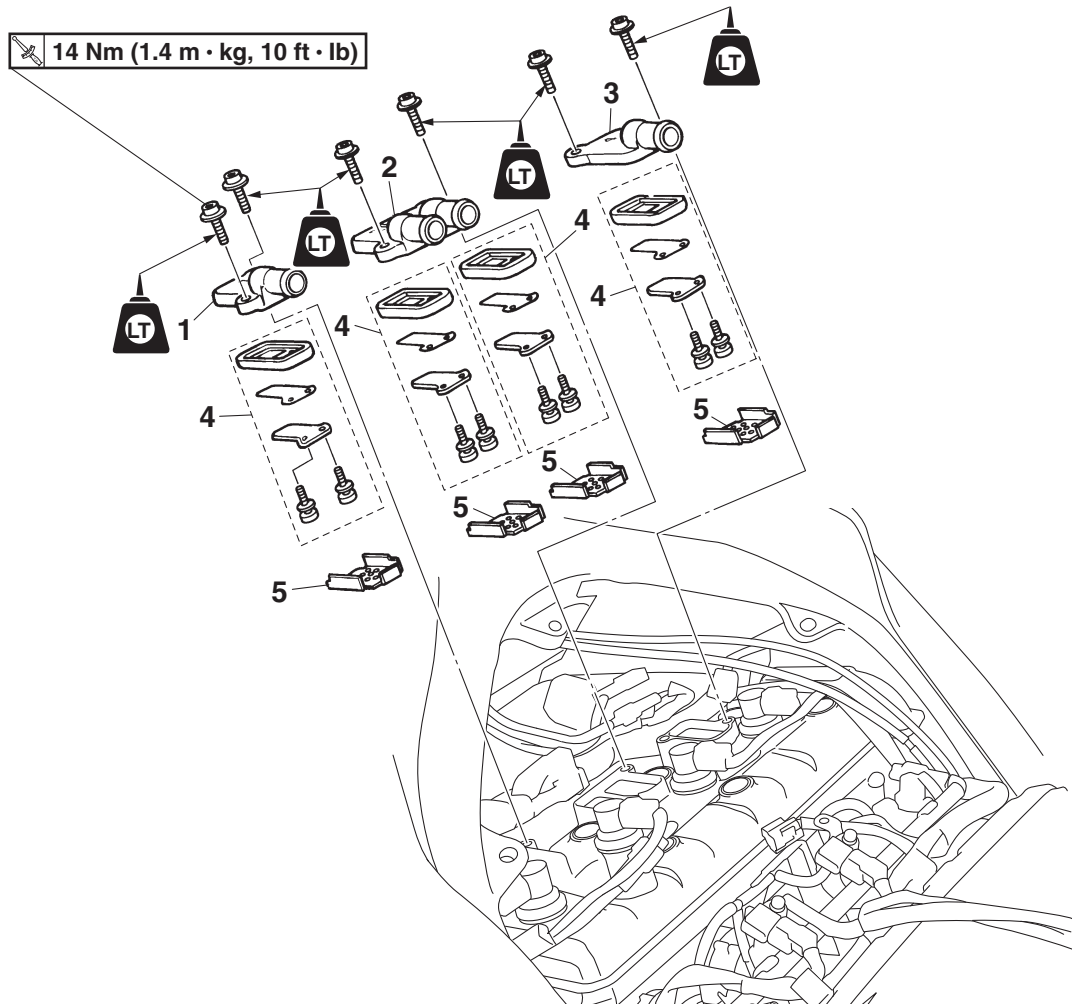
Removing the air cut-off valve



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Air induction system solenoid coupler	1	Disconnect.
2	Air induction system hose (air filter case joint assembly to 3-way joint)	1	
3	Air induction system hose (3-way joint to hose plug)	1	
4	Air induction system hose (3-way joint to air cut-off valve)	1	
5	Air induction system hose (3-way joint to reed valve cover)	4	
6	Air induction system hose (air cut-off valve to 3-way joint)	2	
7	Air cut-off valve	1	
			For installation, reverse the removal procedure.

AIR INDUCTION SYSTEM

Removing the reed valves



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air induction system hoses (3-way joint to reed valve cover)		Refer to "Removing the air cut-off valve".
	Thermostat inlet pipe 1		Refer to "THERMOSTAT" on page 6-6.
1	Reed valve cover (cylinder-#1)	1	
2	Reed valve cover (cylinders-#2/#3)	1	
3	Reed valve cover (cylinder-#4)	1	
4	Reed valve assembly	4	
5	Reed valve plate	4	
			For installation, reverse the removal procedure.

EAS27060

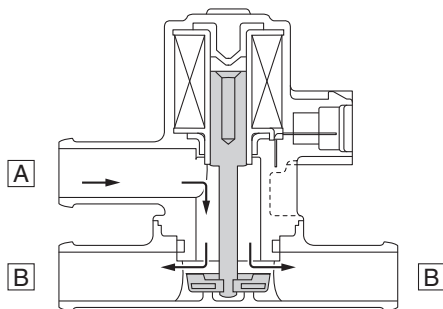
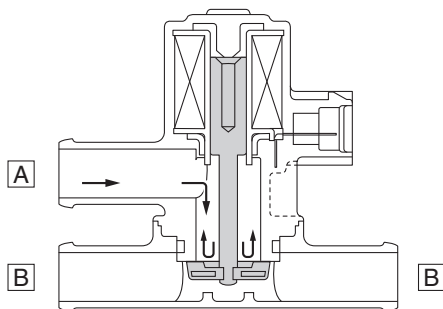
CHECKING THE AIR INDUCTION SYSTEM

Air injection

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons. When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700 °C (1112 to 1292 °F).

Air cut-off valve

The air cut-off valve is controlled by the signals from the ECU in accordance with the combustion conditions. Ordinarily, the air cut-off valve opens to allow the air to flow during idle and closes to cut-off the flow when the vehicle is being driven. However, if the coolant temperature is below the specified value, the air cut-off valve remains open and allows the air to flow into the exhaust pipe until the temperature becomes higher than the specified value.



- A. From the air filter case
- B. To the reed valve

1. Check:

- Hoses
Loose connections → Connect properly.
Cracks/damage → Replace.

- 3-way joint
Cracks/damage → Replace.
2. Check:
 - Reed valve
 - Reed valve stopper
 - Reed valve seat
Cracks/damage → Replace the reed valve assembly.
 3. Check:
 - Air cut-off valve
Cracks/damage → Replace.
 4. Check:
 - Air induction system solenoid
Refer to "CHECKING THE AIR INDUCTION SYSTEM SOLENOID" on page 8-189.

EAS27070

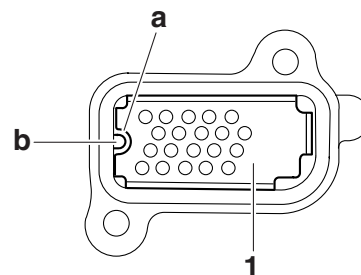
INSTALLING THE AIR INDUCTION SYSTEM

1. Install:

- Reed valve plate "1"

TIP

Align the notch "a" in each plate with the projection "b" of each reed valve seat on the cylinder head cover.



ELECTRICAL SYSTEM

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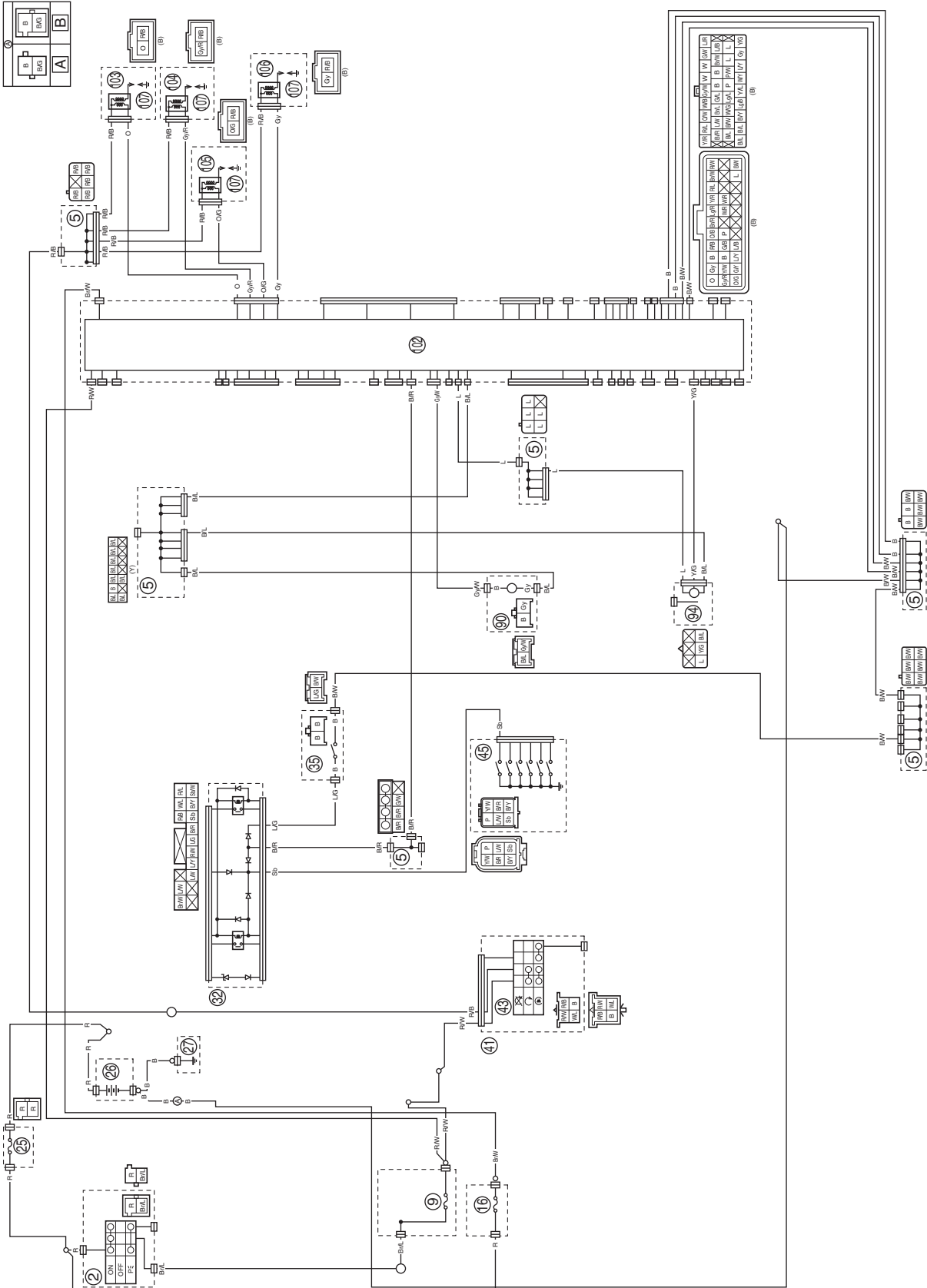
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EAS27090

IGNITION SYSTEM

EAS27110

CIRCUIT DIAGRAM



IGNITION SYSTEM

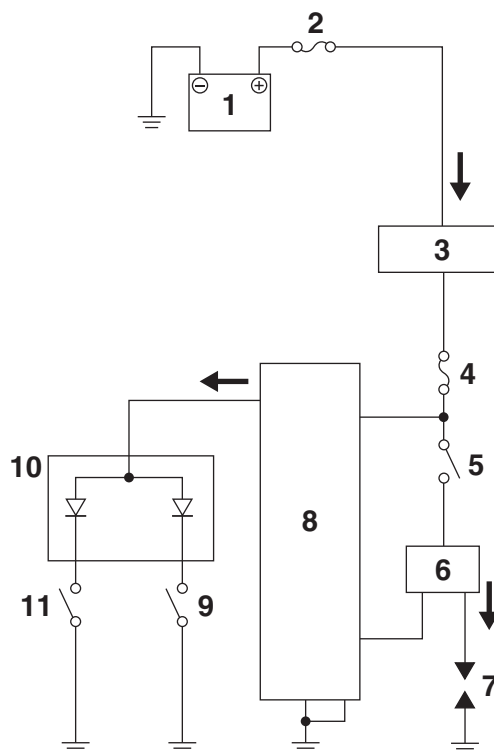
- 2. Main switch
- 5. Joint coupler
- 9. Ignition fuse
- 16. Fuel injection system fuse
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 32. Relay unit
- 35. Sidestand switch
- 41. Right handlebar switch
- 43. Start/engine stop switch
- 45. Gear position switch
- 90. Crankshaft position sensor
- 94. Lean angle sensor
- 102. ECU (engine control unit)
- 103. Ignition coil #1
- 104. Ignition coil #2
- 105. Ignition coil #3
- 106. Ignition coil #4
- 107. Spark plug
- A. Wire harness
- B. Negative battery sub-wire harness

ET3P61002

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 gear position switch (neutral circuit) 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 circuit of the gear position switch is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral circuit of the gear position switch is closed) and the sidestand is down (the sidestand switch circuit is open).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Start/engine stop switch
6. Ignition coil
7. Spark plug
8. ECU (engine control unit)
9. Sidestand switch
10. Relay unit (diode)
11. Gear position switch (neutral circuit)

IGNITION SYSTEM

EAS27140

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

• Before troubleshooting, remove the following part(s):

1. Side cowlings
2. Front cowling assembly
3. Fuel tank
4. T-bar
5. Storage compartment
6. Side covers
7. Air filter case

1. Check the fuses. (Main, ignition, and fuel injection system) Refer to "CHECKING THE FUSES" on page 8-173.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.	NG →	<ul style="list-style-type: none">• Clean the battery terminals.• Recharge or replace the battery.
OK ↓		
3. Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-4.	NG →	Re-gap or replace the spark plug(s).
OK ↓		
4. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 8-182.	OK →	Ignition system is OK.
NG ↓		
5. Check the ignition coils. Refer to "CHECKING THE IGNITION COILS" on page 8-181.	NG →	Replace the ignition coil(s).
OK ↓		
6. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-182.	NG →	Replace the crankshaft position sensor.
OK ↓		
7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	NG →	Replace the main switch/immobilizer unit.
OK ↓		

IGNITION SYSTEM

<p>8. Check the start/engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-169.</p>	NG →	<ul style="list-style-type: none">• The start/engine stop switch is faulty.• Replace the right handlebar switch.
OK ↓		
<p>9. Check the gear position switch. Refer to "CHECKING THE SWITCHES" on page 8-169.</p>	NG →	Replace the gear position switch.
OK ↓		
<p>10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-169.</p>	NG →	Replace the sidestand switch.
OK ↓		
<p>11. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-180.</p>	NG →	Replace the relay unit.
OK ↓		
<p>12. Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-183.</p>	NG →	Replace the lean angle sensor.
OK ↓		
<p>13. Check the entire ignition system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-1.</p>	NG →	Properly connect or replace the wire harness.
OK ↓		
<p>Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.</p>		

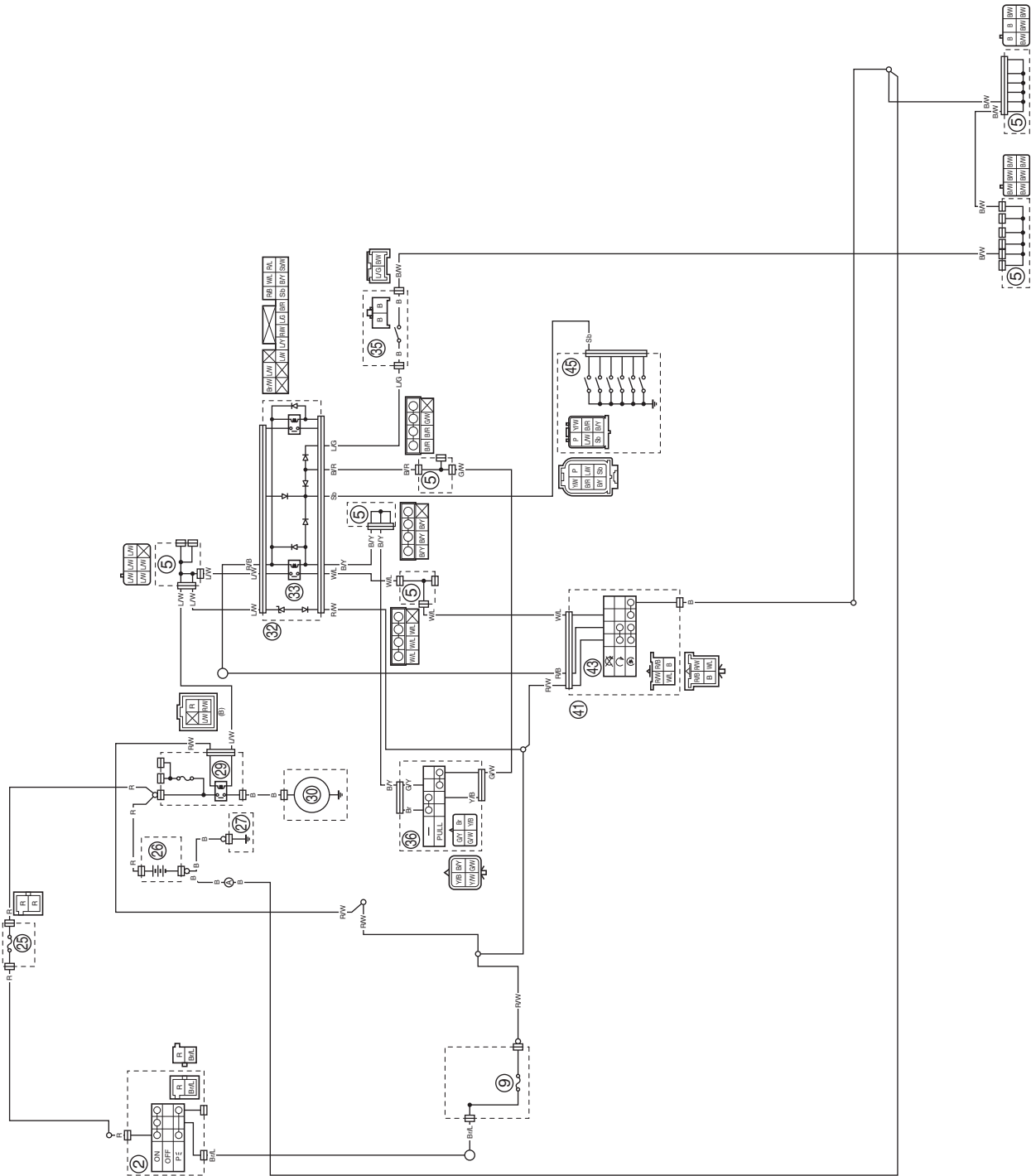
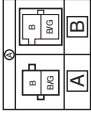
ELECTRIC STARTING SYSTEM

EAS27160

ELECTRIC STARTING SYSTEM

EAS27170

CIRCUIT DIAGRAM



ELECTRIC STARTING SYSTEM

- 2. Main switch
- 5. Joint coupler
- 9. Ignition fuse
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 29. Starter relay
- 30. Starter motor
- 32. Relay unit
- 33. Starting circuit cut-off relay
- 35. Sidestand switch
- 36. Clutch switch
- 41. Right handlebar switch
- 43. Start/engine stop switch
- 45. Gear position switch
- A. Wire harness
- B. Negative battery sub-wire harness

ELECTRIC STARTING SYSTEM

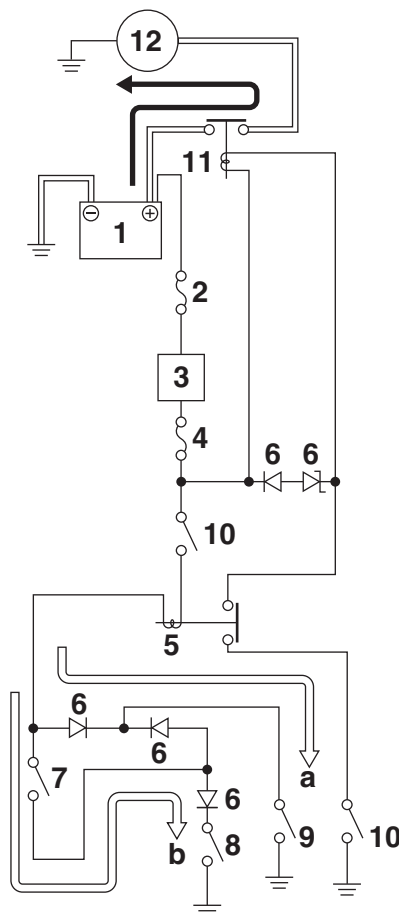
EAS27180

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is turned to "ON" and the "⊗" side of the start/engine stop switch is pushed, the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral circuit of the gear position switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch circuit is closed) and the sidestand is up (the sidestand switch circuit 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 stays 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 pushing the "⊗" side of the start/engine stop switch.



- | | |
|---|------------------------------|
| a. WHEN THE TRANSMISSION IS IN NEUTRAL | 8. Sidestand switch |
| b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR | 9. Gear position switch |
| 1. Battery | 10. Start/engine stop switch |
| 2. Main fuse | 11. Starter relay |
| 3. Main switch | 12. Starter motor |
| 4. Ignition fuse | |
| 5. Starting circuit cut-off relay | |
| 6. Relay unit (diode) | |
| 7. Clutch switch | |

ELECTRIC STARTING SYSTEM

EAS27190

TROUBLESHOOTING

The starter motor fails to turn.

TIP

• Before troubleshooting, remove the following part(s):

1. Side cowlings
2. Front cowling assembly
3. Fuel tank
4. T-bar
5. Throttle bodies

1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 8-173.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.	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 8-183.	OK →	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.
NG ↓		
4. Check the starter motor. Refer to "CHECKING THE STARTER MOTOR" on page 5-41.	NG →	Repair or replace the starter motor.
OK ↓		
5. Check the relay unit (starting circuit cut-off relay). Refer to "CHECKING THE RELAYS" on page 8-177.	NG →	Replace the relay unit.
OK ↓		
6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-180.	NG →	Replace the relay unit.
OK ↓		
7. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 8-177.	NG →	Replace the starter relay.
OK ↓		

ELECTRIC STARTING SYSTEM

8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	NG →	Replace the main switch/immobilizer unit.
OK ↓		
9. Check the gear position switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	NG →	Replace the gear position switch.
OK ↓		
10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	NG →	Replace the sidestand switch.
OK ↓		
11. Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	NG →	Replace the clutch switch.
OK ↓		
12. Check the start/engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	NG →	<ul style="list-style-type: none">• The start/engine stop switch is faulty.• Replace the right handlebar switch.
OK ↓		
13. Check the entire starting system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-7.	NG →	Properly connect or replace the wire harness.
OK ↓		
The starting system circuit is OK.		

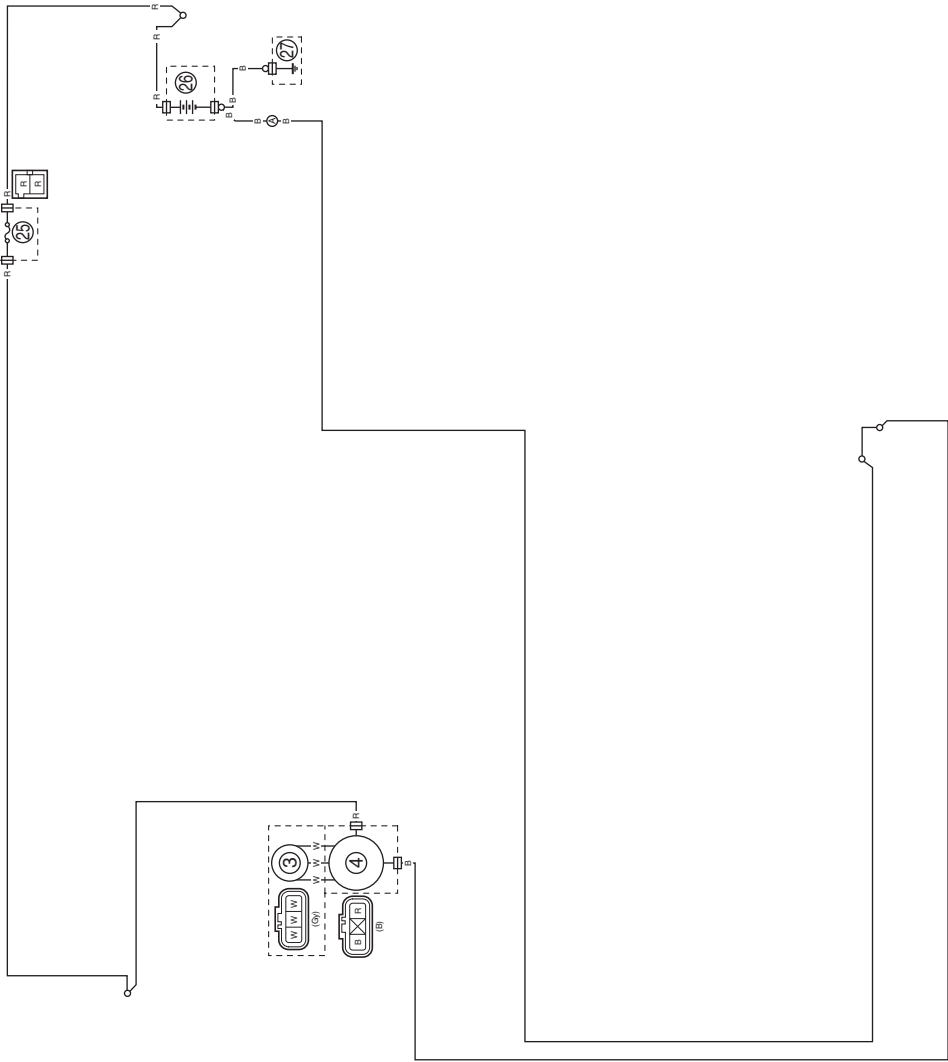
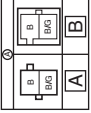
ELECTRIC STARTING SYSTEM

EAS27200

CHARGING SYSTEM

EAS27210

CIRCUIT DIAGRAM



CHARGING SYSTEM

- 3. AC magneto
- 4. Rectifier/regulator
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- A. Wire harness
- B. Negative battery sub-wire harness

EAS27230

TROUBLESHOOTING

The battery is not being charged.

TIP

• Before troubleshooting, remove the following part(s):

1. Right upper inner panel
2. Side cowlings

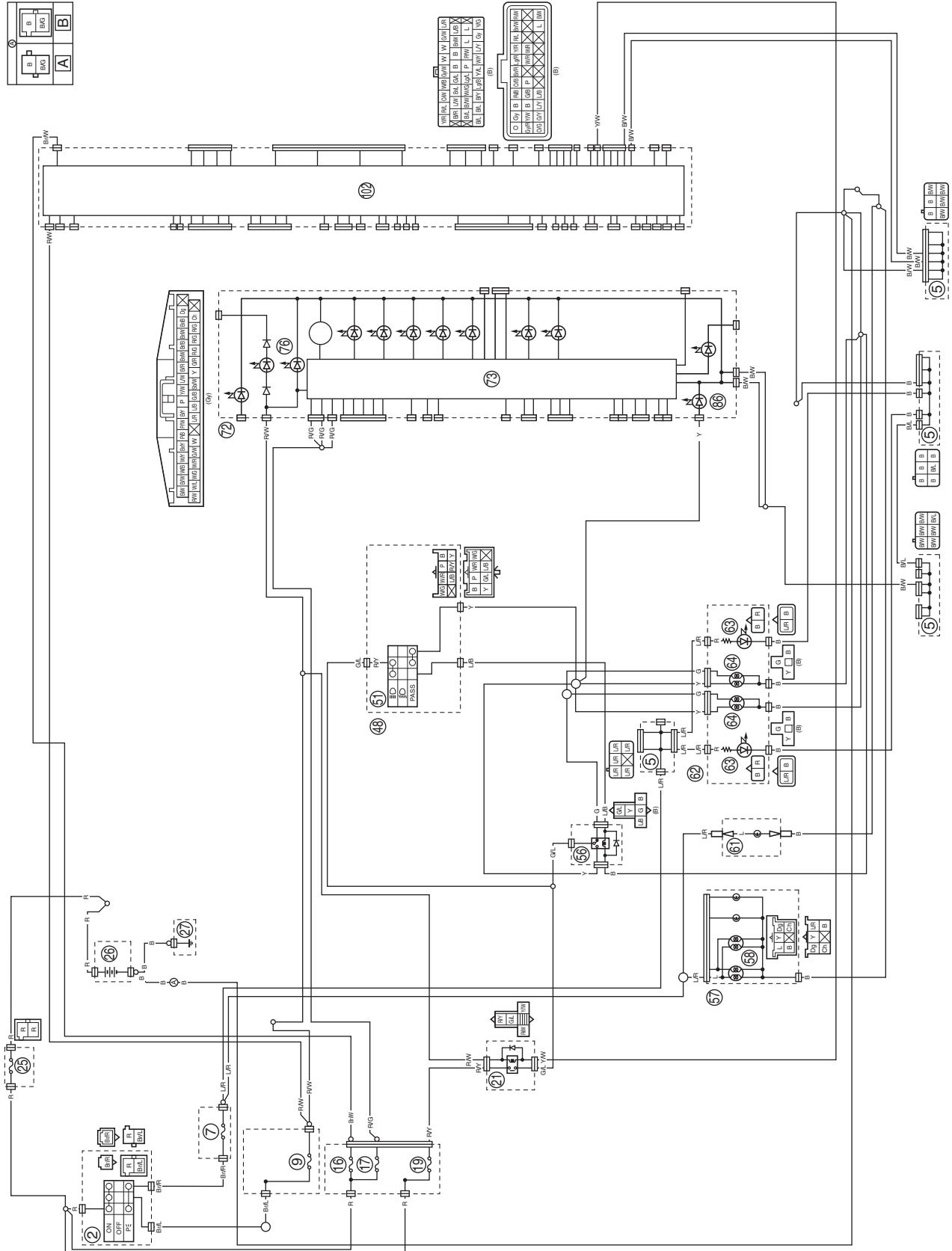
1. Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 8-173.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.	NG →	<ul style="list-style-type: none">• Clean the battery terminals.• Recharge or replace the battery.
OK ↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-184.	NG →	Replace the stator coil.
OK ↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 8-184.	NG →	Replace the rectifier/regulator.
OK ↓		
5. Check the entire charging system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-13.	NG →	Properly connect or replace the wire harness.
OK ↓		
The charging system circuit is OK.		

EAS27240

LIGHTING SYSTEM

EAS27250

CIRCUIT DIAGRAM



- 2. Main switch
- 5. Joint coupler
- 7. Hazard lighting fuse
- 9. Ignition fuse
- 16. Fuel injection system fuse
- 17. Backup fuse
- 19. Headlight fuse
- 21. Headlight relay (on/off)
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 48. Left handlebar switch
- 51. Dimmer/pass switch
- 56. Headlight relay (dimmer)
- 57. Tail/brake light assembly
- 58. Tail/brake light
- 61. License plate light
- 62. Headlight assembly
- 63. Auxiliary light
- 64. Headlight
- 72. Meter assembly
- 73. Multi-function meter
- 76. Meter light
- 86. High beam indicator light
- 102. ECU (engine control unit)
- A. Wire harness
- B. Negative battery sub-wire harness

EAS27260

TROUBLESHOOTING

Any of the following fail to light: headlights, high beam indicator light, taillight, license plate light, auxiliary lights or meter light.

TIP

• Before troubleshooting, remove the following part(s):

1. Side cowlings
2. Front cowling assembly
3. Fuel tank
4. T-bar

<p>1. Check the condition of each bulb and bulb socket. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-172.</p>	<p>NG →</p>	<p>Replace the bulb(s) and bulb socket(s).</p>
<p>OK ↓</p>		
<p>2. Check the fuses. (Main, headlight, ignition, fuel injection system, backup and hazard lighting) Refer to "CHECKING THE FUSES" on page 8-173.</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 8-174.</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 8-169.</p>	<p>NG →</p>	<p>Replace the main switch/immobilizer unit.</p>
<p>OK ↓</p>		
<p>5. Check the dimmer/pass switch. Refer to "CHECKING THE SWITCHES" on page 8-169.</p>	<p>NG →</p>	<ul style="list-style-type: none"> • The dimmer/pass switch is faulty. • Replace the left handlebar switch.
<p>OK ↓</p>		
<p>6. Check the headlight (on/off) relay. Refer to "CHECKING THE RELAYS" on page 8-177.</p>	<p>NG →</p>	<p>Replace the headlight (on/off) relay.</p>
<p>OK ↓</p>		
<p>7. Check the headlight relay (dimmer). Refer to "CHECKING THE RELAYS" on page 8-177.</p>	<p>NG →</p>	<p>Replace the headlight relay (dimmer).</p>
<p>OK ↓</p>		

LIGHTING SYSTEM

8. Check the entire lighting system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-17.

NG →

Properly connect or replace the wire harness.

OK ↓

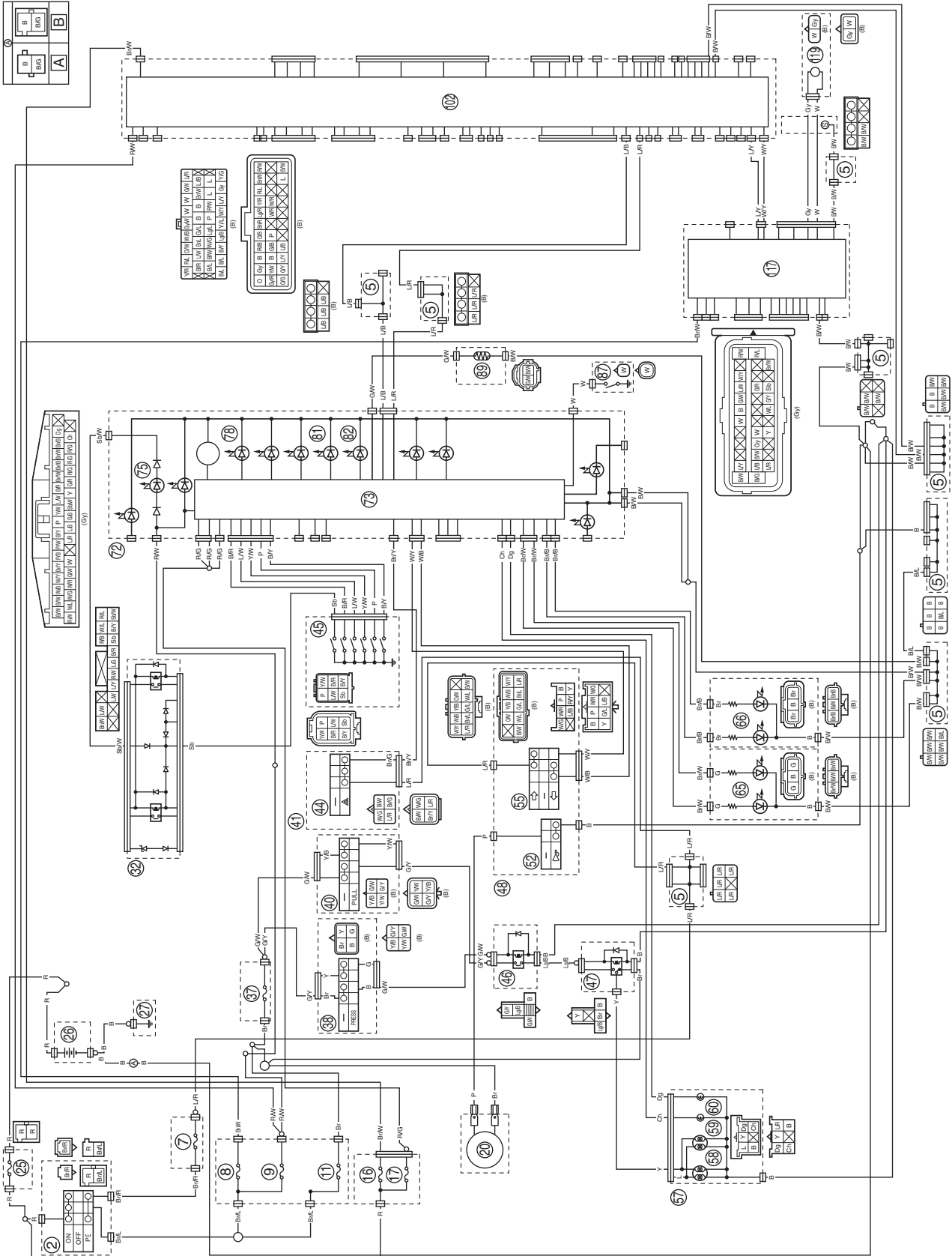
Replace the ECU, meter assembly, or headlight assembly. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.

EAS27270

SIGNALING SYSTEM

EAS27280

CIRCUIT DIAGRAM



- 2. Main switch
- 5. Joint coupler
- 7. Hazard lighting fuse
- 8. ABS ECU fuse
- 9. Ignition fuse
- 11. Signaling system fuse
- 16. Fuel injection system fuse
- 17. Backup fuse
- 20. Horn
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 32. Relay unit
- 37. Brake light fuse
- 38. Rear brake light switch
- 40. Front brake light switch
- 41. Right handlebar switch
- 44. Hazard switch
- 45. Gear position switch
- 46. Brake switch relay
- 47. Brake light relay
- 48. Left handlebar switch
- 52. Horn switch
- 55. Turn signal switch
- 57. Tail/brake light assembly
- 58. Tail/brake light
- 59. Rear left turn signal light
- 60. Rear right turn signal light
- 65. Front right turn signal light
- 66. Front left turn signal light
- 72. Meter assembly
- 73. Multi-function meter
- 75. Neutral indicator light
- 78. Oil level warning light
- 81. Left turn signal indicator light
- 82. Right turn signal indicator light
- 87. Oil level switch
- 89. Fuel sender
- 102. ECU (engine control unit)
- 117. ABS ECU (electronic control unit)
- 119. Rear wheel sensor
- A. Wire harness
- B. Negative battery sub-wire harness

EAS27290

TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or 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. Side cowlings
 2. Front cowling assembly
 3. Fuel tank
 4. T-bar
 5. Left side cover

<p>1. Check the fuses. (Main, ignition, signaling system, hazard lighting, backup, fuel injection system, brake light, and ABS ECU) Refer to "CHECKING THE FUSES" on page 8-173.</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 8-174.</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 8-169.</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" on page 8-21.</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 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 8-169.

NG →

- The horn switch is faulty.
- Replace the left handlebar switch.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the horn.

The tail/brake light fails to come on.

1. Check the tail/brake light bulbs and sockets.
Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-172.

NG →

Replace the tail/brake light bulb, socket or both.

OK ↓

2. Check the front brake light switch.
Refer to "CHECKING THE SWITCHES" on page 8-169.

NG →

Replace the front brake light switch.

OK ↓

3. Check the rear brake light switch.
Refer to "CHECKING THE SWITCHES" on page 8-169.

NG →

Replace the rear brake light switch.

OK ↓

4. Check the brake switch relay.
Refer to "CHECKING THE RELAYS" on page 8-177.

NG →

Replace the brake switch relay.

OK ↓

5. Check the brake light relay.
Refer to "CHECKING THE RELAYS" on page 8-177.

NG →

Replace the brake light relay.

OK ↓

6. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG →

Properly connect or replace the wire harness.

OK ↓

This circuit is OK.

SIGNALING SYSTEM

The turn signal light, turn signal indicator light or both fail to blink.

<p>1. Check the rear turn signal light bulbs and sockets. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-172.</p>	NG →	Replace the rear turn signal light bulb, socket or both.
OK ↓		
<p>2. Check the front turn signal light assembly(-ies). Refer to "CHECKING THE FRONT TURN SIGNAL LIGHT ASSEMBLIES" on page 8-186.</p>	NG →	Replace the front turn signal light assembly(-ies).
OK ↓		
<p>3. Check the turn signal switch. Refer to "CHECKING THE SWITCHES" on page 8-169.</p>	NG →	<ul style="list-style-type: none">• The turn signal switch is faulty.• Replace the left handlebar switch.
OK ↓		
<p>4. Check the hazard switch. Refer to "CHECKING THE SWITCHES" on page 8-169.</p>	NG →	<ul style="list-style-type: none">• The hazard switch is faulty.• Replace the right handlebar switch.
OK ↓		
<p>5. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.</p>	NG →	Properly connect or replace the wire harness.
OK ↓		
Replace the meter assembly.		

The neutral indicator light fails to come on.

<p>1. Check the gear position switch. Refer to "CHECKING THE SWITCHES" on page 8-169.</p>	NG →	Replace the gear position switch.
OK ↓		
<p>2. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-180.</p>	NG →	Replace the relay unit.
OK ↓		

SIGNALING SYSTEM

3. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the meter assembly.

The oil level warning light fails to come on.

1. Check the oil level switch.
Refer to "CHECKING THE OIL LEVEL SWITCH" on page 8-184.

NG →

Replace the oil level switch.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the meter assembly.

The fuel meter fails to come on.

1. Check the fuel sender.
Refer to "CHECKING THE FUEL SENDER" on page 8-185.

NG →

Replace the fuel pump.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the meter assembly.

The speedometer fails to operate.

1. Check the rear wheel sensor.
Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-34.

NG →

Replace the rear wheel sensor.

OK ↓

SIGNALING SYSTEM

2. Check the entire speed 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.

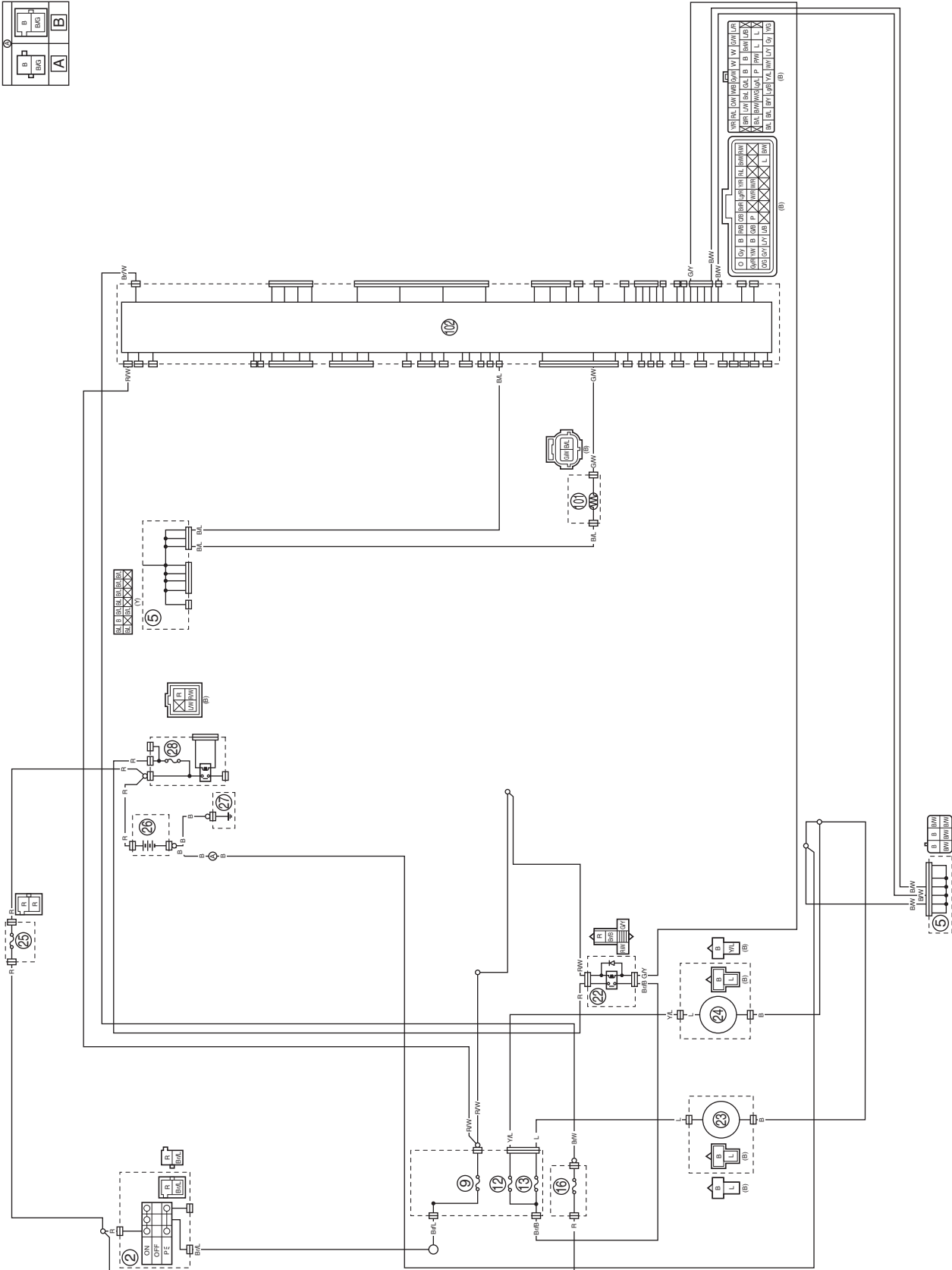
- Between rear wheel sensor coupler and ABS ECU coupler.
(white–white)
(gray–gray)
- Between ABS ECU coupler and ECU coupler.
(blue/yellow–blue/yellow)
(white/yellow–white/yellow)
- Between ECU coupler and meter assembly coupler.
(blue/black–blue/black)
(blue/red–blue/red)

EAS27300

COOLING SYSTEM

EAS27310

CIRCUIT DIAGRAM



- 2. Main switch
- 5. Joint coupler
- 9. Ignition fuse
- 12. Right radiator fan motor fuse
- 13. Left radiator fan motor fuse
- 16. Fuel injection system fuse
- 22. Radiator fan motor relay
- 23. Left radiator fan motor
- 24. Right radiator fan motor
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 28. Cooling system fuse
- 101. Coolant temperature sensor
- 102. ECU (engine control unit)
- A. Wire harness
- B. Negative battery sub-wire harness

EAS27320

TROUBLESHOOTING

The radiator fan motor fails to turn.

TIP

• Before troubleshooting, remove the following part(s):

1. Side cowlings
2. Fuel tank
3. T-bar

<p>1. Check the fuses. (Main, ignition, cooling system, fuel injection system, left radiator fan motor, and right radiator fan motor) Refer to "CHECKING THE FUSES" on page 8-173.</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 8-174.</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 8-169.</p>	<p>NG →</p>	<p>Replace the main switch/immobilizer unit.</p>
<p>OK ↓</p>		
<p>4. Check the radiator fan motors. Refer to "CHECKING THE RADIATOR FAN MOTORS" on page 8-186.</p>	<p>NG →</p>	<p>Replace the radiator fan motor(s).</p>
<p>OK ↓</p>		
<p>5. Check the radiator fan motor relay. Refer to "CHECKING THE RELAYS" on page 8-177.</p>	<p>NG →</p>	<p>Replace the radiator fan motor relay.</p>
<p>OK ↓</p>		
<p>6. Check the coolant temperature sensor. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-186.</p>	<p>NG →</p>	<p>Replace the coolant temperature sensor.</p>
<p>OK ↓</p>		

COOLING SYSTEM

7. Check the entire cooling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-29.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.

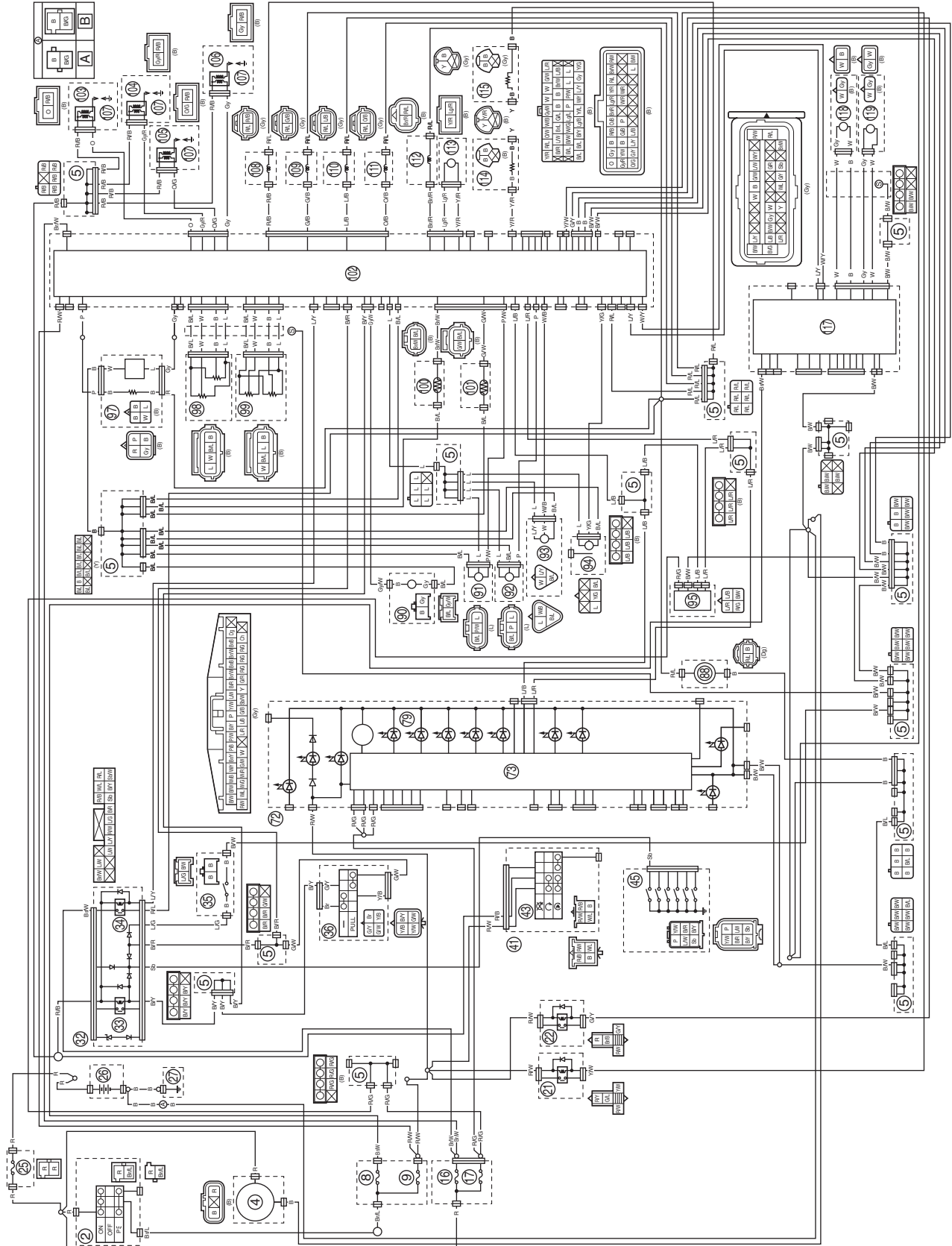
FUEL INJECTION SYSTEM

EAS27330

FUEL INJECTION SYSTEM

EAS27340

CIRCUIT DIAGRAM




FUEL INJECTION SYSTEM

- 2. Main switch
 - 4. Rectifier/regulator
 - 5. Joint coupler
 - 8. ABS ECU fuse
 - 9. Ignition fuse
 - 16. Fuel injection system fuse
 - 17. Backup fuse
 - 21. Headlight relay (on/off)
 - 22. Radiator fan motor relay
 - 25. Main fuse
 - 26. Battery
 - 27. Engine ground
 - 32. Relay unit
 - 33. Starting circuit cut-off relay
 - 34. Fuel pump relay
 - 35. Sidestand switch
 - 36. Clutch switch
 - 41. Right handlebar switch
 - 43. Start/engine stop switch
 - 45. Gear position switch
 - 72. Meter assembly
 - 73. Multi-function meter
 - 79. Engine trouble warning light
 - 88. Fuel pump
 - 90. Crankshaft position sensor
 - 91. Intake air pressure sensor
 - 92. Atmospheric pressure sensor
 - 93. Cylinder identification sensor
 - 94. Lean angle sensor
 - 95. Yamaha diagnostic tool coupler
 - 97. O₂ sensor
 - 98. Throttle position sensor
 - 99. Accelerator position sensor
 - 100. Air temperature sensor
 - 101. Coolant temperature sensor
 - 102. ECU (engine control unit)
 - 103. Ignition coil #1
 - 104. Ignition coil #2
 - 105. Ignition coil #3
 - 106. Ignition coil #4
 - 107. Spark plug
 - 108. Injector #1
 - 109. Injector #2
 - 110. Injector #3
 - 111. Injector #4
 - 112. Air induction system solenoid
 - 113. Throttle servo motor
 - 114. Left grip warmer
 - 115. Right grip warmer
 - 117. ABS ECU (electronic control unit)
 - 118. Front wheel sensor
 - 119. Rear wheel sensor
- A. Wire harness
 - B. Negative battery sub-wire harness

EAS27351

ECU SELF-DIAGNOSTIC FUNCTION

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

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes while the “” side of the start/engine stop 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 multi-function meter right display. This number remains stored in the memory of the ECU until it is deleted.


Engine trouble warning light indication and fuel injection system operation

Warning light indication	ECU operation	Fuel injection operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Can or cannot be operated depending on the fault code

* The warning light flashes when any one of the following conditions is present and the “” side of the start/engine stop switch is pushed:

11: Cylinder identification sensor	30: Lean angle sensor (latch up detected)
12: Crankshaft position sensor	41: Lean angle sensor (open or short circuit)
19: Black/red ECU lead (broken or disconnected)	50: ECU internal malfunction (memory check error)

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 “” side of the start/engine stop 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.

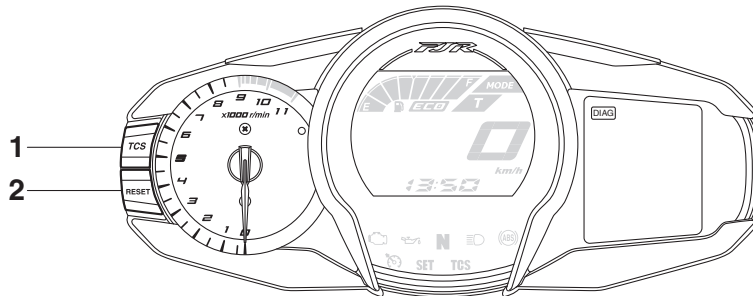
When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue operating or stop operating, depending on the conditions.

EAS30610

DIAGNOSTIC MODE

Setting the diagnostic mode

1. Turn the main switch to "OFF".
2. Disconnect the wire harness coupler from the fuel pump.
3. Simultaneously press and hold the "TCS" button "1" and "RESET" button "2", turn the main switch to "ON", and continue to press the buttons for 8 seconds or more.



TIP

All displays on the multi-function meter right display disappear and "DIAG" appears.

4. Simultaneously press the "TCS" button and "RESET" button for 2 seconds or more to set the diagnostic mode.

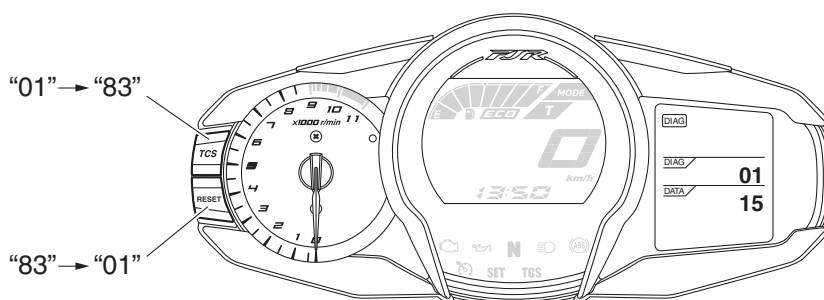
TIP

Diagnostic code number "01" appears on the multi-function meter right display.

5. Select the diagnostic code number corresponding to the fault code number by pressing the "TCS" button and "RESET" button.

TIP

- To decrease the selected diagnostic code number, press the "RESET" button. Press the "RESET" button for 1 second or more to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the "TCS" button. Press the "TCS" button for 1 second or more to automatically increase the diagnostic code numbers.



6. Shift the transmission into gear and extend the sidestand.

ECA1MC1027

NOTICE

If the "⊗" side of the start/engine stop switch is pushed without performing step 6, the starter motor gears or other parts may be damaged.

7. Check the operation of the sensor or actuator.

- Sensor operation

The data representing the operating conditions of the sensor appears on the multi-function meter right display.

- Actuator operation

To operate the actuator, set the start/engine stop switch from “” to “”.

8. Turn the main switch to “OFF” to cancel the diagnostic mode.

TIP

Information about each diagnostic code number is organized in this manual as follows:

- If a diagnostic code number has a corresponding fault code number, the information is shown in “TROUBLESHOOTING DETAILS”. (Refer to “TROUBLESHOOTING DETAILS” on page 8-40.)
- If a diagnostic code number does not have a corresponding fault code number, the information is shown in “DIAGNOSTIC CODE TABLE”. (Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.)

9. Connect the wire harness coupler to the fuel pump.

EAS1MC1036

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.



Yamaha diagnostic tool
90890-03215

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

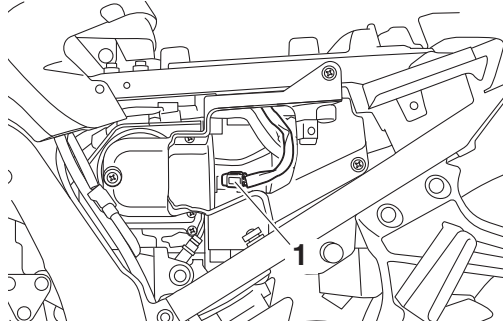
Fault diagnosis mode:	Fault codes recorded on the ECU are read, and the contents are displayed. The freeze frame data (FFD) is the operation data when a malfunction was detected. This data can be used to identify when the malfunction occurred and check the engine conditions and running conditions when it occurred.
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.

FUEL INJECTION SYSTEM

Connecting the Yamaha diagnostic tool

Remove the protective cap, and then connect the Yamaha diagnostic tool to the coupler "1".



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

EAS27462

TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the multi-function meter right 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 have been completed, reset the multi-function meter right display according to the "Confirmation of service completion".

Fault code No.:

Fault code number displayed on the multi-function meter right display when the engine failed to work normally.

Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "TROUBLESHOOTING DETAILS" on page 8-40.

Fault code No.	11		
Item	Cylinder identification sensor: no normal signals are received from the cylinder identification sensor.		
Fail-safe system	Unable to start engine		
	Able to drive vehicle		
Diagnostic code No.	—		
Meter display	—		
Procedure	—		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of cylinder identification 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 wire harness 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.

FUEL INJECTION SYSTEM


Fault code No.		11	
Item		Cylinder identification sensor: no normal signals are received from the cylinder identification sensor.	
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between cylinder identification sensor coupler and ECU coupler. white/black–white/black blue–blue Between cylinder identification 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.
4	Installed condition of cylinder identification 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 cylinder identification sensor.	Check the cylinder identification sensor. Refer to “CHECKING THE CYLINDER IDENTIFICATION SENSOR” on page 8-189. 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. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	

Fault code No.		12	
Item		Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		—	
Meter display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		12	
Item		Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	
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 wire harness 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. gray/white–gray/white 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.
4	Installed condition of crankshaft position sensor. Check for looseness or pinching. Check the gap between the crankshaft position sensor and the pickup rotor.	Improperly installed sensor → Reinstall or replace the sensor. Refer to “PICKUP ROTOR” on page 5-36.	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 8-182. 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. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	

FUEL INJECTION SYSTEM

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		
Meter display	Displays the intake air pressure.		
Procedure	Shift the transmission into gear, extend the sidestand, and then operate the throttle while pushing the “  ” side of the start/engine stop 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 wire harness 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 intake air pressure sensor coupler and ECU coupler. pink/white–pink/white Between intake air pressure 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 intake air pressure 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.

FUEL INJECTION SYSTEM

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
5	Defective intake air pressure sensor.	<p>Execute the diagnostic mode. (Code No. 03)</p> <p>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)</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 8-189.</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	Malfunction in ECU.	<p>Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.</p>	

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	
Meter display		Displays the intake air pressure.	
Procedure		Shift the transmission into gear, extend the sidestand, and then operate the throttle while pushing the "⊗" side of the start/engine stop switch. (If the display value changes, the performance is OK.)	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		14	
Item		Intake air pressure sensor: hose system malfunction (clogged or detached hose).	
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 8-189.	

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
Fail-safe system		Able/Unable to start engine	
		Able/Unable to drive vehicle	
Diagnostic code No.		01, 13	
01	Meter display	Throttle position sensor signal 1 • 12–21 (fully closed position) • 97–106 (fully open position)	
	Procedure	• Check with throttle valves fully closed. • Check with throttle valves fully open.	

FUEL INJECTION SYSTEM

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
13	Meter display	Throttle position sensor signal 2 <ul style="list-style-type: none"> • 9–23 (fully closed position) • 94–108 (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 wire harness 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. black/blue–black/blue white–white black–black blue–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 7-11.	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	Throttle position sensor resistance.	Measure the throttle position sensor resistance. black/blue–blue Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-187.	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.		15	
Item		Throttle position sensor: open or short circuit detected.	
6	Defective throttle position sensor.	<p>Check throttle position sensor signal 1. Execute the diagnostic mode. (Code No. 01) When the throttle valves are fully closed: A value of 12–21 is indicated. When throttle valves are fully open: A value of 97–106 is indicated.</p> <p>Check throttle position sensor signal 2. Execute the diagnostic mode. (Code No. 13) When the throttle valves are fully closed: A value of 9–23 is indicated. When the throttle valves are fully open: A value of 94–108 is indicated. 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. Fault code number is displayed → Go to item 7.</p>
7	Malfunction in ECU.	<p>Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.</p>	

Fault code No.		19	
Item		Sidestand switch: a break or disconnection of the black/red lead of the ECU is detected.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		20	
Meter display		<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

FUEL INJECTION SYSTEM

Fault code No.		19	
Item		Sidestand switch: a break or disconnection of the black/red lead of the ECU is detected.	
1	Connection of sidestand 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 2.
2	Connection of wire harness 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”, and then extend and retract the sidestand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	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 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between relay unit coupler and ECU coupler. black/red–black/red	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	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 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	

FUEL INJECTION SYSTEM

Fault code No.		20	
Item		Intake air pressure sensor or atmospheric pressure sensor: when the main switch is turned to “ON”, the intake air pressure sensor voltage and atmospheric pressure sensor voltage differ greatly.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		03, 02	
03	Meter display	Displays the intake air pressure.	
	Procedure	Shift the transmission into gear, extend the sidestand, and then operate the throttle while pushing the “  ” side of the start/engine stop switch. (If the display value changes, the performance is OK.)	
02	Meter display	Displays the atmospheric pressure.	
	Procedure	Compare the actually measured atmospheric pressure with the meter display value.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	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. 0 m above sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) Displayed value is incorrect → Check the intake air pressure sensor. Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 8-189.	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.		20	
Item		Intake air pressure sensor or atmospheric pressure sensor: when the main switch is turned to "ON", the intake air pressure sensor voltage and atmospheric pressure sensor voltage differ greatly.	
2	Defective atmospheric pressure sensor.	Execute the diagnostic mode. (Code No. 02) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. 0 m above sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) Displayed value is incorrect → Check the atmospheric pressure sensor. Replace if defective. Refer to "CHECKING THE ATMOSPHERIC PRESSURE SENSOR" on page 8-190.	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	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

Fault code No.		21	
Item		Coolant temperature sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		06	
Meter display		Displays the coolant temperature.	
Procedure		Compare the actually measured coolant temperature with the meter display value.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of coolant 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.

FUEL INJECTION SYSTEM

Fault code No.		21	
Item		Coolant temperature sensor: open or short circuit detected.	
2	<p>Connection of wire harness 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>Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.</p>
3	<p>Wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness. Between coolant temperature sensor coupler and ECU coupler. green/white–green/white Between coolant temperature sensor coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. 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 4.</p>
4	<p>Installed condition of coolant temperature sensor. Check for looseness or pinching.</p>	<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 5.</p>
5	<p>Defective coolant temperature sensor.</p>	<p>Execute the diagnostic mode. (Code No. 06) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature → Check the coolant temperature sensor. Replace if defective. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-186.</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	<p>Malfunction in ECU.</p>	<p>Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.</p>	

FUEL INJECTION SYSTEM

Fault code No.	22		
Item	Air temperature sensor: open or short circuit detected.		
Fail-safe system	Able to start engine		
	Able to drive vehicle		
Diagnostic code No.	05		
Meter display	Displays the air temperature.		
Procedure	Compare the actually measured air temperature with the meter display value.		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of 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 wire harness 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 air temperature sensor coupler and ECU coupler. brown/white–brown/white Between 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 4.
4	Installed condition of 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 5.

FUEL INJECTION SYSTEM

Fault code No.		22	
Item		Air temperature sensor: open or short circuit detected.	
5	Defective 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 air temperature sensor. Replace if defective. Refer to “CHECKING THE AIR TEMPERATURE SENSOR” on page 8-190.	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. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	

Fault code No.		23	
Item		Atmospheric pressure sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		02	
Meter display		Displays the atmospheric pressure.	
Procedure		Compare the actually measured atmospheric pressure with the meter display value.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of atmospheric 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 wire harness 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.		23	
Item		Atmospheric pressure sensor: open or short circuit detected.	
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between atmospheric pressure sensor coupler and ECU coupler. pink–pink Between atmospheric pressure 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 atmospheric pressure 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 atmospheric pressure sensor.	Execute the diagnostic mode. (Code No. 02) 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) Displayed value is incorrect → Check the atmospheric pressure sensor. Replace if defective. Refer to “CHECKING THE ATMOSPHERIC PRESSURE SENSOR” on page 8-190.	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. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	

FUEL INJECTION SYSTEM

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.	—		
Meter display	—		
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.
3	Connection of wire harness 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–gray pink–pink Between O ₂ sensor coupler and joint coupler. black–black red–red/blue Between joint coupler and ECU coupler. black/blue–black/blue red/blue–red/blue	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.

FUEL INJECTION SYSTEM

Fault code No.		24	
Item		O₂ sensor: no normal signals are received from the O₂ sensor.	
5	Check fuel pressure.	Refer to "CHECKING THE FUEL PRESSURE" on page 7-10.	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. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

Fault code No.		30	
Item		Latch up detected.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		08	
Meter display		Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)	
Procedure		Remove the lean angle sensor and incline it more than 65 degrees.	

Item	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.

FUEL INJECTION SYSTEM

Fault code No.		30	
Item		Latch up detected.	
3	Defective lean angle sensor.	Execute the diagnostic mode. (Code No. 08) Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-183.	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. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

Fault code No.		33	
Item		Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.	
Fail-safe system		Able to start engine (depending on the number of faulty cylinders) Able to drive vehicle (depending on the number of faulty cylinders)	
Diagnostic code No.		30	
Actuation		Actuates the cylinder-#1 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	
Procedure		Check that a spark is generated five times. • Connect an ignition checker.	

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of cylinder-#1 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 wire harness 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 cylinder-#1 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.

FUEL INJECTION SYSTEM

Fault code No.		33	
Item		Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.	
4	Installed condition of cylinder-#1 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 cylinder-#1 ignition coil.	Measure the primary coil resistance of the cylinder-#1 ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 8-181.	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. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

Fault code No.		34	
Item		Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.	
Fail-safe system		Able to start engine (depending on the number of faulty cylinders)	
		Able to drive vehicle (depending on the number of faulty cylinders)	
Diagnostic code No.		31	
Actuation		Actuates the cylinder-#2 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	
Procedure		Check that a spark is generated five times. • Connect an ignition checker.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of cylinder-#2 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.

FUEL INJECTION SYSTEM

Fault code No.		34	
Item		Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.	
2	Connection of wire harness 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 cylinder-#2 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 cylinder-#2 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 cylinder-#2 ignition coil.	Measure the primary coil resistance of the cylinder-#2 ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 8-181.	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. 31) No spark → Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

Fault code No.		35	
Item		Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.	
Fail-safe system		Able to start engine (depending on the number of faulty cylinders)	
		Able to drive vehicle (depending on the number of faulty cylinders)	
Diagnostic code No.		32	
Actuation		Actuates the cylinder-#3 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	
Procedure		Check that a spark is generated five times. • Connect an ignition checker.	

FUEL INJECTION SYSTEM

Fault code No.		35	
Item		Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of cylinder-#3 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 wire harness 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 cylinder-#3 ignition coil coupler and ECU coupler. orange/green–orange/green	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 cylinder-#3 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 cylinder-#3 ignition coil.	Measure the primary coil resistance of the cylinder-#3 ignition coil. Replace if out of specification. Refer to “CHECKING THE IGNITION COILS” on page 8-181.	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. 32) No spark → Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	

FUEL INJECTION SYSTEM

Fault code No.	36		
Item	Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.		
Fail-safe system	Able to start engine (depending on the number of faulty cylinders)		
	Able to drive vehicle (depending on the number of faulty cylinders)		
Diagnostic code No.	33		
Actuation	Actuates the cylinder-#4 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.		
Procedure	Check that a spark is generated five times. • Connect an ignition checker.		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of cylinder-#4 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 wire harness 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 cylinder-#4 ignition coil coupler and ECU coupler. gray-gray	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 cylinder-#4 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 cylinder-#4 ignition coil.	Measure the primary coil resistance of the cylinder-#4 ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 8-181.	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.		36	
Item		Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.	
6	Malfunction in ECU.	Execute the diagnostic mode. (Code No. 33) No spark → Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	
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, 38, 39	
36	Actuation	Actuates injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.	
	Procedure	Check that injector #1 is actuated five times by listening for the operating sound.	
37	Actuation	Actuates injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.	
	Procedure	Check that injector #2 is actuated five times by listening for the operating sound.	
38	Actuation	Actuates injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.	
	Procedure	Check that injector #3 is actuated five times by listening for the operating sound.	
39	Actuation	Actuates injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.	
	Procedure	Check that injector #4 is actuated five times by listening for the operating sound.	
Item	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, 38, 39) 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 8-191.	—

FUEL INJECTION SYSTEM

Fault code No.		39	
Item		Injector: open or short circuit detected.	
2	<p>Connection of injector #1, #2, #3, and/or injector #4 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>Execute the diagnostic mode. (Code Nos. 36, 37, 38, 39)</p> <p>No operating sound → Go to item 3.</p> <p>Operating sound → Go to item 7.</p>
3	<p>Defective injector #1, #2, #3, and/or injector #4.</p>	<p>Measure the injector resistance.</p> <p>Replace if out of specification.</p> <p>Refer to "CHECKING THE FUEL INJECTORS" on page 8-191.</p>	<p>Execute the diagnostic mode. (Code Nos. 36, 37, 38, 39)</p> <p>No operating sound → Go to item 4.</p> <p>Operating sound → Go to item 7.</p>
4	<p>Connection of wire harness 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>Execute the diagnostic mode. (Code Nos. 36, 37, 38, 39)</p> <p>No operating sound → Go to item 5.</p> <p>Operating sound → Go to item 7.</p>
5	<p>Wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness.</p> <p>Between injector coupler and ECU coupler.</p> <p>Injector #1 red/black–red/black</p> <p>Injector #2 green/black–green/black</p> <p>Injector #3 blue/black–blue/black</p> <p>Injector #4 orange/black–orange/black</p> <p>Between injector coupler and joint coupler.</p> <p>red/blue–red/blue</p> <p>Between joint coupler and ECU coupler.</p> <p>red/blue–red/blue</p>	<p>Execute the diagnostic mode. (Code Nos. 36, 37, 38, 39)</p> <p>No operating sound → Go to item 6.</p> <p>Operating sound → Go to item 7.</p>
6	<p>Malfunction in ECU.</p>	<p>Replace the ECU.</p> <p>Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.</p>	
7	<p>Delete the fault code.</p>		<p>Start the engine and let it idle for approximately 5 seconds.</p> <p>Check that the fault code number is not displayed.</p>

FUEL INJECTION SYSTEM

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		
Meter display	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 65 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 wire harness 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) Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-183.	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.

FUEL INJECTION SYSTEM

Fault code No.		41	
Item		Lean angle sensor: open or short circuit detected.	
5	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

Fault code No.		42	
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	
Meter display		Rear wheel 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 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.

FUEL INJECTION SYSTEM

Fault code No.		42	
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.	
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 wire harness 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.	Open or short circuit → Replace the wire harness. Between rear wheel sensor coupler and ABS ECU coupler. gray–gray white–white Between ABS ECU coupler and ECU coupler. white/yellow–white/yellow	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.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	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.

FUEL INJECTION SYSTEM

Fault code No.		42	
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.	
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). The fault code can also be deleted by activating the diagnostic mode and selecting diagnostic code number "63".

Fault code No.		42	
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	
Meter display		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
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 rear wheel sensor. Incorrect indication → Go to item 2. Incorrect indication → Go to item 2 in section C for the clutch switch.

FUEL INJECTION SYSTEM

Fault code No.		42	
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 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 clutch lever is released: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 3.
3	Connection of wire harness 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 clutch lever is released: "OFF" When the clutch lever is squeezed: "ON" 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 ECU coupler and joint coupler. black/yellow–black/yellow Between joint coupler and relay unit coupler. black/yellow–black/yellow Between relay unit coupler and gear position switch coupler. sky blue–sky blue	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released: "OFF" When the clutch lever is squeezed: "ON" 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 8-180.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released: "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	
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	Defective gear position switch (neutral circuit).	Check the gear position switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 7.
7	Faulty shift drum (neutral detection area).	Malfunction → Replace the shift drum. Refer to "TRANSMISSION" on page 5-97.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released: "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. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	
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). The fault code can also be delete by activating the diagnostic mode and selecting diagnostic code number "63".

Fault code No.		42	
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		

FUEL INJECTION SYSTEM

Fault code No.		42	
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.	
Meter display		Clutch switch • “ON” (when the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted) • “OFF” (when the clutch lever is squeezed with the transmission in gear and when the sidestand is extended)	
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.	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 in section A for the rear wheel sensor. Incorrect indication → Go to item 2 in section B for the neutral switch. Incorrect indication → Go to item 2.
2	Clutch lever adjustment.	Refer to “ADJUSTING THE CLUTCH LEVER” on page 3-12.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released: “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 clutch lever is released: “OFF” When the clutch lever is squeezed: “ON” Correct indication → Go to item 9. Incorrect indication → Go to item 4.

FUEL INJECTION SYSTEM

Fault code No.		42	
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	Connection of wire harness 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 clutch lever is released: "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 ECU coupler and joint coupler. black/yellow–black/yellow Between joint coupler and clutch switch coupler. black/yellow–black/yellow Between clutch switch coupler and joint coupler. green/white–green/white Between joint coupler and relay unit coupler. black/red–black/red	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 6.
6	Defective relay unit.	Check the relay unit. Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-180.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released: "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 8-169.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released: "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. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

FUEL INJECTION SYSTEM

Fault code No.		42	
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). The fault code can also be delete by activating the diagnostic mode and selecting diagnostic code number "63".

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	
09	Meter display	Fuel system voltage (battery voltage) Approximately 12.0	
	Procedure	Set the start/engine stop switch to "○", and then compare the actually measured battery voltage with the meter display value. (If the actually measured battery voltage is low, recharge the battery.)	
50	Actuation	Actuates the relay unit five times at one-second intervals. Illuminates the engine trouble warning light.	
	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 30 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.

FUEL INJECTION SYSTEM

Fault code No.		43	
Item		Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	
2	<p>Connection of wire harness 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>Start the engine and let it idle for approximately 30 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.</p>
3	<p>Wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness. Between relay unit coupler and joint coupler. red/blue–red/blue Between joint coupler and ECU coupler. red/blue–red/blue Between relay unit coupler and fuel injection system fuse. brown/white–brown/white Between fuel injection system fuse and main switch coupler. red–red Between main switch coupler and main fuse coupler. red–red Between main fuse coupler and battery terminal. red–red</p>	<p>Start the engine and let it idle for approximately 30 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.</p>
4	<p>Defective relay unit.</p>	<p>Execute the diagnostic mode. (Code No. 50) No operating sound → Replace the relay unit.</p>	<p>Start the engine and let it idle for approximately 30 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.</p>
5	<p>Defective relay unit.</p>	<p>Execute the diagnostic mode. (Code No. 09) Fuel system voltage is below 3 V → Replace the relay unit.</p>	<p>Start the engine and let it idle for approximately 30 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.</p>
6	<p>Malfunction in ECU.</p>	<p>Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.</p>	

FUEL INJECTION SYSTEM

Fault code No.	44		
Item	EEPROM fault code number: an error is detected while reading or writing on EEPROM.		
Fail-safe system	Able/Unable to start engine		
	Able/Unable to drive vehicle		
Diagnostic code No.	60		
Meter display	EEPROM fault code display • 00 (no history) • 01–04: Cylinder fault code number (history exists) If more than one cylinder is defective, the display switches every two seconds to show the cylinder fault code numbers of all defective cylinders in a repeating cycle. • 17: Data error for ISC (idle speed control) learning values (history exists)		
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) 00: Go to item 7. 01: Go to item 2. 02: Go to item 3. 03: Go to item 4. 04: Go to item 5. 17: Go to item 6.	—
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 3-10. After this adjustment is made, the memory is not recovered when the main switch is turned to “OFF”. → Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	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 7.

FUEL INJECTION SYSTEM

Fault code No.	44		
Item	EEPROM fault code number: an error is detected while reading or writing on EEPROM.		
3	<p>“02” is indicated in diagnostic mode (code No. 60). EEPROM data error for adjustment of CO concentration of cylinder #2.</p>	<p>Change the CO concentration of cylinder #2, and rewrite in EEPROM. Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 3-10. After this adjustment is made, the memory is not recovered when the main switch is turned to “OFF”. → Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.</p>	<p>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 7.</p>
4	<p>“03” is indicated in diagnostic mode (code No. 60). EEPROM data error for adjustment of CO concentration of cylinder #3.</p>	<p>Change the CO concentration of cylinder #3, and rewrite in EEPROM. Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 3-10. After this adjustment is made, the memory is not recovered when the main switch is turned to “OFF”. → Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.</p>	<p>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 7.</p>
5	<p>“04” is indicated in diagnostic mode (code No. 60). EEPROM data error for adjustment of CO concentration of cylinder #4.</p>	<p>Change the CO concentration of cylinder #4, and rewrite in EEPROM. Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 3-10. After this adjustment is made, the memory is not recovered when the main switch is turned to “OFF”. → Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.</p>	<p>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 7.</p>
6	<p>“17” is indicated in diagnostic mode (code No. 60). EEPROM data error for ISC (idle speed control) learning values.</p>	<p>Turn the main switch to “OFF”.</p>	<p>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 7.</p>

FUEL INJECTION SYSTEM

Fault code No.		44	
Item		EEPROM fault code number: an error is detected while reading or writing on EEPROM.	
7	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

Fault code No.		46	
Item		Charging voltage is abnormal.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Meter display		—	
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 8-13. 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 memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the multi-function meter right display.)	
Fail-safe system		Able/Unable to start engine	
		Able/Unable to drive vehicle	
Diagnostic code No.		—	
Meter display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174. TIP _____ Do not perform this procedure with the main switch turned to "ON". _____	Turn the main switch to "ON". Check that the fault code number is not displayed.

FUEL INJECTION SYSTEM

Fault code No.		59	
Item		Accelerator position sensor: open or short circuit detected.	
Fail-safe system		Able/Unable to start engine	
		Able/Unable to drive vehicle	
Diagnostic code No.		14, 15	
14	Meter display	Accelerator position sensor signal 1 <ul style="list-style-type: none"> • 12–22 (fully closed position) • 97–107 (fully open position) 	
	Procedure	<ul style="list-style-type: none"> • Check with throttle grip in fully closed position. • Check with throttle grip in fully open position. 	
15	Meter display	Accelerator position sensor signal 2 <ul style="list-style-type: none"> • 10–24 (fully closed position) • 97–109 (fully open position) 	
	Procedure	<ul style="list-style-type: none"> • Check with throttle grip in fully closed position. • Check with throttle grip in fully open position. 	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of accelerator 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 wire harness 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 accelerator position sensor coupler and ECU coupler. black/blue–black/blue white–white black–black blue–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 accelerator position sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or adjust the sensor. Refer to “ADJUSTING THE ACCELERATOR POSITION SENSOR” on page 7-11.	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.		59	
Item		Accelerator position sensor: open or short circuit detected.	
5	Accelerator position sensor resistance.	Measure the accelerator position sensor resistance. black/blue–blue Refer to “CHECKING THE ACCELERATOR POSITION SENSOR” on page 8-188.	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	Defective accelerator position sensor.	Check accelerator position sensor signal 1. Execute the diagnostic mode. (Code No. 14) When the throttle grip is fully closed: A value of 12–22 is indicated. When the throttle grip is fully open: A value of 97–107 is indicated. Check accelerator position sensor signal 2. Execute the diagnostic mode. (Code No. 15) When the throttle grip is fully closed: A value of 10–24 is indicated. When the throttle grip is fully open: A value of 95–109 is indicated. An indicated value is out of the specified range → Replace the accelerator position sensor.	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. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	

Fault code No.		60	
Item		YCC-T drive system: malfunction detected.	
Fail-safe system		Able/Unable to start engine	
		Able/Unable to drive vehicle	
Diagnostic code No.		—	
Meter display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		60	
Item		YCC-T drive system: malfunction detected.	
1	Connection of throttle servo motor 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 wire harness ECU 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	Check the electronic throttle valve fuse.	Abnormality → Replace the electronic throttle valve fuse.	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. light green–light green yellow/red–yellow/red	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 throttle servo motor.	Check the throttle servo motor. Replace the throttle bodies if defective. Refer to "CHECKING THE THROTTLE SERVO MOTOR" on page 8-188.	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	Defective throttle bodies.	Check the throttle bodies. Replace if defective. Refer to "CHECKING THE THROTTLE SERVO MOTOR" on page 8-188.	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. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

Fault code No.		69	
Item		Front wheel sensor: no normal signals are received from the front wheel sensor.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		16	

FUEL INJECTION SYSTEM

Fault code No.	69		
Item	Front wheel sensor: no normal signals are received from the front wheel sensor.		
Meter display	Front wheel speed pulse 0-999		
Procedure	Check that the number increases when the front 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.	If the ABS warning light is on, refer to "BASIC INSTRUCTIONS FOR TROUBLESHOOTING" on page 8-132. If the ABS warning light is off, perform the following procedure. Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and delete the fault code. Value does not increase → Go to item 2.	—
2	Connection of front 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. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 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. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and delete the fault code. Value does not increase → Go to item 4.

FUEL INJECTION SYSTEM

Fault code No.		69	
Item		Front wheel sensor: no normal signals are received from the front wheel sensor.	
4	Connection of wire harness 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. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and delete the fault code. Value does not increase → Go to item 5.
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between front wheel sensor coupler and ABS ECU coupler. black–black white–white Between ABS ECU coupler and ECU coupler. blue/yellow–blue/yellow	Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and delete the fault code. Value does not increase → Go to item 6.
6	Defective front wheel sensor.	Improperly installed sensor → Reinstall or replace the sensor.	Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and delete the fault code. Value does not increase → Go to item 7.
7	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and delete the fault code. Value does not increase → Go to item 8.
8	Malfunction in ABS ECU.	Replace the ABS ECU.	Go to item 9.

FUEL INJECTION SYSTEM

Fault code No.		69	
Item		Front wheel sensor: no normal signals are received from the front wheel sensor.	
9	Delete the fault code.		Turn the main switch to "ON", and then rotate the front wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (19 mph). The fault code can also be deleted by activating the diagnostic mode and selecting diagnostic code number "63".

Fault code No.		89 (Yamaha diagnostic tool) Err (multi-function meter center display)	
Item		Multi-function meter: 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.		—	
Meter display		—	
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 wire harness 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. blue/black–blue/black blue/red–blue/red	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.		89 (Yamaha diagnostic tool) Err (multi-function meter center display)	
Item		Multi-function meter: signals cannot be transmitted between the ECU and the multi-function 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. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

FUEL INJECTION SYSTEM

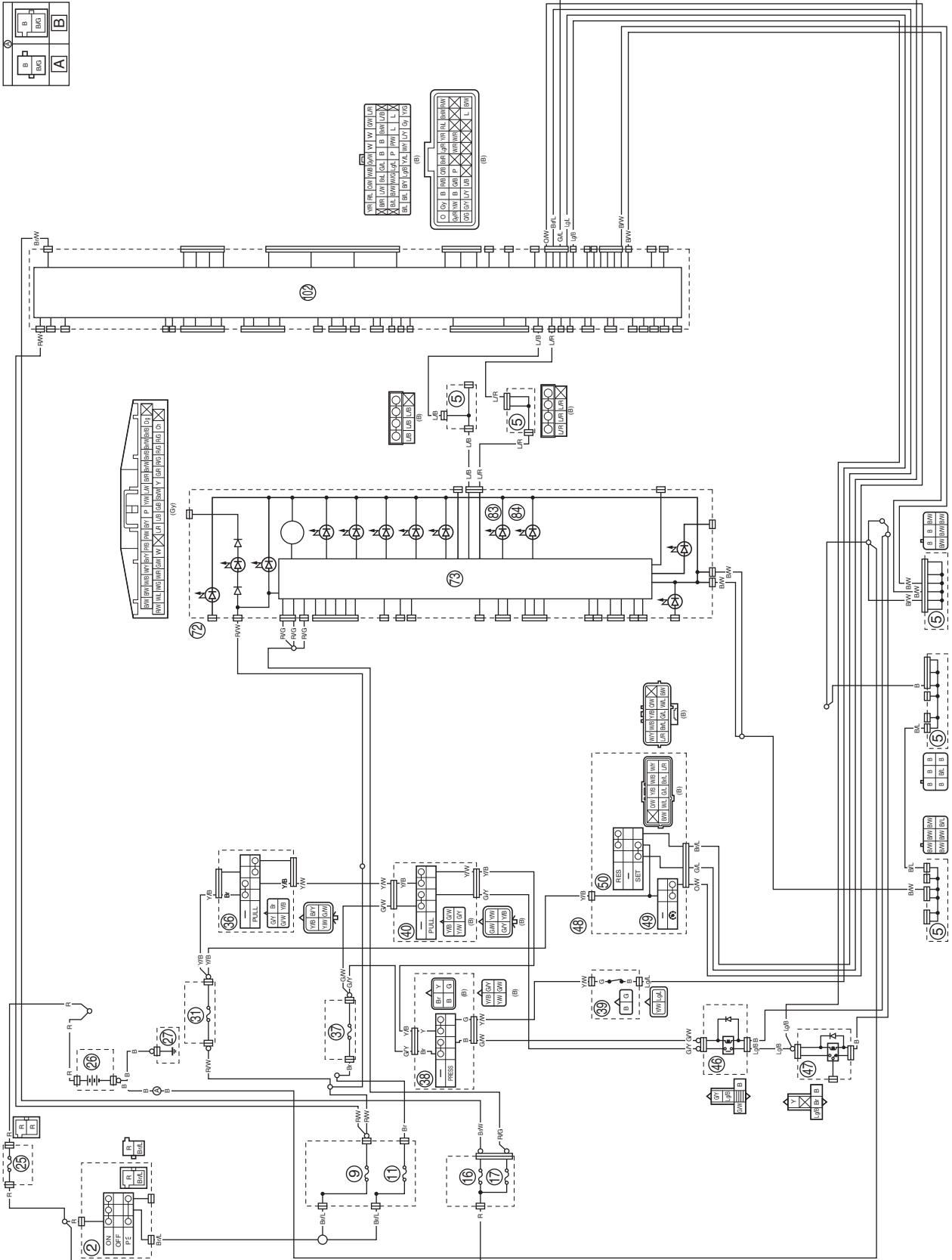
CRUISE CONTROL SYSTEM

EAS1MC1010

CRUISE CONTROL SYSTEM

EAS1MC1011

CIRCUIT DIAGRAM



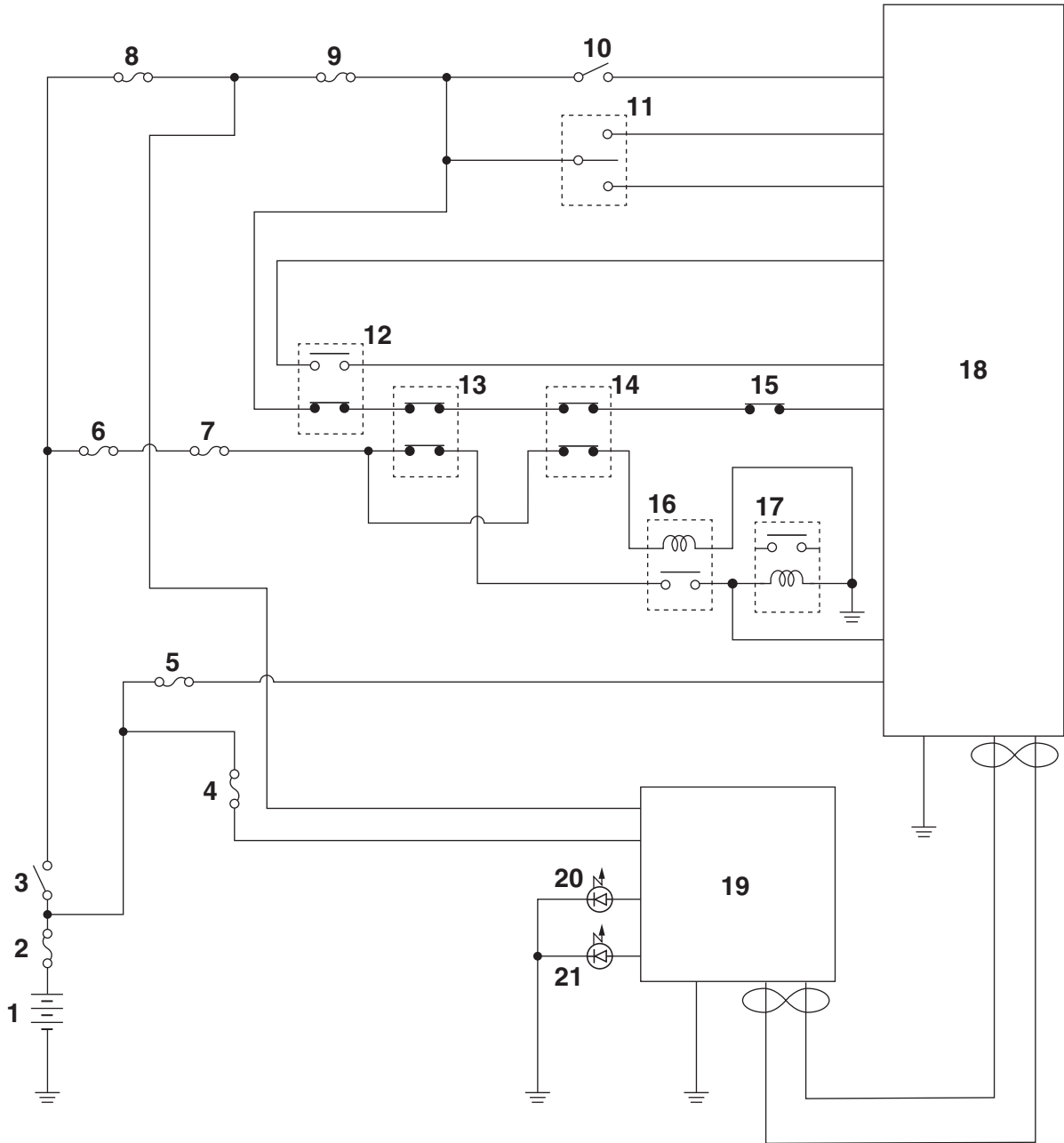
CRUISE CONTROL SYSTEM

- 2. Main switch
- 5. Joint coupler
- 9. Ignition fuse
- 11. Signaling system fuse
- 16. Fuel injection system fuse
- 17. Backup fuse
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 31. Cruise control system fuse
- 36. Clutch switch
- 37. Brake light fuse
- 38. Rear brake light switch
- 39. Grip cancel switch
- 40. Front brake light switch
- 46. Brake switch relay
- 47. Brake light relay
- 48. Left handlebar switch
- 49. Cruise control power switch
- 50. Cruise control setting switch
- 72. Meter assembly
- 73. Multi-function meter
- 83. Cruise control system indicator light
- 84. Cruise control setting indicator light
- 102. ECU (engine control unit)
- A. Wire harness
- B. Negative battery sub-wire harness

CRUISE CONTROL SYSTEM

EAS1MC1012

CRUISE CONTROL CIRCUIT OPERATION



CRUISE CONTROL SYSTEM

1. Battery
2. Main fuse
3. Main switch
4. Backup fuse
5. Fuel injection system fuse
6. Signaling system fuse
7. Brake light fuse
8. Ignition fuse
9. Cruise control system fuse
10. Cruise control power switch
11. Cruise control setting switch
12. Clutch switch
13. Front brake light switch
14. Rear brake light switch
15. Grip cancel switch
16. Brake switch relay
17. Brake light relay
18. ECU (engine control unit)
19. Multi-function meter
20. Cruise control system indicator light
21. Cruise control setting indicator light

CRUISE CONTROL SYSTEM

EAS1MC1014

BASIC INSTRUCTIONS FOR TROUBLESHOOTING

EWA1MC1001

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 cruise control system indicator light.

[B] Use the diagnostic mode or Yamaha diagnostic tool to determine the cause of the malfunction for the stored fault code from the condition and place where the malfunction occurred.

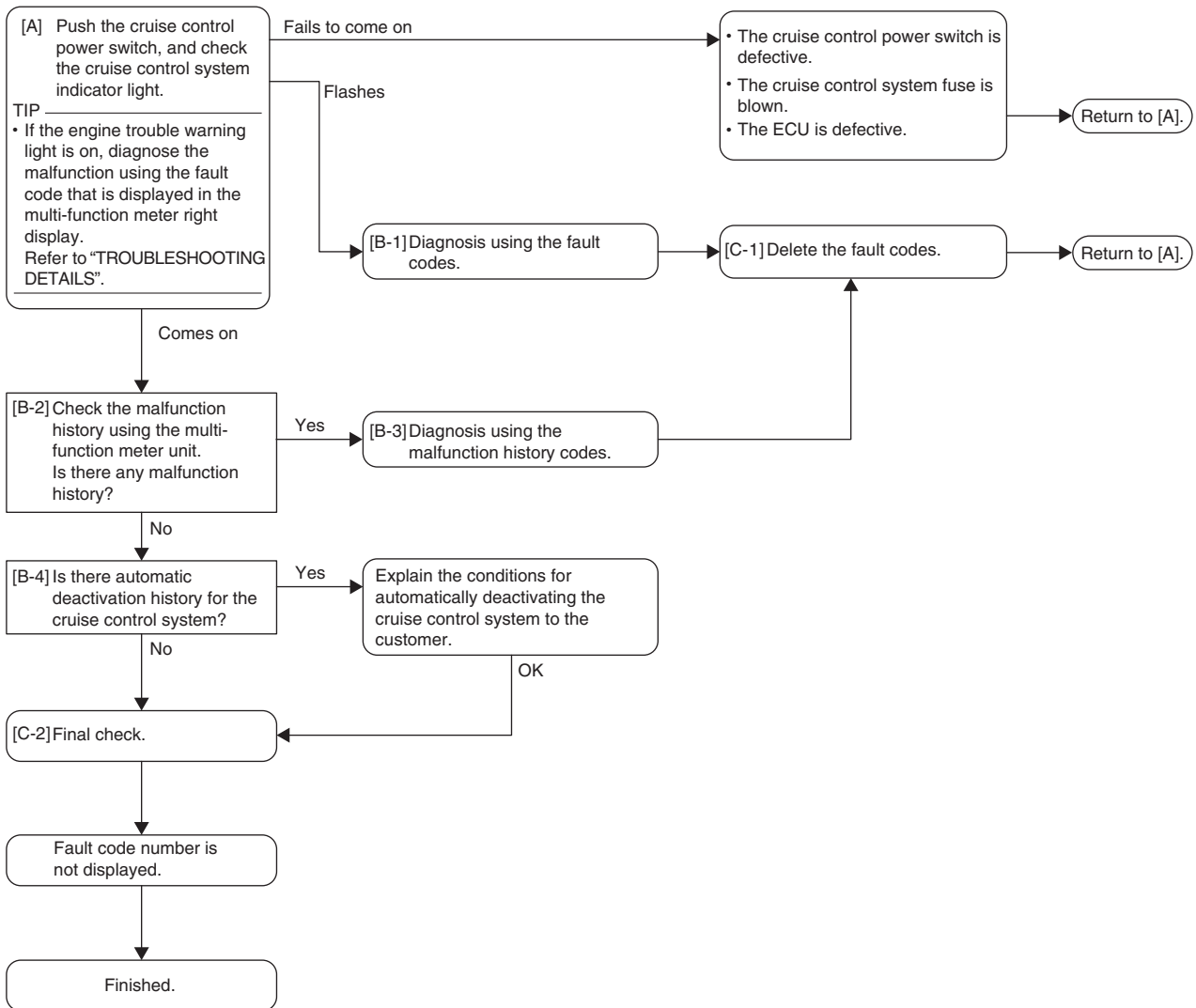
[C] Servicing the cruise control system.

Execute the final check after disassembly and assembly.

CRUISE CONTROL SYSTEM

EAS1MC1015

BASIC PROCESS FOR TROUBLESHOOTING



CRUISE CONTROL SYSTEM

EWA1MC1005



When maintenance or checks have been performed on components related to the cruise control system, be sure to perform a final check before delivering the vehicle to the customer. (Refer to “[C-2] FINAL CHECK” on page 8-101.)

EAS1MC1016

[A] CHECKING THE CRUISE CONTROL SYSTEM INDICATOR LIGHT

Turn the main switch to “ON”, and then push the cruise control power switch.

1. The cruise control system indicator light does not come on.
 - Check the control power switch for continuity. Refer to “CHECKING THE SWITCHES” on page 8-169. If there is no continuity, replace the left handlebar switch.
 - Check the fuse for continuity. Refer to “CHECKING THE FUSES” on page 8-173. If the cruise control system fuse is blown, replace the fuse.
 - Check for continuity between the orange/white terminal of the left handlebar switch coupler and orange/white terminal of the ECU (engine control unit) coupler. If there is no continuity, the wire harness is defective. Replace the wire harness.
2. The cruise control system indicator light flashes. [B-1]
3. The cruise control system indicator light come on. [B-2]

EAS1MC1017

[B-1] DIAGNOSIS USING THE FAULT CODES

1. Information for the fault codes from the cruise control system is contained in the following table. Refer to this table or troubleshooting.

Fault code table

Fault code No.	Symptom	Check point
90	No normal signals from the switch are received by the ECU.	<ul style="list-style-type: none"> • Wire harness (ECU coupler and front or rear brake light switch coupler) • Signaling system and brake light fuses • Connection of the brake switch relay coupler • Connection of the main switch coupler • Front brake light switch • Rear brake light switch
91	No normal signals from the switch are received by the ECU.	<ul style="list-style-type: none"> • Wire harness (ECU coupler and left handlebar switch coupler) • Signaling system fuse • Connection of the main switch coupler • Cruise control setting switch

Fault code No.	90	
Item	A	Front brake light switch: open or short circuit is detected.
	B	Rear brake light switch: open or short circuit is detected.
Fail-safe system	Able to start engine	
	Able to drive vehicle	
Diagnostic code No.	82, 83	
Meter display	“ON” (when the brakes are applied) “OFF” (when the brakes are not applied)	
Procedure	Operate the brake lever.	

CRUISE CONTROL SYSTEM

Fault code No.		90	
Item		A	Front brake light switch: open or short circuit is detected.
		B	Rear brake light switch: open or short circuit is detected.
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction.	Execute the diagnostic mode. (Code 82, 83) When the front brake is applied: "ON" When the front brake is not applied: "OFF" When the rear brake is applied: "ON" When the rear brake is not applied: "OFF"	Malfunction → Go to item 2. Malfunction → Go to item 2 in section B for the rear brake light switch.
2	Connection of front brake light 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". Operate the brake lever. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Connection of brake switch relay 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". Operate the brake lever. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	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". Operate the brake lever. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Connection of wire harness 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". Operate the brake lever. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.

CRUISE CONTROL SYSTEM

Fault code No.		90	
Item		A	Front brake light switch: open or short circuit is detected.
		B	Rear brake light switch: open or short circuit is detected.
6	Check the fuse. (signaling system fuse, brake light fuse)	Abnormality → Replace the fuse. (signaling system fuse, brake light fuse)	Turn the main switch to "ON". Operate the brake lever. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.
7	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between battery and main switch coupler. red-red Between main switch coupler and fuse box 1 (signaling system fuse). brown/blue-brown/blue Between fuse box 1 and brake light fuse. brown-brown Between brake light fuse and front brake light switch coupler. green/white-green/white Between front brake light switch coupler and brake switch relay coupler. green/yellow-green/yellow Between brake switch relay coupler and ECU coupler. light green/black-light green/black	Turn the main switch to "ON". Operate the brake lever. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 8.
8	Defective front brake light switch.	Replace the front brake light switch.	Turn the main switch to "ON". Operate the brake lever. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 9.
9	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

Fault code No.		90	
Item		A	Front brake light switch: open or short circuit is detected.
		B	Rear brake light switch: open or short circuit is detected.
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		82, 83	

CRUISE CONTROL SYSTEM

Fault code No.		90	
Item		A	Front brake light switch: open or short circuit is detected.
		B	Rear brake light switch: open or short circuit is detected.
Meter display		"ON" (when the brakes are applied) "OFF" (when the brakes are not applied)	
Procedure		Operate the brake pedal.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction.	Execute the diagnostic mode. (Code 82, 83) When the front brake is applied: "ON" When the front brake is not applied: "OFF" When the rear brake is applied: "ON" When the rear brake is not applied: "OFF"	Malfunction → Go to item 2 in section A for the front brake light switch. Malfunction → Go to item 2.
2	Connection of rear brake light 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". Operate the brake pedal. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Connection of brake switch relay 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". Operate the brake pedal. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	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". Operate the brake pedal. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Connection of wire harness 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". Operate the brake pedal. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.

CRUISE CONTROL SYSTEM

Fault code No.		90	
Item		A	Front brake light switch: open or short circuit is detected.
		B	Rear brake light switch: open or short circuit is detected.
6	Check the fuse. (signaling system fuse, brake light fuse)	Abnormality → Replace the fuse. (signaling system fuse, brake light fuse)	Turn the main switch to "ON". Operate the brake pedal. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.
7	Wire harness continuity.	<p>Open or short circuit → Replace the wire harness.</p> <p>Between battery and main switch coupler. red-red</p> <p>Between main switch coupler and fuse box 1 (signaling system fuse). brown/blue–brown/blue</p> <p>Between fuse box 1 and brake light fuse. brown–brown</p> <p>Between brake light fuse and rear brake light switch coupler. green/yellow–green/yellow</p> <p>Between rear brake light switch coupler and brake switch relay coupler. green/white–green/white</p> <p>Between brake switch relay coupler and joint coupler. black–black</p> <p>Between joint coupler and negative battery sub-wire harness coupler. black–black</p> <p>Between negative battery sub-wire harness coupler and engine ground. black–black</p>	Turn the main switch to "ON". Operate the brake pedal. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 8.
8	Defective rear brake light switch.	Replace the rear brake light switch.	Turn the main switch to "ON". Operate the brake pedal. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 9.
9	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.	

CRUISE CONTROL SYSTEM

Fault code No.	91		
Item	A	Cruise control setting switch “RES+”: open or short circuit is detected.	
	B	Cruise control setting switch “SET-”: open or short circuit is detected.	
Fail-safe system	Able to start engine		
	Able to drive vehicle		
Diagnostic code No.	80, 81		
Meter display	“ON” (when the switch is pushed) “OFF” (when the switch is released)		
Procedure	Push and release the “RES+” side of the cruise control setting switch.		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction.	Execute the diagnostic mode. (Code 80) When the cruise control setting switch “RES+” is pushed: “ON” When the cruise control setting switch is released: “OFF” Execute the diagnostic mode. (Code 81) When the cruise control setting switch “SET-” is pushed: “ON” When the cruise control setting switch is released: “OFF”	Malfunction → Go to item 2. Malfunction → Go to item 2 in section B for the cruise control setting switch “SET-”.
2	Connection of left handlebar 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”. Push and release the “RES+” side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
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”. Push and release the “RES+” side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.

CRUISE CONTROL SYSTEM

Fault code No.		91	
Item	A	Cruise control setting switch “RES+”: open or short circuit is detected.	
	B	Cruise control setting switch “SET-”: 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.	Turn the main switch to “ON”. Push and release the “RES+” side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Check the fuse. (cruise control system fuse)	Abnormality → Replace the fuse. (cruise control system fuse)	Turn the main switch to “ON”. Push and release the “RES+” side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between battery and main fuse coupler. red–red Between main fuse coupler and main switch coupler. red–red Between main switch coupler and fuse box 1 (ignition fuse). brown/blue–brown/blue Between fuse box 1 (ignition fuse) and cruise control system fuse. red/white–red/white Between cruise control system fuse and left handlebar switch coupler. yellow/black–yellow/black Between left handlebar switch coupler and ECU coupler. brown/blue–brown/blue	Turn the main switch to “ON”. Push and release the “RES+” side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.
7	Defective cruise control switch.	Replace the left handlebar switch.	Turn the main switch to “ON”. Push the “RES+” side and “SET-” side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 8.

CRUISE CONTROL SYSTEM

Fault code No.	91		
Item	A	Cruise control setting switch “RES+”: open or short circuit is detected.	
	B	Cruise control setting switch “SET-”: open or short circuit is detected.	
8	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	

Fault code No.	91		
Item	A	Cruise control setting switch “RES+”: open or short circuit is detected.	
	B	Cruise control setting switch “SET-”: open or short circuit is detected.	
Fail-safe system	Able to start engine		
	Able to drive vehicle		
Diagnostic code No.	80, 81		
Meter display	“ON” (when the switch is pushed) “OFF” (when the switch is released)		
Procedure	Push the “SET-” side of the cruise control setting switch.		

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction.	Execute the diagnostic mode. (Code 80) When the cruise control setting switch “RES+” is pushed: “ON” When the cruise control setting switch is released: “OFF” Execute the diagnostic mode. (Code 81) When the cruise control setting switch “SET-” is pushed: “ON” When the cruise control setting switch is released: “OFF”	Malfunction → Go to item 2 in section A for the cruise control setting switch “RES+”. Malfunction → Go to item 2.
2	Connection of left handlebar 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”. Push and “SET-” side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.

CRUISE CONTROL SYSTEM

Fault code No.		91	
Item	A	Cruise control setting switch "RES+": open or short circuit is detected.	
	B	Cruise control setting switch "SET-": open or short circuit 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". Push and "SET-" side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → 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.	Turn the main switch to "ON". Push and "SET-" side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Check the fuse. (cruise control system fuse)	Abnormality → Replace the fuse. (cruise control system fuse)	Turn the main switch to "ON". Push the "SET-" side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between battery and main fuse coupler. red-red Between main fuse coupler and main switch coupler. red-red Between main switch coupler and fuse box 1 (ignition fuse). brown/blue-brown/blue Between fuse box 1 (ignition fuse) and cruise control system fuse. red/white-red/white Between cruise control system fuse and left handlebar switch coupler. yellow/black-yellow/black Between left handlebar switch coupler and ECU coupler. green/blue-green/blue	Turn the main switch to "ON". Push the "SET-" side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.

CRUISE CONTROL SYSTEM

Fault code No.		91	
Item	A	Cruise control setting switch “RES+”: open or short circuit is detected.	
	B	Cruise control setting switch “SET-”: open or short circuit is detected.	
7	Defective cruise control switch.	Replace the left handlebar switch.	Turn the main switch to “ON”. Push the “RES+” side and “SET-” side of the cruise control setting switch. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 8.
8	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-174.	

EAS1MC1018

[B-2] DIAGNOSIS USING THE MALFUNCTION HISTORY CODES

Execute the diagnostic mode (code No. 61) to check the malfunction history.

- Refer to “DIAGNOSTIC MODE” on page 8-37.
- Malfunction history is displayed in the multi-function meter unit right display. [B-3]
- Malfunction history is not displayed in the multi-function meter unit right display. [B-4]

EAS1MC1019

[B-3] MALFUNCTION HISTORY IS DISPLAYED

1. Information for the fault codes.

Refer to “TROUBLESHOOTING DETAILS” on page 8-40.

EAS1MC1020

[B-4] MALFUNCTION HISTORY IS NOT DISPLAYED

Use the Yamaha diagnostic tool to check whether automatic deactivation history for the cruise control system exists.

1. There is automatic deactivation history for the cruise control system.
 - Explain the conditions for automatically deactivating the cruise control system to the customer.
 - For information about the conditions for automatically deactivating the cruise control system. Refer to “OUTLINE OF THE CRUISE CONTROL SYSTEM” on page 1-6.

TIP

If you do not have a Yamaha diagnostic tool, the automatic deactivation history cannot be checked. Therefore, explain the automatic deactivation function of the cruise control system to the customer and explain that this is not a malfunction.

EAS1MC1022

[C-1] DELETING THE FAULT CODES

1. Setting the diagnostic mode.
Refer to “DIAGNOSTIC MODE” on page 8-37.
2. Execute the diagnostic mode (code No. 62) to erase the malfunction history in the diagnostic mode.
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.

EAS1MC1023

[C-2] FINAL CHECK

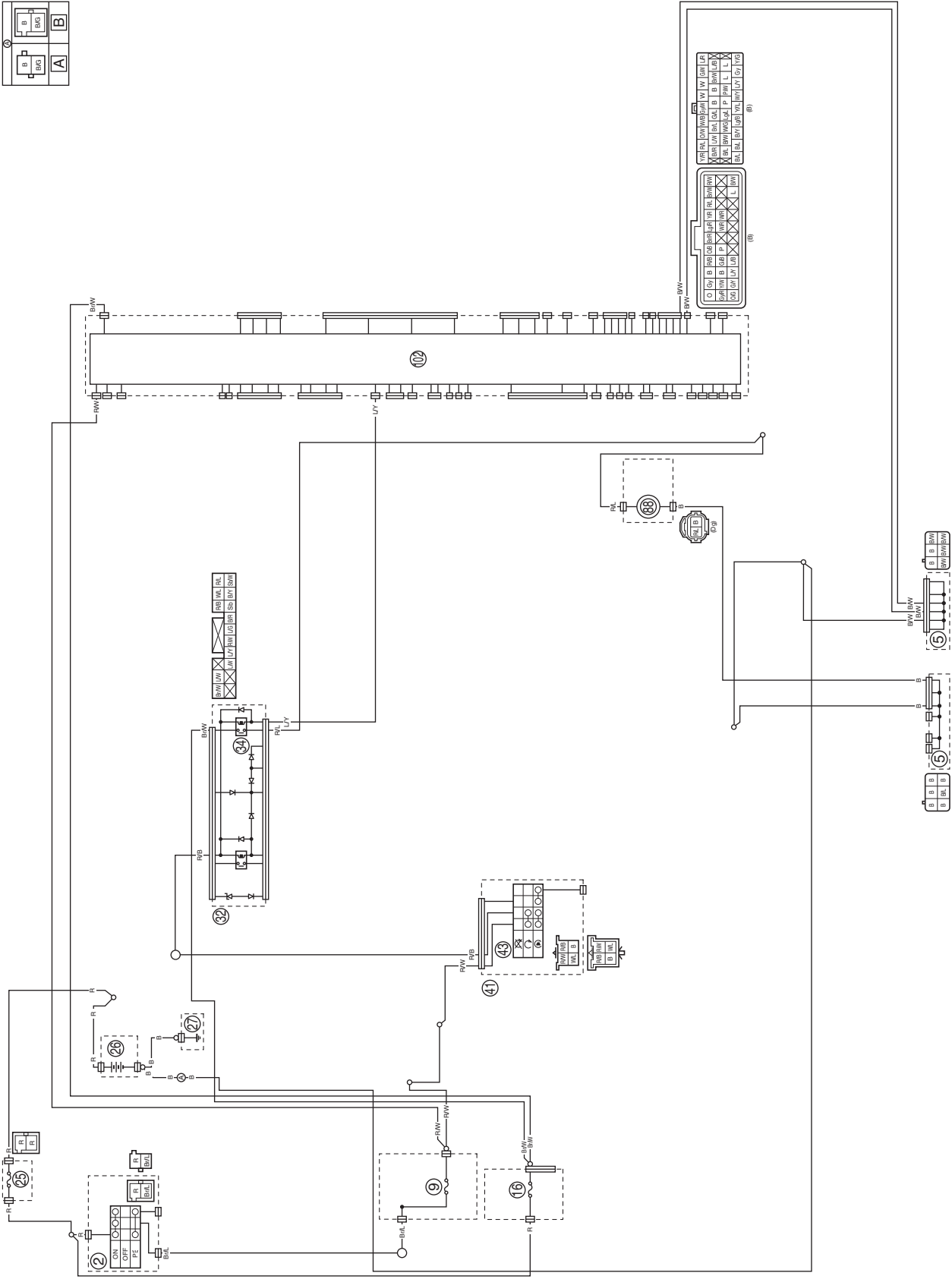
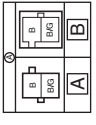
1. Check the brake lever and brake pedal operation.
2. Check the rear brake light switches.
Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-30.
3. Execute the diagnostic mode (code Nos. 82 and 83) to check the operation of the front brake light switch, rear brake light switch, clutch switch, and grip cancel switch.
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.
4. Execute the diagnostic mode (code Nos. 80 and 81) to check the operation of the cruise control setting switch.
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.
5. Delete the fault codes.
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.
6. Check the operation of the cruise control system.
Test ride the vehicle and confirm that the cruise control system is operating normally.

EAS27550

FUEL PUMP SYSTEM

EAS27560

CIRCUIT DIAGRAM



FUEL PUMP SYSTEM

- 2. Main switch
- 5. Joint coupler
- 9. Ignition fuse
- 16. Fuel injection system fuse
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 32. Relay unit
- 34. Fuel pump relay
- 41. Right handlebar switch
- 43. Start/engine stop switch
- 88. Fuel pump
- 102. ECU (engine control unit)
- A. Wire harness
- B. Negative battery sub-wire harness

EAS27570

TROUBLESHOOTING

If the fuel pump fails to operate.

TIP

• Before troubleshooting, remove the following part(s):

1. Side cowlings
2. Front cowling assembly
3. Fuel tank
4. T-bar

<p>1. Check the fuses. (Main, ignition, and fuel injection system) Refer to "CHECKING THE FUSES" on page 8-173.</p>	<p>NG →</p>	<p>Replace the fuse(s).</p>
OK ↓		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.</p>	<p>NG →</p>	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
<p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-169.</p>	<p>NG →</p>	<p>Replace the main switch/immobilizer unit.</p>
OK ↓		
<p>4. Check the start/engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-169.</p>	<p>NG →</p>	<p>Replace the right handlebar switch.</p>
OK ↓		
<p>5. Check the relay unit (fuel pump relay). Refer to "CHECKING THE RELAYS" on page 8-177.</p>	<p>NG →</p>	<p>Replace the relay unit.</p>
OK ↓		
<p>6. Check the fuel pump. Refer to "CHECKING THE FUEL PUMP BODY" on page 7-2.</p>	<p>NG →</p>	<p>Replace the fuel pump assembly.</p>
OK ↓		
<p>7. Check the entire fuel pump system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-103.</p>	<p>NG →</p>	<p>Properly connect or replace the wire harness.</p>
OK ↓		
<p>Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.</p>		

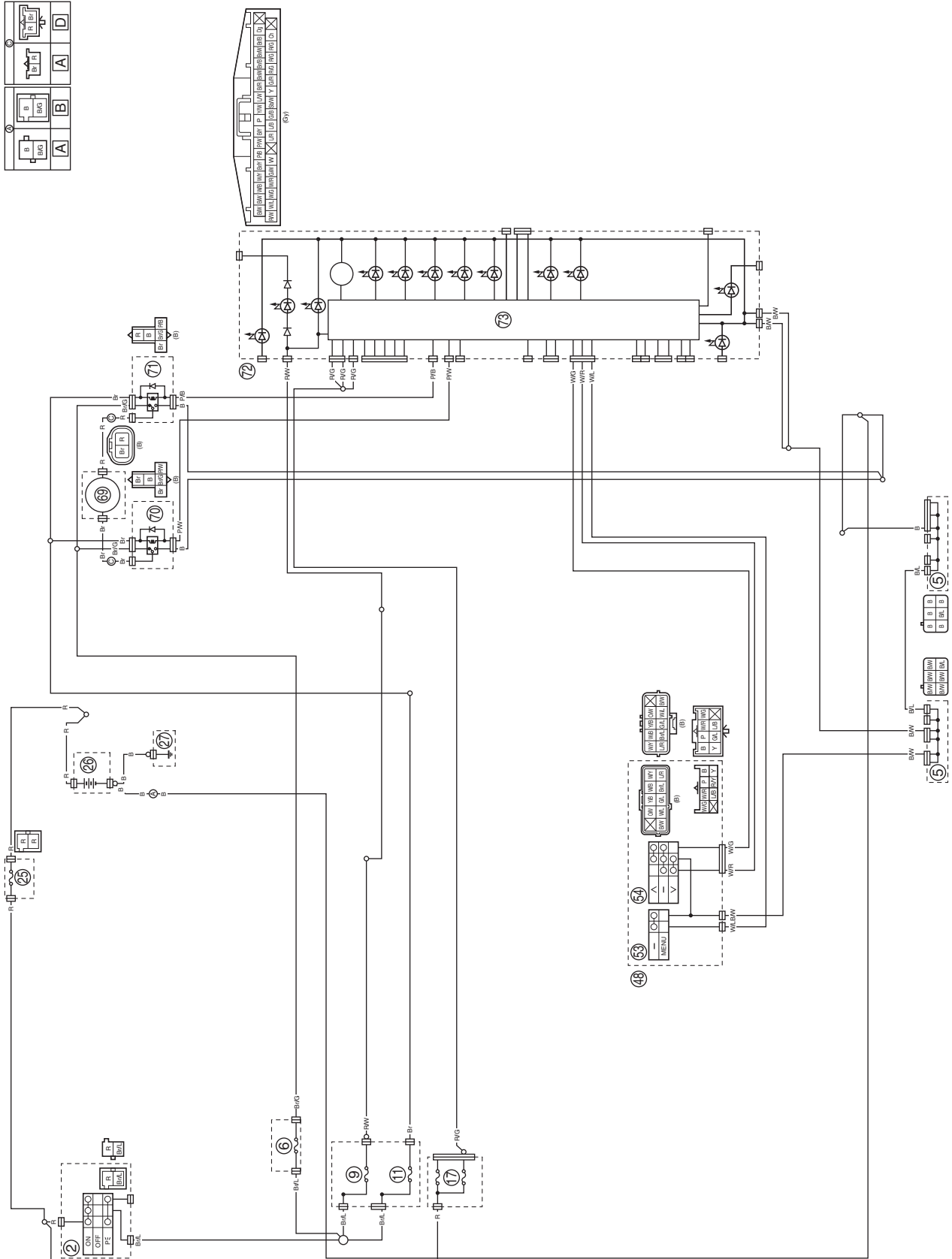
WINDSHIELD DRIVE SYSTEM

EAS27610

WINDSHIELD DRIVE SYSTEM

EAS27620

CIRCUIT DIAGRAM



WINDSHIELD DRIVE SYSTEM

- 2. Main switch
- 5. Joint coupler
- 6. Windshield drive system fuse
- 9. Ignition fuse
- 11. Signaling system fuse
- 17. Backup fuse
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 48. Left handlebar switch
- 53. Menu switch
- 54. Select switch
- 69. Windshield drive unit
- 70. Windshield drive unit relay (down)
- 71. Windshield drive unit relay (up)
- 72. Meter assembly
- 73. Multi-function meter
- A. Wire harness
- B. Negative battery sub-wire harness
- D. Windshield drive unit sub-lead

WINDSHIELD DRIVE SYSTEM

EAS27630

TROUBLESHOOTING

The windshield fails to move.

TIP

• Before troubleshooting, remove the following part(s):

1. Front cowling assembly
2. Fuel tank
3. T-bar

1. Check that there are no rocks or other foreign material in the windshield drive unit side rails.	NG →	Remove the foreign material.
OK ↓		
2. Check that there is no foreign material between the cable and the pulley.	NG →	Remove the foreign material.
OK ↓		
3. Check the fuses. (Main, ignition, signaling system, backup and windshield drive system) Refer to "CHECKING THE FUSES" on page 8-173.	NG →	Replace the fuse(s).
OK ↓		
4. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.	NG →	<ul style="list-style-type: none">• Clean the battery terminals.• Recharge or replace the battery.
OK ↓		
5. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	NG →	Replace the main switch/immobilizer unit.
OK ↓		
6. Check the menu switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	NG →	<ul style="list-style-type: none">• The menu switch is faulty.• Replace the left handlebar switch.
OK ↓		
7. Check the select switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	NG →	<ul style="list-style-type: none">• The select switch is faulty.• Replace the left handlebar switch.
OK ↓		

WINDSHIELD DRIVE SYSTEM

8. Check the windshield drive unit relay (up).
Refer to "CHECKING THE RELAYS" on page 8-177.

NG →

Replace the windshield drive unit relay (up).

OK ↓

9. Check the windshield drive unit relay (down).
Refer to "CHECKING THE RELAYS" on page 8-177.

NG →

Replace the windshield drive unit relay (down).

OK ↓

10. Check the windshield drive motor.
Refer to "CHECKING THE WINDSHIELD DRIVE UNIT" on page 8-192.

NG →

Replace the windshield drive unit.

OK ↓

11. Check the entire windshield drive system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-107.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the meter assembly.

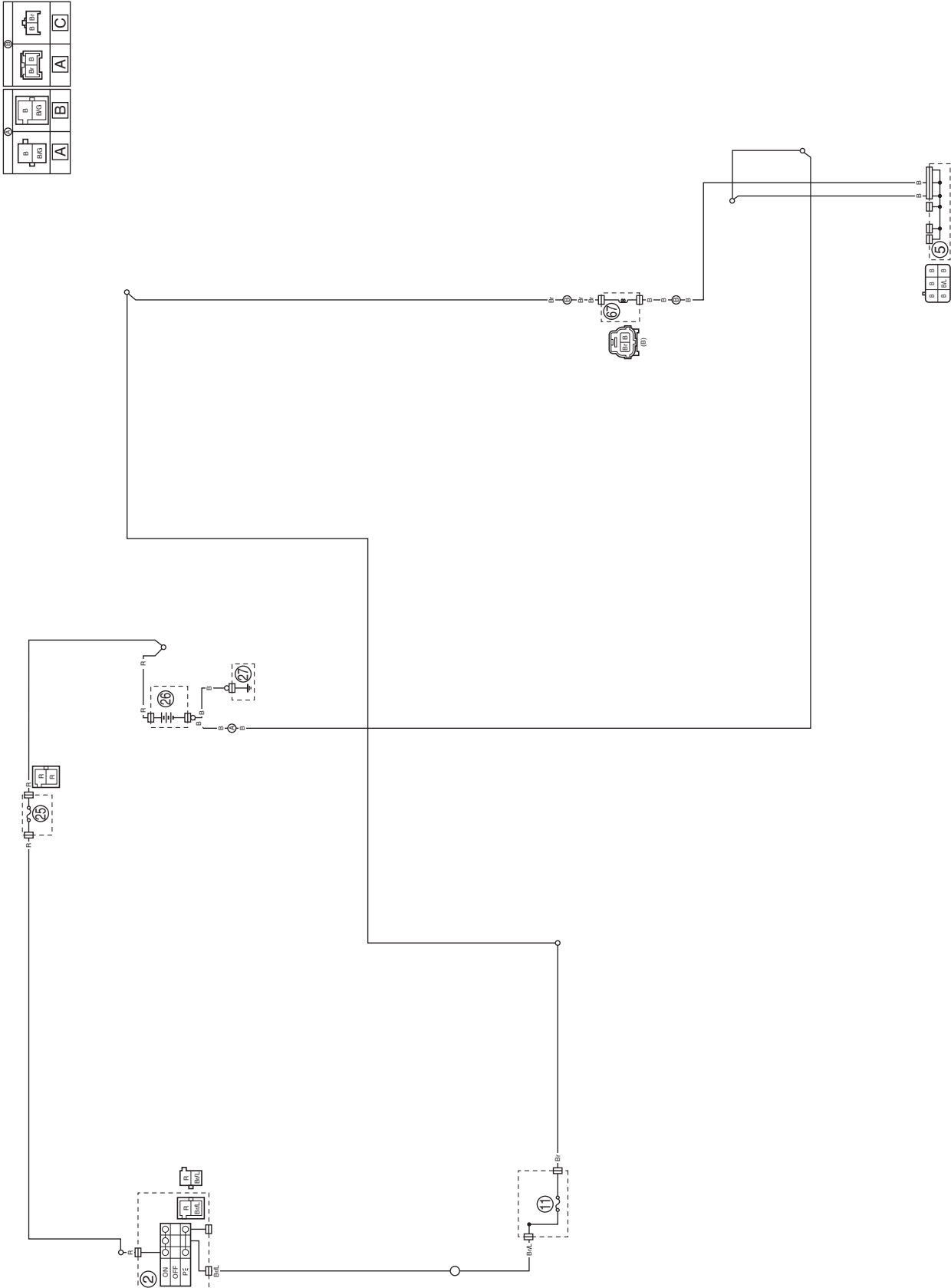
ACCESSORY BOX SYSTEM

ET3P61009

ACCESSORY BOX SYSTEM

ET3P61010

CIRCUIT DIAGRAM



ACCESSORY BOX SYSTEM

- 2. Main switch
- 5. Joint coupler
- 11. Signaling system fuse
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 67. Accessory box solenoid
 - A. Wire harness
 - B. Negative battery sub-wire harness
 - C. Accessory box solenoid sub-lead

ACCESSORY BOX SYSTEM

ET3P61012

TROUBLESHOOTING

The accessory box fails to operate.

TIP

- Before troubleshooting, remove the following part(s):
 1. Right upper inner panel
 2. Left side cowling
 3. Fuel tank
 4. T-bar

1. Check the fuses. (Main and signaling system) Refer to "CHECKING THE FUSES" on page 8-173.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.	NG →	<ul style="list-style-type: none">• Clean the battery terminals.• Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-169.	NG →	Replace the main switch/immobilizer unit.
OK ↓		
4. Check the accessory box solenoid. Refer to "CHECKING THE ACCESSORY BOX SOLENOID" on page 8-192.	NG →	Replace the accessory box solenoid.
OK ↓		
5. Check the entire accessory box system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-111.	NG →	Properly connect or replace the wire harness.
OK ↓		
This accessory box system circuit is OK.		

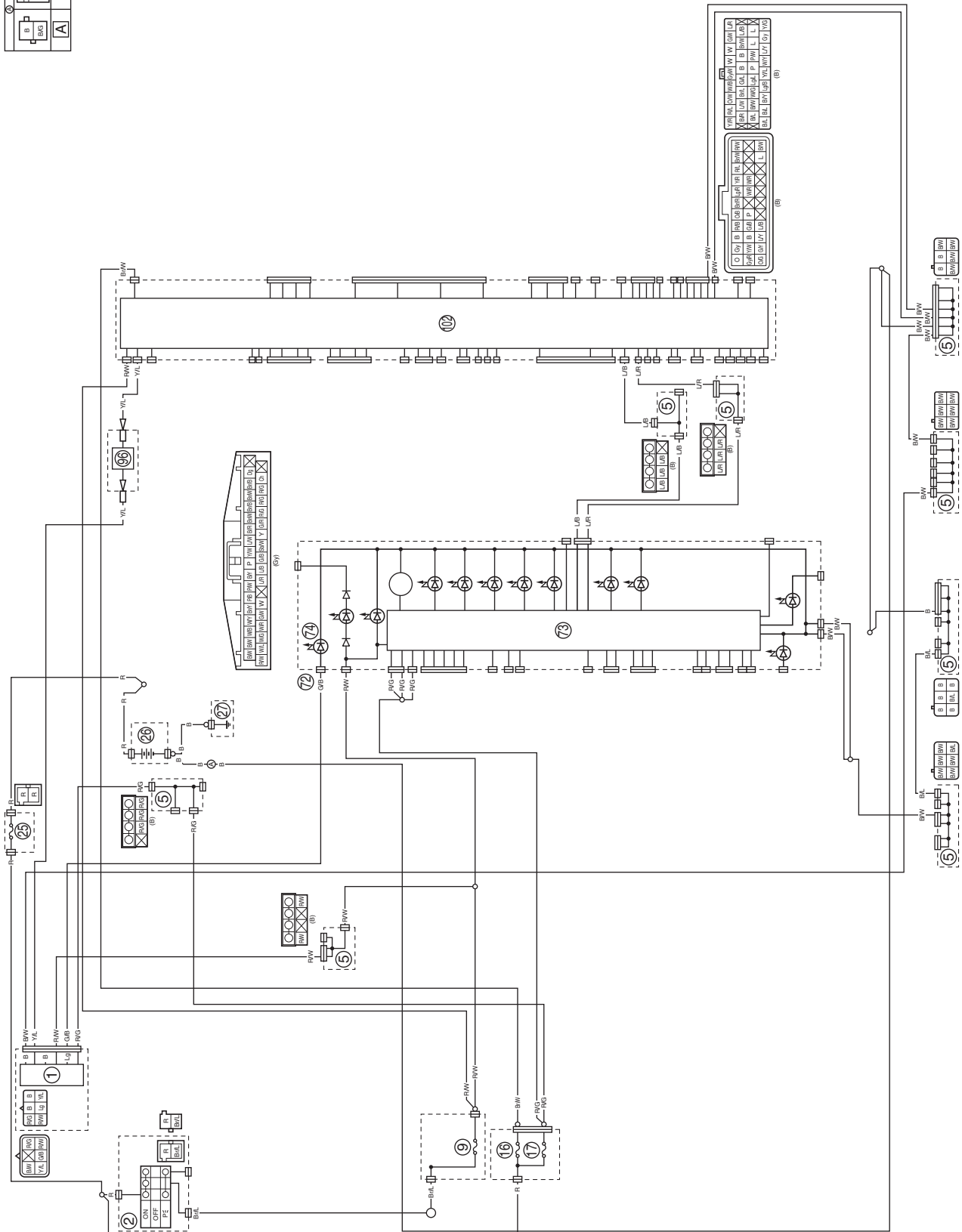
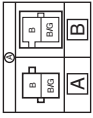
ACCESSORY BOX SYSTEM

EAS27640

IMMOBILIZER SYSTEM

EAS27650

CIRCUIT DIAGRAM



IMMOBILIZER SYSTEM

1. Immobilizer unit
2. Main switch
5. Joint coupler
9. Ignition fuse
16. Fuel injection system fuse
17. Backup fuse
25. Main fuse
26. Battery
27. Engine ground
72. Meter assembly
73. Multi-function meter
74. Immobilizer system indicator light
96. Yamaha diagnostic tool connector
102. ECU (engine control unit)
- A. Wire harness
- B. Negative battery sub-wire harness

EAS27670

GENERAL INFORMATION

This vehicle is equipped with an immobilizer system to help prevent theft by re-registering codes in the standard keys. This system consists of the following:

- a code re-registering key (with a red bow)
- two standard keys (with a black bow) that can be re-registered with new codes
- a transponder (installed in the red key bow)
- an immobilizer unit
- 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.

EC3P61001

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.**
-

EAS27690

PART REPLACEMENT AND KEY CODE REGISTRATION REQUIREMENTS

In the course of use, you may encounter the following cases where replacement of parts and registration of code re-registering/standard keys are required.

TIP

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

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 seat lock and fuel tank cap.

Code re-registering key registration:

When the immobilizer unit or ECU is replaced, the code re-registering key must be registered to the unit.

To register a code re-registering key:

1. Turn the main switch to "ON" with the code re-registering key.

TIP

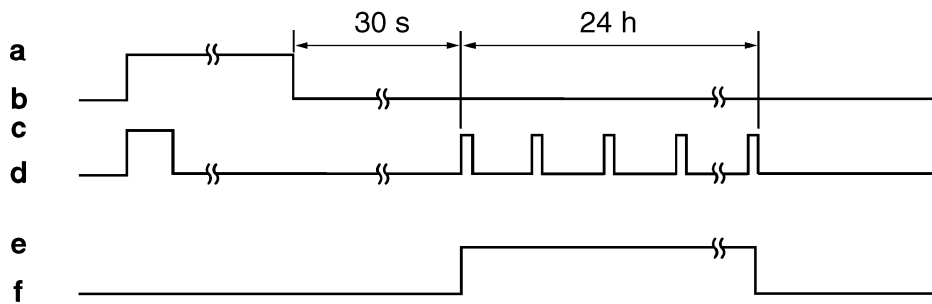
Check that the immobilizer system indicator light comes on for one second, then goes off. When the immobilizer system indicator light goes off, the code re-registering key has been registered.

2. Check that the engine can be started.
3. Register the standard key, following the instructions in the section below.

Standby mode:

To enable the immobilizer system, turn the ignition key to "OFF". 30 seconds later, the indicator light will start flashing continuously in the standby flashing mode pattern for up to 24 hours. After that time, the indicator light will stop flashing, but the immobilizer system is still enabled.

Standby mode



- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Standby mode on
- f. Standby mode off

Standard key registration:

Standard key registration is required when a standard key is lost and needs to be replaced, or when the code re-registering key is re-registered after the immobilizer unit or ECU are replaced.

TIP

Do not start the engine with a standard key that has not been registered. If the main switch is turned to "ON" with a standard key that has not been registered, the immobilizer system indicator light flashes to indicate fault code number "52". (Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-122.)

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.

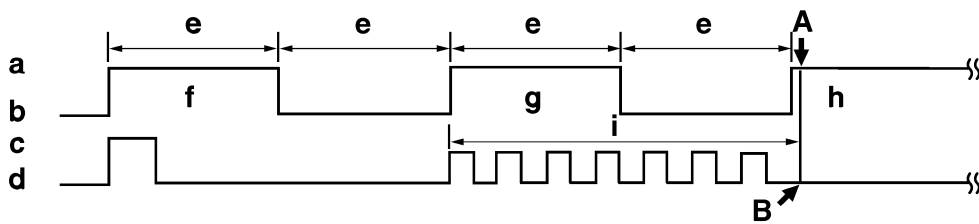
5. Turn the main switch to "ON".

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

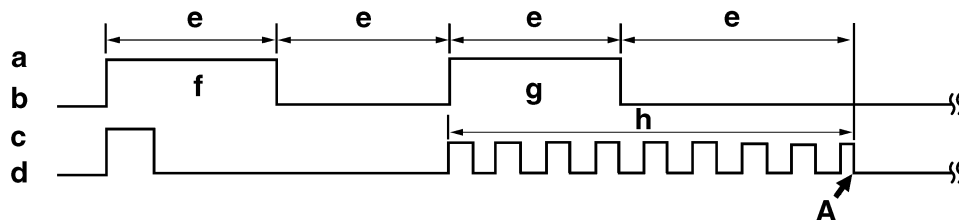


- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. First standard key
- h. Second standard key
- i. Registration mode
- A. Registration of the second standard key is complete.
- B. Immobilizer system indicator light stops flashing 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

EAS27700

TROUBLESHOOTING

When the main switch is turned to "ON", the immobilizer system indicator light does not come on nor flashes.

1. Check the fuses.
(Main, ignition, fuel injection system, and backup)
Refer to "CHECKING THE FUSES" on page 8-173.

NG →

Replace the fuse(s).

OK ↓

2. Check the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.

NG →

- Clean the battery terminals.
- Recharge or replace the battery.

OK ↓

3. Check the main switch.
Refer to "CHECKING THE SWITCHES" on page 8-169.

NG →

Replace the main switch/immobilizer unit.

OK ↓

4. Check the entire immobilizer system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-115.

NG →

Properly connect or replace the wire harness.

OK ↓

- Check the condition each of the immobilizer system circuits.
Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-122.

IMMOBILIZER SYSTEM

EAS27720

SELF-DIAGNOSIS FAULT CODE INDICATION

When a system malfunction occurs, the fault code number is indicated in the multi-function meter right display 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 antenna. 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. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.
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. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.

IMMOBILIZER SYSTEM

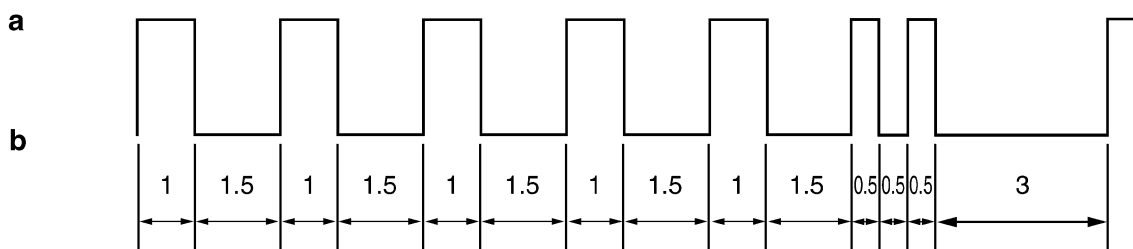
Fault code	Part	Symptom	Cause	Action
55	IMMOBILIZER UNIT	Key code registration malfunction.	Same standard key was attempted to be registered two consecutive times.	Register another standard key.
56	ECU	Unidentified code is received.	Noise interference or disconnected lead/cable.	<ol style="list-style-type: none"> 1. Check the wire harness and connector. 2. Replace the main switch/immobilizer unit. 3. Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.

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

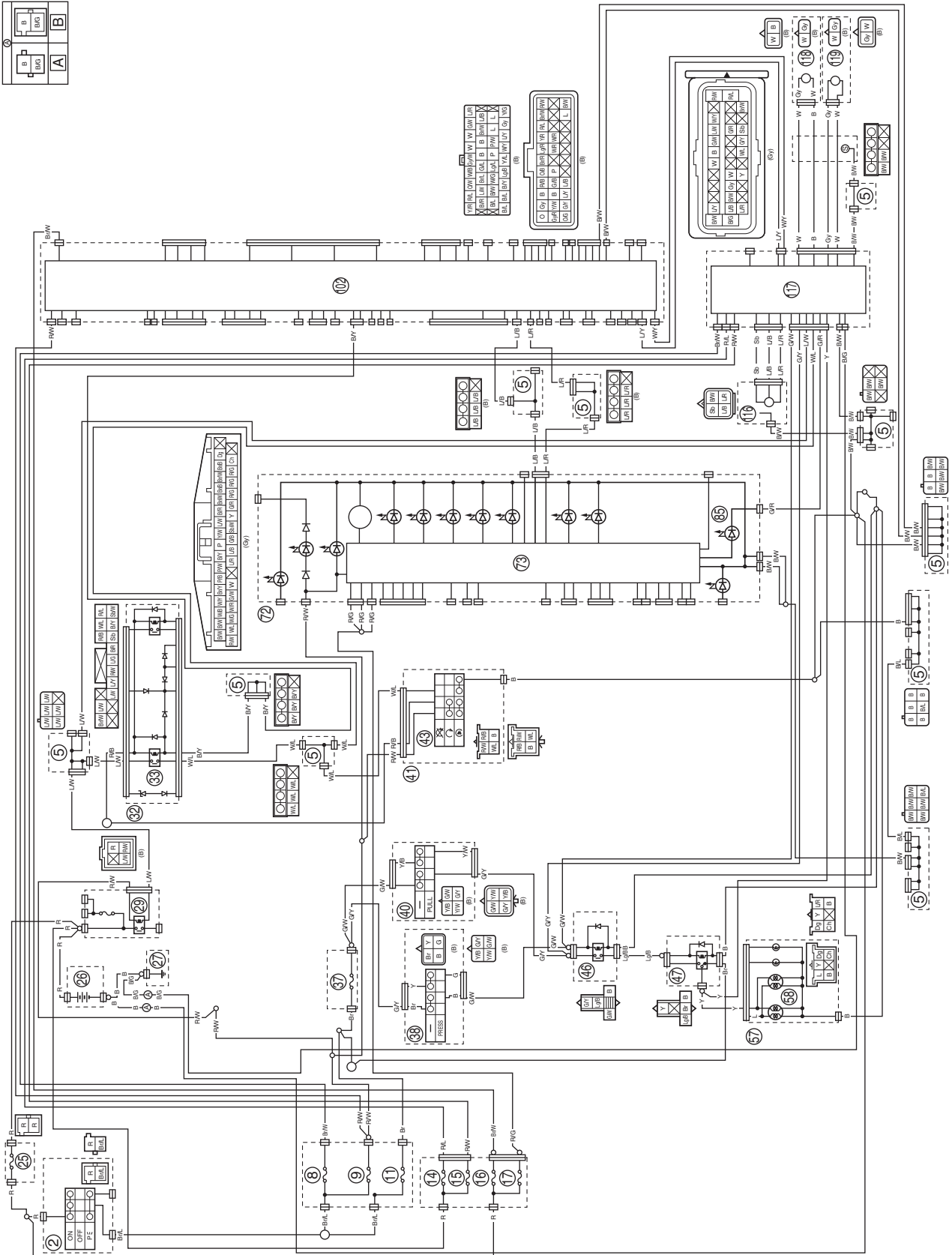
ABS (ANTI-LOCK BRAKE SYSTEM)

EAS28790

ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27730

CIRCUIT DIAGRAM



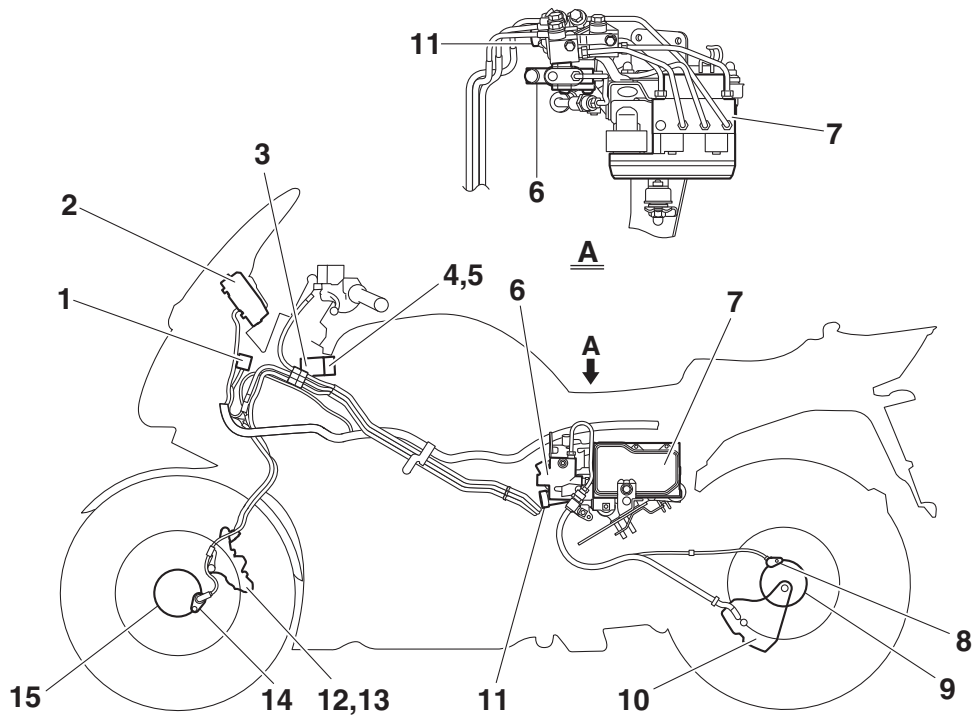
ABS (ANTI-LOCK BRAKE SYSTEM)

- 2. Main switch
- 5. Joint coupler
- 8. ABS ECU fuse
- 9. Ignition fuse
- 11. Signaling system fuse
- 14. ABS motor fuse
- 15. ABS solenoid fuse
- 16. Fuel injection system fuse
- 17. Backup fuse
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 29. Starter relay
- 32. Relay unit
- 33. Starting circuit cut-off relay
- 37. Brake light fuse
- 38. Rear brake light switch
- 40. Front brake light switch
- 41. Right handlebar switch
- 43. Start/engine stop switch
- 46. Brake switch relay
- 47. Brake light relay
- 57. Tail/brake light assembly
- 58. Tail/brake light
- 72. Meter assembly
- 73. Multi-function meter
- 85. ABS warning light
- 102. ECU (engine control unit)
- 116. ABS test coupler
- 117. ABS ECU (electronic control unit)
- 118. Front wheel sensor
- 119. Rear wheel sensor
- A. Wire harness
- B. Negative battery sub-wire harness

ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27740

ABS COMPONENTS CHART



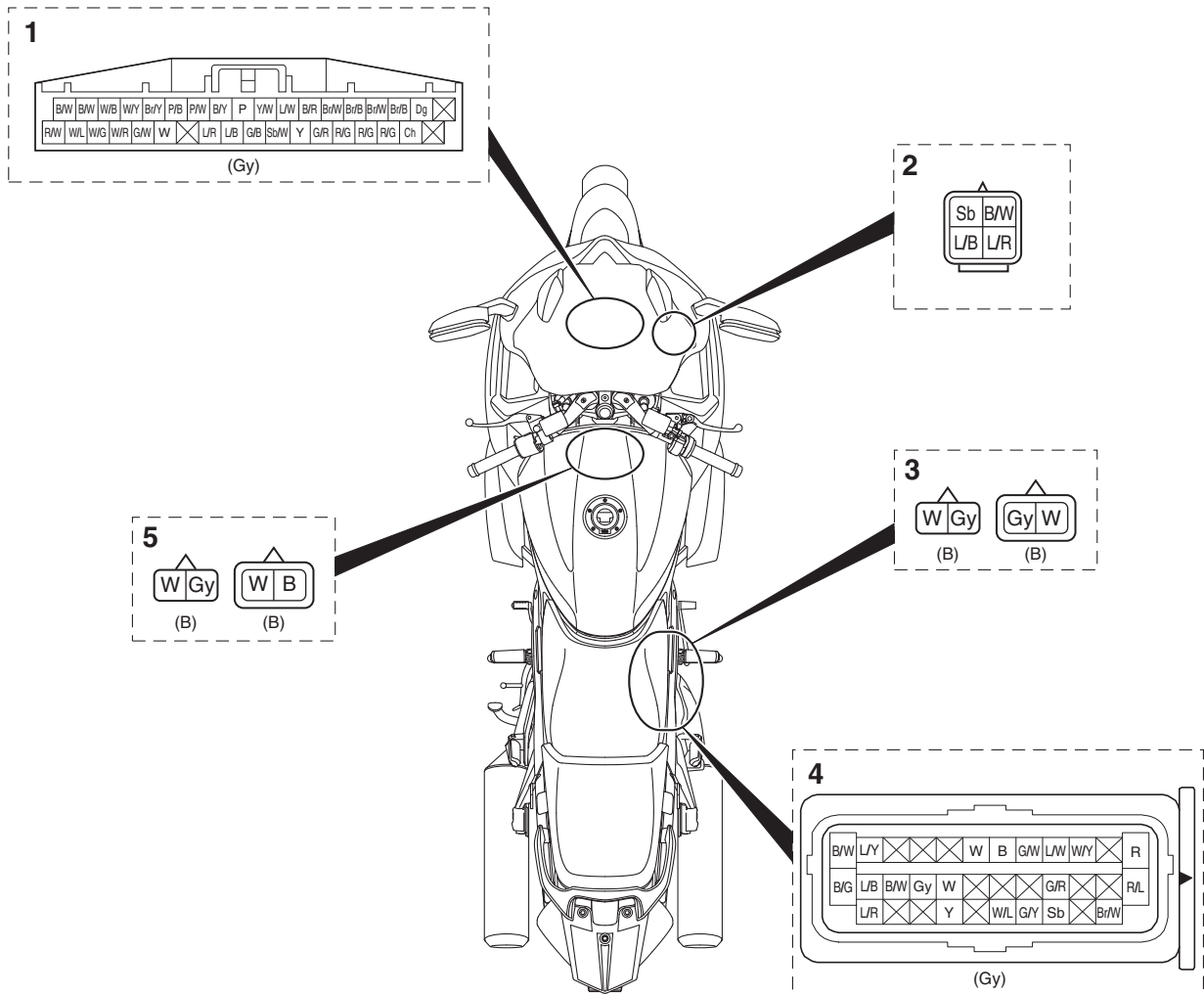
1. ABS test coupler
2. ABS warning light
3. ABS ECU fuse
4. ABS solenoid fuse
5. ABS motor fuse
6. Proportioning valve
7. Hydraulic unit assembly
8. Rear wheel sensor
9. Rear wheel sensor rotor
10. Rear brake caliper
11. Metering valve
12. Left front brake caliper
13. Right front brake caliper (partially operated together with the rear brake)
14. Front wheel sensor
15. Front wheel sensor rotor

ABS (ANTI-LOCK BRAKE SYSTEM)

ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27750

ABS COUPLER LOCATION CHART



ABS (ANTI-LOCK BRAKE SYSTEM)

1. Meter assembly coupler
2. ABS test coupler
3. Rear wheel sensor coupler
4. ABS ECU coupler
5. Front wheel sensor coupler

ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27770

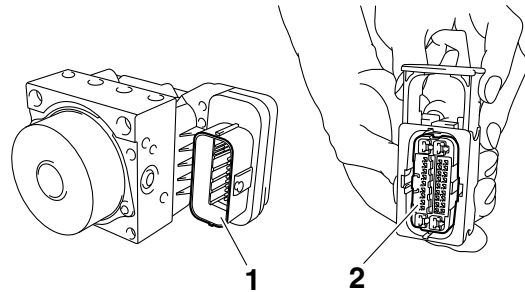
MAINTENANCE OF THE ABS ECU

Checking the ABS ECU

1. Check:
 - Terminals “1” of the ABS ECU
Cracks/damages → Replace the hydraulic unit assembly and the brake pipes that are connected to the assembly as a set.
 - Terminals “2” of the ABS ECU coupler
Connection defective, contaminated, come-off → Correct or clean.

TIP

If the ABS ECU coupler is clogged with mud or dirt, clean with compressed air.



EAS27790

ABS TROUBLESHOOTING OUTLINE

This section describes the troubleshooting for the ABS in detail. Read this service manual carefully and make sure you fully understand the information provided before repairing any malfunctions or performing service.

The ABS ECU (electronic control unit) has a self-diagnosis function. When failures occur in the system, the ABS warning light on the multi-function meter center display indicates a malfunction.

The following troubleshooting describes the problem identification and service method according to the indications by the multi-function meter right display. For troubleshooting items other than the following items, follow the normal service method.

EWA1MC1004



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-3] FINAL CHECK” on page 8-160.)

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.
 - The ABS warning light comes on while the start switch is being pushed.
3. The ABS warning light flashes → ABS operation is normal.
 - Refer to “BASIC INSTRUCTIONS FOR TROUBLESHOOTING” on page 8-132.

Self-diagnosis and servicing

The ABS ECU has a self-diagnosis function. By utilizing this function, quick problem identification and service are possible. Previous malfunctions can be checked since the ABS ECU also stores the malfunction history.

The multi-function meter right display indicates all the fault codes recorded in the ABS ECU.

Note all of the indicated fault codes if more than two fault codes are stored in the memory. When the service is finished, check the normal operation of the vehicle, and then delete the fault code(s). (Refer to “[C-3] FINAL CHECK” on page 8-160.) By deleting the fault codes stored in the ABS ECU memory, it is possible to pursue the cause correctly if another malfunction occurs.

ABS (ANTI-LOCK BRAKE SYSTEM)

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 multi-function meter right display when the ABS ECU has entered the self-diagnosis mode.

Special precautions for handling and servicing a vehicle equipped with ABS

EC3P61030

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

EWA1MC1001

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 test coupler adapter to determine the cause of the malfunction for the stored fault code from the condition and place where the malfunction occurred.

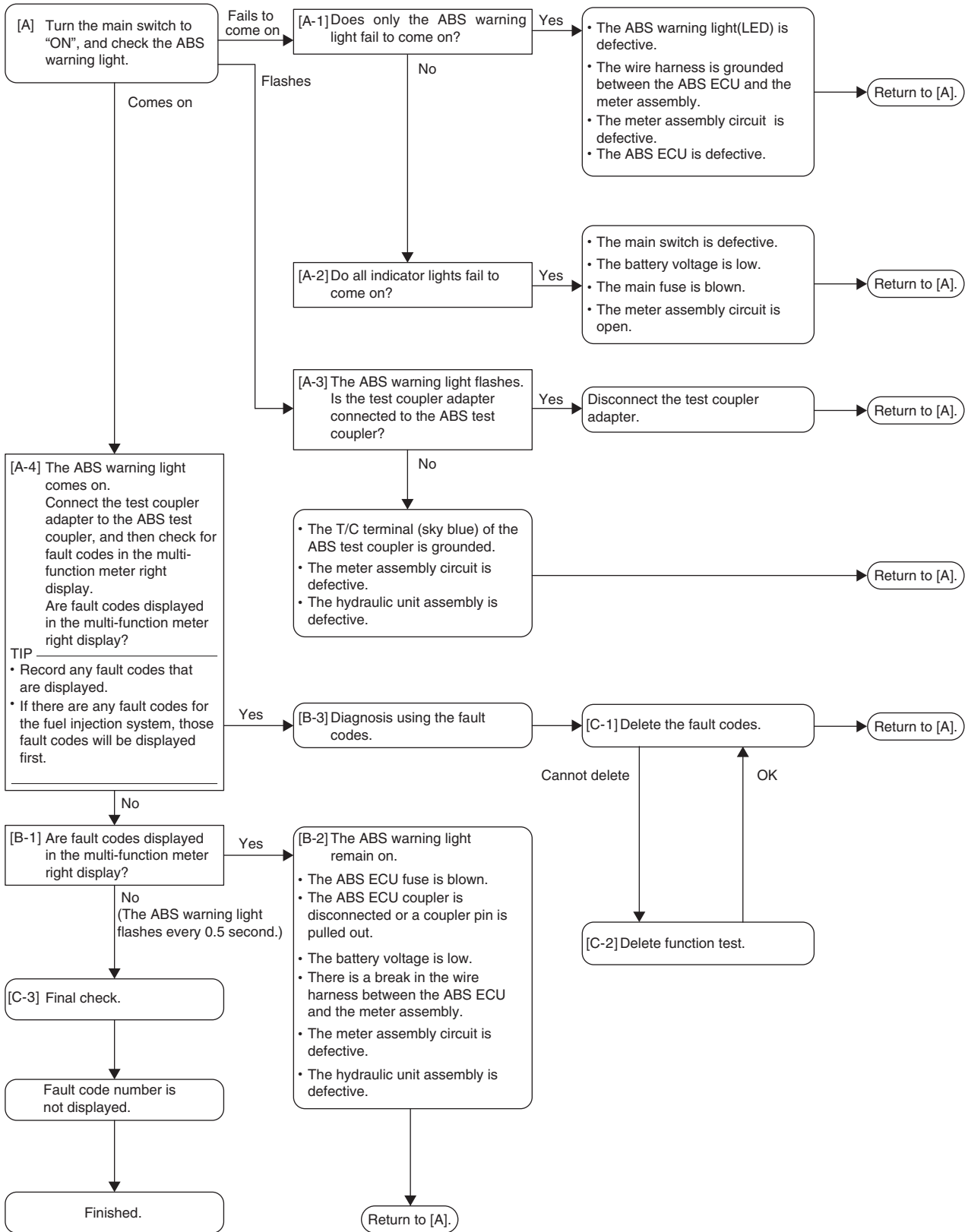
[C] Servicing the ABS

Execute the final check after disassembly and assembly.

ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27810

BASIC PROCESS FOR TROUBLESHOOTING



ABS (ANTI-LOCK BRAKE SYSTEM)

EWA1MC1004



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-3] FINAL CHECK” on page 8-160.)

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 flashes. [A-3]
3. The ABS warning light remains on. [A-4]

EAS1MC1001

[A-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON

1. Check for a short circuit to the ground between the green/red terminal of the ABS ECU coupler and green/red terminal of the meter assembly.
 - If there is a 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, ABS ECU is defective. Replace the hydraulic unit assembly.

EAS1MC1002

[A-2] ALL INDICATOR LIGHTS FAIL TO COME ON

1. Main switch
 - Check the main switch for continuity.
Refer to “CHECKING THE SWITCHES” on page 8-169.
 - If there is no continuity, replace the main switch/immobilizer unit.
2. Battery
 - Check the condition of the battery.
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-174.
 - If the battery is defective, clean the battery terminals and recharge it, or replace the battery.
3. Main fuse
 - Check the fuse for continuity.
Refer to “CHECKING THE FUSES” on page 8-173.
 - If the main fuse is blown, replace the fuse.
4. Circuit
 - Check the meter assembly circuit.
Refer to “CIRCUIT DIAGRAM” on page 8-125.
 - If the meter assembly circuit is open, replace the wire harness.

EAS1MC1003

[A-3] THE ABS WARNING LIGHT FLASHES

1. Test coupler adapter confirmation
 - Check if the test coupler adapter is connected to the ABS test coupler.
 - If the test coupler adapter is connected, disconnect it, and then install the protective cap onto the ABS test coupler.
2. If the test coupler adapter is not connected
 - Check that the T/C terminal (sky blue) of the ABS test coupler is not short-circuited to the ground.
 - If the T/C terminal is short-circuited to the ground, the wire harness is defective. Replace the wire harness.

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- If the T/C terminal is not short-circuited to the ground, check the internal circuit of the meter assembly.

Turn the main switch to “OFF”.

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 is flashes, the internal circuit of the meter assembly is defective. Replace the meter assembly.

If the ABS warning light is on, the ABS ECU is defective. Replace the hydraulic unit assembly.

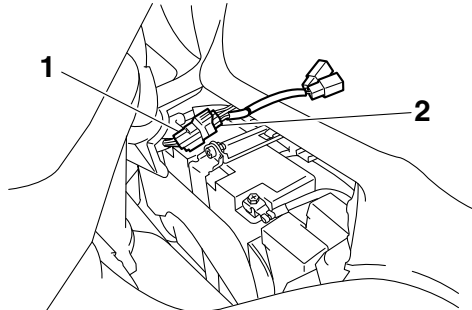
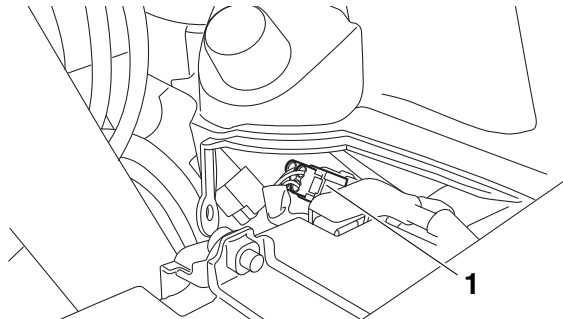
EAS1MC1004

[A-4] THE ABS WARNING LIGHT COME ON

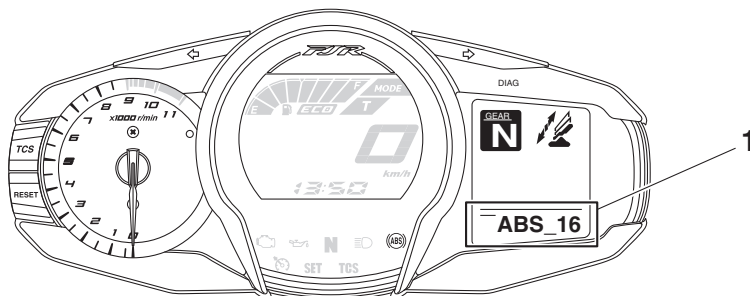
Turn the main switch to “OFF”.

Remove front cowling inner panel and right upper inner panel to access the ABS test coupler “1”. Remove the protective cap from the ABS test coupler, and then connect the test coupler adapter “2” to the coupler. The T/C terminal (sky blue) is now grounded.

Turn the main switch to “ON”, and then check the multi-function meter right display.



1. A fault code number “1” is not displayed in the multi-function meter right display. [B-1]
2. A fault code number “1” is displayed in the multi-function meter right display. (For example, fault code No. ABS_16) [B-3]



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[B-1] A FAULT CODE NUMBER IS NOT DISPLAYED IN THE MULTI-FUNCTION METER RIGHT DISPLAY

1. The ABS warning light remains on.
A malfunction is detected. [B-2]
2. The ABS warning light flashes every 0.5 second for more than 6 seconds.
A malfunction is not detected.
The ABS warning light flashes every 0.5 second if a fault code for a past malfunction is not stored in the memory of the ABS ECU. The ABS warning light flashes quicker if a fault code is displayed on the multi-function meter right display. If no fault code is displayed, make sure that the customer understands the possible conditions that may cause the ABS warning light to come on or flash even if the system is normal.

TIP

- The ABS fault codes will not be displayed if a fault code for the fuel injection system is displayed on the multi-function meter right display. To display the ABS fault codes, delete the fuel injection system fault codes, and then start the check again.
 - The test coupler adapter must be connected to the ABS test coupler to display the fault codes. If the adapter is not connected, the ABS warning light will come on or flash, but no fault codes will be displayed.
-

EAS1MC1006

[B-2] THE ABS WARNING LIGHT REMAINS ON

1. The battery voltage is low.
 - Check the condition of the battery.
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-174.
 - If the battery voltage is low, clean the battery terminals and recharge it, or replace the battery.
2. ABS ECU fuse
 - Check the ABS ECU fuse for continuity.
Refer to “CHECKING THE FUSES” on page 8-173.
 - If the ABS ECU fuse is blown, replace the fuse.
3. ABS ECU coupler
 - Check that the ABS ECU coupler is connected properly.
 - Connect the couplers properly if necessary.
4. There is a break in the wire harness between the main switch and the ABS ECU or between the ABS ECU and the ground.
 - Check for continuity between the brown/blue terminal of the main switch coupler and brown/blue terminal of the ABS ECU fuse.
 - Check for continuity between the brown/white terminal of the ABS ECU fuse and the brown/white terminal of the ABS ECU coupler.
 - If there is no continuity, the wire harness is defective. Replace the wire harness.
 - Check for continuity between the black/white terminal of the ABS ECU coupler and the ground.
 - If there is no continuity, the wire harness is defective. Replace the wire harness.
5. There is a break in the wire harness between the ABS ECU and the meter assembly (ABS warning light).
 - Check for continuity between the green/red terminal of the ABS ECU coupler and the green/red terminal of the meter assembly coupler.
6. The meter assembly circuit is defective.
 - Disconnect the ABS ECU coupler.
 - The green/red terminal of the ABS ECU coupler is short-circuited to the ground.
 - Turn the main switch to “ON”, and then check the ABS warning light.
 - If the ABS warning light is on, the internal circuit of the meter assembly is defective. Replace the meter assembly.

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- If the ABS warning light does not come on, the ABS ECU is defective. Replace the hydraulic unit assembly.

7. The hydraulic unit assembly is defective.

EAS1MC1029

[B-3] DIAGNOSIS USING THE FAULT CODES

Connect the test coupler adapter to the ABS test coupler, and then turn the main switch to "ON". Information for the fault codes from the ABS ECU is contained in the following table. Refer to this table for troubleshooting.

TIP

Record all of the fault codes displayed and inspect the check points.

Fault code table

Fault code No.	Symptom	Check point
ABS_11* ABS_25*	Front wheel sensor signal is not received properly.	<ul style="list-style-type: none"> • Installation of the front wheel sensor • Front wheel • Front wheel sensor housing • Front wheel sensor rotor
ABS_12	Rear wheel sensor signal is not received properly.	<ul style="list-style-type: none"> • Installation of the rear wheel sensor • Rear wheel • Rear wheel sensor housing • Rear wheel sensor rotor
ABS_13 ABS_26	Incorrect signal from the front wheel sensor is detected.	<ul style="list-style-type: none"> • Installation of the front wheel sensor • Front wheel • Front wheel sensor housing • Front wheel sensor rotor • Hydraulic unit assembly
ABS_14 ABS_27	Incorrect signal from the rear wheel sensor is detected.	<ul style="list-style-type: none"> • Installation of the rear wheel sensor • Rear wheel • Rear wheel sensor housing • Rear wheel sensor rotor • Hydraulic unit assembly
ABS_15	No continuity in the front wheel sensor circuit.	<ul style="list-style-type: none"> • Continuity of the front wheel sensor circuit • Wire harness (ABS circuit) • Connection of the front wheel sensor coupler and ABS ECU coupler • Front wheel sensor
ABS_16	No continuity in the rear wheel sensor circuit.	<ul style="list-style-type: none"> • Continuity of the rear wheel sensor circuit • Wire harness (ABS circuit) • Connection of the rear wheel sensor coupler and ABS ECU coupler • Rear wheel sensor
ABS_17 ABS_45	Missing pulses detected in the front wheel sensor signal.	<ul style="list-style-type: none"> • Front wheel sensor rotor • Front wheel sensor housing • Front wheel
ABS_18 ABS_46	Missing pulses detected in the rear wheel sensor signal.	<ul style="list-style-type: none"> • Rear wheel sensor rotor • Rear wheel sensor housing • Rear wheel
ABS_21	Hydraulic unit solenoid circuit is open or short-circuited.	<ul style="list-style-type: none"> • Hydraulic unit assembly

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Fault code No.	Symptom	Check point
ABS_22	Start switch signal is not received properly (start switch circuit or start switch monitor circuit).	<ul style="list-style-type: none"> • Wire harness • Connection of the relay unit coupler and ABS ECU coupler.
ABS_23	Brake light signal is not received properly when main switch is turned to "ON" (brake light circuit, or front or rear brake light switch circuit).	<ul style="list-style-type: none"> • Brake light bulbs • Brake switch relay • Brake light relay • Wire harness and brake light switch circuit • Brake light system couplers
ABS_24	Brake light signal is not received properly while vehicle is traveling (brake light circuit, or front or rear brake light switch circuit).	<ul style="list-style-type: none"> • Improper adjustment of the rear brake light switch • Brake light switches • Brake switch relay • Brake light relay • Tail/brake light bulbs • Wire harness (brake light circuit) • Brake light system couplers
ABS_31	Solenoid relay is defective. Power is not supplied to the solenoid relay.	<ul style="list-style-type: none"> • ABS solenoid fuse • Wire harness (battery and ABS ECU circuit) • Connection of the ABS ECU coupler • Hydraulic unit assembly
ABS_32	Hydraulic unit solenoid relay is short-circuited.	<ul style="list-style-type: none"> • Hydraulic unit assembly
ABS_33	ABS motor is defective. Power is not supplied to the ABS motor.	<ul style="list-style-type: none"> • Battery voltage • ABS motor fuse • Wire harness (ABS circuit) • Connection of the ABS ECU coupler and starter relay coupler • Hydraulic unit assembly
ABS_34	Hydraulic unit ABS motor relay is short-circuited.	<ul style="list-style-type: none"> • Hydraulic unit assembly
ABS_41	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.	<ul style="list-style-type: none"> • Brake dragging • Brake fluid • Hydraulic unit operation tests • Front wheel brake lines • Hydraulic unit assembly
ABS_42 ABS_47	Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.	<ul style="list-style-type: none"> • Brake dragging • Brake fluid • Hydraulic unit operation tests • Rear wheel brake lines • Hydraulic unit assembly
ABS_43	Incorrect signal from the front wheel sensor is detected.	<ul style="list-style-type: none"> • Installation of the front wheel sensor • Front wheel sensor housing • Front wheel sensor rotor
ABS_44	Incorrect signal from the rear wheel sensor is detected.	<ul style="list-style-type: none"> • Installation of the rear wheel sensor • Rear wheel sensor housing • Rear wheel sensor rotor

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Fault code No.	Symptom	Check point
ABS_51 ABS_52	Power voltage is too high.	<ul style="list-style-type: none"> • Battery voltage • Battery terminal • Refer to “CHARGING SYSTEM” on page 8-13.
ABS_53	Power voltage is too low.	<ul style="list-style-type: none"> • Battery voltage • Connection of the ABS ECU coupler • Wire harness • Refer to “CHARGING SYSTEM” on page 8-13.
ABS_54	Power voltage is too low.	<ul style="list-style-type: none"> • Battery voltage • Connection of the ABS ECU coupler and starter relay coupler • Wire harness • Refer to “CHARGING SYSTEM” on page 8-13.
ABS_56	Hydraulic unit sensor power monitor circuit is abnormal.	<ul style="list-style-type: none"> • Hydraulic unit assembly
ABS_63	Front wheel sensor power is abnormal.	<ul style="list-style-type: none"> • Front wheel sensor lead • Wire harness • Hydraulic unit assembly
ABS_64	Rear wheel sensor power is abnormal.	<ul style="list-style-type: none"> • Rear wheel sensor lead • Wire harness • Hydraulic unit assembly

* A fault code is indicated if the rear wheel rotates for longer than about 20 seconds (fault code No. ABS_11) or for longer than about 2 seconds (fault code No. ABS_25) with the front wheel stopped (e.g., when the vehicle is on the centerstand).

TIP

Fault code numbers “ABS_15” (front wheel) and “ABS_16” (rear wheel) are indicated if a defective connection is detected in the front or rear wheel sensor when the vehicle is not being ridden.

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	ABS_11 ABS_25	Symptom	Front wheel sensor signal is not received properly.
Order	Item/components and probable cause		Check or maintenance job
1	Installed condition of wheel sensor.		Check for looseness. Properly install or replace the wheel sensor if necessary.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-25.
3	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-26.
4	Defective sensor rotor.		Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-26.

TIP

With front wheel stopped, rear wheel was rotated for longer than about 20 seconds (fault code No. ABS_11) or for longer than about 2 seconds (fault code No. ABS_25).

Fault code No.	ABS_12	Symptom	Rear wheel sensor signal is not received properly.
Order	Item/components and probable cause		Check or maintenance job
1	Installed condition of wheel sensor.		Check for looseness. Properly install or replace the wheel sensor if necessary.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-34.
3	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-34.
4	Defective sensor rotor.		Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-34.

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Fault code No.	ABS_13 ABS_26	Symptom	Incorrect signal from the front wheel sensor is detected.
Order	Item/components and probable cause	Check or maintenance job	
1	Installed condition of wheel sensor.	Check for looseness. Properly install or replace the wheel sensor if necessary.	
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-25.	
3	Foreign material inside sensor housing.	Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-26.	
4	Defective sensor rotor.	Check the surface of the sensor rotor for damage. If there is visible damage, replace the sensor rotor. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-26.	
5	Hydraulic unit assembly internal malfunction.	Replace the hydraulic unit assembly.	

TIP

Vehicle possibly ridden on uneven roads.

Fault code No.	ABS_14 ABS_27	Symptom	Incorrect signal from the rear wheel sensor is detected.
Order	Item/components and probable cause	Check or maintenance job	
1	Installed condition of wheel sensor.	Check for looseness. Properly install or replace the wheel sensor if necessary.	
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-34.	
3	Foreign material inside sensor housing.	Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-34.	
4	Defective sensor rotor.	Check the surface of the sensor rotor for damage. If there is visible damage, replace the sensor rotor. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-34.	

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	ABS_14 ABS_27	Symptom	Incorrect signal from the rear wheel sensor is detected.
Order	Item/components and probable cause		Check or maintenance job
5	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.

TIP _____

Vehicle possibly ridden on uneven roads.

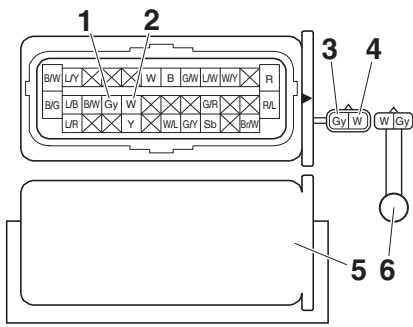
Fault code No.	ABS_15	Symptom	No continuity in the front wheel sensor circuit.
Order	Item/components and probable cause		Check or maintenance job
1	Connections <ul style="list-style-type: none"> • Front wheel sensor coupler • ABS ECU coupler 		<ul style="list-style-type: none"> • Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, connect the coupler securely or replace the wire harness. <p>TIP _____</p> <p>Turn the main switch to “OFF” before disconnecting or connecting a coupler.</p>
2	Wire harness continuity.		<ul style="list-style-type: none"> • Check for continuity between the white terminal “1” and the white terminal “3” and between the black terminal “2” and the black terminal “4”. • If there is no continuity, the wire harness is defective. Replace the wire harness. • Check that there is no continuity between the ground and the white terminal “1” or white terminal “3” and between the ground and the black terminal “2” or black terminal “4”. • If there is continuity, the wire harness is defective. Replace the wire harness. • Check that there is no continuity between the white terminal “1” and the black terminal “2” and between the white terminal “3” and the black terminal “4”. • If there is continuity, the wire harness is defective. Replace the wire harness. <div style="text-align: center;"> </div> <p>5. ABS ECU 6. Front wheel sensor</p>

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	ABS_15	Symptom	No continuity in the front wheel sensor circuit.
Order	Item/components and probable cause		Check or maintenance job
3	Defective wheel sensor.		<p>If the above items were performed and no malfunctions were found, connect the ABS ECU coupler and front wheel sensor coupler, and then delete the fault codes. If fault code number "ABS_15" could not be deleted, the front wheel sensor is defective. Replace the front wheel sensor.</p> <p>TIP _____</p> <p>Before deleting the fault codes, record all of the fault codes and perform the related checks and maintenance.</p> <p>_____</p>

Fault code No.	ABS_16	Symptom	No continuity in the rear wheel sensor circuit.
Order	Item/components and probable cause		Check or maintenance job
1	Connections <ul style="list-style-type: none"> • Rear wheel sensor coupler • ABS ECU coupler 		<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, replace the wire harness and connect the coupler securely. <p>TIP _____</p> <p>Turn the main switch to "OFF" before disconnecting or connecting a coupler.</p> <p>_____</p>

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	ABS_16	Symptom	No continuity in the rear wheel sensor circuit.
Order	Item/components and probable cause		Check or maintenance job
2	Wire harness continuity.		<ul style="list-style-type: none"> Check for continuity between the gray terminal "1" and the gray terminal "3" and between the white terminal "2" and the white terminal "4". If there is no continuity, the wire harness is defective. Replace the wire harness. Check that there is no continuity between the ground and the gray terminal "1" or gray terminal "3" and between the ground and the white terminal "2" or white terminal "4". If there is continuity, the wire harness is defective. Replace the wire harness. Check that there is no continuity between the gray terminal "1" and the white terminal "2" and between the gray terminal "3" and the white terminal "4". If there is continuity, the wire harness is defective. Replace the wire harness. <div style="text-align: center;">  </div> <p style="text-align: center;">5. ABS ECU 6. Rear wheel sensor</p>
3	Defective wheel sensor.		<p>If the above items were performed and no malfunctions were found, connect the ABS ECU coupler and rear wheel sensor coupler, and then delete the fault codes. If fault code number "ABS_16" could not be deleted, the rear wheel sensor is defective. Replace the rear wheel sensor.</p> <p>TIP _____</p> <p>Before deleting the fault codes, record all of the fault codes and perform the related checks and maintenance.</p> <p>_____</p>
Fault code No.	ABS_17 ABS_45	Symptom	Missing pulses detected in the front wheel sensor signal.
Order	Item/components and probable cause		Check or maintenance job
1	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-25.

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Fault code No.	ABS_17 ABS_45	Symptom	Missing pulses detected in the front wheel sensor signal.
Order	Item/components and probable cause		Check or maintenance job
2	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-26.
3	Defective sensor rotor.		<ul style="list-style-type: none"> • Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.

Fault code No.	ABS_18 ABS_46	Symptom	Missing pulses detected in the rear wheel sensor signal.
Order	Item/components and probable cause		Check or maintenance job
1	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-34.
2	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-34.
3	Defective sensor rotor.		<ul style="list-style-type: none"> • Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.

Fault code No.	ABS_21	Symptom	Hydraulic unit solenoid circuit is open or short-circuited.
Order	Item/components and probable cause		Check or maintenance job
1	Open or short circuit in solenoid circuit.		Replace the hydraulic unit assembly.

Fault code No.	ABS_22	Symptom	Start switch signal is not received properly (start switch circuit or start switch monitor circuit).
Order	Item/components and probable cause		Check or maintenance job
1	Engine startability.		Check the electric starting system. Refer to "ELECTRIC STARTING SYSTEM" on page 8-7.

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	ABS_22	Symptom	Start switch signal is not received properly (start switch circuit or start switch monitor circuit).
Order	Item/components and probable cause		Check or maintenance job
2	Connections <ul style="list-style-type: none"> • Starter relay coupler • ABS ECU coupler • Right handlebar switch coupler 		<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, replace the wire harness and connect the coupler securely. <p>TIP _____</p> Turn the main switch to “OFF” before disconnecting or connecting a coupler.
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> • Replace if there is an open or short circuit. • Between ABS ECU coupler and joint coupler. (blue/white–blue/white) • Between joint coupler and ABS ECU coupler. (blue/white–blue/white) • Between ABS ECU coupler and joint coupler. (white/blue–white/blue) • Between joint coupler and right handlebar switch (start/engine stop switch) coupler. (white/blue–white/blue)
Fault code No.	ABS_23	Symptom	Brake light signal is not received properly when main switch is turned to “ON” (brake light circuit, or front or rear brake light switch circuit).
Order	Item/components and probable cause		Check or maintenance job
1	Brake light operation. <ul style="list-style-type: none"> • Burned-out brake light bulb • Defective brake switch and brake light relays 		<ul style="list-style-type: none"> • Check the brake light. Repair or replace the tail/brake light if necessary. Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 8-172. • Check the brake switch and brake light relays. Refer to “CHECKING THE RELAYS” on page 8-177.
2	Connections <ul style="list-style-type: none"> • ABS ECU coupler • Brake switch relay coupler • Brake light relay coupler • Front brake light switch coupler • Rear brake light switch coupler 		<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, replace the wire harness and connect the coupler securely. <p>TIP _____</p> Turn the main switch to “OFF” before disconnecting or connecting a coupler.

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	ABS_23	Symptom	Brake light signal is not received properly when main switch is turned to "ON" (brake light circuit, or front or rear brake light switch circuit).
Order	Item/components and probable cause		Check or maintenance job
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> • Replace if there is an open or short circuit. • Between ABS ECU coupler and brake light relay coupler. (yellow–yellow) • Between rear brake light switch coupler and brake switch relay coupler. (green/white–green/white) • Between front brake light switch coupler and brake switch relay coupler. (green/yellow–green/yellow) • Between brake switch relay coupler and brake light relay coupler. (light green/black–light green/black)
4	Water inside switch.		Use compressed air to blow out the water.
Fault code No.	ABS_24	Symptom	Brake light signal is not received properly while vehicle is traveling (brake light circuit, or front or rear brake light switch circuit).
Order	Item/components and probable cause		Check or maintenance job
1	Brake light operation. <ul style="list-style-type: none"> • Burned-out tail/brake light bulb • Defective brake switch and brake light relays • Improperly adjusted rear brake light switch • Defective front and rear brake light switches 		<ul style="list-style-type: none"> • Check the brake light. Repair or replace the tail/brake light if necessary. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-172. • Check the brake switch and brake light relays. Refer to "CHECKING THE RELAYS" on page 8-177. • Check the rear brake light switch for proper adjustment. Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-30. • Check the front and rear brake light switches. Refer to "CHECKING THE SWITCHES" on page 8-169.
2	Connections <ul style="list-style-type: none"> • ABS ECU coupler • Brake switch relay coupler • Brake light relay coupler • Front brake light switch connectors • Rear brake light switch coupler 		<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, replace the wire harness 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)

Fault code No.	ABS_24	Symptom	Brake light signal is not received properly while vehicle is traveling (brake light circuit, or front or rear brake light switch circuit).
Order	Item/components and probable cause		Check or maintenance job
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> • Replace if there is an open or short circuit. • Between ABS ECU coupler and brake light relay coupler. (yellow–yellow) • Between rear brake light switch coupler and brake switch relay coupler. (green/white–green/white) • Between front brake light switch coupler and brake switch relay coupler. (green/yellow–green/yellow) • Between brake switch relay coupler and brake light relay coupler. (light green/black–light green/black)
4	Water inside switch.		Use compressed air to blow out the water.

Fault code No.	ABS_31	Symptom	Solenoid relay is defective. Power is not supplied to the solenoid relay.
Order	Item/components and probable cause		Check or maintenance job
1	Battery voltage		Recharge or replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-174.
2	Blown ABS solenoid fuse.		Check the ABS solenoid fuse. If the ABS solenoid fuse is blown, replace the fuse and check the wire harness. Refer to “CHECKING THE FUSES” on page 8-173.
3	Connections • ABS ECU coupler		<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, replace the wire harness and connect the coupler securely. <p>TIP _____</p> <p>Turn the main switch to “OFF” before disconnecting or connecting a coupler.</p>
4	Open or short circuit in wire harness.		<ul style="list-style-type: none"> • Replace if there is an open or short circuit. • Between ABS ECU coupler and ABS solenoid fuse. (red/white–red/white)
5	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.

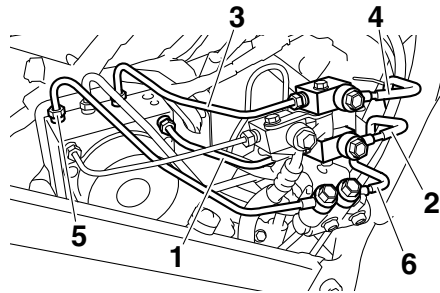
ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.		ABS_32	Symptom	Hydraulic unit solenoid relay is short-circuited.
Order	Item/components and probable cause		Check or maintenance job	
1	Short circuit in solenoid relay.		Replace the hydraulic unit assembly.	
2	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.	

Fault code No.		ABS_33	Symptom	ABS motor is defective. Power is not supplied to the ABS motor.
Order	Item/components and probable cause		Check or maintenance job	
1	Battery voltage		Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.	
2	Blown ABS motor fuse.		Check the ABS motor fuse. If the ABS motor fuse is blown, replace the fuse and check the wire harness. Refer to "CHECKING THE FUSES" on page 8-173.	
3	Connections <ul style="list-style-type: none"> • ABS ECU coupler • Starter relay coupler 		<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, replace the wire harness and connect the coupler securely. <p>TIP _____</p> <p>Turn the main switch to "OFF" before disconnecting or connecting a coupler.</p>	
4	Open or short circuit in wire harness and/or negative battery sub-wire harness.		<ul style="list-style-type: none"> • Replace if there is an open or short circuit. • Between ABS ECU coupler and ABS motor fuse. (red/blue-red/blue) • Between ABS ECU coupler and negative battery sub-wire harness coupler. (black/green-black/green) • Between negative battery sub-wire harness coupler and engine ground. (black-black) 	
5	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.	

Fault code No.		ABS_34	Symptom	Hydraulic unit ABS motor relay is short-circuited.
Order	Item/components and probable cause		Check or maintenance job	
1	Short circuit in ABS motor relay.		Replace the hydraulic unit assembly.	

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	ABS_41	Symptom	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is normal)
Order	Item/components and probable cause		Check or maintenance job
1	Rotation of wheel		<ul style="list-style-type: none"> • Check that there is no brake disc drag on the front wheel and make sure that it rotates smoothly. • Check the front wheel axle for loose bearings and bends, and the brake discs for distortion. Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-43.
2	Brake master cylinder and brake caliper		<ul style="list-style-type: none"> • Check that the brake fluid pressure is correctly transmitted to the brake calipers when the brake lever is operated and that the pressure decreases when the lever is released.
3	Brake fluid		<ul style="list-style-type: none"> • Visually check the brake fluid in the brake master cylinder reservoir and the brake fluid reservoir for water, foreign materials, solidification, and contamination. • Check for air in the brake lines.
4	Brake lines		<ul style="list-style-type: none"> • Check the brake lines for kinks and deterioration. <p style="font-size: small;">EWA3P6D005</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">⚠ WARNING</div> <p>Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake lines.</p> <ul style="list-style-type: none"> • Check that the connections of the brake lines from the brake master cylinder to the hydraulic unit and from the hydraulic unit to the front brake calipers and the metering valve are correct. <div style="text-align: center;">  </div> <p style="text-align: center;">See WARNING and TIP.</p>
5	Hydraulic unit assembly		<p>If the malfunction is not corrected after checking items (1) to (4), replace the hydraulic unit assembly. Be sure to connect the brake pipes and coupler correctly and securely. Check the hydraulic unit operation.</p> <p>Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-72.</p>

ABS (ANTI-LOCK BRAKE SYSTEM)

EWA3P6D006

WARNING

The front brakes will not function properly if the connections are reversed.

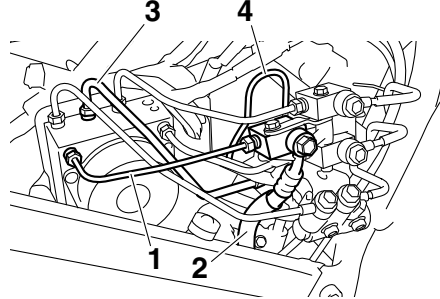
- Brake pipe/lower joint assembly “1” and brake pipe “2” inlet: from the front brake master cylinder
- Brake pipe/upper joint assembly “3” and brake pipe “4” outlet: to the front brake calipers
- Brake pipe “5” outlet: to the metering valve
- Brake pipe “6” outlet: to the right front brake caliper

TIP

- If the brake pipe inlet and outlet connections are incorrect on the hydraulic unit, the brake lever will be pulled to its full-stroke position without responding, and then it will be pushed back slowly without pulsating when the final check on page “[C-3] FINAL CHECK” on page 8-160 is performed.
- If the front and rear brake pipe connections are reversed on the hydraulic unit, the pulsating action in the brake lever and brake pedal will be performed in the reverse order when the final check on page “[C-3] FINAL CHECK” on page 8-160 is performed.
- If the brake pipes (to the proportioning valve and the metering valve) are switched during assembly, the brakes will continue to operate as normal. However, the reduction of the hydraulic pressure for the rear brake and part of the right front brake will be reversed during the ABS operation when the final check on page “[C-3] FINAL CHECK” on page 8-160 is performed.

Fault code No.	ABS_42 ABS_47	Symptom	Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.
Order	Item/components and probable cause		Check or maintenance job
1	Rotation of wheel		<ul style="list-style-type: none"> • Check that there is no brake disc drag on the rear wheel and make sure that it rotates smoothly. • Check for brake disc distortion. Refer to “CHECKING THE REAR BRAKE DISC” on page 4-56.
2	Brake master cylinder and brake caliper		<ul style="list-style-type: none"> • 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.
3	Brake fluid		<ul style="list-style-type: none"> • Visually check the brake fluid in the brake fluid reservoir for water, foreign materials, solidification, and contamination. • Check for air in the brake lines.

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	ABS_42 ABS_47	Symptom	Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.
Order	Item/components and probable cause	Check or maintenance job	
4	Brake lines	<ul style="list-style-type: none"> • Check the brake lines for kinks and deterioration (particularly between the hydraulic unit and the rear brake caliper). <p style="font-size: small;">EWA3P6D005</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">⚠ WARNING</div> <p>Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake lines.</p> <ul style="list-style-type: none"> • Check that the connections of the brake lines from the brake master cylinder to the hydraulic unit and from the hydraulic unit to the proportioning valve are correct. <div style="text-align: center;">  </div> <p style="text-align: center;">See WARNING and TIP.</p>	
5	Hydraulic unit assembly	<p>If the malfunction is not corrected after checking items (1) to (4), replace the hydraulic unit assembly. Be sure to connect the brake hose, brake pipe, and coupler correctly and securely. Check the hydraulic unit operation. Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-72.</p>	

EWA3P6D007

⚠ WARNING

The rear brake will not function properly if the connections are reversed.

- **Brake pipe/middle joint assembly “1” and brake hose “2” inlet: from the rear brake master cylinder**
- **Brake pipe “3” outlet: to the proportioning valve**
- **Brake pipe “4” outlet: to the rear brake caliper**

TIP

- If the brake pipe inlet and outlet connections are reversed on the hydraulic unit, the brake pedal will be pressed down to its full-stroke position without responding, and then it will be pushed back slowly without pulsating when the final check on page “[C-3] FINAL CHECK” on page 8-160 is performed.
- If the front and rear brake pipe connections are reversed on the hydraulic unit, the pulsating action in the brake lever and brake pedal will be performed in the reverse order when the final check on page “[C-3] FINAL CHECK” on page 8-160 is performed.

ABS (ANTI-LOCK BRAKE SYSTEM)

- If the brake pipes (to the proportioning valve and the metering valve) are switched during assembly, the brakes will continue to operate as normal. However, the reduction of the hydraulic pressure for the rear brake and part of the right front brake will be reversed during the ABS operation when the final check on page “[C-3] FINAL CHECK” on page 8-160 is performed.

Fault code No.	ABS_43	Symptom	Incorrect signal from the front wheel sensor is detected.
Order	Item/components and probable cause		Check or maintenance job
1	Installed condition of wheel sensor.		Check for looseness. Properly install or replace the wheel sensor if necessary.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to “CHECKING THE FRONT WHEEL” on page 4-25.
3	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-26.
4	Defective sensor rotor.		<ul style="list-style-type: none"> • Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.

Fault code No.	ABS_44	Symptom	Incorrect signal from the rear wheel sensor is detected.
Order	Item/components and probable cause		Check or maintenance job
1	Installed condition of wheel sensor.		Check for looseness. Properly install or replace the wheel sensor if necessary.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to “CHECKING THE REAR WHEEL” on page 4-34.
3	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-34.
4	Defective sensor rotor.		<ul style="list-style-type: none"> • Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.		ABS_51 ABS_52	Symptom	Power voltage is too high.
Order	Item/components and probable cause		Check or maintenance job	
1	Battery voltage		Replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.	
2	Disconnected battery terminal (fault code No. ABS_52).		Check the connection. Replace or reconnect the terminal if necessary.	
3	Charging system		Check the charging system. Refer to "CHARGING SYSTEM" on page 8-13.	

Fault code No.		ABS_53	Symptom	Power voltage is too low.
Order	Item/components and probable cause		Check or maintenance job	
1	Battery voltage		Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.	
2	Connections • ABS ECU coupler		<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, replace the wire harness and connect the coupler securely. TIP _____ Turn the main switch to "OFF" before disconnecting or connecting a coupler.	
3	Open or short circuit in wire harness.		<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	Charging system		Check the charging system. Refer to "CHARGING SYSTEM" on page 8-13.	

Fault code No.		ABS_54	Symptom	Power voltage is too low.
Order	Item/components and probable cause		Check or maintenance job	
1	Battery voltage		Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-174.	
2	Connections • ABS ECU coupler • Starter relay coupler		<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, replace the wire harness and connect the coupler securely. TIP _____ Turn the main switch to "OFF" before disconnecting or connecting a coupler.	

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.		ABS_54	Symptom	Power voltage is too low.
Order	Item/components and probable cause		Check or maintenance job	
3	Open or short circuit in wire harness.		<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) • Between ABS ECU coupler and ABS solenoid fuse. (red/white–red/white) • Between ABS ECU coupler and joint coupler. (blue/white–blue/white) • Between joint coupler and starter relay coupler. (blue/white–blue/white) 	
4	Charging system		Check the charging system. Refer to “CHARGING SYSTEM” on page 8-13.	

Fault code No.		ABS_56	Symptom	Hydraulic unit sensor power monitor circuit is abnormal.
Order	Item/components and probable cause		Check or maintenance job	
1	Defective internal monitor circuit (sensor power).		Replace the hydraulic unit assembly.	

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	ABS_63	Symptom	Front wheel sensor power is abnormal.
Order	Item/components and probable cause		Check or maintenance job
1	Short circuit in wire harness.		<ul style="list-style-type: none"> • Check that there is no short circuit between the white terminal “1” and the black terminal “2”. • Check that there is no short circuit between the frame ground and the black terminal “2”. • If there is a short circuit, the wire harness is defective. Replace the wire harness. <p>TIP _____</p> <p>Disconnect the ABS ECU coupler before checking the wire harness.</p>
2	Short circuit in front wheel sensor lead.		<ul style="list-style-type: none"> • Check that there is no short circuit between the white terminal “3” and the gray terminal “4”. • Check that there is no short circuit between the frame ground and the white terminal “3”. • If there is a short circuit, the front wheel sensor is defective. Replace the front wheel sensor. <div style="text-align: center;"> </div> <p>5. ABS ECU 6. Front wheel sensor</p>
3	Hydraulic unit internal malfunction.		Replace the hydraulic unit assembly.

ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	ABS_64	Symptom	Rear wheel sensor power is abnormal.
Order	Item/components and probable cause		Check or maintenance job
1	Short circuit in wire harness.		<ul style="list-style-type: none"> • Check that there is no short circuit between the gray terminal “1” and the white terminal “2”. • Check that there is no short circuit between the frame ground and the white terminal “2”. • If there is a short circuit, the wire harness is defective. Replace the wire harness. <p>TIP _____</p> <p>Disconnect the ABS ECU coupler before checking the wire harness.</p>
2	Short circuit in rear wheel sensor lead.		<ul style="list-style-type: none"> • Check that there is no short circuit between the white terminal “3” and the gray terminal “4”. • Check that there is no short circuit between the frame ground and the white terminal “3”. • If there is a short circuit, the rear wheel sensor is defective. Replace the rear wheel sensor. <div style="text-align: center; margin: 10px 0;"> </div> <p>5. ABS ECU 6. Rear wheel sensor</p>
3	Hydraulic unit internal malfunction.		Replace the hydraulic unit assembly.

ABS (ANTI-LOCK BRAKE SYSTEM)

EAS1MC1007


[C-1] DELETING THE FAULT CODES

1. Check:
 - Engine stop due to sidestand operation

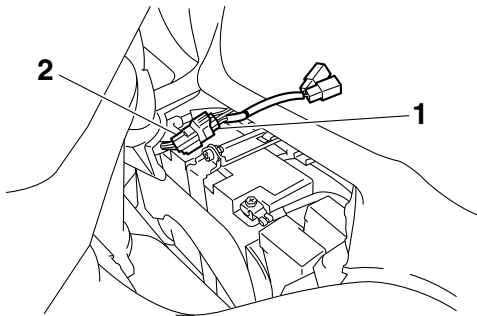
EWA1MC1021

WARNING

- Make sure to elevate the rear wheel.
- Make sure that there are no persons or objects in front of the vehicle.

- a. Place the vehicle on the centerstand so that the rear wheel is elevated.
- b. Shift the transmission into gear and extend the sidestand.
- c. Turn the main switch to “ON”.
- d. Push the “” side of the start/engine stop switch, and check that the starter motor does not operate. If the starter motor operates, check the ignition circuit cut-off system. Refer to “ENGINE STOPPING DUE TO SIDE- STAND OPERATION” on page 8-3.
- e. Turn the main switch to “OFF”.
- f. Retract the sidestand.


2. Connect the test coupler adapter “1” to the ABS test coupler “2”. Refer to “[A-4] THE ABS WARNING LIGHT COME ON” on page 8-135.




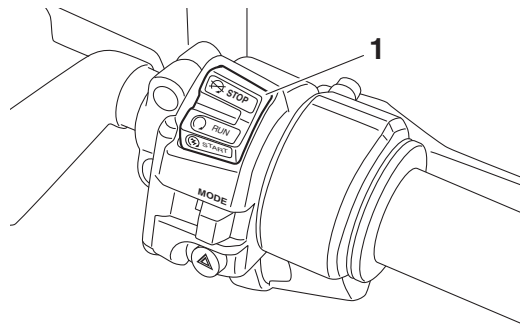
3. Turn the main switch to “ON”.
Fault codes will be displayed in the multi-function meter right display.
4. Shift the transmission into gear and extend the sidestand.

ECA1MC1026

NOTICE

If the “” side of the start/engine stop switch is pushed without performing step 4, the starter motor gear or other parts may be damaged.

5. Push the “” side of the start/engine stop switch “1” at least 10 times in 4 seconds to delete the fault codes.



6. The multi-function meter right display switches to the normal display and the ABS warning light flashes in 0.5 second-intervals while the fault codes are being deleted.
7. Turn the main switch to “OFF”.
8. Turn the main switch to “ON” again.

TIP

If fault codes are still displayed in the multi-function meter right display, the malfunctions have not been repaired. Diagnose the malfunctions using the fault codes.

9. Turn the main switch to “OFF”.
10. Disconnect the test coupler adapter from the ABS test coupler, and then install the protective cap onto the ABS test coupler. Deleting the fault codes is now finished.

TIP

Do not forget to install the protective cap onto the ABS test coupler.

ECA3P6D014

NOTICE

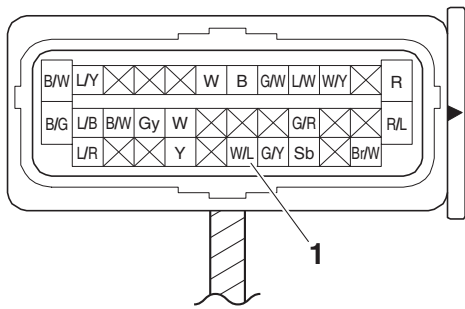
Since the fault codes remain in the memory of the ABS ECU until they are deleted, always delete the fault codes after the service has been completed.


EAS1MC1008

[C-2] DELETE FUNCTION TEST

1. Check:
 - Engine stop due sidestand operationRefer to “[C-1] DELETING THE FAULT CODES” on page 8-158.
2. Disconnect the ABS ECU coupler.
3. Connect the test coupler adapter to the ABS test coupler.
4. Turn the main switch to “ON”.

ABS (ANTI-LOCK BRAKE SYSTEM)



- b. Shift the transmission into gear and extend the sidestand.
- c. Push the “” side of the start/engine stop switch.
- d. Measure the ABS ECU voltage.



8. If the above-mentioned checks are within specification, replace the hydraulic unit assembly.

EAS1MC1009

[C-3] FINAL CHECK

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 3-14.
2. Check the wheel sensor housings and wheel sensors for proper installation. Refer to “INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)” on page 4-29 and “INSTALLING THE REAR WHEEL (REAR BRAKE DISC)” on page 4-36.
3. Perform hydraulic unit operation test 1 or 2. Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-72.
4. Delete the fault codes. Refer to “[C-1] DELETING THE FAULT CODES” on page 8-158.
5. Check the ABS warning light. Refer to “CHECKING THE ABS WARNING LIGHT” on page 4-75.

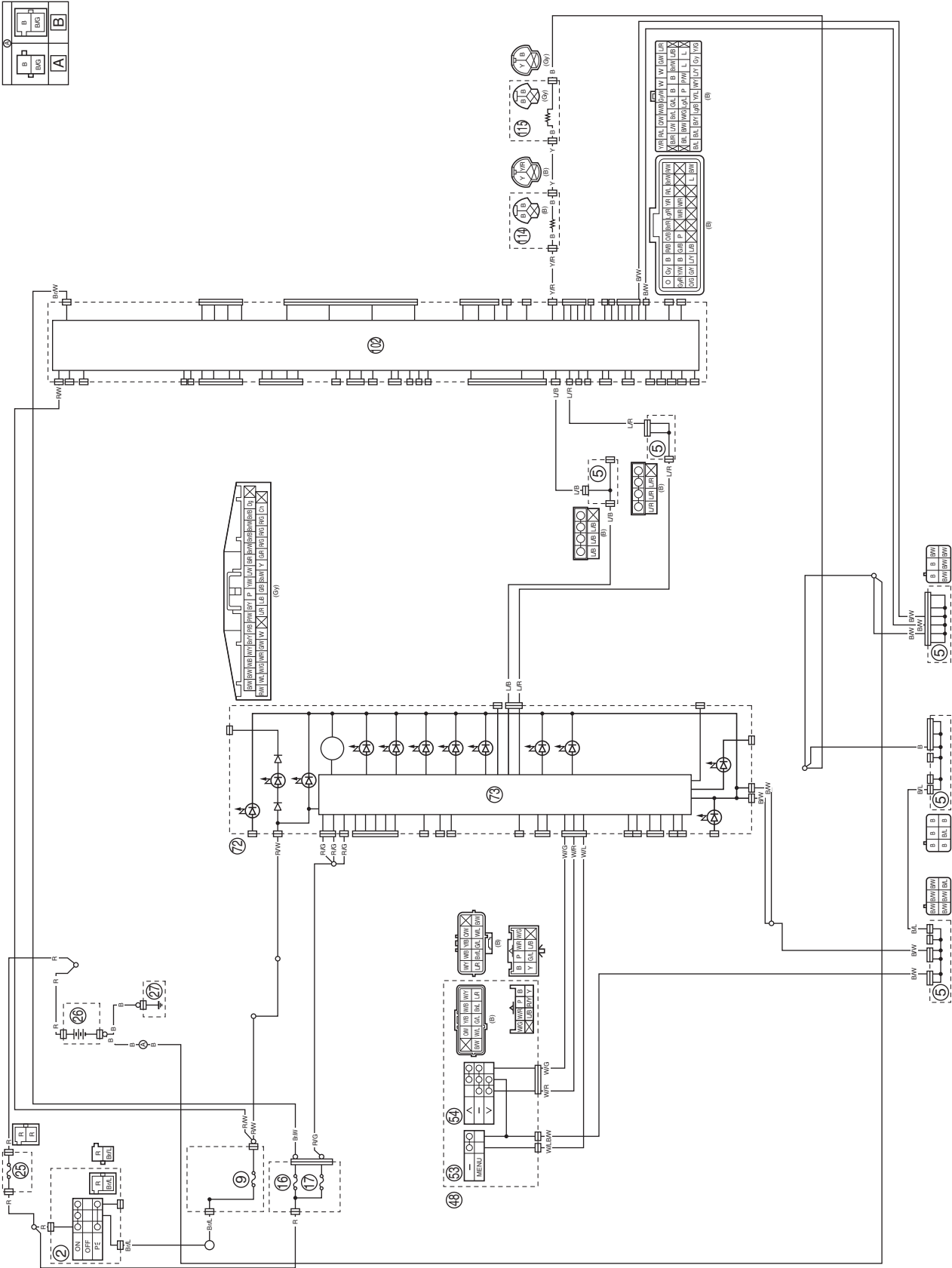
GRIP WARMER SYSTEM

ET3P66016

GRIP WARMER SYSTEM

ET3P66017

CIRCUIT DIAGRAM



- 2. Main switch
- 5. Joint coupler
- 9. Ignition fuse
- 16. Fuel injection system fuse
- 17. Backup fuse
- 25. Main fuse
- 26. Battery
- 27. Engine ground
- 48. Left handlebar switch
- 53. Menu switch
- 54. Select switch
- 72. Meter assembly
- 73. Multi-function meter
- 102. ECU (engine control unit)
- 114. Left grip warmer
- 115. Right grip warmer
- A. Wire harness
- B. Negative battery sub-wire harness

ET3P66019

TROUBLESHOOTING

TIP

- Before troubleshooting, remove the following part(s):

 1. Right upper inner panel
 2. Lower center cover
 3. Fuel tank
 4. T-bar

The grip warmers do not become warm at all.

1. Check that the engine trouble warning light is on and that "Err" is displayed in the multi-function meter center display.	NG →	Perform the troubleshooting for fault code No. 89. Refer to "TROUBLESHOOTING DETAILS" on page 8-40.
OK ↓		
2. Check that the grip warmers are not turned off.	NG →	Adjust the temperature levels of the grip warmer settings.
OK ↓		
3. Check the fuses. (Main, ignition, backup, and fuel injection system) Refer to "CHECKING THE FUSES" on page 8-173.	NG →	Replace the fuse(s).
OK ↓		
4. Check that the engine is started.	NG →	Start the engine.
OK ↓		
5. Check the grip warmers. Refer to "CHECKING THE GRIP WARMERS" on page 8-193.	NG →	Replace the grip warmer(s).
OK ↓		
6. Check the entire grip warmer system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-161.	NG →	Properly connect or replace the wiring harness.
OK ↓		
7. Execute the diagnostic mode (code No. 57) to turn on the grip warmers, and then check that they become warm.	NG →	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.
OK ↓		
Replace the meter assembly.		

GRIP WARMER SYSTEM

The grip warmers are abnormally hot while the engine is idling.

1. Check that the temperature level of the low grip warmer setting is set to "1".

NG →

Adjust the temperature levels of the grip warmer settings.

OK ↓

Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.

The grip warmers do not become very warm while the vehicle is traveling.

1. Check that the temperature level of the high grip warmer setting is set to "10".

NG →

Adjust the temperature levels of the grip warmer settings.

OK ↓

2. Check that the engine trouble warning light is on and that fault code No. 42 is displayed in the multi-function meter right display.

NG →

Perform the troubleshooting for fault code No. 42. Refer to "TROUBLESHOOTING DETAILS" on page 8-40.

OK ↓

Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-174.

The temperature levels of the grip warmer settings cannot be changed.

1. Check the left handlebar switch. Refer to "CHECKING THE SWITCHES" on page 8-169.

NG →

Replace the left handlebar switch.

OK ↓

2. Check the wire harness between the left handlebar switch and the meter assembly.

NG →

Properly connect or replace the wiring harness.

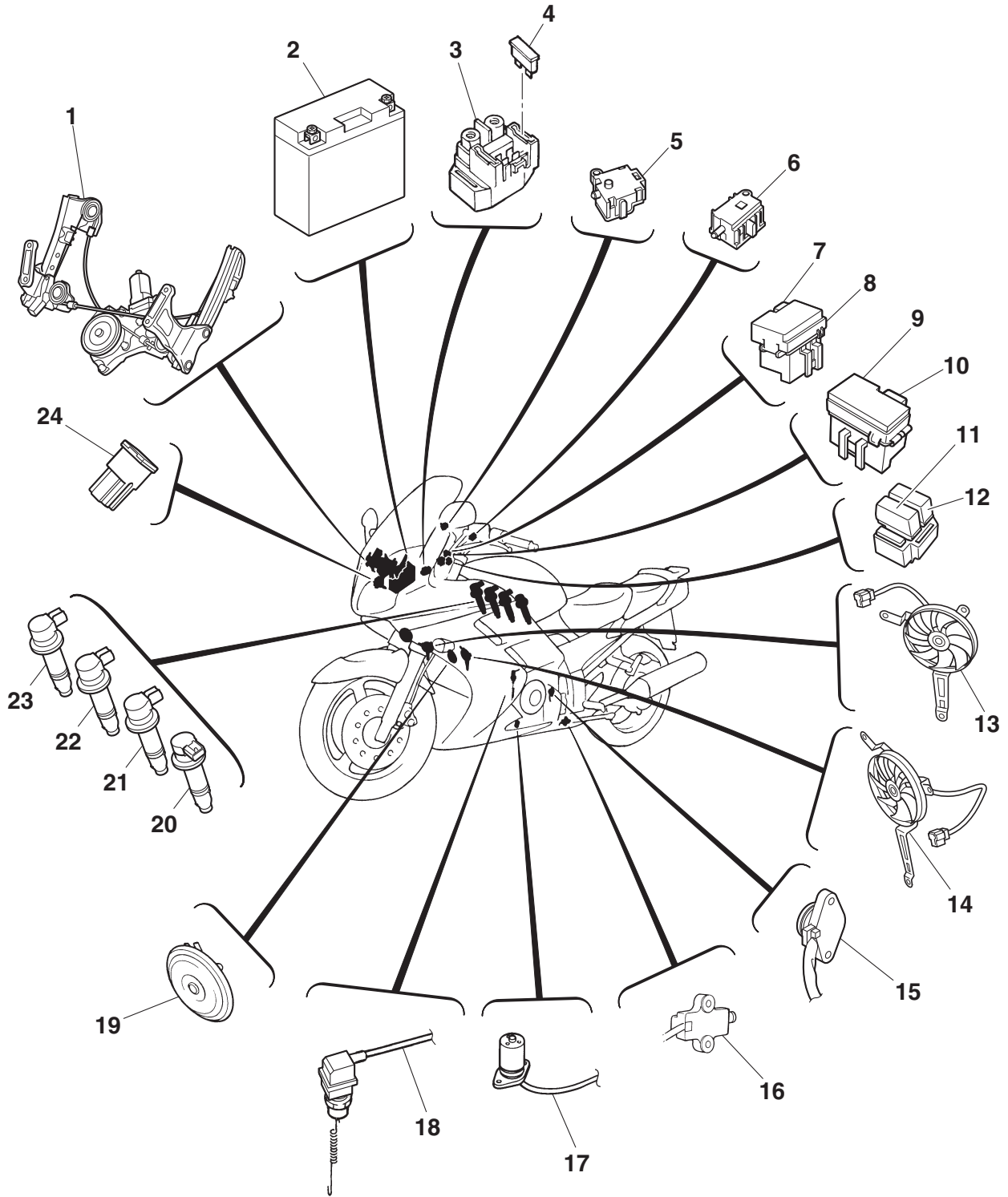
OK ↓

Replace the meter assembly.

ELECTRICAL COMPONENTS

EAS27970

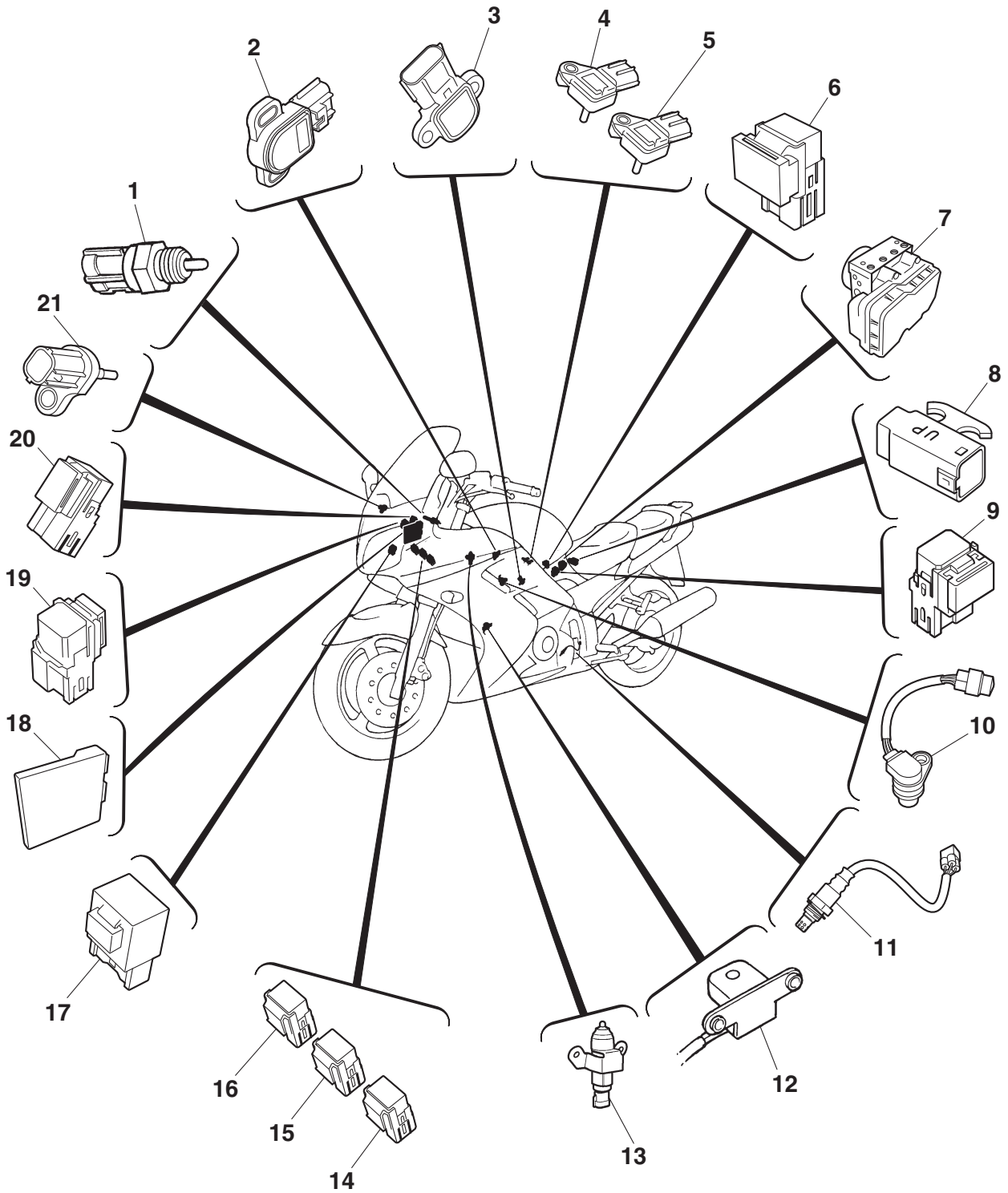
ELECTRICAL COMPONENTS



ELECTRICAL COMPONENTS

1. Windshield drive unit
2. Battery
3. Starter relay
4. Cooling system fuse
5. Front brake light switch
6. Clutch switch
7. Windshield drive system fuse
8. Fuse box 1
9. Fuse box 2
10. Hazard lighting fuse
11. Cruise control system fuse
12. Brake light fuse
13. Right radiator fan motor
14. Left radiator fan motor
15. Gear position switch
16. Sidestand switch
17. Oil level switch
18. Rear brake light switch
19. Horn
20. Ignition coil #1
21. Ignition coil #2
22. Ignition coil #3
23. Ignition coil #4
24. Main fuse

ELECTRICAL COMPONENTS



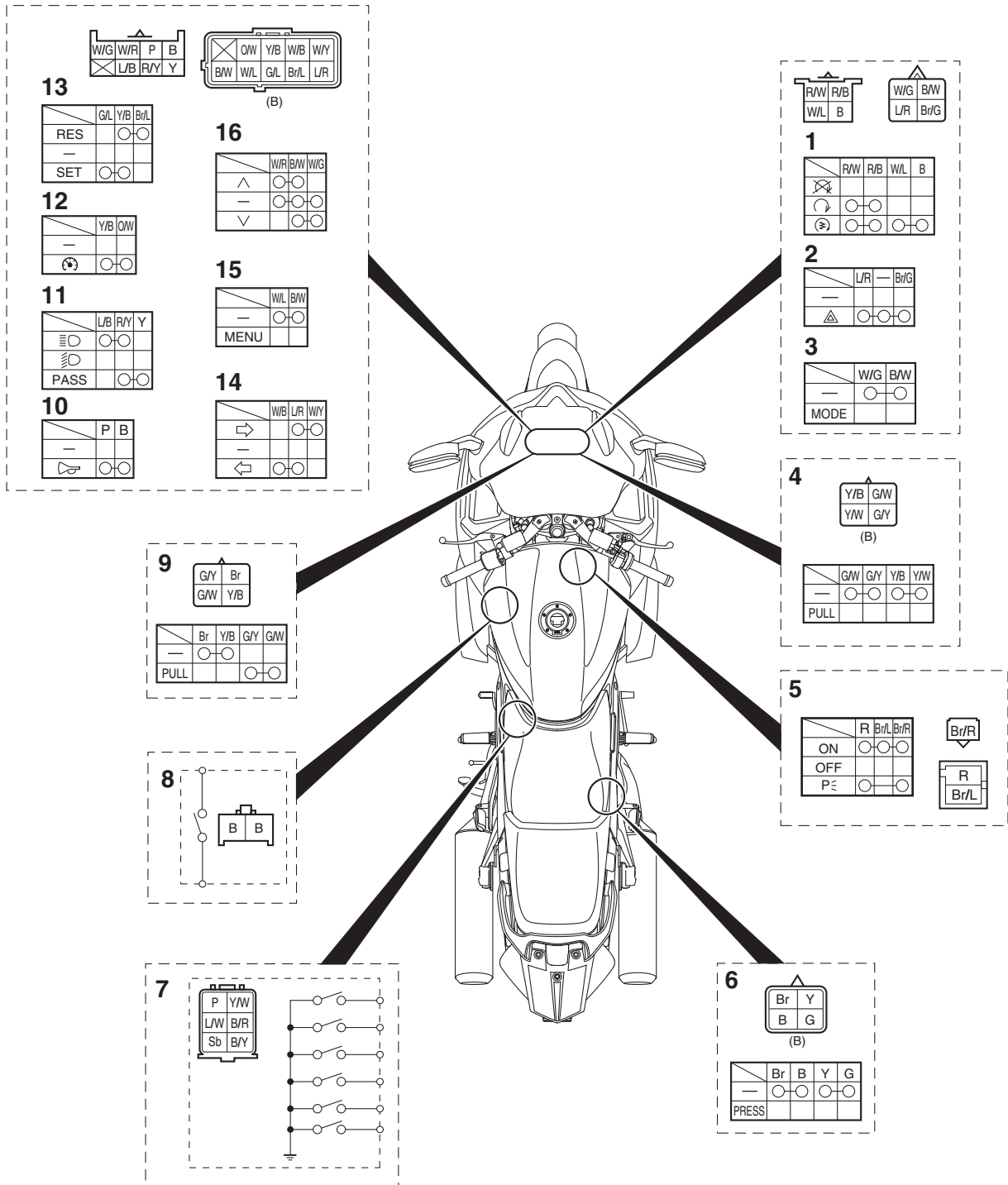
ELECTRICAL COMPONENTS

1. Coolant temperature sensor
2. Accelerator position sensor
3. Throttle position sensor
4. Intake air pressure sensor
5. Atmospheric pressure sensor
6. Brake light relay
7. Hydraulic unit assembly
8. Lean angle sensor
9. Brake switch relay
10. Cylinder identification sensor
11. O₂ sensor
12. Crankshaft position sensor
13. Accessory box solenoid
14. Windshield drive unit relay (up)
15. Windshield drive unit relay (down)
16. Headlight relay (dimmer)
17. Relay unit
18. ECU (engine control unit)
19. Radiator fan motor relay
20. Headlight relay (on/off)
21. Air temperature sensor

ELECTRICAL COMPONENTS

EAS27980

CHECKING THE SWITCHES



ELECTRICAL COMPONENTS

1. Start/engine stop switch
2. Hazard switch
3. Mode switch
4. Front brake light switch
5. Main switch
6. Rear brake light switch
7. Gear position switch
8. Sidestand switch
9. Clutch switch
10. Horn switch
11. Dimmer/pass switch
12. Cruise control power switch
13. Cruise control setting switch
14. Turn signal switch
15. Menu switch
16. Select 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

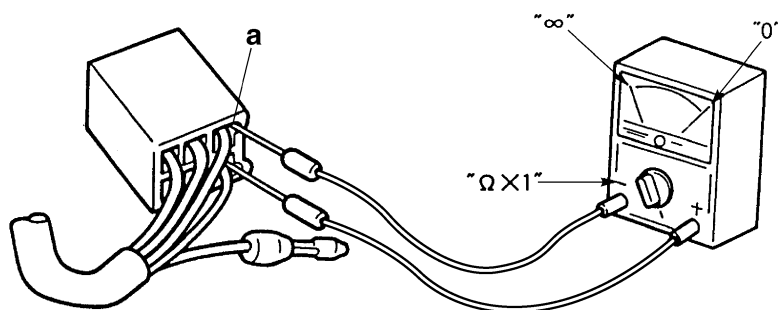
Never insert the tester probes into the coupler terminal slots "a". Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



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

TIP

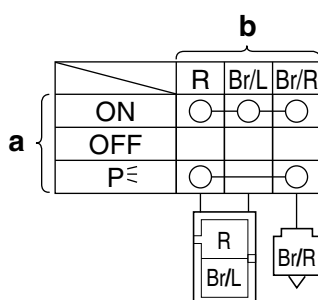
- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.
- When checking for continuity, switch back and forth between the switch positions a few times.



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/blue, and brown/red when the switch is turned to "ON" and between red and brown/red when the switch is turned to "P \leq ".



EAS27990

CHECKING THE BULBS AND BULB SOCKETS

TIP

Do not check any of the lights that use LEDs.

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

Damage/wear → Repair or replace the bulb, bulb socket or both.

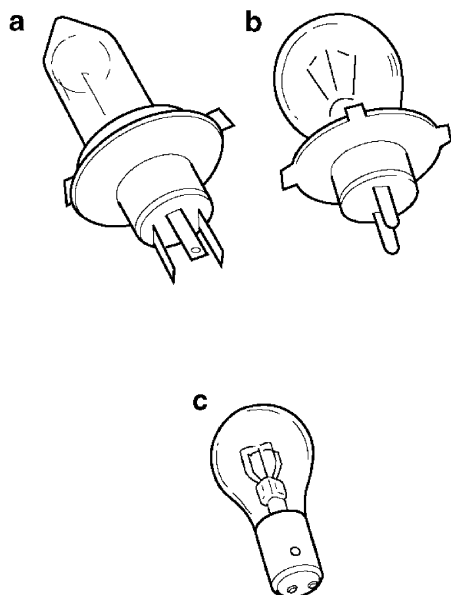
Improperly connected → Properly connect.

No continuity → Repair or replace the bulb, bulb socket or both.

Types of bulbs

The bulbs used on this vehicle are shown in the illustration.

- Bulbs “a” and “b” are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective sockets by turning them counterclockwise.
- Bulbs “c” are used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.



Checking the condition of the bulbs

The following procedure applies to all of the bulbs.

1. Remove:
 - Bulb

EW3P61001

WARNING

Since headlight bulbs get extremely hot, keep flammable products and your hands away from them until they have cooled down.

EC3P61002

NOTICE

- Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.
- Avoid touching the glass part of a headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

2. Check:

- Bulb (for continuity)
(with the pocket tester)
No continuity → Replace.

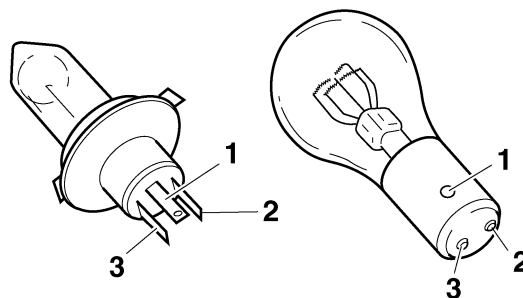


Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

Before checking for continuity, set the pocket tester to “0” and to the “Ω × 1” range.

- a. Connect the positive tester probe to terminal “1” and the negative tester probe to terminal “2”, and check the continuity.
- b. Connect the positive tester probe to terminal “1” and the negative tester probe to terminal “3”, and check the continuity.
- c. If either of the readings indicate no continuity, replace the bulb.




ELECTRICAL COMPONENTS

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 indicate no continuity, replace the bulb socket.

EAS28000

CHECKING THE FUSES

The following procedure applies to all of the fuses.

EC3P61003

NOTICE

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


1. Remove:
 - Right upper inner panel

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. Turn the main switch to “OFF”.
- b. Install a new fuse of the correct amperage rating.
- c. Set on the switches to verify if the electrical circuit is operational.
- d. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	50 A	1
ABS motor	30 A	1
Cooling system	30 A	1
Headlight	25 A	1
ABS solenoid	20 A	1
Ignition	20 A	1
Windshield drive system	20 A	1
Fuel injection system	15 A	1
Signaling system	10 A	1
Left radiator fan motor	10 A	1
Right radiator fan motor	10 A	1
Electric throttle valve	7.5 A	1
Hazard lighting	7.5 A	1
ABS ECU	7.5 A	1
Backup	7.5 A	1
Auxiliary DC jack	3 A	1
Cruise control system	1 A	1
Brake light	1 A	1
Spare	30 A	2
Spare	25 A	1
Spare	20 A	1
Spare	15 A	1
Spare	10 A	1
Spare	7.5 A	1
Spare	3 A	1
Spare	1 A	1

EWA13310

WARNING

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electri-

cal system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.



4. Install:
- Right upper inner panel
Refer to “GENERAL CHASSIS” on page 4-1.

EAS1MC1024

REPLACING THE ECU (engine control unit)

1. Turn the main switch to “OFF”.
2. Replace the ECU (engine control unit).
3. Clean the throttle bodies and reset the ISC (idle speed control) learning value.
Refer to “CHECKING AND CLEANING THE THROTTLE BODIES” on page 7-7.
4. Check:
 - Engine idling speed
Start the engine, warm it up, and then measure the engine idling speed.



EAS28030

CHECKING AND CHARGING THE BATTERY

EWA13290



Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid.

Therefore, always follow these preventive measures:

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

FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

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

INTERNAL

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

ECA1MC1001

NOTICE

- **This is a VRLA (Valve Regulated Lead Acid) battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.**
- **Charging time, charging amperage and charging voltage for an VRLA (Valve Regulated Lead Acid) battery are different from those of conventional batteries. The VRLA (Valve Regulated Lead Acid) battery should be charged according to the appropriate charging method. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.**

TIP

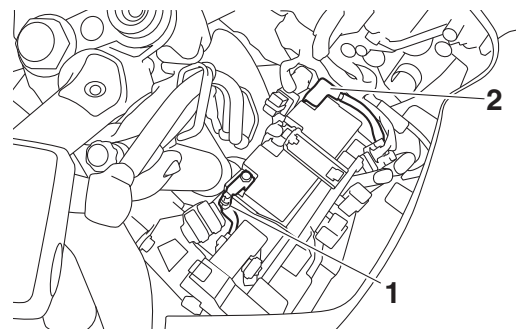
Since VRLA (Valve Regulated Lead Acid) batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Remove:
 - Right upper inner panel
Refer to “GENERAL CHASSIS” on page 4-1.
2. Disconnect:
 - Battery leads
(from the battery terminals)

ECA13640

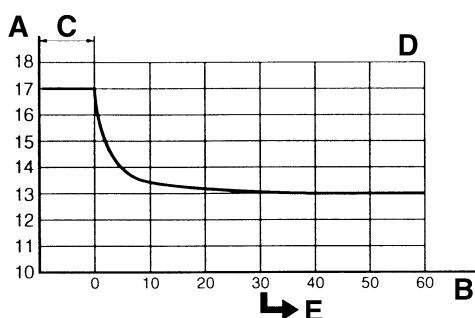
NOTICE

First, disconnect the negative battery lead “1”, and then positive battery lead “2”.



3. Remove:
 - Battery

- 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.

TIP _____

Voltage should be measured 30 minutes after the engine is stopped.

- Connect a charger and ammeter to the battery and start charging.

TIP _____

Set the charging voltage to 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

- Make sure that the current is higher than the standard charging current written on the battery.

TIP _____

If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

- Standard charging current is reached
Battery is good.
- Standard charging current is not reached
Replace the battery.

- Adjust the voltage so that the current is at the standard charging level.
- Set the time according to the charging time suitable for the open-circuit voltage.
- 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.
- 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

- Measure the open-circuit voltage prior to charging.

TIP _____

Voltage should be measured 30 minutes after the engine is stopped.

- Connect a charger and ammeter to the battery and start charging.
- 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.

- Charge the battery until the battery's charging voltage is 15 V.

TIP _____

Set the charging time at 20 hours (maximum).

- Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

ELECTRICAL COMPONENTS

12.8 V or more --- Charging is complete.
 12.7 V or less --- Recharging is required.
 Under 12.0 V --- Replace the battery.

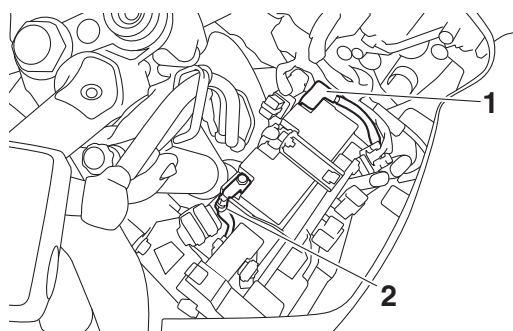


6. Install:
- Battery
7. Connect:
- Battery leads
(to the battery terminals)

ECA13630

NOTICE

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



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

Recommended lubricant
Dielectric grease

10. Install:
- Right upper inner panel
Refer to “GENERAL CHASSIS” on page 4-1.

EAS28040

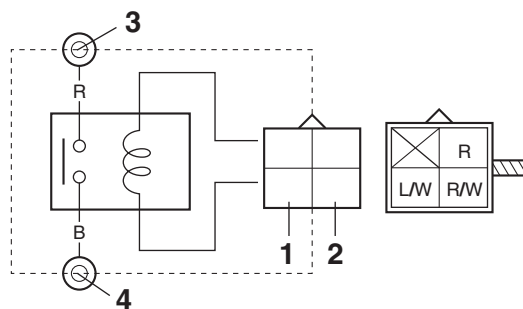
CHECKING THE RELAYS

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.

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

1. Disconnect the relay from the wire harness.
2. Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the relay terminals as shown.
Check the relay operation.
Out of specification → Replace.

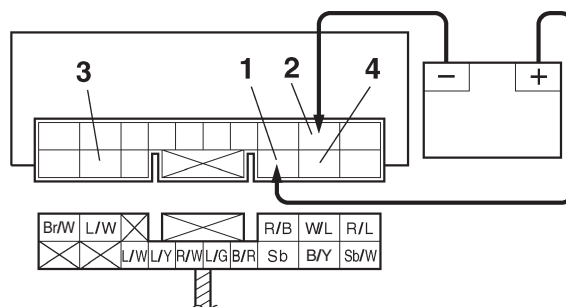
Starter relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between “3” and “4”)

Relay unit (starting circuit cut-off relay)

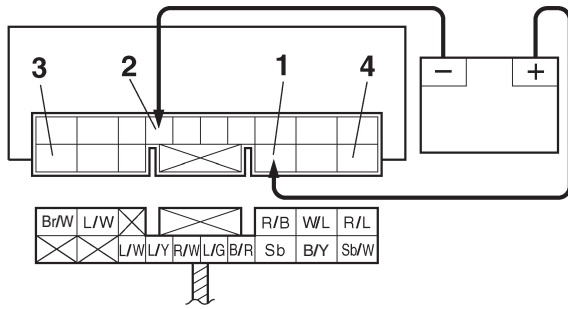


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe


Result
Continuity
(between “3” and “4”)

ELECTRICAL COMPONENTS

Relay unit (fuel pump relay)



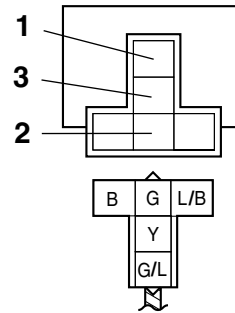
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe




Result
Continuity
(between "3" and "4")

Headlight relay (dimmer)

First step:

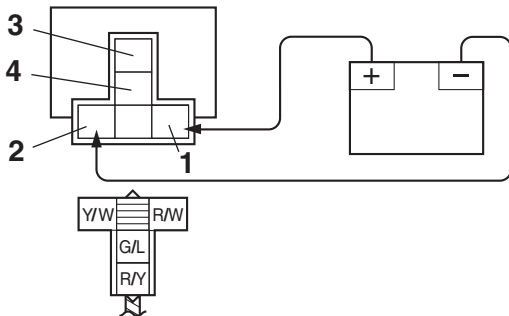


1. Positive tester probe
2. Negative tester probe
3. Negative tester probe




Result
Continuity
(between "1" and "2")
No continuity
(between "1" and "3")

Headlight relay (on/off)

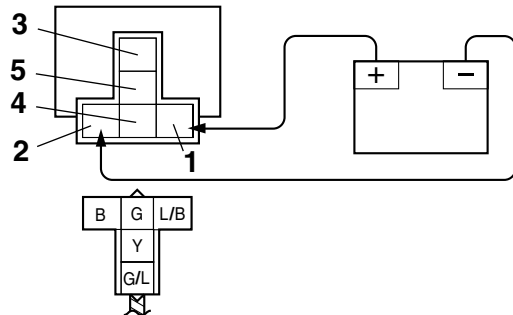


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe




Result
Continuity
(between "3" and "4")

Second step:



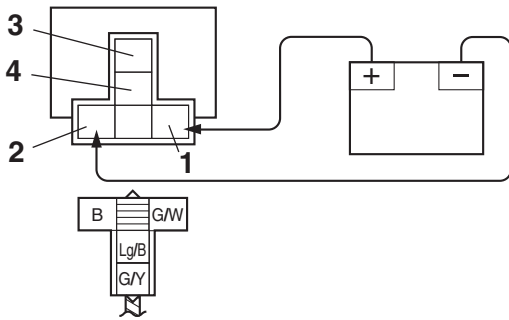
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe
5. Negative tester probe



Result
No continuity
(between "3" and "4")
Continuity
(between "3" and "5")

ELECTRICAL COMPONENTS

Brake switch relay

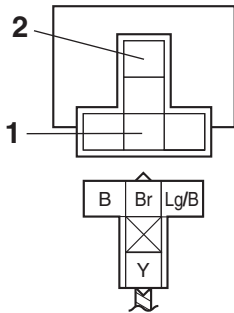


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

Brake light relay

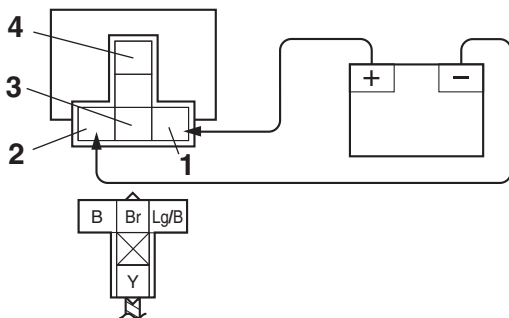
First step:



1. Positive tester probe
2. Negative tester probe

Result
Continuity
(between "1" and "2")

Second step:

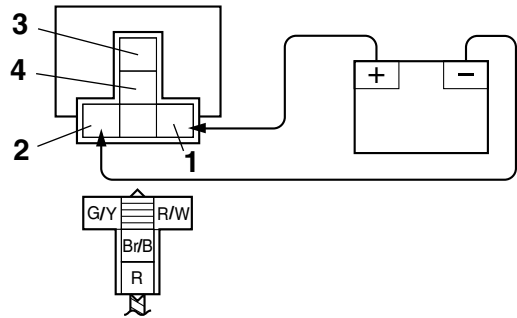


1. Positive battery terminal
2. Negative battery terminal

3. Positive tester probe
4. Negative tester probe

Result
No continuity
(between "3" and "4")

Radiator fan motor relay

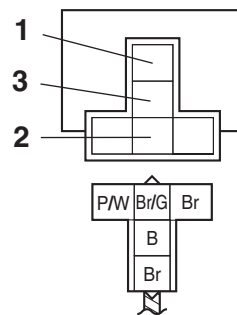


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

Windshield drive unit relay (down)

First step:

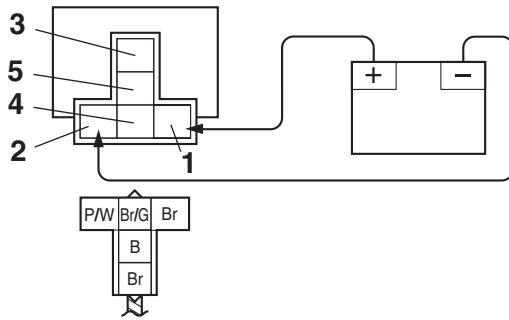


1. Positive tester probe
2. Negative tester probe
3. Negative tester probe

Result
Continuity
(between "1" and "2")
No continuity
(between "1" and "3")

ELECTRICAL COMPONENTS

Second step:



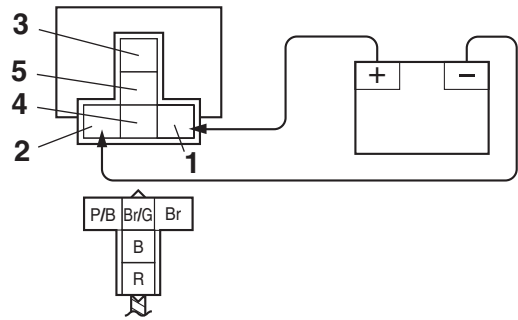
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe
5. Negative tester probe



Result

No continuity
(between "3" and "4")
Continuity
(between "3" and "5")

Second step:



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe
5. Negative tester probe

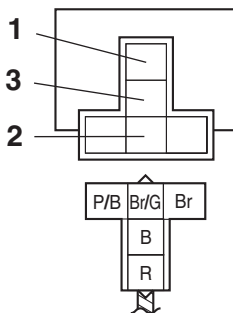


Result

No continuity
(between "3" and "4")
Continuity
(between "3" and "5")

Windshield drive unit relay (up)

First step:



1. Positive tester probe
2. Negative tester probe
3. Negative tester probe



Result

Continuity
(between "1" and "2")
No continuity
(between "1" and "3")

EAS28050

CHECKING THE RELAY UNIT (DIODE)

1. Check:

- Relay unit (diode)
Out of specification → Replace.



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

TIP

The pocket tester and the analog pocket tester readings are shown in the following table.



Continuity

Positive tester probe → sky blue “1”

Negative tester probe → black/yellow “2”

No continuity

Positive tester probe → black/yellow “2”

Negative tester probe → sky blue “1”

Continuity

Positive tester probe → sky blue “1”

Negative tester probe → black/red “3”

No continuity

Positive tester probe → black/red “3”

Negative tester probe → sky blue “1”

Continuity

Positive tester probe → sky blue “1”

Negative tester probe → sky blue/white “4”

No continuity

Positive tester probe → sky blue/white “4”

Negative tester probe → sky blue “1”

Continuity

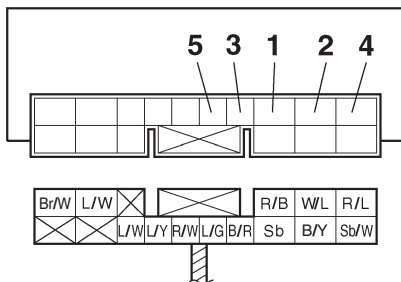
Positive tester probe → blue/green “5”

Negative tester probe → black/red “3”

No continuity

Positive tester probe → black/red “3”

Negative tester probe → blue/green “5”



- Disconnect the relay unit coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the relay unit terminal as shown.

- Check the relay unit (diode) for continuity.
- Check the relay unit (diode) for no continuity.

EAS28100

CHECKING THE IGNITION COILS

The following procedure applies to all of the ignition coils.

- Check:
 - Primary coil resistance
Out of specification → Replace.



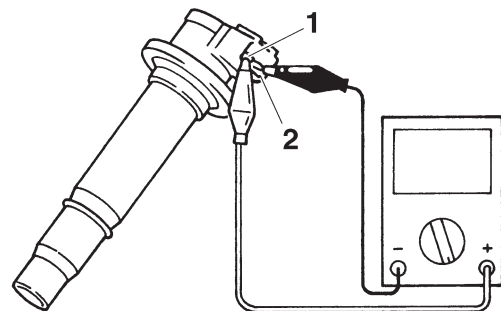
Primary coil resistance
1.19–1.61 Ω

- Remove the ignition coil from the spark plug.
- Connect the pocket tester ($\Omega \times 1$) to the ignition coil as shown.



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

- Positive tester probe → red/black “1”
- Negative tester probe →
 - Cylinder-#1 ignition coil orange “2”
 - Cylinder-#2 ignition coil gray/red “2”
 - Cylinder-#3 ignition coil orange/green “2”
 - Cylinder-#4 ignition coil gray “2”




- Measure the primary coil resistance.

- Check:
 - Secondary coil resistance
Out of specification → Replace.



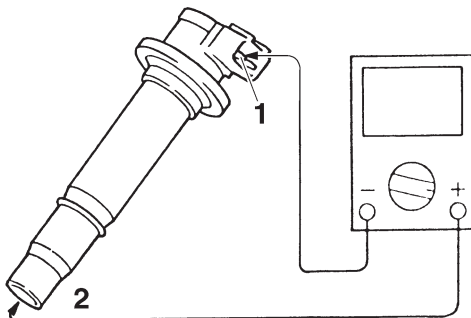
Secondary coil resistance
8.50–11.50 k Ω

a. Connect the pocket tester ($\Omega \times 1k$) to the ignition coil as shown.



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


- Positive tester probe → red/black “1”
- Negative tester probe → Spark plug terminal “2”



b. Measure the secondary coil resistance.

CHECKING THE IGNITION SPARK GAP

1. Check:
 - Ignition spark gap
Out of specification → Perform the ignition system troubleshooting, starting with step 5. Refer to “TROUBLESHOOTING” on page 8-4.



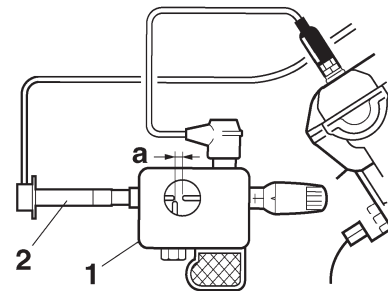
Minimum ignition spark gap
6.0 mm (0.24 in)

TIP _____
If the ignition spark gap is within specification, the ignition system circuit is operating normally.

a. Remove the ignition coil from the spark plug.
b. Connect the ignition checker “1” as shown.



Ignition checker
90890-06754
Oppama pet-4000 spark checker
YM-34487



2. Ignition coil
- c. Turn the main switch to “ON”.
- d. Measure the ignition spark gap “a”.
- e. Crank the engine by pushing the “⊞” side of the start/engine stop switch and gradually increase the spark gap until a misfire occurs.


CHECKING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:
 - Crankshaft position sensor coupler (from the wire harness)
2. Check:
 - Crankshaft position sensor resistance
Out of specification → Replace the crankshaft position sensor.



Crankshaft position sensor resistance
421–569 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”

ELECTRICAL COMPONENTS

EAS28150

CHECKING THE STATOR COIL

1. Disconnect:
 - Stator coil coupler
(from the wire harness)
2. Check:
 - Stator coil resistance
Out of specification → Replace the stator coil.



Stator coil resistance
0.128–0.192 Ω

- a. Connect the digital circuit tester to the stator coil coupler as shown.

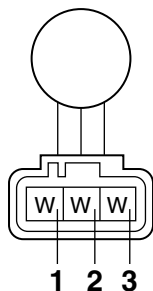


Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → white “1”
- Negative tester probe → white “2”

- Positive tester probe → white “1”
- Negative tester probe → white “3”

- Positive tester probe → white “2”
- Negative tester probe → white “3”



- b. Measure the stator coil resistance.

EAS28170

CHECKING THE RECTIFIER/REGULATOR

1. Check:
 - Charging voltage
Out of specification → Replace the rectifier/regulator.



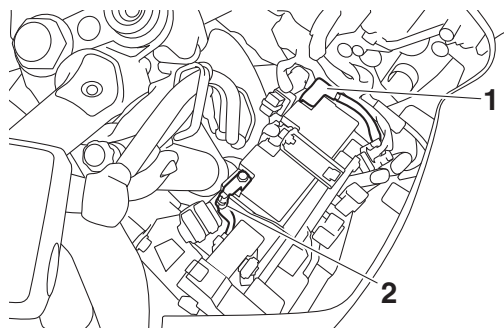
Charging voltage
14 V at 5000 r/min

- a. Connect the pocket tester (DC 20 V) to the battery terminals as shown.



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

- Positive tester probe → positive battery terminal “1”
- Negative tester probe → negative battery terminal “2”



- b. Start the engine and let it run at approximately 5000 r/min.
- c. Measure the charging voltage.

EAS28190

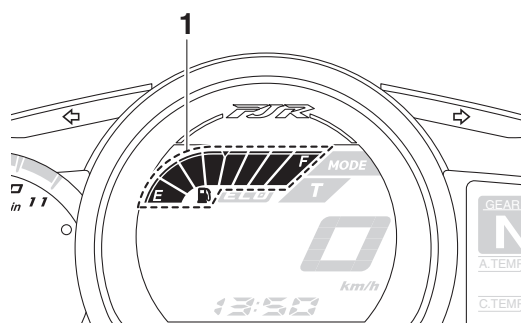
CHECKING THE OIL LEVEL SWITCH

1. Drain:
 - Engine oil
2. Remove:
 - Oil level switch
(from the oil pan)
3. Check:
 - Oil level switch continuity
Out of specification → Replace.



Oil level switch resistance
Minimum level position
No continuity
Maximum level position
Continuity

- a. Connect the pocket tester ($\Omega \times 1$) to the oil level switch terminal as shown.



EAS28250

CHECKING THE RADIATOR FAN MOTORS

The following procedure applies to both of the radiator fan motors.

1. Check:
 - Radiator fan motor
 - Faulty/rough movement → Replace.

- a. Disconnect the radiator fan motor coupler from the wire harness.
- b. Connect the battery (DC 12 V) as shown.

- Positive battery terminal → blue or yellow/blue "1"
- Negative battery terminal → black "2"

EAS1MC1086

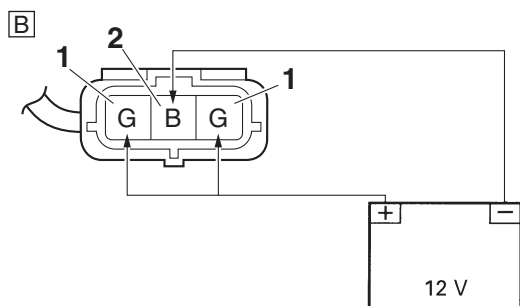
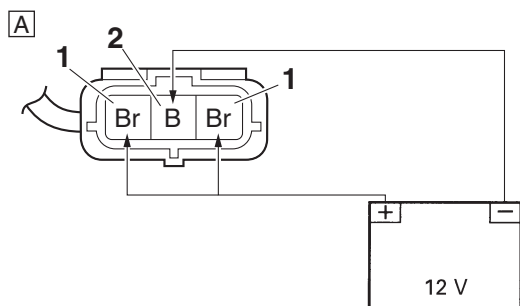
CHECKING THE FRONT TURN SIGNAL LIGHT ASSEMBLIES

The following procedure applies to both of the front turn signal light assemblies.

1. Check:
 - Front turn signal light assembly
 - Faulty → Replace.

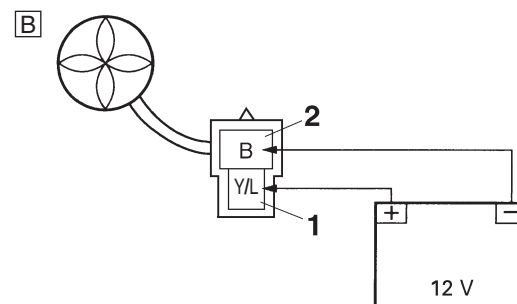
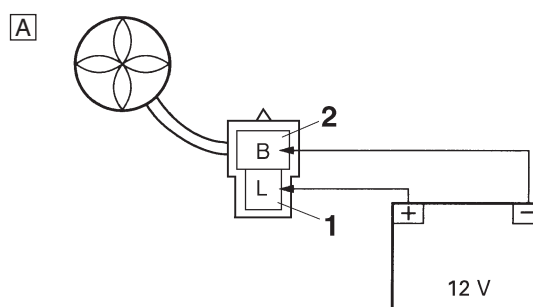
- a. Disconnect the front turn signal light assembly coupler from the wire harness.
- b. Connect the battery (DC 12 V) as shown.

- Positive battery terminal → brown or green "1"
- Negative battery terminal → black "2"



- A. Left side
- B. Right side

- c. Check that the front turn signal light comes on.



- A. Left side
- B. Right side

- c. Check the radiator fan motor movement.

EAS28260

CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
 - Coolant temperature sensor
 - Refer to "THERMOSTAT" on page 6-6.

EWA14130

⚠ WARNING

- Handle the coolant temperature sensor with special care.
- Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.

EAS29100

CHECKING THE ACCELERATOR POSITION SENSOR


- Remove:
 - Accelerator position sensor (from the throttle bodies)

EWA1MC1003


WARNING

- Handle the accelerator position sensor with special care.
- Never subject the accelerator position sensor to strong shocks. If the accelerator position sensor is dropped, replace it.

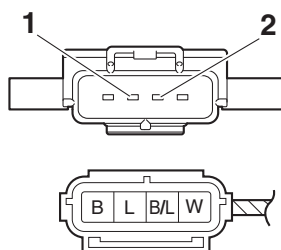
- Check:
 - Accelerator position sensor maximum resistance
Out of specification → Replace the accelerator position sensor.

	Resistance 1.08–2.52 kΩ
---	-----------------------------------

- Connect the pocket tester ($\Omega \times 1k$) to the accelerator position sensor terminals as shown.

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

- Positive tester probe → blue “1”
- Negative tester probe → black/blue “2”



- Measure the accelerator position sensor maximum resistance.

- Install:

- Accelerator position sensor

TIP

When installing the accelerator position sensor, adjust its angle properly. Refer to “ADJUSTING THE ACCELERATOR POSITION SENSOR” on page 7-11.

EAS1MC1083

CHECKING THE THROTTLE SERVO MOTOR

- Remove:
 - Air filter case
Refer to “GENERAL CHASSIS” on page 4-1.
- Check:
 - Throttle valve operation
Throttle valves do not fully close → Replace the throttle bodies.

- Connect two C-size batteries to the throttle servo motor terminals “1” as shown.

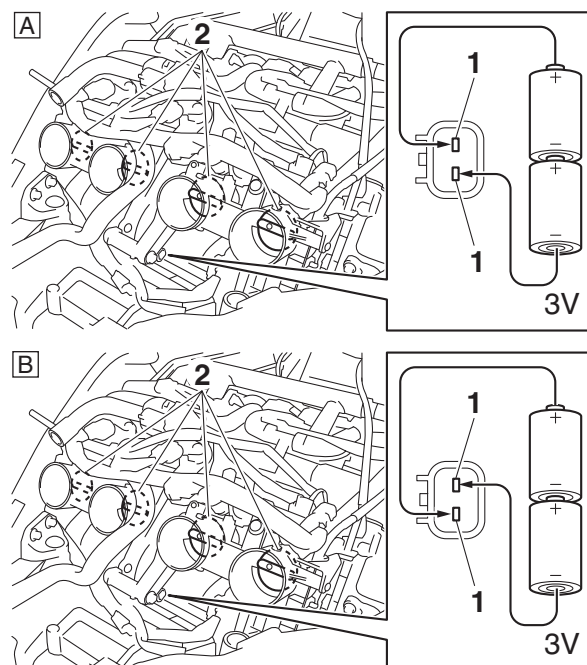
ECA1MC1004

NOTICE

Do not use a 12 V battery to operate the throttle servo motor.

TIP

Do not use old batteries to operate the throttle servo motor.



- Check that the throttle valves “2” open.
- Check that the throttle valves “2” fully close.


ELECTRICAL COMPONENTS

ECA1MC1005

NOTICE

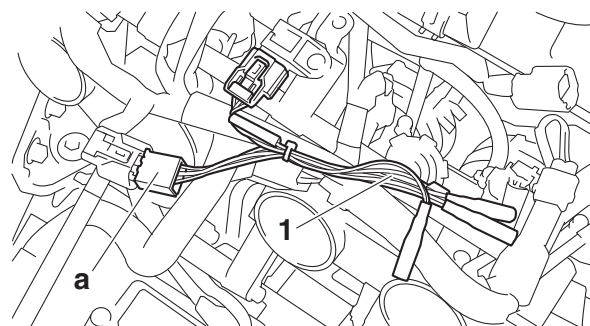
Pay attention to the installing direction of the test harness S-pressure sensor (3P) coupler "a".

- b. Connect the digital circuit tester (DCV) to the test harness S-pressure sensor (3P).



Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927
Test harness S- pressure sensor (3P)
90890-03207
YU-03207

- Positive tester probe → pink/white (wire harness color)
- Negative tester probe → black/blue (wire harness color)




- c. Turn the main switch to "ON".
 d. Measure the intake air pressure sensor output voltage.



EAS1MC1021

CHECKING THE ATMOSPHERIC PRESSURE SENSOR

1. Check:
- Atmospheric pressure sensor output voltage
 Out of specification → Replace.



Atmospheric pressure sensor output voltage
3.57–3.71 V


- a. Connect the test harness S-pressure sensor (3P) "1" to the atmospheric pressure sensor and wire harness as shown.

ECA1MC1005

NOTICE

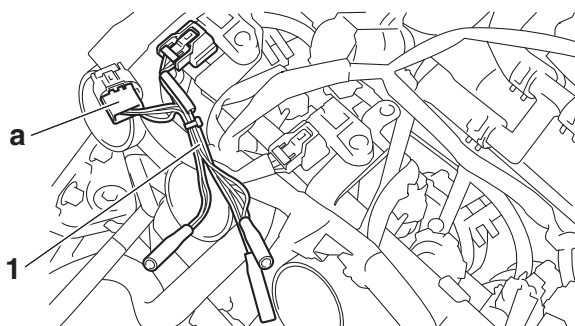
Pay attention to the installing direction of the test harness S-pressure sensor (3P) coupler "a".

- b. Connect the digital circuit tester (DCV) to the test harness S-pressure sensor (3P).



Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927
Test harness S- pressure sensor (3P)
90890-03207
YU-03207

- Positive tester probe → pink (wire harness color)
- Negative tester probe → black/blue (wire harness color)



- c. Turn the main switch to "ON".
 d. Measure the atmospheric pressure sensor output voltage.



EAS1MC1025

CHECKING THE AIR TEMPERATURE SENSOR

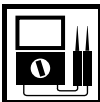
1. Remove:
- Air temperature sensor
 (from the windshield drive unit)

EWA1MC1020

WARNING

- Handle the air temperature sensor with special care.
- Never subject the air temperature sensor to strong shocks. If the air temperature sensor is dropped, replace it.

2. Check:
- Air temperature sensor resistance
 Out of specification → Replace.



Air temperature sensor resistance
 5.4–6.6 k Ω at 0 °C (32.0 °F)
 290–390 Ω at 80.0 °C (176.0 °F)

- a. Connect the pocket tester ($\Omega \times 100/\times 1 \text{ k}\Omega$) to the air temperature sensor terminals as shown.



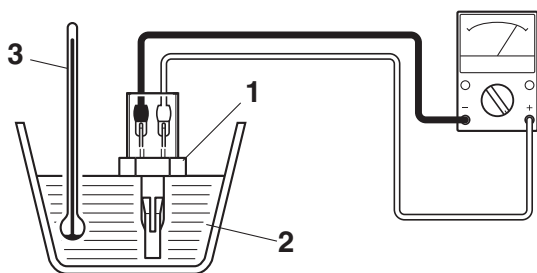
Pocket tester
 90890-03112
Analog pocket tester
 YU-03112-C

- b. Immerse the air temperature sensor “1” in a container filled with water “2”.

TIP

Make sure that the air temperature sensor terminals do not get wet.

- c. Place a thermometer “3” in the water.



- d. Heat the water or let it cool down to the specified temperatures.
 e. Measure the air temperature sensor resistance.

EAS1MC1026

CHECKING THE GEAR POSITION SWITCH

- Remove:
 - Gear position switch (from crankcase)
- Check:
 - Gear position switch
 Out of specification → Replace the gear position switch.



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



Result

Neutral position

Continuity

Positive tester probe → sky blue “1”

Negative tester probe → Switch terminal “a”

1st position

Continuity

Positive tester probe → black/yellow “2”

Negative tester probe → Switch terminal “b”

2nd position

Continuity

Positive tester probe → pink “3”

Negative tester probe → Switch terminal “c”

3rd position

Continuity

Positive tester probe → yellow/white “4”

Negative tester probe → Switch terminal “d”

4th position

Continuity

Positive tester probe → blue/white “5”

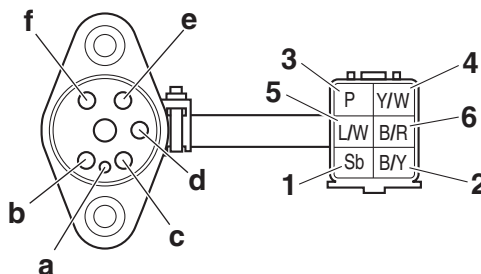
Negative tester probe → Switch terminal “e”

5th position

Continuity

Positive tester probe → black/red “6”

Negative tester probe → Switch terminal “f”



EAS1MC1027

CHECKING THE FUEL INJECTORS


- Check:
 - Fuel injector resistance
 Out of specification → Replace the fuel injector.

ELECTRICAL COMPONENTS



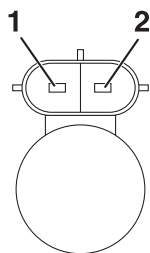
Resistance
12.0 Ω

- 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"

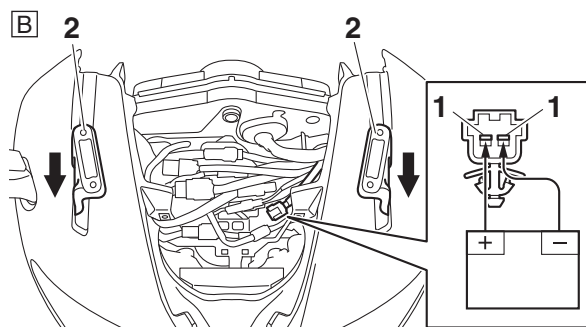
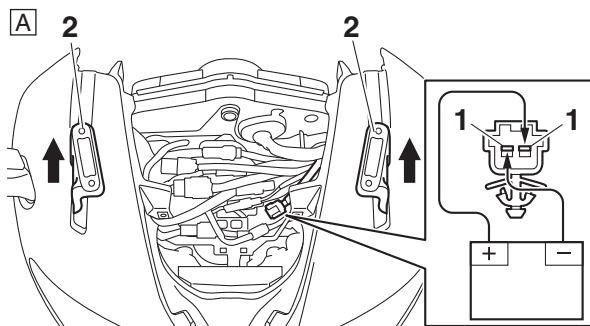


c. Measure the fuel injector resistance.

EAS1MC1078
CHECKING THE WINDSHIELD DRIVE UNIT

1. Check:
 - Windshield drive unit operation
Faulty/rough movement → Replace.


- a. Disconnect the windshield drive unit sub-lead from the wire harness.
- b. Connect the battery (DC 12 V) to the windshield drive unit sub-lead terminals "1" as shown.



- A. Check that the windshield drive unit arms "2" up.
- B. Check that the windshield drive unit arms "2" down.


ET3P61017
CHECKING THE ACCESSORY BOX SOLENOID

1. Check:
 - Accessory box solenoid resistance
Out of specification → Replace.



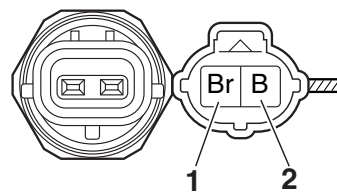
Accessory box solenoid resistance
19–21 Ω

- a. Disconnect the accessory box solenoid coupler from the wire harness.
- b. Connect the pocket tester ($\Omega \times 10$) to the accessory box solenoid terminals as shown.



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

- Positive tester probe → brown "1"
- Negative tester probe → black "2"



c. Measure the accessory box solenoid resistance.




ET3P66023

CHECKING THE GRIP WARMERS

The following procedure applies to both of the grip warmers.


1. Check:

- Grip warmer resistance
Out of specification → Replace the grip warmer.

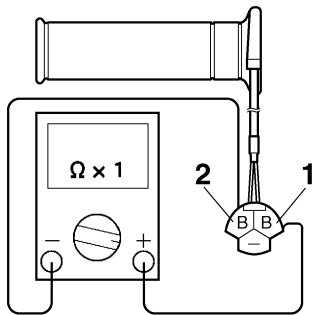
	Grip warmer resistance (L) 1.21–1.48 Ω
	Grip warmer resistance (R) 1.17–1.43 Ω



- Disconnect the grip warmer coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the grip warmer coupler as shown.

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

- Positive tester probe → black "1"
- Negative tester probe → black "2"



c. Measure the grip warmer 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
 - Loose spark plug
 - Loose cylinder head
 - Damaged cylinder head gasket
 - Worn or damaged cylinder
 - Incorrect valve clearance
 - Improperly sealed valve
 - Incorrect valve-to-valve-seat contact
 - Incorrect valve timing
 - Faulty valve spring
 - Seized valve
2. Piston(s) and piston ring(s)
 - Improperly installed piston ring
 - Damaged, worn or fatigued piston ring
 - Seized piston ring
 - Seized or damaged piston
3. Air filter
 - Improperly installed air filter
 - Clogged air filter element
4. Crankcase and crankshaft
 - Improperly assembled crankcase
 - Seized crankshaft

Fuel system

1. Fuel tank
 - Empty fuel tank
 - Clogged fuel tank overflow hose
 - 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
4. Ignition coil(s)
 - Cracked or broken ignition coil body
 - Broken or shorted primary or secondary coils
5. Ignition system
 - Faulty ECU
 - Faulty crankshaft position sensor
 - Faulty cylinder identification sensor
 - Broken generator rotor woodruff key
6. Switches and wiring
 - Faulty main switch
 - Faulty start/engine stop switch
 - Broken or shorted wiring
 - Faulty gear position switch (neutral circuit)
 - 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
 - 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
 - Faulty air induction system

Electrical system

1. Battery
 - Discharged battery
 - Faulty battery
2. Spark plug(s)
 - Incorrect spark plug gap
 - Incorrect spark plug heat range
 - Fouled spark plug
 - Worn or damaged electrode
 - Worn or damaged insulator
3. Ignition coil(s)
 - Broken or shorted primary or secondary coils
 - Cracked or broken ignition coil
4. Ignition system
 - Faulty ECU
 - Faulty crankshaft position sensor
 - Faulty cylinder identification sensor
 - Broken generator rotor woodruff key

EAS28510

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING FAILURES” on page 9-1.

Engine

1. Air filter
 - Clogged air filter element

Fuel system

1. Fuel pump
 - Faulty fuel pump

EAS28530

FAULTY GEAR SHIFTING

Shifting is difficult

Refer to “Clutch drags”.

EAS28540

SHIFT PEDAL DOES NOT MOVE

Shift shaft

- Improperly adjusted shift rod
- Bent shift shaft

Shift drum and shift forks

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

Transmission

- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

EAS28550

JUMPS OUT OF GEAR

Shift shaft

- Incorrect shift pedal position
- Improperly returned stopper lever

Shift forks

- Worn shift fork

Shift drum

- Incorrect axial play
- Worn shift drum groove

Transmission

- Worn gear dog

EAS28570

FAULTY CLUTCH

Clutch slips

1. Clutch
 - Improperly assembled clutch
 - Improperly assembled clutch master cylinder
 - Improperly assembled clutch release cylinder
 - Incorrect clutch fluid level
 - Damaged clutch hose
 - Loose or fatigued clutch spring plate
 - Loose union bolt
 - Worn friction plate
 - Worn clutch plate
 - Damaged clutch release cylinder
2. Engine oil
 - Incorrect oil level
 - Incorrect oil viscosity (low)
 - Deteriorated oil

Clutch drags

1. Clutch
 - Air in hydraulic clutch system
 - Warped pressure plate
 - Bent clutch plate
 - Swollen friction plate
 - Bent clutch push rod
 - Damaged clutch boss
 - Burnt primary driven gear bushing
 - Damaged clutch release cylinder
 - Match marks not aligned
2. Engine oil
 - Incorrect oil level
 - Incorrect oil viscosity (high)
 - Deteriorated oil

EAS28600

OVERHEATING

Engine

1. Clogged coolant passages
 - Cylinder head and piston(s)
 - Heavy carbon buildup
2. Engine oil
 - Incorrect oil level
 - Incorrect oil viscosity
 - Inferior oil quality

Cooling system

1. Coolant
 - Low coolant level
2. Radiator
 - Damaged or leaking radiator
 - Faulty radiator cap
 - Bent or damaged radiator fin
3. Water pump
 - Damaged or faulty water pump
4. Thermostat
 - Thermostat stays closed
5. Oil cooler
 - Clogged or damaged oil cooler
6. Hose(s) and pipe(s)
 - Damaged hose
 - Improperly connected hose
 - Damaged pipe
 - Improperly connected pipe

Fuel system

1. Throttle body(-ies)
 - Damaged or loose throttle body joint
2. Air filter
 - Clogged air filter element

Chassis

1. Brake(s)
 - Dragging brake

Electrical system

1. Spark plug(s)
 - Incorrect spark plug gap
 - Incorrect spark plug heat range
2. Ignition system
 - Faulty ECU

EAS28610

OVERCOOLING

Cooling system

1. Thermostat
 - Thermostat stays open

EAS28620

POOR BRAKING PERFORMANCE

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit
- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

EAS28660

FAULTY FRONT FORK LEGS

Leaking oil

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Cracked or damaged cap bolt O-ring

Malfunction

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS28680

UNSTABLE HANDLING

Handlebars

- Bent or improperly installed right handlebar
 - Bent or improperly installed left handlebar
1. Steering head components
 - Improperly installed upper bracket
 - Improperly installed lower bracket (improperly tightened ring nut)
 - Bent steering stem
 - Damaged ball bearing or bearing race
 2. Front fork leg(s)
 - Incorrect oil level
 - Unevenly tensioned fork spring (both front fork legs)
 - Broken fork spring
 - Bent or damaged inner tube

- Bent or damaged outer tube
3. Swingarm
- Worn bearing or bushing
 - Bent or damaged swingarm

Rear shock absorber assembly

- Faulty rear shock absorber spring
- Leaking oil or gas

Tire(s)

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

Wheel(s)

- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame

- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

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

- Wrong tail/brake light bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

Tail/brake light bulb burnt out

- Wrong tail/brake light bulb

- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

Turn signal does not come on

- Faulty turn signal switch
- Faulty meter assembly
- Faulty front turn signal light
- Burnt-out rear 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 meter assembly
- Faulty main switch
- Faulty turn signal switch
- Incorrect rear turn signal bulb

Turn signal remains lit

- Faulty meter assembly
- Burnt-out rear turn signal bulb

Turn signal flashes quickly

- Incorrect rear turn signal bulb
- Faulty meter assembly
- Burnt-out rear 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

EAS1MC1048

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Self-diagnostic function table

Fault code No.	Item	Reference pages
11	Cylinder identification sensor: no normal signals are received from the cylinder identification sensor.	8-40
12	Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	8-41
13	Intake air pressure sensor: open or short circuit detected.	8-43
14	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	8-44
15	Throttle position sensor: open or short circuit detected.	8-45
19	Sidestand switch: a break or disconnection of the black/red lead of the ECU is detected.	8-47
20	Intake air pressure sensor or atmospheric pressure sensor: when the main switch is turned to "ON", the intake air pressure sensor voltage and atmospheric pressure sensor voltage differ greatly.	8-49
21	Coolant temperature sensor: open or short circuit detected.	8-50
22	Air temperature sensor: open or short circuit detected.	8-52
23	Atmospheric pressure sensor: open or short circuit detected.	8-53
24	O ₂ sensor: no normal signals are received from the O ₂ sensor.	8-55
30	Latch up detected.	8-56
33	Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.	8-57
34	Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.	8-58
35	Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.	8-59
36	Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.	8-61
39	Injector: open or short circuit detected.	8-62
41	Lean angle sensor: open or short circuit detected.	8-64
42	Rear wheel sensor: no normal signals are received from the rear wheel sensor.	8-65
	Neutral switch: open or short circuit is detected.	8-67
	Clutch switch: open or short circuit is detected.	8-69
43	Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	8-72
44	EEPROM fault code number: an error is detected while reading or writing on EEPROM.	8-74
46	Charging voltage is abnormal.	8-76
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	8-76

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Fault code No.	Item	Reference pages
51	Immobilizer unit: Code cannot be transmitted between the key and the immobilizer unit.	8-122
52	Immobilizer unit: Codes between the key and immobilizer unit do not match.	8-122
53	Immobilizer unit: Codes cannot be transmitted between the ECU and the immobilizer unit.	8-122
54	Immobilizer unit: Codes transmitted between the ECU and the immobilizer unit do not match.	8-122
55	Immobilizer unit: Key code registration malfunction.	8-122
56	ECU: Unidentified code is received.	8-122
59	Accelerator position sensor: open or short circuit detected.	8-77
60	YCC-T drive system: malfunction detected.	8-78
69	Front wheel sensor: no normal signals are received from the front wheel sensor.	8-79
70	Engine idling stop	—
90	Front brake light switch: open or short circuit is detected.	8-91
	Rear brake light switch: open or short circuit is detected.	8-93
91	Cruise control setting switch "RES+": open or short circuit is detected.	8-96
	Cruise control setting switch "SET-": open or short circuit is detected.	8-98



Communication error with the meter

Fault code No.	Item	Reference pages
89 (Yamaha diagnostic tool) Err (multi-function meter center display)	Multi-function meter: signals cannot be transmitted between the ECU and the multi-function meter.	8-82

Diagnostic code: sensor operation table

Diagnostic code No.	Item	Meter display	Procedure
01	Throttle position sensor signal 1		
	<ul style="list-style-type: none"> • Fully closed position • Fully open position 	12-21 97-106	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 meter display value.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Meter display	Procedure
03	Intake air pressure	Displays the intake air pressure.	Shift the transmission into gear, extend the side-stand, and then operate the throttle while pushing the “  ” side of the start/engine stop switch. (If the display value changes, the performance is OK.)
05	Air temperature	Displays the air temperature.	Compare the actually measured air temperature with the meter display value.
06	Coolant temperature	When engine is cold: Displays temperature closer to air temperature. When engine is hot: Displays current coolant temperature.	Compare the actually measured coolant temperature with the meter display value.
07	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 65 degrees.
09	Fuel system voltage (battery voltage)	Approximately 12.0	Set the start/engine stop switch to “  ”, and then compare the actually measured battery voltage with the meter display value. (If the actually measured battery voltage is low, recharge the battery.)
13	Throttle position sensor signal 2 • Fully closed position • Fully open position	9–23 94–108	Check with throttle valves fully closed. Check with throttle valves fully open.
14	Accelerator position sensor signal 1 • Fully closed position • Fully open position	12–22 97–107	Check with throttle grip fully closed position. Check with throttle grip fully open position.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Meter display	Procedure
15	Accelerator position sensor signal 2 <ul style="list-style-type: none"> • Fully closed position • Fully open position 	10–24 95–109	Check with throttle grip fully closed position. Check with throttle grip fully open position.
16	Front wheel vehicle speed pulses	Front wheel speed pulse 0–999	Check that the number increases when the front wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
20	Sidestand switch <ul style="list-style-type: none"> • Stand retracted • Stand extended 	ON OFF	Extend and retract the sidestand (with the transmission in gear).
21	Gear position 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 sidestand is retracted • Clutch lever is squeezed with the transmission in gear and when the sidestand is extended 	ON OFF ON OFF	Operate the transmission, clutch lever, and sidestand.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Meter display	Procedure
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.) 01–04 (Cylinder fault code) <ul style="list-style-type: none"> • (If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.) 17 (Data error for ISC (idle speed control) learning values)	—
61	Malfunction history code display <ul style="list-style-type: none"> • No history • History exists 	00 <p>Fault codes 11–91</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.) 	—
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 start/engine stop switch from “⊗” to “○”.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Meter display	Procedure
63	<p>Malfunction code reinstatement (for fault code No. 24, 42, 69 only)</p> <ul style="list-style-type: none"> • No malfunction code • Malfunction code exists 	<p>00</p> <p>Fault code 24, 42, 69</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.) 	<p>—</p> <p>To reinstate, set the start/engine stop switch from “⊗” to “○”.</p>
67	<p>ISC (idle speed control) learning condition display</p> <p>ISC (idle speed control) learning data erasure</p>	<p>00</p> <p>ISC (idle speed control) learning data has been erased.</p> <p>01</p> <p>It is not necessary to erase the ISC (idle speed control) learning data.</p> <p>02</p> <p>It is necessary to erase the ISC (idle speed control) learning data.</p>	<p>To erase the ISC (idle speed control) learning data, set the start/engine stop switch from “⊗” to “○” 3 times in 5 seconds.</p>
70	Control number	0–254 [-]	—
80	<p>Cruise control setting switch “RES+”</p> <ul style="list-style-type: none"> • Switch is pushed • Switch is released 	<p>ON</p> <p>OFF</p>	<p>Push and release the “RES+” side of the cruise control setting switch.</p>
81	<p>Cruise control setting switch “SET-”</p> <ul style="list-style-type: none"> • Switch is pushed • Switch is released 	<p>ON</p> <p>OFF</p>	<p>Push and release the “SET-” side of the cruise control setting switch.</p>

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Meter display	Procedure
82	Cruise control cancel circuit <ul style="list-style-type: none"> • Clutch lever is squeezed • Clutch lever is released • Brake lever is squeezed • Brake lever is released • Brake pedal is depressed • Brake pedal is released • Throttle grip is turned past the closed position in the deceleration direction • Throttle grip is released 	ON OFF ON OFF ON OFF ON OFF	Operate the clutch lever, brake lever, brake pedal, and throttle grip.
83	Front brake light switch and rear brake light switch <ul style="list-style-type: none"> • Brake lever is squeezed • Brake lever is released • Brake pedal is depressed • Brake pedal is released 	ON OFF ON OFF	Operate the brake lever and brake pedal.

Diagnostic code: actuator operation table

Diagnostic code No.	Item	Actuation	Procedure
30	Cylinder-#1 ignition coil	Actuates the cylinder-#1 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check that a spark is generated five times. <ul style="list-style-type: none"> • Connect an ignition checker.
31	Cylinder-#2 ignition coil	Actuates the cylinder-#2 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check that a spark is generated five times. <ul style="list-style-type: none"> • Connect an ignition checker.
32	Cylinder-#3 ignition coil	Actuates the cylinder-#3 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check that a spark is generated five times. <ul style="list-style-type: none"> • Connect an ignition checker.
33	Cylinder-#4 ignition coil	Actuates the cylinder-#4 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check that a spark is generated five times. <ul style="list-style-type: none"> • Connect an ignition checker.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Actuation	Procedure
36	Injector #1	Actuates the injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.	Check that injector #1 is actuated five times by listening for the operating sound.
37	Injector #2	Actuates the injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.	Check that injector #2 is actuated five times by listening for the operating sound.
38	Injector #3	Actuates the injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.	Check that injector #3 is actuated five times by listening for the operating sound.
39	Injector #4	Actuates the injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.	Check that injector #4 is actuated five times by listening for the operating sound.
48	Air induction system solenoid	Actuates the air induction system solenoid five times at one-second intervals. Illuminates the engine trouble warning light.	Check that the air induction system solenoid is actuated five times by listening for the operating sound.
50	Relay unit	Actuates the relay unit five times at one-second intervals. Illuminates the engine trouble warning light. (The engine trouble warning light is OFF when the relay is ON, and the engine trouble warning light is ON when the relay is OFF.)	Check that the relay unit is actuated five times by listening for the operating sound.
51	Radiator fan motor relay	Actuates the radiator fan motor relay five times at five-second intervals. (2 seconds on, 3 seconds off) Illuminates the engine trouble warning light.	Check that the radiator fan motor relay is actuated five times by listening for the operating sound.
52	Headlight relay	Actuates the headlight relay five times at five-second intervals. (2 seconds on, 3 seconds off) Illuminates the engine trouble warning light.	Check that the headlight relay is actuated five times by listening for the operating sound.
57	Grip warmer	Turns on the grip warmers for 2 minutes.	Check that the grip warmers become warm.

WIRING DIAGRAM**FJR1300A(D) 2013**

1. Immobilizer unit
2. Main switch
3. AC magneto
4. Rectifier/regulator
5. Joint coupler
6. Windshield drive system fuse
7. Hazard lighting fuse
8. ABS ECU fuse
9. Ignition fuse
10. Auxiliary DC jack fuse
11. Signaling system fuse
12. Right radiator fan motor fuse
13. Left radiator fan motor fuse
14. ABS motor fuse
15. ABS solenoid fuse
16. Fuel injection system fuse
17. Backup fuse
18. Electric throttle valve fuse
19. Headlight fuse
20. Horn
21. Headlight relay (on/off)
22. Radiator fan motor relay
23. Left radiator fan motor
24. Right radiator fan motor
25. Main fuse
26. Battery
27. Engine ground
28. Cooling system fuse
29. Starter relay
30. Starter motor
31. Cruise control system fuse
32. Relay unit
33. Starting circuit cut-off relay
34. Fuel pump relay
35. Sidestand switch
36. Clutch switch
37. Brake light fuse
38. Rear brake light switch
39. Grip cancel switch
40. Front brake light switch
41. Right handlebar switch
42. D-Mode switch
43. Start/engine stop switch
44. Hazard switch
45. Gear position switch
46. Brake switch relay
47. Brake light relay
48. Left handlebar switch
49. Cruise control power switch
50. Cruise control setting switch
51. Dimmer/pass switch
52. Horn switch
53. Menu switch
54. Select switch
55. Turn signal switch
56. Headlight relay (dimmer)
57. Tail/brake light assembly
58. Tail/brake light
59. Rear left turn signal light
60. Rear right turn signal light
61. License plate light
62. Headlight assembly
63. Auxiliary light
64. Headlight
65. Front right turn signal light
66. Front left turn signal light
67. Accessory box solenoid
68. Auxiliary DC jack
69. Windshield drive unit
70. Windshield drive unit relay (down)
71. Windshield drive unit relay (up)
72. Meter assembly
73. Multi-function meter
74. Immobilizer system indicator light
75. Neutral indicator light
76. Meter light
77. Tachometer
78. Oil level warning light
79. Engine trouble warning light
80. Traction control system indicator/warning light
81. Left turn signal indicator light
82. Right turn signal indicator light
83. Cruise control system indicator light
84. Cruise control setting indicator light
85. ABS warning light
86. High beam indicator light
87. Oil level switch
88. Fuel pump
89. Fuel sender
90. Crankshaft position sensor
91. Intake air pressure sensor
92. Atmospheric pressure sensor
93. Cylinder identification sensor
94. Lean angle sensor
95. Yamaha diagnostic tool coupler
96. Yamaha diagnostic tool connector
97. O₂ sensor
98. Throttle position sensor
99. Accelerator position sensor
100. Air temperature sensor
101. Coolant temperature sensor
102. ECU (engine control unit)
103. Ignition coil #1
104. Ignition coil #2
105. Ignition coil #3
106. Ignition coil #4
107. Spark plug
108. Injector #1
109. Injector #2
110. Injector #3
111. Injector #4
112. Air induction system solenoid
113. Throttle servo motor
114. Left grip warmer
115. Right grip warmer
116. ABS test coupler
117. ABS ECU (electronic control unit)
118. Front wheel sensor
119. Rear wheel sensor
- A. Wire harness
- B. Negative battery sub-wire harness
- C. Accessory box solenoid sub-lead
- D. Windshield drive unit sub-lead

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/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
Br/Y	Brown/Yellow
G/B	Green/Black
G/L	Green/Blue
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/R	Gray/Red
Gy/W	Gray/White
L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
Lg/B	Light green/Black
Lg/L	Light green/Blue
Lg/R	Light green/Red
O/B	Orange/Black
O/G	Orange/Green
O/W	Orange/White
P/B	Pink/Black
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
Sb/W	Sky blue/White
W/B	White/Black
W/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
Y/R	Yellow/Red
Y/W	Yellow/White



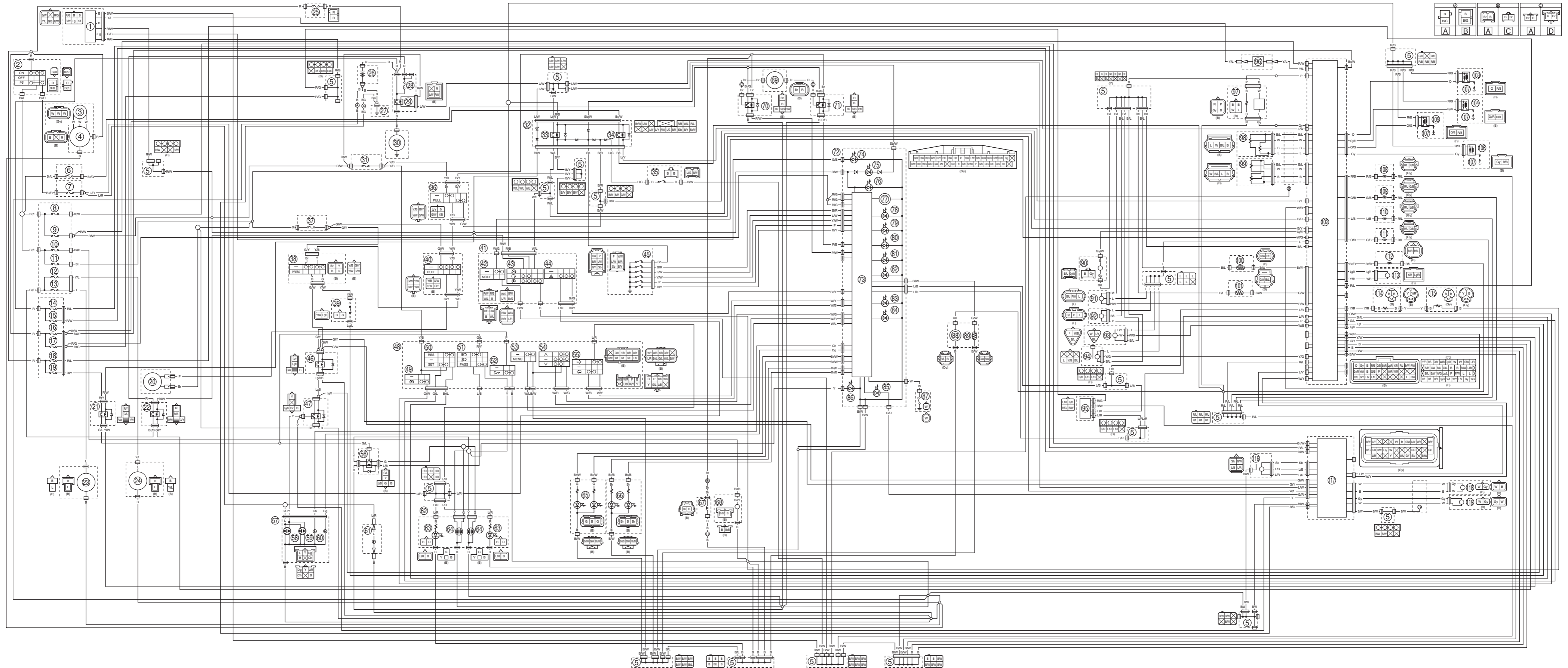
FJR1300A(D) 2013
WIRING DIAGRAM

FJR1300A(D) 2013
SCHEMA DE CÂBLAGE

FJR1300A(D) 2013
SCHALTPLAN

FJR1300A(D) 2013
SCHEMA ELETTRICO

FJR1300A(D) 2013
DIAGRAMA ELÉCTRICO



FJR1300A(D) 2013
WIRING DIAGRAM

FJR1300A(D) 2013
SCHÉMA DE CÂBLAGE

FJR1300A(D) 2013
SCHALTPLAN

FJR1300A(D) 2013
SCHEMA ELETTRICO

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DIAGRAMA ELÉCTRICO

