



**YAMAHA**

**2008**

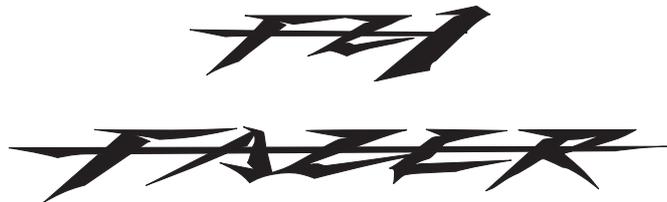
**SERVICE MANUAL**

**FZ1-N(X)**

**FZ1-S(X)**

**FZ1-SA**

**FZ1-NA**



**5D0-28197-E1**

---

EAS20040

**FZ1-N(X)/FZ1-S(X)/FZ1-SA/FZ1-NA  
SERVICE MANUAL**

**©2008 by Yamaha Motor Co., Ltd.**

**First edition, December 2007**

**All rights reserved.**

**Any reproduction or unauthorized use without  
the written permission of Yamaha Motor Co.,  
Ltd. is expressly prohibited.**

---

**NOTICE**

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

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

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

**NOTE:**

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

**IMPORTANT MANUAL INFORMATION**

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



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



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



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

**NOTE:**

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

# HOW TO USE THIS MANUAL

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

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

1  
↓  
**CLUTCH**

**EAS20090**  
**CLUTCH**

**Removing the clutch cover**

12 Nm (1.2 m•kg, 8.7 ft•lb)

12 Nm (1.2 m•kg, 8.7 ft•lb)

Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to
1	Clutch cable	1	
2	Clutch cover	1	
3	Clutch cover gasket	1	
4	Dowel pin	2	
5	Oil filler cap	1	
			For installation, reverse the removal procedure.

5-42

**CLUTCH**

10. Remove:

- Clutch damper spring "1"
- Clutch damper spring seat "2"

**ETD1010**  
**CHECKING THE FRICTION PLATES**  
The following procedure applies to all of the friction plates.

1. Check:
  - Friction plate
  - Damage/wear → Replace the friction plates as a set.
2. Measure:
  - Friction plate thickness
  - Out of specification → Replace the friction plates as a set.

**NOTE:**  
Measure the friction plate at four places.

**Friction plate thickness**  
2.9 - 3.1 mm (0.114 - 0.122 in)  
Limit  
2.8 mm (0.110 in)

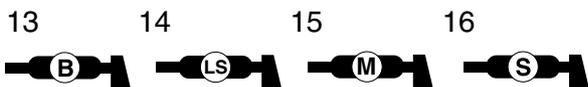
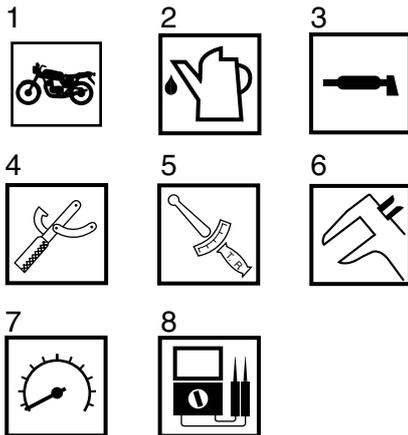
**Clutch plate warpage limit**  
0.1 mm (0.0039 in)

## SYMBOLS

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

### NOTE:

The following symbols are not relevant to every vehicle.



17



18



15. Molybdenum-disulfide grease

16. Silicon grease

17. Apply locking agent (LOCTITE®)

18. Replace the part

1. Serviceable with engine mounted
2. Filling fluid
3. Lubricant
4. Special tool
5. Tightening torque
6. Wear limit, clearance
7. Engine speed
8. Electrical data
9. Engine oil
10. Gear oil
11. Molybdenum-disulfide oil
12. Brake fluid
13. Wheel-bearing grease
14. Lithium-soap-based grease

---

---

# TABLE OF CONTENTS

<b>GENERAL INFORMATION</b>	<b>1</b>
<b>SPECIFICATIONS</b>	<b>2</b>
<b>PERIODIC CHECKS AND ADJUSTMENTS</b>	<b>3</b>
<b>CHASSIS</b>	<b>4</b>
<b>ENGINE</b>	<b>5</b>
<b>COOLING SYSTEM</b>	<b>6</b>
<b>FUEL SYSTEM</b>	<b>7</b>
<b>ELECTRICAL SYSTEM</b>	<b>8</b>
<b>TROUBLESHOOTING</b>	<b>9</b>

---

---

## GENERAL INFORMATION

<b>IDENTIFICATION</b> .....	1-1
VEHICLE IDENTIFICATION NUMBER.....	1-1
MODEL LABEL .....	1-1
<b>FEATURES</b> .....	1-2
OUTLINE OF THE FI SYSTEM .....	1-2
FI SYSTEM.....	1-3
INSTRUMENT FUNCTIONS .....	1-4
<b>IMPORTANT INFORMATION</b> .....	1-26
PREPARATION FOR REMOVAL AND DISASSEMBLY .....	1-26
REPLACEMENT PARTS.....	1-26
GASKETS, OIL SEALS AND O-RINGS.....	1-26
LOCK WASHERS/PLATES AND COTTER PINS .....	1-26
BEARINGS AND OIL SEALS .....	1-27
CIRCLIPS .....	1-27
<b>CHECKING THE CONNECTIONS</b> .....	1-28
<b>SPECIAL TOOLS</b> .....	1-29

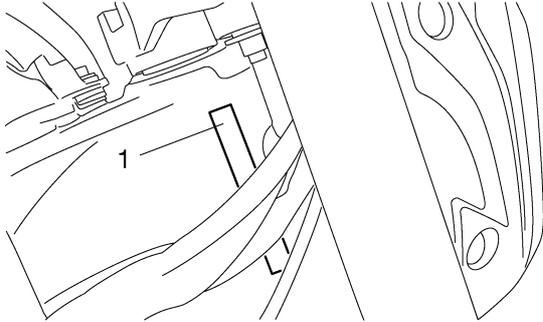
EAS20130

## IDENTIFICATION

EAS20140

### VEHICLE IDENTIFICATION NUMBER

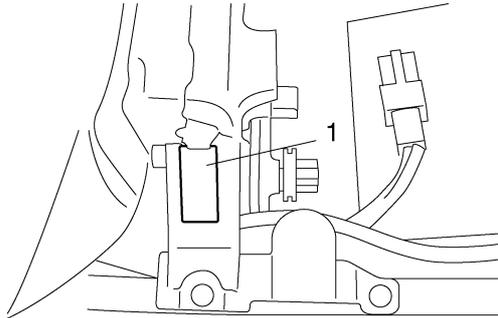
The vehicle identification number "1" is stamped into the right side of the steering head pipe.



EAS20150

### MODEL LABEL

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



EAS20170

## FEATURES

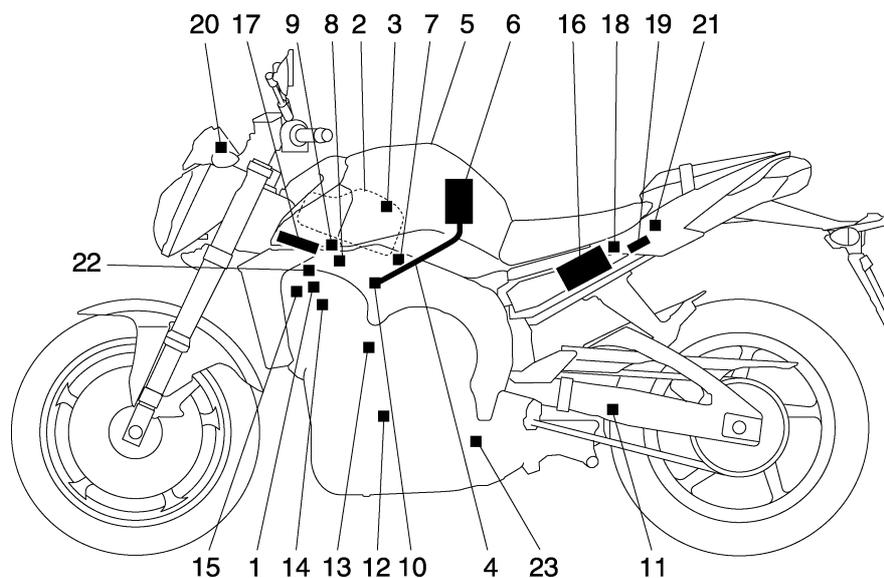
EAS5D01032

### OUTLINE OF THE FI SYSTEM

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

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

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



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

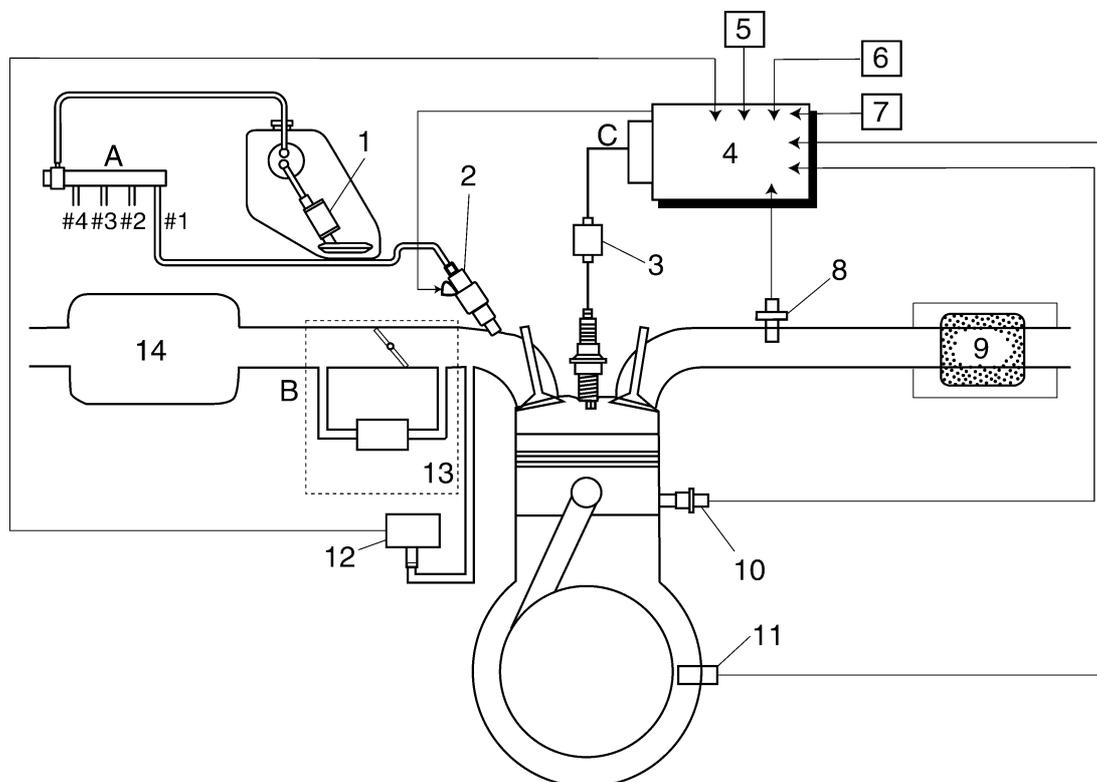
EAS5D01013

## 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/cm<sup>2</sup>, 46.1 psi). Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remain open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.

The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, crankshaft position sensor, intake air pressure sensor, air temperature sensor, coolant temperature sensor, speed sensor and O<sub>2</sub> sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.

**Illustration is for reference only.**

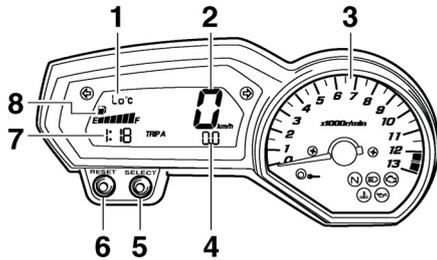


- |                                  |                     |
|----------------------------------|---------------------|
| 1. Fuel pump                     | 14. Air filter case |
| 2. Fuel injector                 | A. Fuel system      |
| 3. Ignition coil                 | B. Air system       |
| 4. ECU (engine control unit)     | C. Control system   |
| 5. Intake air temperature sensor |                     |
| 6. Throttle position sensor      |                     |
| 7. Sub-throttle position sensor  |                     |
| 8. O <sub>2</sub> sensor         |                     |
| 9. Catalytic converter           |                     |
| 10. Coolant temperature sensor   |                     |
| 11. Crankshaft position sensor   |                     |
| 12. Intake air pressure sensor   |                     |
| 13. Throttle body                |                     |

EAS5D01014

## INSTRUMENT FUNCTIONS

### Multi-function meter unit



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

EWA5D01011



**Be sure to stop the vehicle before making any setting changes to the multi-function meter unit.**

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

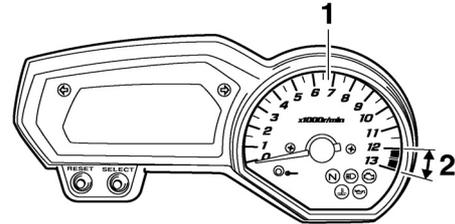
- a speedometer (which shows the riding speed)
- a tachometer (which shows engine speed)
- an odometer (which shows the total distance traveled)
- two tripmeters (which show the distance traveled since they were last set to zero)
- a fuel reserve tripmeter (which shows the distance traveled since the left segment of the fuel meter started flashing)
- a clock
- a fuel meter
- a coolant temperature display
- an air intake temperature display
- a self-diagnosis device
- an LCD and tachometer brightness control mode

#### NOTE:

- Be sure to turn the key to "ON" before using the "SELECT" and "RESET" buttons.
- For the U.K. only: To switch the speedometer and odometer/tripmeter displays between

kilometers and miles, press the "SELECT" button for at least one second.

### Tachometer



1. Tachometer
2. Tachometer red zone

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

When the key is turned to "ON", the tachometer needle will sweep once across the r/min range and then return to zero r/min in order to test the electrical circuit.

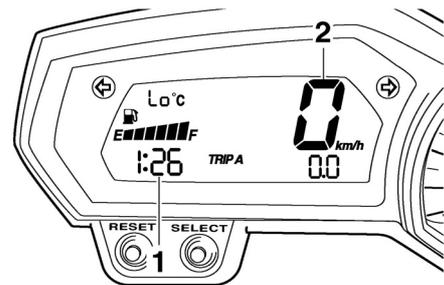
ECA5D01015

#### CAUTION:

**Do not operate the engine in the tachometer red zone.**

**Red zone: 12000 r/min and above**

### Clock mode



1. Clock
2. Speedometer

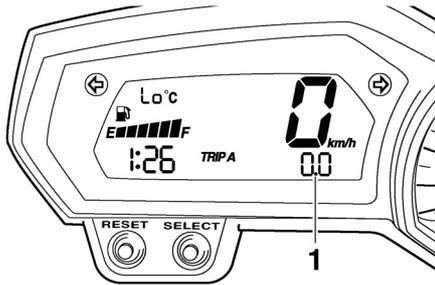
The clock is displayed when the key is turned to "ON". In addition, the clock can be displayed for 10 seconds by pushing the "SELECT" button when the main switch is in the "OFF" or "LOCK" position.

To set the clock

1. Turn the key to "ON".
2. Push the "SELECT" button and "RESET" button together for at least two seconds.

3. When the hour digits start flashing, push the “RESET” button to set the hours.
4. Push the “SELECT” button, and the minute digits will start flashing.
5. Push the “RESET” button to set the minutes.
6. Push the “SELECT” button and then release it to start the clock.

## Odometer and tripmeter modes



1. Odometer/tripmeter/fuel reserve tripmeter

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

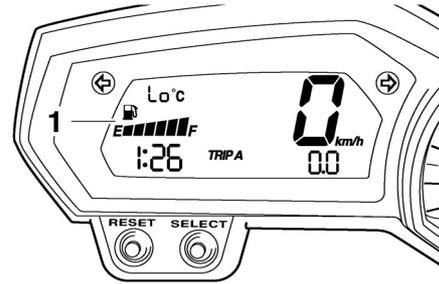
TRIP A → TRIP B → ODO → TRIP A

When the fuel amount in the fuel tank decreases to 3.4 L (0.90 US gal) (0.75 Imp.gal), the left segment of the fuel meter will start flashing, and the odometer display will automatically change to the fuel reserve tripmeter mode “FTRIP” and start counting the distance traveled from that point. In that case, push the “SELECT” button to switch the display between the various tripmeter and odometer modes in the following order:

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

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

## Fuel meter



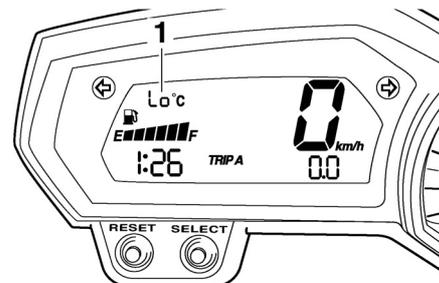
1. Fuel meter

The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the fuel meter disappear towards “E” (Empty) as the fuel level decreases. When only one segment is left near “E”, refuel as soon as possible.

### NOTE:

This fuel meter is equipped with a self-diagnosis system. If the electrical circuit is defective, the following cycle will be repeated until the malfunction is corrected: “E” (Empty), “F” (Full) and symbol “” will flash eight times, then go off for approximately 3 seconds. If this occurs, have a Yamaha dealer check the electrical circuit.

## Coolant temperature mode



1. Coolant temperature display

The coolant temperature display indicates the temperature of the coolant.

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

### NOTE:

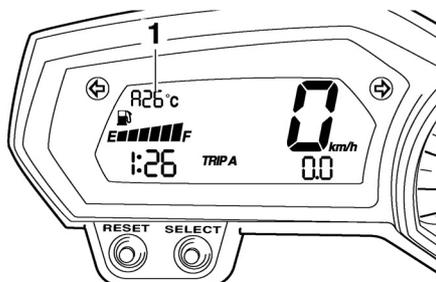
When the coolant temperature display is selected, “C” is displayed for one second, and then the coolant temperature is displayed.

ECA5D01023

**CAUTION:**

**Do not operate the engine if it is overheated.**

### Air intake temperature mode



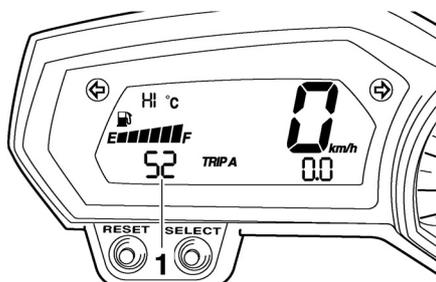
1. Air intake temperature display

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

**NOTE:**

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

### Self-diagnosis device



1. Error code display

This model is equipped with a self-diagnosis device for various electrical circuits. If any of those circuits are defective, the engine trouble warning light will come on, and then the

display will indicate a two-digit error code (e.g., 11, 12, 13).

This model is also equipped with a self-diagnosis device for the immobilizer system.

If any of the immobilizer system circuits are defective, the immobilizer system indicator light will flash, and then the display will indicate a two-digit error code (e.g., 51, 52, 53).

**NOTE:**

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

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

**NOTE:**

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

2. If the engine starts, turn it off and try starting the engine with the standard keys.
3. If one or both of the standard keys do not start the engine, take the vehicle, the code re-registering key and both standard keys to a Yamaha dealer and have the standard keys re-registered.

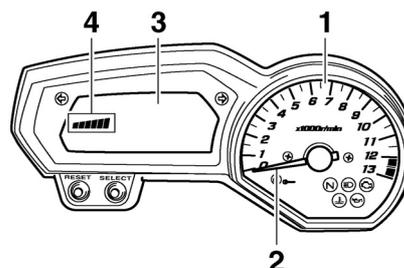
If the display indicates any error codes, note the code number, and then have a Yamaha dealer check the vehicle.

ECA5D01024

**CAUTION:**

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

### LCD and tachometer brightness control mode



1. Tachometer panel
2. Tachometer needle

3. LCD
4. Brightness level

This function allows you to adjust the brightness of the LCD and the tachometer panel and needle to suit the outside lighting conditions.

To set the brightness

1. Turn the key to "OFF".
2. Push and hold the "SELECT" button.

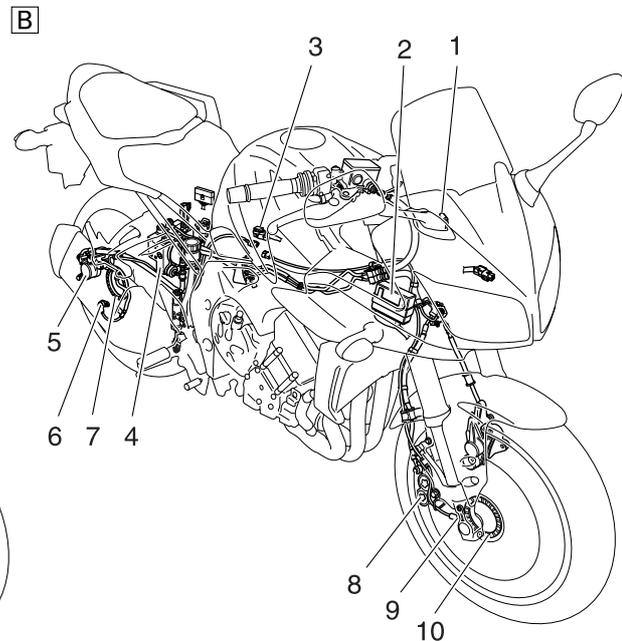
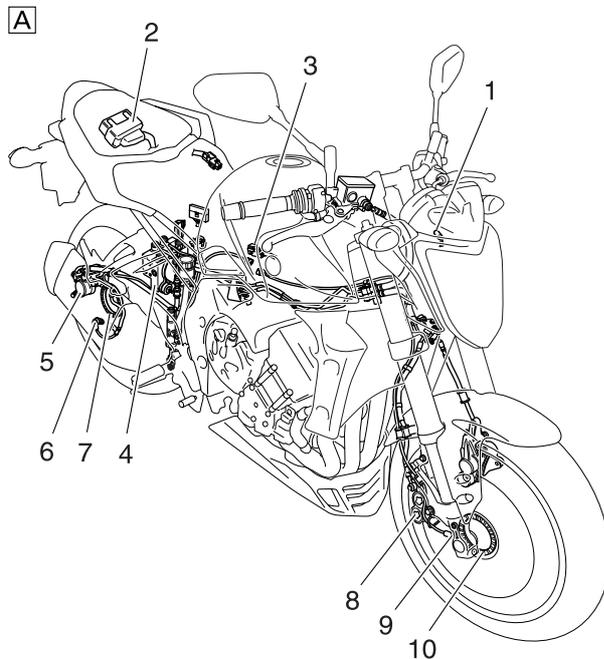
3. Turn the key to "ON", and then release the "SELECT" button after five seconds.
4. Push the "RESET" button to select the desired brightness level.
5. Push the "SELECT" button to confirm the selected brightness level. The display will return to the odometer or tripmeter mode.

EAS5D01001

## OUTLINE OF THE ABS

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

### ABS layout



1. ABS warning light
2. ABS ECU (electronic control unit)
3. ABS motor relay
4. Hydraulic unit (HU)
5. Rear brake caliper
6. Rear wheel sensor
7. Rear wheel sensor rotor

8. Front brake caliper
9. Front wheel sensor
10. Front wheel sensor rotor

- A. FZ1-NA  
B. FZ1-SA

## ABS

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

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

## Useful terms

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

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

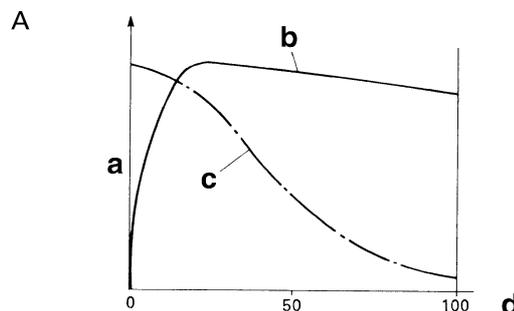
0%: There is no slipping between the wheel and the road surface. The chassis speed is equal to the wheel speed.

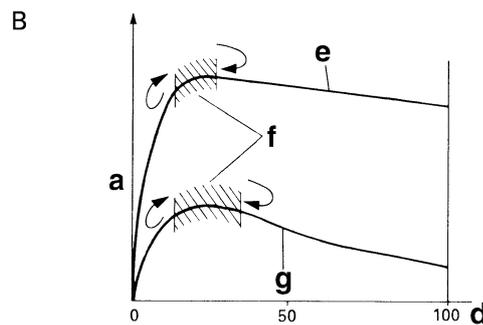
100%: The wheel speed is "0", but the chassis is moving (i.e., wheel lock).

## Brake force and vehicle stability

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

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





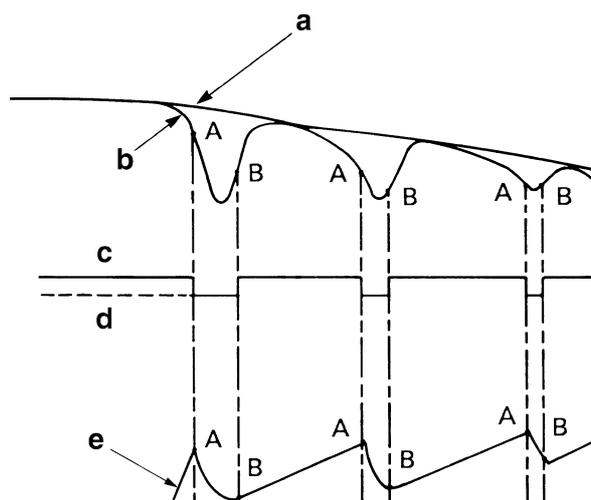
- a. Friction force between the tire and road surface
- b. Brake force
- c. Side force
- d. Slip ratio (%)
- e. Less slippery road surface
- f. Controlling zone
- g. Slippery road surface

## Wheel slip and hydraulic control

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

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

If the slip is large and the wheel has a tendency to lock (point A in the following figure), the ABS ECU reduces the brake fluid pressure in the brake caliper. The ABS ECU increases the pressure of the brake fluid in the brake caliper when the tendency to lock has diminished (point B in the following figure).



- a. Vehicle speed
- b. Wheel speed
- c. Pressurized
- d. Depressurized
- e. Brake force

## 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.

### NOTE:

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.

EWA5D01001



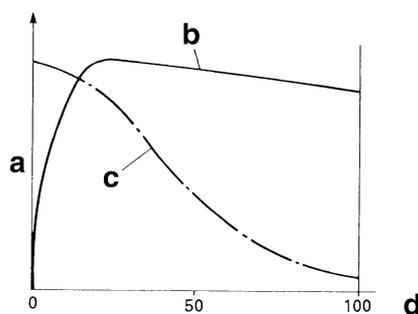
**The braking of the vehicle, even in the worst case, is principally executed when the vehicle is advancing straight ahead. During a turn, sudden braking is liable to cause a loss of traction of the tires. Even in vehicles equipped with ABS, overturning of the vehicle cannot be prevented if it is braked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



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



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

## Electronic ABS features

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

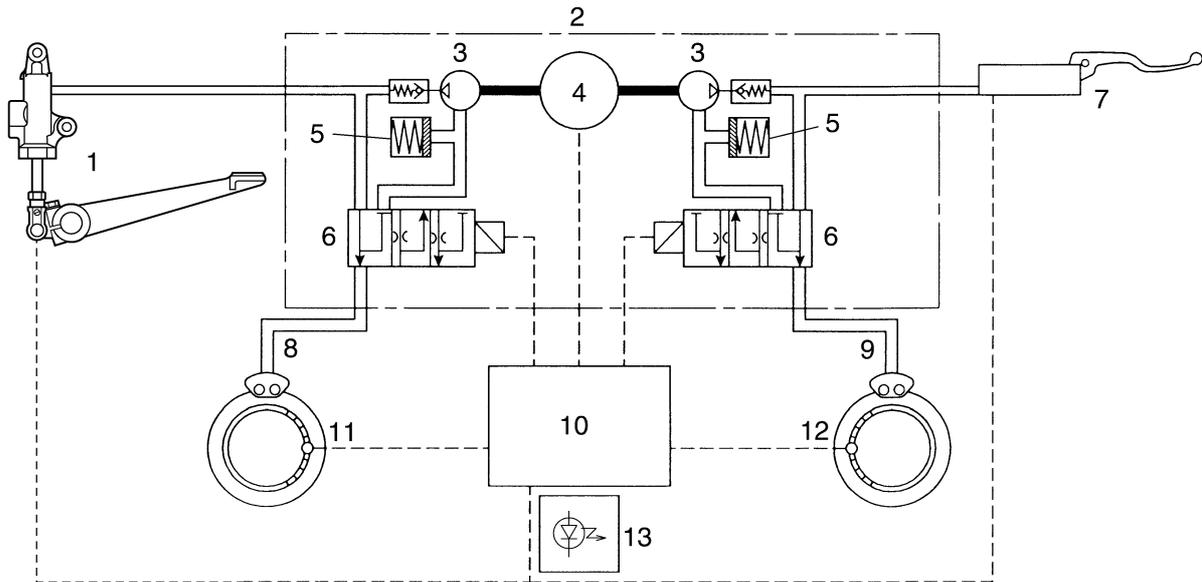
The ABS control is processed with good response under various vehicle travel conditions.

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

When this occurs, the ABS warning light on the meter assembly comes on.

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

## ABS block diagram



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

EAS5D01002

## ABS COMPONENT FUNCTIONS

### Wheel sensors and wheel sensor rotors

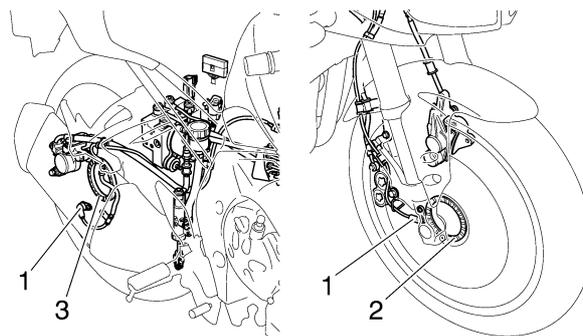
Wheel sensors “1” detect the wheel rotation speed and transmit the wheel rotation signal to the ABS ECU.

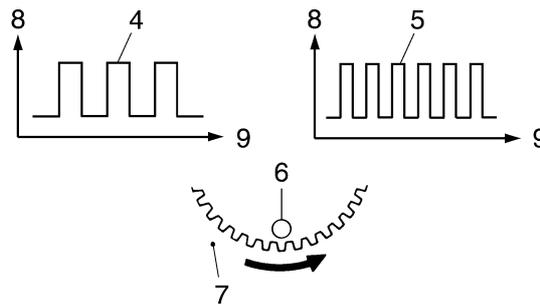
Each wheel sensor is composed of a permanent magnet and a hall IC. The wheel sensors are installed in the sensor housing for each wheel.

Sensor rotor “2” is pressed in the inner side of the front wheel hub and rotate with the wheel.

Sensor rotor “3” is install on the rear hub and rotate with the wheel. The sensor rotors have 42/front, 44/rear serrations inside and are installed close to the wheel sensors. As the sensor rotor rotates, the hall element in the hall IC installed in the wheel sensor generates the voltage which is proportional to the magnetic flux density, and the generated voltage is processed for waveform shaping in the hall IC to output.

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





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

- 7. Wheel sensor rotor
- 8. Voltage
- 9. Time

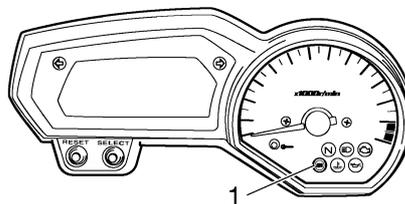
## ABS warning light

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

ECA5D01001

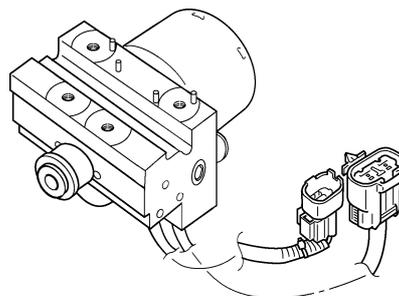
### CAUTION:

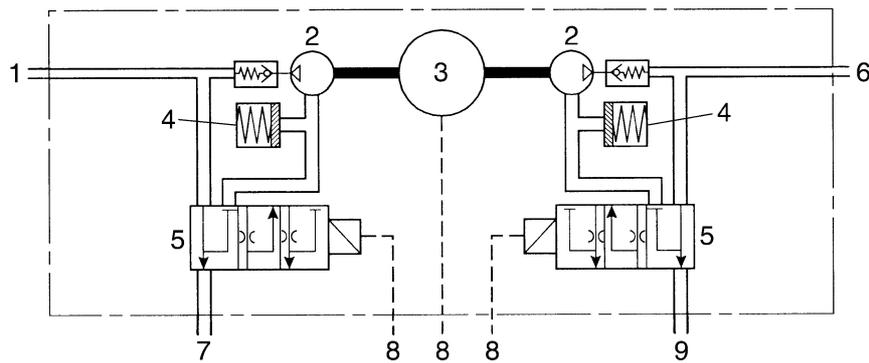
**If the rear wheel is raced with the vehicle on the suitable stand, the ABS warning light may flash or come on. If this occurs, turn the main switch to “OFF”, then back to “ON”. The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.**



## Hydraulic unit

The hydraulic unit “1” is composed of three hydraulic control valves (each with a solenoid valve and flow control valve), two buffer chambers, two hydraulic pumps, and an ABS motor. 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.





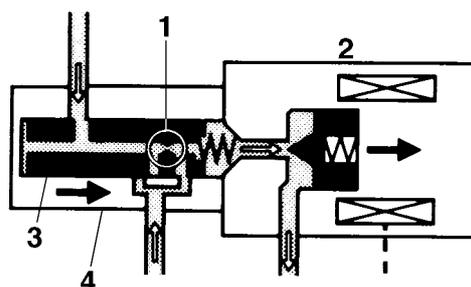
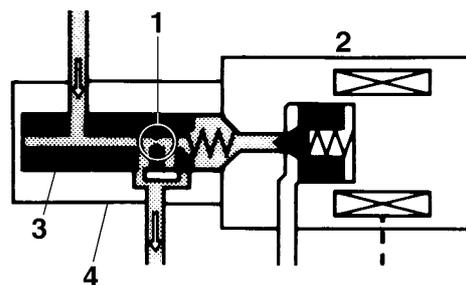
- |                                      |                                       |
|--------------------------------------|---------------------------------------|
| 1. To the rear brake master cylinder | 6. To the front brake master cylinder |
| 2. Hydraulic pump                    | 7. To the rear brake caliper          |
| 3. ABS motor                         | 8. To the ABS ECU                     |
| 4. Buffer chamber                    | 9. To the front brake caliper         |
| 5. Hydraulic control valve           |                                       |

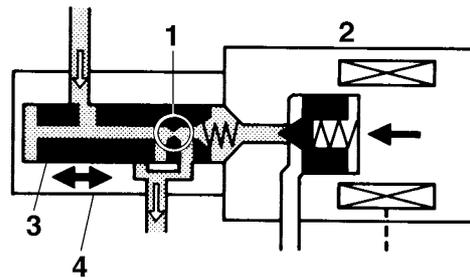
• Hydraulic control valve

The hydraulic control valve is composed of a flow control valve and solenoid valve.

When the ABS is activated, the flow control valve regulates the flow of brake fluid to the brake and the solenoid valve decreases and increases the brake fluid pressure.

1. When the brakes are operated normally, the solenoid valve "2" is closed, the spool "3" of the flow control valve does not move, and the hydraulic line between the brake master cylinder and brake caliper is open.
2. When the ABS is activated, the solenoid valve "2" is opened by the power supplied from the ABS ECU signals to decrease the brake fluid pressure and the spool "3" of the flow control valve is moved toward the solenoid valve.
3. When the ABS ECU stops transmitting signals to decrease the brake fluid pressure, the solenoid valve "2" closes and the brake fluid is pressurized again. Pressurizing the brake fluid again, while the ABS is activated, limits the flow of the brake fluid with the movement of the flow control valve spool "3" and provides a gradual pressure increase.

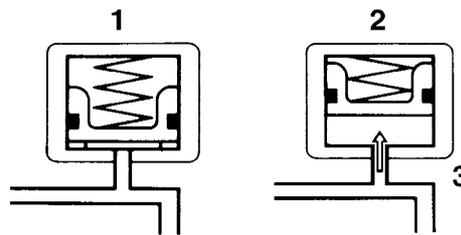




- 1. Orifice
- 2. Solenoid valve
- 3. Spool
- 4. Flow control valve

• **Buffer chamber**

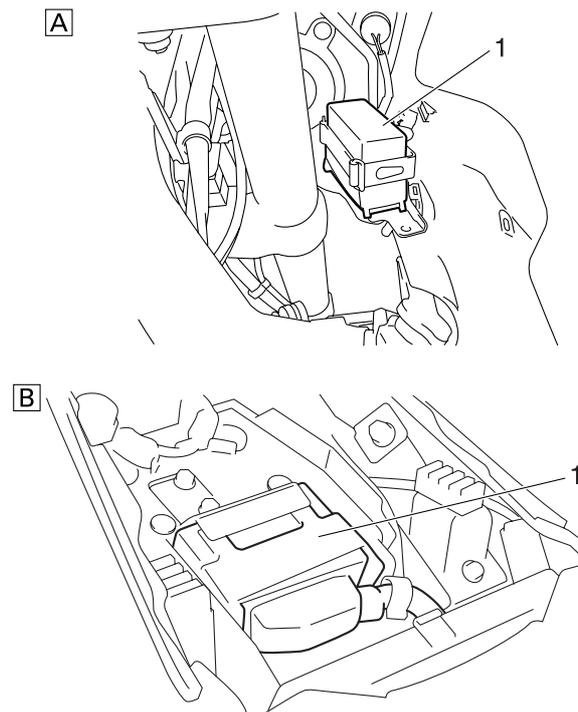
The buffer chamber accumulates the brake fluid that is depressurized while the ABS is operating.

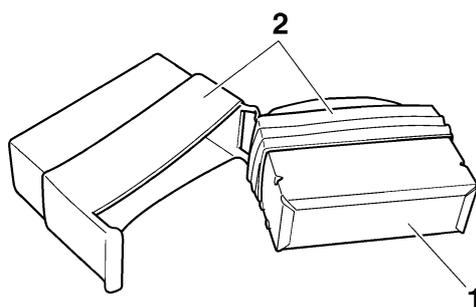


- 1. Buffer chamber (pressurized)
- 2. Buffer chamber (depressurized)
- 3. Raised piston

**ABS ECU (electronic control unit)**

The ABS ECU “1” controls the ABS and is installed inside the right cowling. To protect the ABS ECU from water damage, it is protected by a cover “2”.

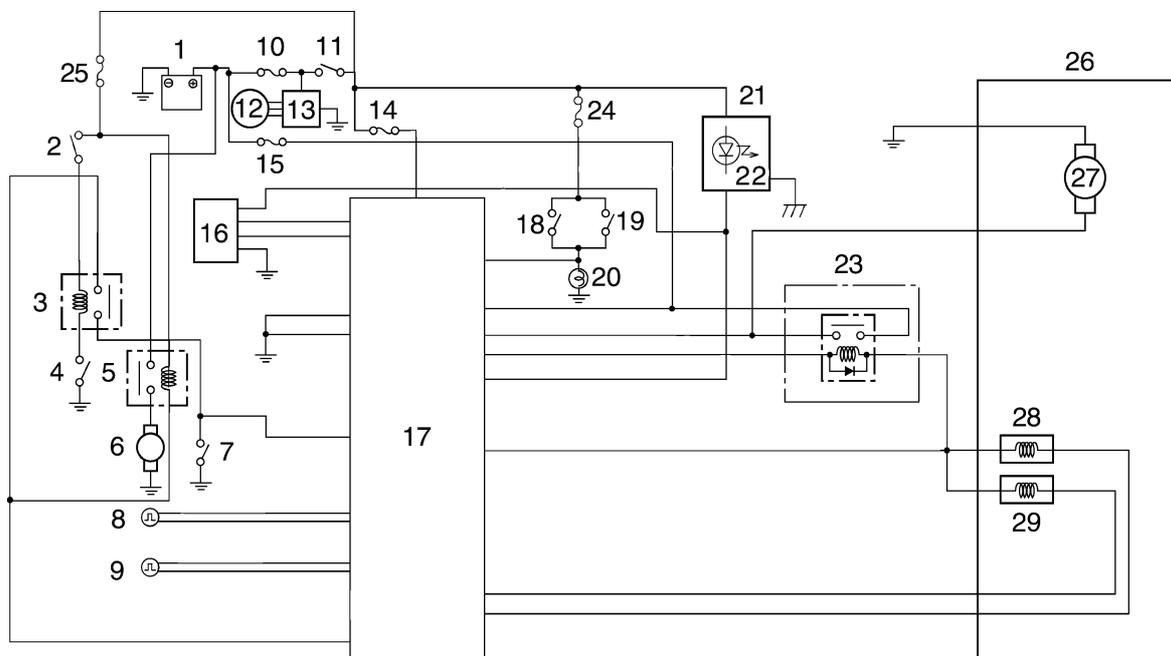




A. FZ1-SA

B. FZ1-NA

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                        | 16. ABS test coupler         |
| 2. Engine stop switch             | 17. ABS ECU                  |
| 3. Starting circuit cut-off relay | 18. Rear brake light switch  |
| 4. Sidestand switch               | 19. Front brake light switch |
| 5. Starter relay                  | 20. Tail/brake light         |
| 6. Starter motor                  | 21. Meter assembly           |
| 7. Start switch                   | 22. ABS warning light        |
| 8. Front wheel sensor             | 23. ABS motor relay          |
| 9. Rear wheel sensor              | 24. Signal fuse              |
| 10. Main fuse                     | 25. Ignition fuse            |
| 11. Main switch                   | 26. Hydraulic unit           |
| 12. Generator                     | 27. ABS motor                |
| 13. Rectifier/regulator           | 28. Front brake solenoid     |
| 14. ABS fuse                      | 29. Rear brake solenoid      |
| 15. ABS motor fuse                |                              |

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

## ABS control operation

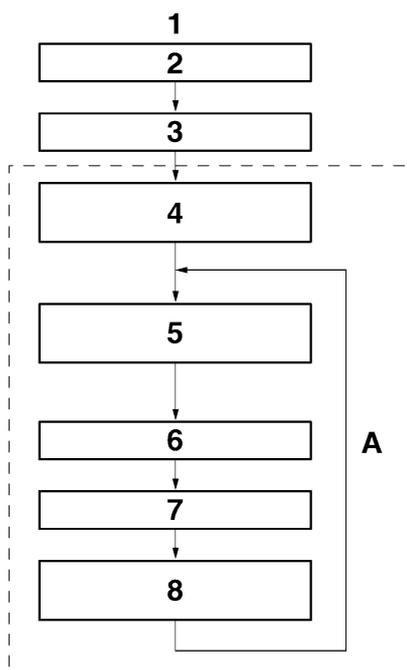
The ABS control operation performed in the ABS ECU is divided into the following two parts.

- Hydraulic control
- Self-diagnosis

These operations are performed once every 8/1000th of a second. When a failure is detected in the ABS, a malfunction code is stored in the memory of the ABS ECU for easy problem identification and troubleshooting.

### NOTE:

Some types of failures are not recorded in the memory of the ABS ECU (e.g., a drop in battery voltage).



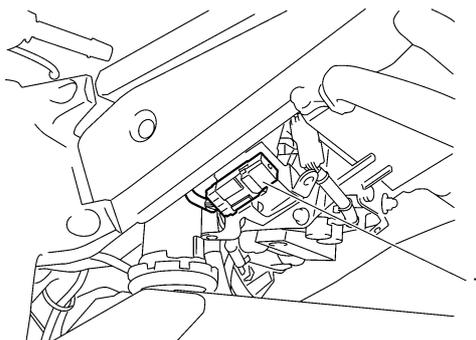
1. Software operation flow
2. Main switch "ON"
3. Initialize
4. Self-diagnosis (when static)
5. Self-diagnosis (when riding)

6. Receive signals
7. Control operation
8. Depressurize/pressurize

A. 8/1000th of a second

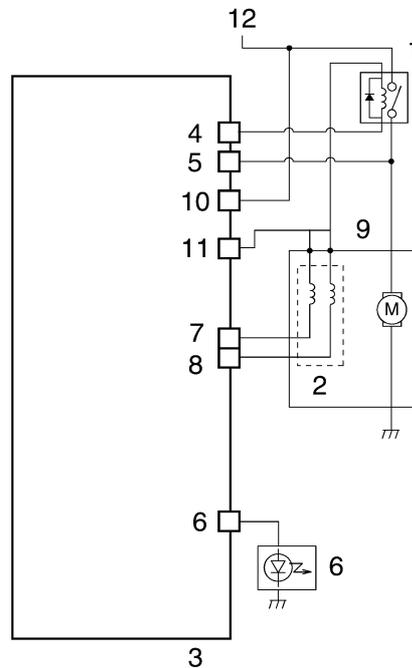
## ABS motor relay

The ABS motor relay "1" controls the power supply of the hydraulic unit and is located under the hydraulic unit bracket.



## Composition and operation

The ABS motor relay is activated by signals transmitted from the ABS ECU and operates simultaneously when the ABS starts to reduce the hydraulic pressure of the brake fluid. If the solenoid relay is turned off, the ABS motor relay is also deactivated and the motor stops operating if there is a malfunction.



- |                          |                         |
|--------------------------|-------------------------|
| 1. ABS motor relay       | 7. Front brake solenoid |
| 2. Solenoid valves       | 8. Rear brake solenoid  |
| 3. ABS ECU               | 9. Hydraulic unit       |
| 4. Pump motor relay coil | 10. Power supply        |
| 5. Pump motor monitor    | 11. Power of solenoid   |
| 6. ABS warning light     | 12. Power               |

EAS5D01003

## ABS OPERATION

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

### Normal braking (ABS not activated)

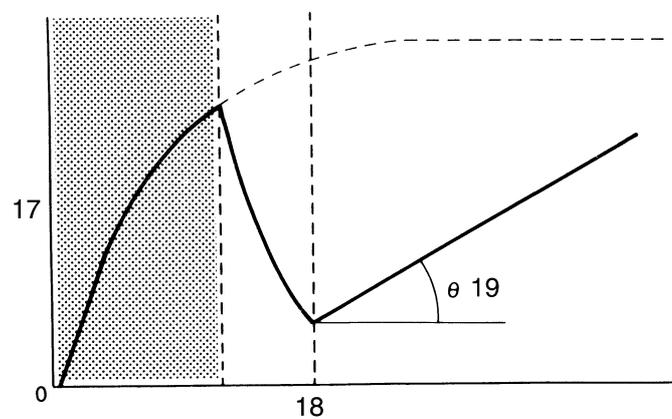
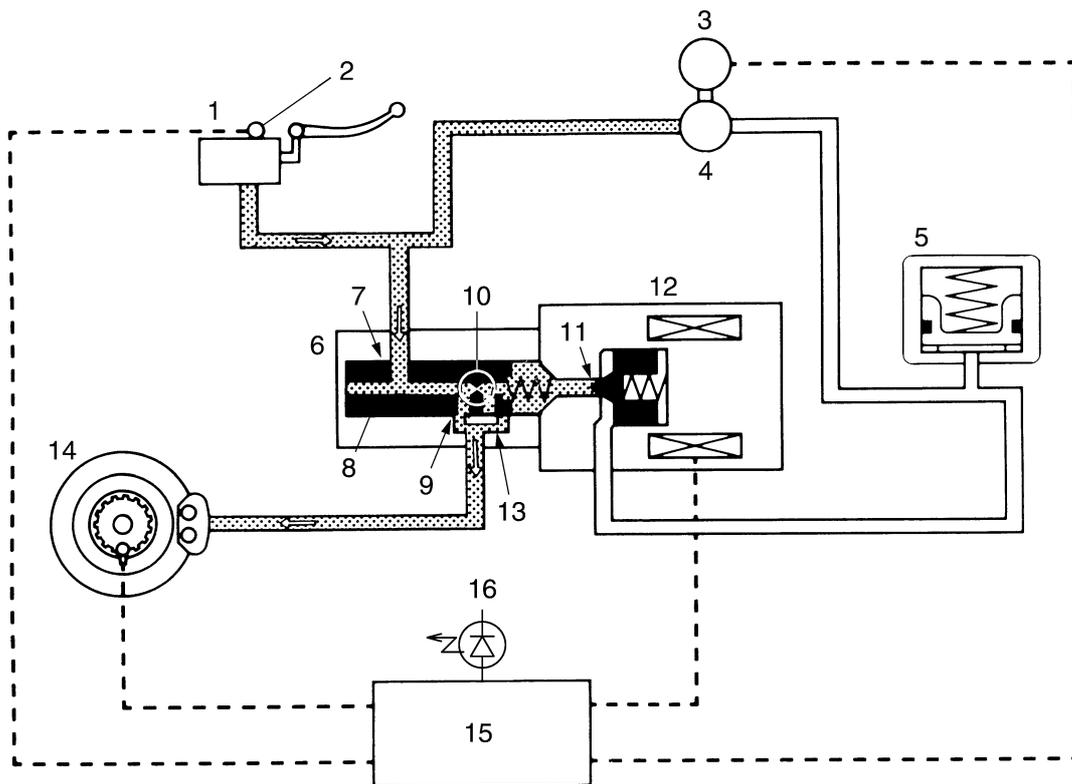
When the ABS is not activated, port D "11" of the solenoid valve is closed because a control signal has not been transmitted from the ABS ECU and port A "7" and port B "9" of the flow control valve are open.

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 via port A "7" and port B "9".

At this time, the inlet and outlet check valves of the pump close the lines and brake fluid is not sent. As a result, 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 via port A "7" and port B "9".

# FEATURES



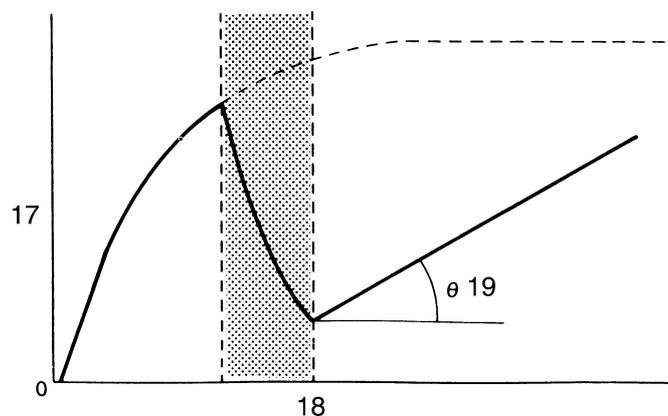
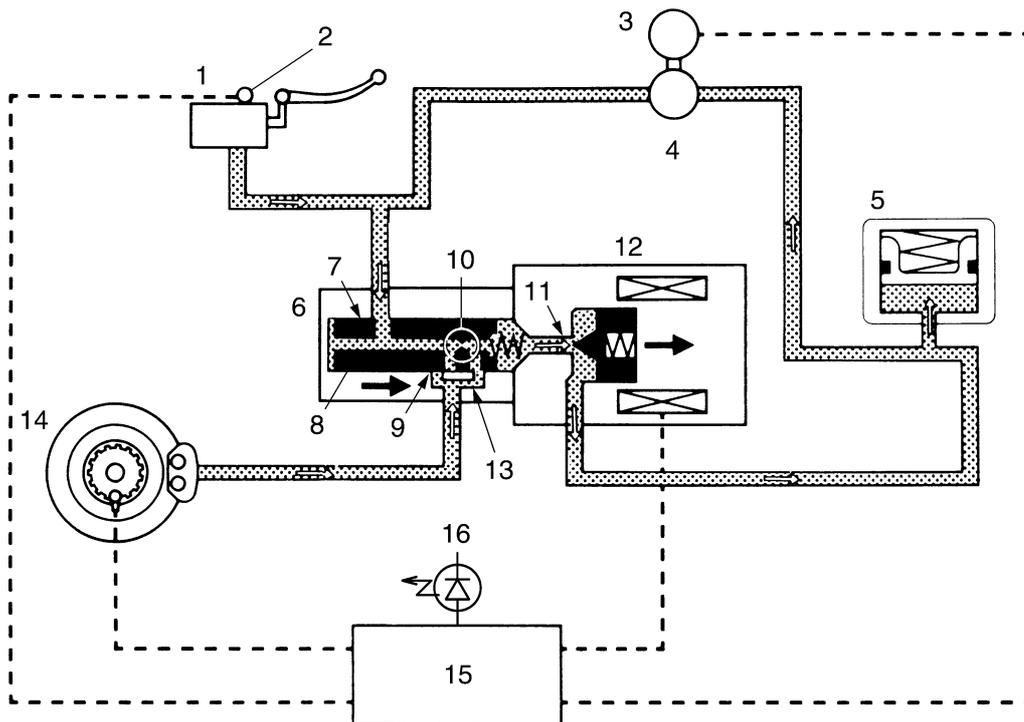
- |                          |                          |
|--------------------------|--------------------------|
| 1. Brake master cylinder | 15. ABS ECU              |
| 2. Brake light switch    | 16. ABS warning light    |
| 3. ABS motor             | 17. Brake fluid pressure |
| 4. Hydraulic pump        | 18. Time                 |
| 5. Buffer chamber        | 19. Repressurizing       |
| 6. Flow control valve    |                          |
| 7. Port A                |                          |
| 8. Spool                 |                          |
| 9. Port B                |                          |
| 10. Orifice              |                          |
| 11. Port D               |                          |
| 12. Solenoid valve       |                          |
| 13. Port C               |                          |
| 14. Brake caliper        |                          |

## Emergency braking (ABS activated)

### 1. Depressurized state

When the front wheel is about to lockup, port D “11” of the solenoid valve is opened by the “depressurization” signal transmitted from the ABS ECU. When this occurs, the spool of the flow control valve compresses the return spring and closes port B “9”. Brake fluid that has entered through port A “7” is restricted by the orifice “10” and the brake fluid is sent to the brake caliper via port C “13” and port D “11”, and 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 fluid pressure pump linked to the pump motor.



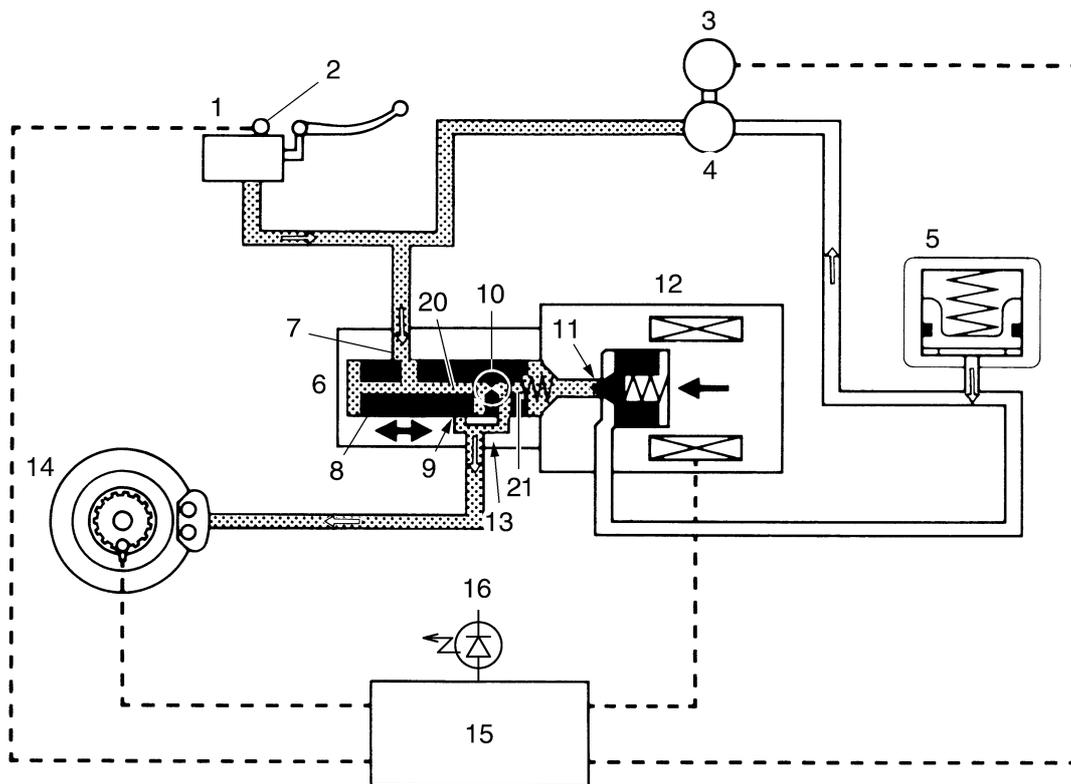
- |                          |                       |
|--------------------------|-----------------------|
| 1. Brake master cylinder | 5. Buffer chamber     |
| 2. Brake light switch    | 6. Flow control valve |
| 3. ABS motor             | 7. Port A             |
| 4. Hydraulic pump        | 8. Spool              |

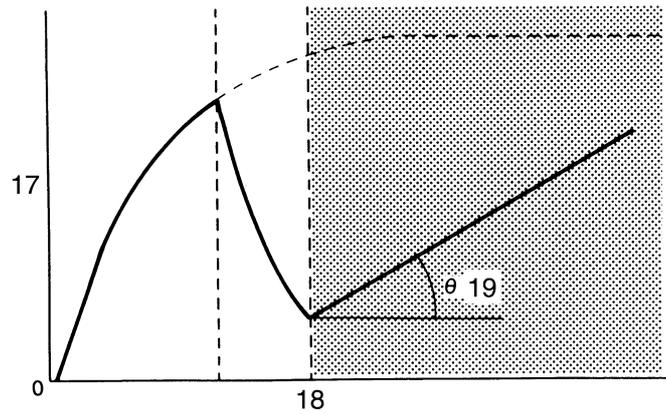
- 9. Port B
- 10.Orifice
- 11.Port D
- 12.Solenoid valve
- 13.Port C
- 14.Brake caliper
- 15.ABS ECU
- 16.ABS warning light
- 17.Brake fluid pressure
- 18.Time
- 19.Repressurizing

## 2. Pressurized state

Port D “11” is closed by the “pressurization” signal transmitted from the ABS ECU. Before this occurs, the spool of the flow control valve has compressed the return spring and closed port B “9”.

Brake fluid that has entered through port A “7” is further restricted by the orifice “10” and the brake fluid is sent to the brake calipers via port A “7” and port C “13”. At this time, the brake is pressurized at a constant speed regardless of the brake fluid pressure level since restriction of port A “7” changes so that a constant pressure difference is maintained between chamber A “20”and chamber B “21” of the flow control valve.





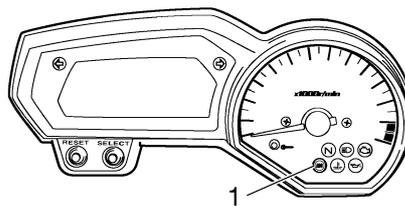
- |                          |                          |
|--------------------------|--------------------------|
| 1. Brake master cylinder | 12. Solenoid valve       |
| 2. Brake light switch    | 13. Port C               |
| 3. ABS motor             | 14. Brake caliper        |
| 4. Hydraulic pump        | 15. ABS ECU              |
| 5. Buffer chamber        | 16. ABS warning light    |
| 6. Flow control valve    | 17. Brake fluid pressure |
| 7. Port A                | 18. Time                 |
| 8. Spool                 | 19. Repressurizing       |
| 9. Port B                | 20. Chamber A            |
| 10. Orifice              | 21. Chamber B            |
| 11. Port D               |                          |

EAS5D01004

## ABS SELF-DIAGNOSIS FUNCTION

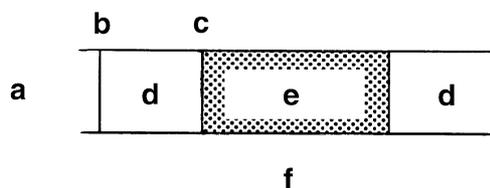
### ABS warning light

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



## Instances when the ABS warning light comes on

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



- |                      |                           |
|----------------------|---------------------------|
| a. ABS warning light | d. Goes off               |
| b. Main switch "OFF" | e. Comes on for 2 seconds |
| c. Main switch "ON"  | f. Preparation            |

- 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.

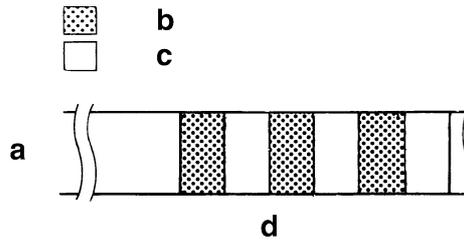


- |                      |             |
|----------------------|-------------|
| a. ABS warning light | b. Comes on |
|----------------------|-------------|

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

### NOTE:

- The ABS warning light comes on or flashes if the vehicle is ridden with the test coupler adapter connected to the ABS test coupler.
- The ABS warning light comes on during the engine cranking when the starter switch is pressed and starting circuit cut-off relay is turned "ON".



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

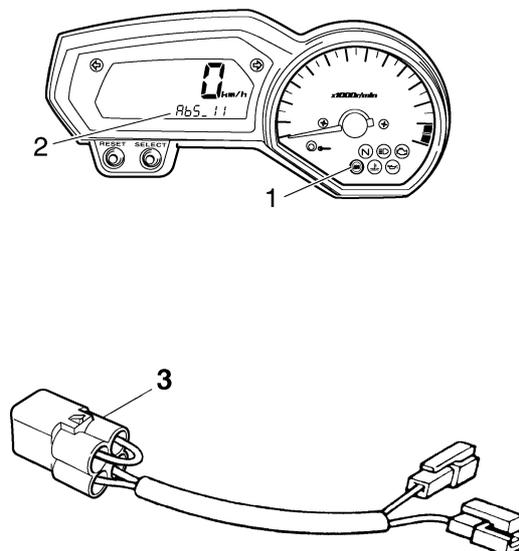
4. The ABS warning light “1” flashes and a malfunction code “2” is indicated on the multi-function display when the test coupler adapter “3” is connected to the ABS test coupler “4” for troubleshooting the ABS.

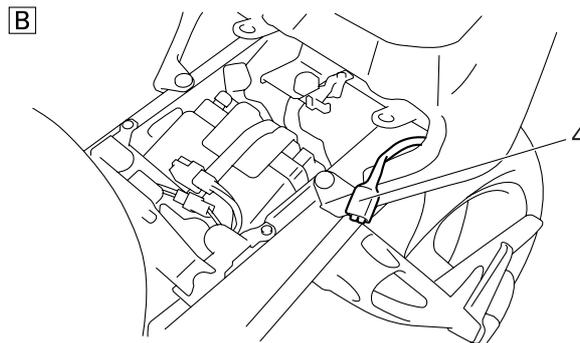
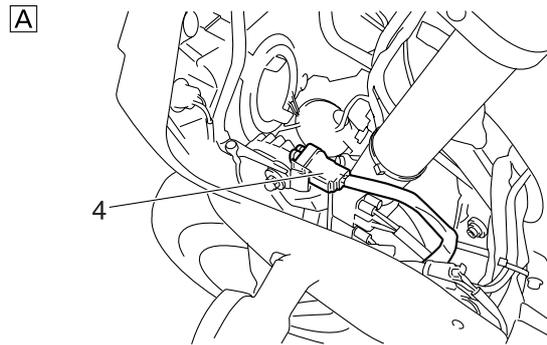
The ABS test coupler can be accessed by removing the left inner panel (front cowling). When the test coupler adapter is connected to the ABS test coupler, the ABS warning light starts flashing and the multi-function display indicates all the malfunction codes recorded in the ABS ECU.



**Test coupler adapter**  
**90890-03149**

**NOTE:**  
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. FZ1-SA

B. FZ1-NA

- **Diagnosis indication**

The place where the ABS diagnosis code is displayed is also used for the indication of the FI diagnosis code, odometer, trip meter and fuel trip.

As the priority level of indication, the diagnosis code for FI is the first and the diagnosis code for ABS is the second.

Accordingly, the ABS diagnosis code is not displayed during the diagnosis for FI.

**NOTE:**

---

It shall not be in the diagnosis mode for FI.

---

EAS5D01033

## **ABS WARNING LIGHT AND OPERATION**

### **ABS warning light**

- When the main switch is turned to “ON”, the ABS warning light comes on for 2 seconds, then goes off.
- If the ABS warning light comes on while riding, stop the vehicle, and then turn the main switch to “OFF”, then back to “ON”. The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.
- The ABS operation is normal if the ABS warning light flashes.
- Even if the ABS warning light remains on and does not go off, or if it comes on after riding, conventional braking performance of the vehicle is maintained.

## **ABS function**

- A brake system in which the hydraulic control has been performed by the ABS alerts a rider that the wheels had 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 surface such as ice, when it is caused by engine braking, even if the ABS is activated.
- The ABS is not designed to shorten the braking distance or improve the cornering performance.
- Depending on the road conditions, the braking distance may be longer compared to that of vehicles not equipped with ABS. Therefore, ride at a safe speed and keep a safe distance between yourself and other vehicles.
- The braking of the vehicle, even in the worst case, is principally executed when the vehicle is advancing straight ahead. During a turn, sudden braking is liable to cause a loss of traction of the tires. Even vehicles equipped with ABS cannot be prevented from falling over if braked suddenly.
- The ABS does not work when the main switch is turned to "OFF". The conventional braking function can be used.

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

EAS20180

## IMPORTANT INFORMATION

EAS20190

### PREPARATION FOR REMOVAL AND DISASSEMBLY

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



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

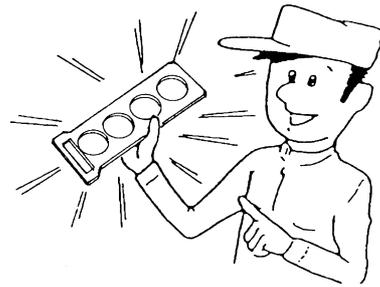


4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EAS20200

### REPLACEMENT PARTS

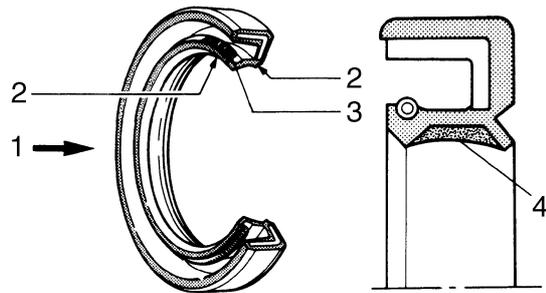
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



EAS20210

### GASKETS, OIL SEALS AND O-RINGS

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

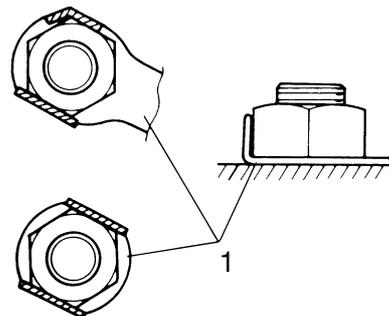


1. Oil
2. Lip
3. Spring
4. Grease

EAS20220

### LOCK WASHERS/PLATES AND COTTER PINS

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



EAS20230

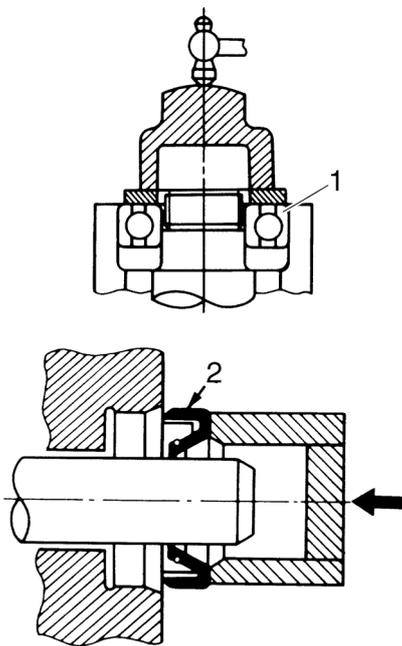
## BEARINGS AND OIL SEALS

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

ECA13300

### CAUTION:

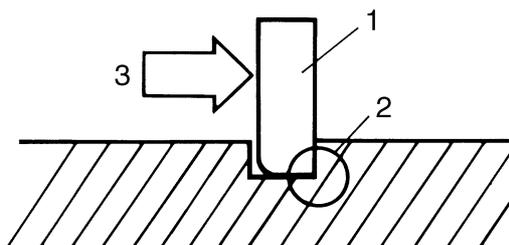
**Do not spin the bearing with compressed air because this will damage the bearing surfaces.**



EAS20240

## CIRCLIPS

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



# CHECKING THE CONNECTIONS

EAS20250

## CHECKING THE CONNECTIONS

Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:

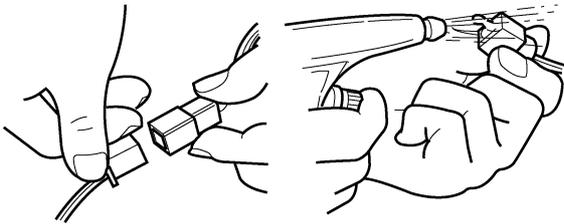
- Lead
- Coupler
- Connector

2. Check:

- Lead
- Coupler
- Connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.

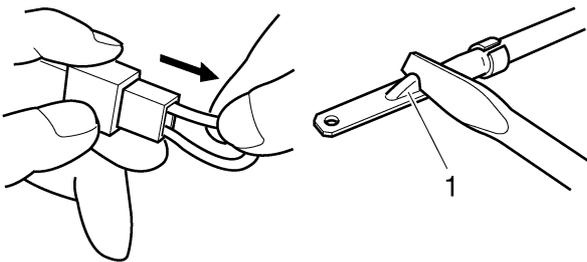


3. Check:

- All connections
- Loose connection → Connect properly.

**NOTE:**

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



4. Connect:

- Lead
- Coupler
- Connector

**NOTE:**

Make sure all connections are tight.

5. Check:

- Continuity  
(with the pocket tester)



Pocket tester

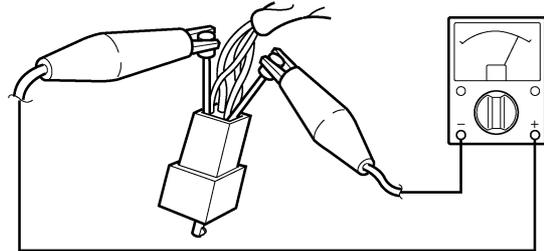
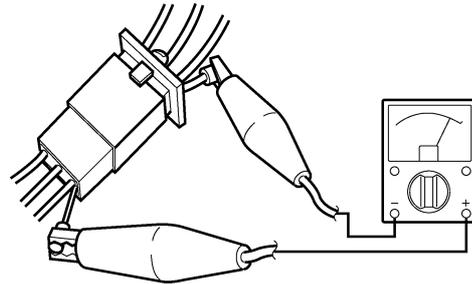
90890-03112

Analog Pocket tester

YU-03112-C

**NOTE:**

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



# SPECIAL TOOLS

EAS20260

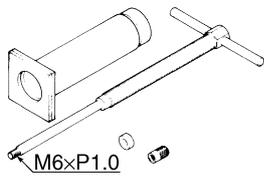
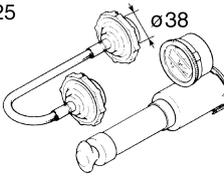
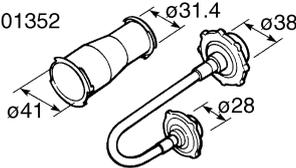
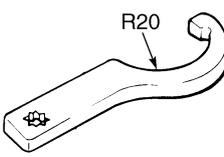
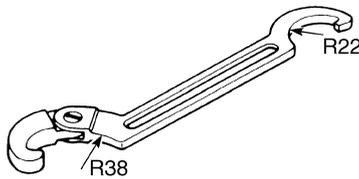
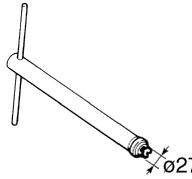
## SPECIAL TOOLS

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.

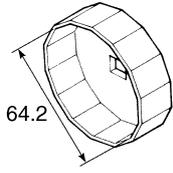
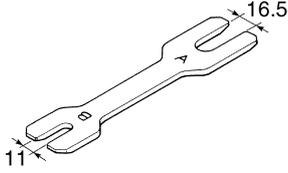
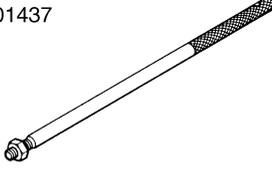
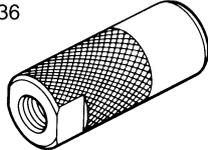
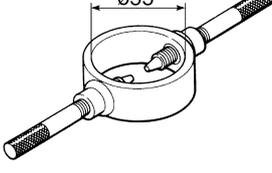
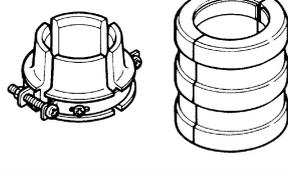
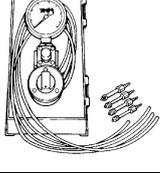
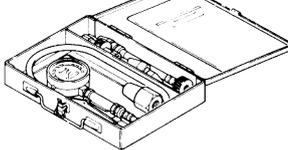
When placing an order, refer to the list provided below to avoid any mistakes.

**NOTE:**

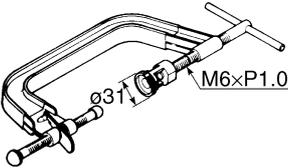
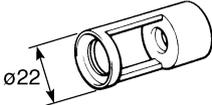
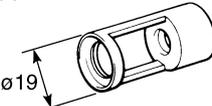
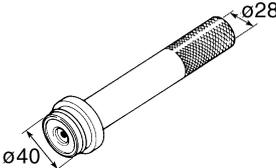
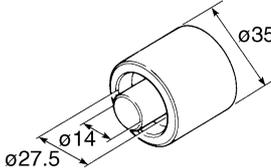
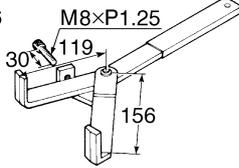
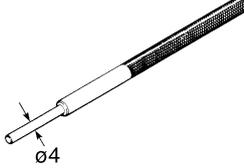
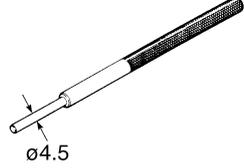
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

Tool name/Tool No.	Illustration	Reference pages
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304 	5-68
Radiator cap tester 90890-01325 Radiator pressure tester YU-24460-01	90890-01325 	6-2
Radiator cap tester adapter 90890-01352 Radiator pressure tester adapter YU-33984	90890-01352 	6-2
Steering nut wrench 90890-01403 Spanner wrench YU-33975		3-28, 4-73
Ring nut wrench 90890-01268 Spanner wrench YU-01268		4-73
Damper rod holder 90890-01423 Damping rod holder YM-01423		4-65, 4-66

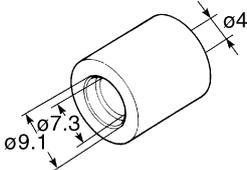
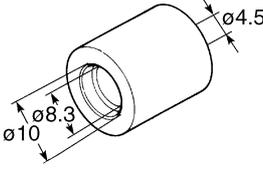
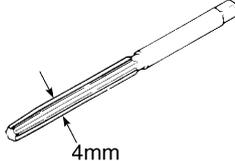
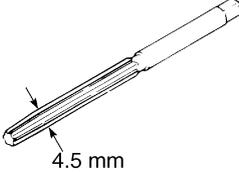
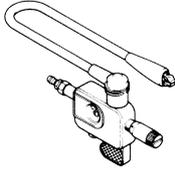
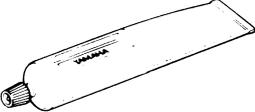
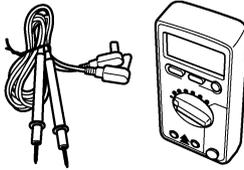
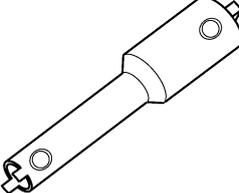
## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Oil filter wrench 90890-01426 YU-38411		3-13
Rod holder 90890-01434 Damper rod holder double ended YM-01434		4-64, 4-69
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703	90890-01437 	4-67
Rod puller attachment (M10) 90890-01436 Universal damping rod bleeding tool set YM-A8703	90890-01436 	4-67
Fork spring compressor 90890-01441 YM-01441		4-64, 4-69
Fork seal driver 90890-01442 Adjust table fork seal driver (36-46 mm) YM-01442		4-67
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456	90890-03094 	3-7
Compression gauge 90890-03081 Engine compression tester YU-33223		3-11

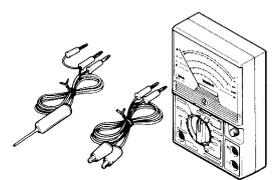
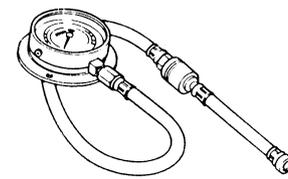
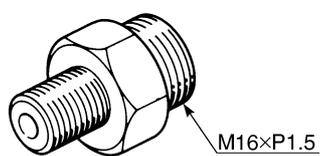
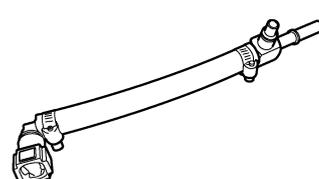
# SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Valve spring compressor 90890-04019 YM-04019		5-23, 5-29
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter (22 mm) YM-04108		5-23, 5-29
Valve spring compressor attachment 90890-04114 Valve spring compressor adapter YM-04114	90890-04114 	5-23, 5-29
Middle driven shaft bearing driver 90890-04058 Bearing driver (40 mm) YM-04058		6-11
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A		6-11
Universal clutch holder 90890-04086 YM-91042	90890-04086 	5-46, 5-50
Valve guide remover (ø4) 90890-04111 Valve guide remover (4.0 mm) YM-04111		5-25
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-25

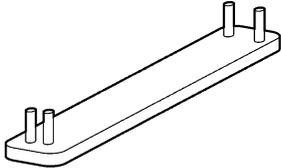
## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Valve guide installer (ø4) 90890-04112 Valve guide installer (4.0 mm) YM-04112		5-25
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117		5-25
Valve guide reamer (ø4) 90890-04113 Valve guide reamer (4.0 mm) YM-04113		5-25
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-25
Ignition checker 90890-06754 Opama pet-4000 spark checker YU-34487		8-148
Yamaha bond No.1215 (Three Bond No.1215®) 90890-85505		5-64, 6-11
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		7-8, 7-9
Pivot shaft wrench 90890-01518 Frame spanner socket YM-01518		5-7

## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Pivot shaft wrench adapter 90890-01476		5-7
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-28, 5-41, 8-137, 8-138, 8-139, 8-142, 8-144, 8-145, 8-146, 8-147, 8-148, 8-149, 8-150, 8-151, 8-152, 8-153, 8-154, 8-155, 8-156, 8-157
Pressure gauge 90890-03153 YU-03153		3-14, 7-7
Oil pressure gauge adapter 90890-03139		3-14
Vacuum/pressure pump gauge set 90890-06756		7-7
Valve lapper 90890-04101 Valve lapping tool YM-A8998		3-5
Fuel pressure adapter 90890-03176 YM-03176		7-7

## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Camshaft wrench 90890-04143 YM-04143		5-11, 5-16
Test coupler adapter 90890-03149		1-23, 4-54, 4-55



---

# SPECIFICATIONS

<b>GENERAL SPECIFICATIONS</b> .....	2-1
<b>ENGINE SPECIFICATIONS</b> .....	2-2
<b>CHASSIS SPECIFICATIONS</b> .....	2-8
<b>ELECTRICAL SPECIFICATIONS</b> .....	2-11
<b>TIGHTENING TORQUES</b> .....	2-14
GENERAL TIGHTENING TORQUE SPECIFICATIONS .....	2-14
ENGINE TIGHTENING TORQUES .....	2-15
CHASSIS TIGHTENING TORQUES .....	2-19
<b>LUBRICATION POINTS AND LUBRICANT TYPES</b> .....	2-22
ENGINE .....	2-22
CHASSIS .....	2-23
<b>LUBRICATION SYSTEM CHART AND DIAGRAMS</b> .....	2-25
ENGINE OIL LUBRICATION CHART .....	2-25
LUBRICATION DIAGRAMS .....	2-27
<b>COOLING SYSTEM DIAGRAMS</b> .....	2-37
<b>CABLE ROUTING</b> .....	2-41

# GENERAL SPECIFICATIONS

EAS20280

## GENERAL SPECIFICATIONS

### Model

Model	2D1B (EUR, ZAF) (FZ1-N) 2D1C (FRA, BEL) (FZ1-N) 2D1D (AUS) (FZ1-N(X)) 2D1E (EUR, ZAF) (FZ1-N) 2D1F (FRA, BEL) (FZ1-N) 2D1G (AUS) (FZ1-N(X)) 3C3H (EUR, ZAF) (FZ1-S) 3C3J (FRA, BEL) (FZ1-S) 3C3K (AUS) (FZ1-S(X)) 5D03 (EUR, ZAF) (FZ1-SA) 5D04 (FRA, BEL) (FZ1-SA) 22C1 (EUR, ZAF) (FZ1-NA) 22C2 (FRA, BEL) (FZ1-NA) 22C3 (EUR, ZAF) (FZ1-NA) 22C4 (FRA, BEL) (FZ1-NA)
-------	---

### Dimensions

Overall length	2140 mm (84.3 in)
Overall width	770 mm (30.3 in)
Overall height	1060 mm (41.7 in) (FZ1-N(X), FZ1-NA) 1205 mm (47.4 in) (FZ1-S(X), FZ1-SA)
Seat height	815 mm (32.1 in)
Wheelbase	1460 mm (57.5 in)
Ground clearance	135 mm (5.31 in)
Minimum turning radius	3000 mm (118.1 in)

### Weight

With oil and fuel	214.0 kg (472 lb) (FZ1-N(X)) 220.0 kg (485 lb) (FZ1-S(X)) 221.0 kg (487 lb) (FZ1-NA) 226.0 kg (498 lb) (FZ1-SA)
Maximum load	196 kg (432 lb) (FZ1-N(X)) 190 kg (419 lb) (FZ1-S(X)) 189 kg (417 lb) (FZ1-NA) 184 kg (406 lb) (FZ1-SA)

# ENGINE SPECIFICATIONS

EAS20290

## ENGINE SPECIFICATIONS

### Engine

Engine type	Liquid cooled 4-stroke, DOHC
Displacement	998.0 cm <sup>3</sup> (60.90 cu.in)
Cylinder arrangement	Forward-inclined parallel 4-cylinder
Bore × stroke	77.0 × 53.6 mm (3.03 × 2.11 in)
Compression ratio	11.50 : 1
Standard compression pressure (at sea level)	1480 kPa/350 r/min (210.5 psi/350 r/min) (14.8 kgf/cm <sup>2</sup> /350 r/min)
Starting system	Electric starter

### Fuel

Recommended fuel	Regular unleaded gasoline only (EUR, FRA, BEL) Unleaded gasoline only (AUS)
Fuel tank capacity	18.0 L (4.76 US gal) (3.96 Imp.gal)
Fuel reserve amount	3.4 L (0.90 US gal) (0.75 Imp.gal)

### Engine oil

Lubrication system	Wet sump
Type	SAE10W-30 or SAE10W-40 or SAE15W-40 or SAE20W-40 or SAE20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA

### Engine oil quantity

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

### Oil filter

Oil filter type	Paper
-----------------	-------

### Oil pump

Oil pump type	Trochoid
Inner-rotor-to-outer-rotor-tip clearance	0.010–0.100 mm (0.0004–0.0039 in)
Limit	0.18 mm (0.0071 in)
Outer-rotor-to-oil-pump-housing clearance	0.090–0.150 mm (0.0035–0.0059 in)
Limit	0.22 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.06–0.13 mm (0.0024–0.0051 in)
Limit	0.20 mm (0.0079 in)
Bypass valve opening pressure	80.0–120.0 kPa (11.6–17.4 psi) (0.80–1.20 kgf/cm <sup>2</sup> )
Relief valve operating pressure	600.0–680.0 kPa (87.0–98.6 psi) (6.00–6.80 kgf/cm <sup>2</sup> )

### Cooling system

Radiator capacity (including all routes)	2.25 L (2.38 US qt) (1.98 Imp.qt)
Coolant reservoir capacity (up to the maximum level mark)	0.25 L (0.26 US qt) (0.22 Imp.qt)
Radiator cap opening pressure	93.3–122.7 kPa (13.5–17.8 psi) (0.93–1.23 kgf/cm <sup>2</sup> )

### Radiator core

Width	222.6 mm (8.76 in)
Height	360.0 mm (14.17 in)

# ENGINE SPECIFICATIONS

Depth	22.0 mm (0.87 in)
-------	-------------------

## Water pump

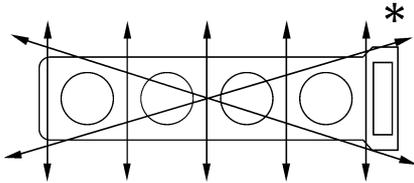
Water pump type	Single suction centrifugal pump
Reduction ratio	65/43 × 25/32 (1.181)
Max impeller shaft tilt limit	0.15 mm (0.0059 in)

## Spark plug (s)

Manufacturer/model	NGK/CR9EK
Spark plug gap	0.6–0.7 mm (0.024–0.028 in)

## Cylinder head

Volume	12.20–13.00 cm <sup>3</sup> (0.74–0.79 cu.in)
Warpage limit*	0.10 mm (0.0039 in)

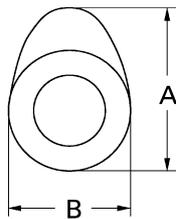


## Camshaft

Drive system	Chain drive (right)
Camshaft cap inside diameter	22.500–22.521 mm (0.8858–0.8867 in)
Camshaft journal diameter	22.459–22.472 mm (0.8842–0.8847 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)

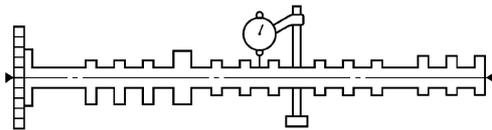
## Camshaft lobe dimensions

Intake A	32.500–32.600 mm (1.2795–1.2835 in)
Limit	32.400 mm (1.2756 in)
Intake B	24.950–25.050 mm (0.9823–0.9862 in)
Limit	24.850 mm (0.9783 in)
Exhaust A	30.699–30.799 mm (1.2086–1.2126 in)
Limit	30.599 mm (1.2047 in)
Exhaust B	22.950–23.050 mm (0.9035–0.9075 in)
Limit	22.850 mm (0.8996 in)



Camshaft runout limit

0.030 mm (0.0012 in)



## Timing chain

Model/number of links	RH2020/122
Tensioning system	Automatic

## Valve clearance (cold)

Intake	0.11–0.20 mm (0.0043–0.0079 in)
--------	---------------------------------

# ENGINE SPECIFICATIONS

Exhaust

0.21–0.25 mm (0.0083–0.0098 in)

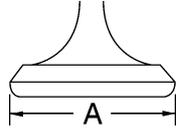
## Valve dimensions

Valve head diameter A (intake)

23.40–23.60 mm (0.9213–0.9291 in)

Valve head diameter A (exhaust)

24.90–25.10 mm (0.9803–0.9882 in)

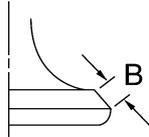


Valve face width B (intake)

1.760–2.900 mm (0.0693–0.1142 in)

Valve face width B (exhaust)

1.760–2.900 mm (0.0693–0.1142 in)

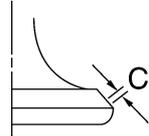


Valve seat width C (intake)

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)

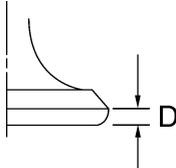


Valve margin thickness D (intake)

0.50–0.90 mm (0.0197–0.0354 in)

Valve margin thickness D (exhaust)

0.50–0.90 mm (0.0197–0.0354 in)



Valve stem diameter (intake)

3.975–3.990 mm (0.1565–0.1571 in)

Limit

3.945 mm (0.1553 in)

Valve stem diameter (exhaust)

4.460–4.475 mm (0.1756–0.1762 in)

Limit

4.425 mm (0.1742 in)

Valve guide inside diameter (intake)

4.000–4.012 mm (0.1575–0.1580 in)

Limit

4.050 mm (0.1594 in)

Valve guide inside diameter (exhaust)

4.500–4.512 mm (0.1772–0.1776 in)

Limit

4.550 mm (0.1791 in)

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

0.010–0.037 mm (0.0004–0.0015 in)

Limit

0.080 mm (0.0032 in)

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

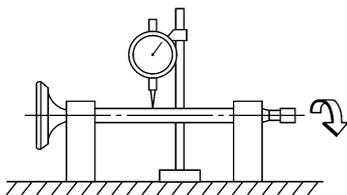
0.025–0.052 mm (0.0010–0.0020 in)

Limit

0.100 mm (0.0039 in)

Valve stem runout

0.010 mm (0.0004 in)



Cylinder head valve seat width (intake)

0.90–1.10 mm (0.0354–0.0433 in)

Cylinder head valve seat width (exhaust)

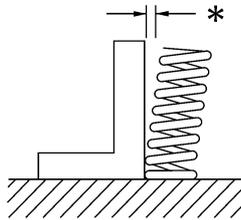
0.90–1.10 mm (0.0354–0.0433 in)

# ENGINE SPECIFICATIONS

## Valve spring

### Inner spring

Free length (intake)	40.47 mm (1.59 in)
Free length (exhaust)	40.53 mm (1.60 in)
Installed length (intake)	32.66 mm (1.29 in)
Installed length (exhaust)	33.88 mm (1.33 in)
Spring rate K1 (intake)	17.53 N/mm (100.10 lb/in) (1.79 kgf/mm)
Spring rate K2 (intake)	22.86 N/mm (130.53 lb/in) (2.33 kgf/mm)
Spring rate K1 (exhaust)	21.52 N/mm (122.88 lb/in) (2.19 kgf/mm)
Spring rate K2 (exhaust)	27.99 N/mm (159.82 lb/in) (2.85 kgf/mm)
Installed compression spring force (intake)	127.40–146.60 N (28.64–32.94 lb) (12.99–14.93 kgf)
Installed compression spring force (exhaust)	133.00–153.00 N (29.90–34.39 lb) (13.56–15.60 kgf)
Spring tilt (intake)*	2.5 °/1.8 mm
Spring tilt (exhaust)*	2.5 °/1.8 mm



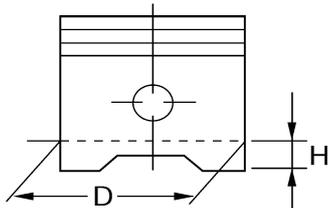
Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise

## Cylinder

Bore	77.000–77.010 mm (3.0315–3.0319 in)
Taper limit	0.050 mm (0.0020 in)
Out of round limit	0.050 mm (0.0020 in)

## Piston

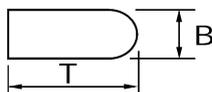
Piston-to-cylinder clearance	0.010–0.035 mm (0.0004–0.0014 in)
Limit	0.12 mm (0.0047 in)
Diameter D	76.975–76.990 mm (3.0305–3.0311 in)
Height H	5.0 mm (0.20 in)



Offset	0.50 mm (0.0197 in)
Offset direction	Intake side
Piston pin bore inside diameter	17.002–17.013 mm (0.6694–0.6698 in)
Piston pin outside diameter	16.991–17.000 mm (0.6689–0.6693 in)

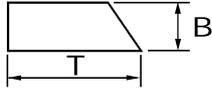
## Piston ring

Top ring	
Ring type	Barrel
Dimensions (B × T)	0.90 × 2.75 mm (0.04 × 0.11 in)

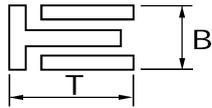


# ENGINE SPECIFICATIONS

End gap (installed)	0.15–0.25 mm (0.0059–0.0098 in)
Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
2nd ring	
Ring type	Taper
Dimensions (B × T)	0.80 × 2.75 mm (0.03 × 0.11 in)



End gap (installed)	0.30–0.45 mm (0.0118–0.0177 in)
Ring side clearance	0.020–0.055 mm (0.0008–0.0022 in)
Oil ring	
Dimensions (B × T)	1.50 × 2.25 mm (0.06 × 0.09 in)



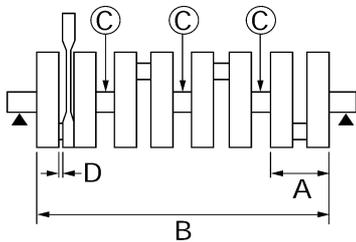
End gap (installed)	0.10–0.40 mm (0.0039–0.0157 in)
---------------------	---------------------------------

## Connecting rod

Oil clearance (using plastigauge®)	0.034–0.058 mm (0.0013–0.0023 in)
Bearing color code	1.Blue 2.Black 3.Brown 4.Green

## Crankshaft

Width A	55.20–56.60 mm (2.173–2.228 in)
Width B	298.75–300.65 mm (11.76–11.84 in)
Runout limit C	0.030 mm (0.0012 in)
Big end side clearance D	0.160–0.262 mm (0.0063–0.0103 in)



Journal oil clearance (using plastigauge®)	0.014–0.037 mm (0.0006–0.0015 in)
Bearing color code	0.White 1.Blue 2.Black 3.Brown 4.Green

## Clutch

Clutch type	Wet, multiple-disc
Clutch release method	Outer pull, rack and pinion pull
Clutch lever free play	10.0–15.0 mm (0.39–0.59 in)
Friction plate thickness	2.90–3.10 mm (0.114–0.122 in)
Wear limit	2.80 mm (0.1102 in)
Plate quantity	9 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	8 pcs
Warpage limit	0.10 mm (0.0039 in)
Clutch spring free length	52.50 mm (2.07 in)
Spring quantity	6 pcs

## Transmission

Transmission type	Constant mesh 6-speed
Primary reduction system	Spur gear
Primary reduction ratio	65/43 (1.512)

# ENGINE SPECIFICATIONS

---

Secondary reduction system	Chain drive
Secondary reduction ratio	45/17 (2.647)
Operation	Left foot operation

---

<b>Gear ratio</b>	
1st	38/15 (2.533)
2nd	33/16 (2.063)
3rd	37/21 (1.762)
4th	35/23 (1.522)
5th	27/20 (1.350)
6th	29/24 (1.208)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)

---

<b>Shifting mechanism</b>	
Shift mechanism type	Guide bar
Shift fork guide bar bending limit	0.100 mm (0.0039 in)
Shift fork thickness	5.80–5.88 mm (0.2283–0.2315 in)

---

<b>Air filter</b>	
Air filter element	Oil-coated paper element

---

<b>Fuel pump</b>	
Pump type	Electrical
Model/manufacture	2D1/DENSO
Maximum consumption amperage	4.3 A
Output pressure	324.0 kPa (47.0 psi) (3.24 kgf/cm <sup>2</sup> )

---

<b>Fuel injection</b>	
Model/quantity	297500-0300/4
Manufacturer	DENSO

---

<b>Throttle body</b>	
Type/quantity	SE 45EIDW-B41/1
Manufacturer	MIKUNI
ID mark	2D11 20
Throttle valve size	#100

---

<b>Throttle position sensor</b>	
Resistance	2.00–3.00 kΩ
Output voltage (at idle)	0.63–0.73 V

---

<b>Idling condition</b>	
Engine idling speed	1100–1300 r/min
Intake vacuum	30.0 kPa (8.9 inHg) (225 mmHg)
Water temperature	95.0–105.0 °C (203.00–221.00 °F)
Oil temperature	80.0–90.0 °C (176.00–194.00 °F)
Throttle cable free play	3.0–5.0 mm (0.12–0.20 in)

# CHASSIS SPECIFICATIONS

EAS20300

## CHASSIS SPECIFICATIONS

### Chassis

Frame type	Diamond
Caster angle	25.00 °
Trail	109.0 mm (4.29 in)

### Front wheel

Wheel type	Cast wheel
Rim size	17M/C x MT3.50
Rim material	Aluminum
Wheel travel	130.0 mm (5.12 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)

### Rear wheel

Wheel type	Cast wheel
Rim size	17M/C x MT6.00
Rim material	Aluminum
Wheel travel	130.0 mm (5.12 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)

### Front tire

Size	120/70 ZR17 M/C (58W)
Manufacturer/model	MICHELIN/Pilot Road S
Manufacturer/model	DUNLOP/D221FA
Wear limit (front)	1.6 mm (0.06 in)

### Rear tire

Size	190/50 ZR17 M/C (73W)
Manufacturer/model	MICHELIN/Pilot Road D
Manufacturer/model	DUNLOP/D221G
Wear limit (rear)	1.6 mm (0.06 in)

### Tire air pressure (measured on cold tires)

Loading condition	0–90 kg (0–198 lb)
Front	250 kPa (36 psi) (2.50 kgf/cm <sup>2</sup> ) (2.50 bar)
Rear	290 kPa (42 psi) (2.90 kgf/cm <sup>2</sup> ) (2.90 bar)
Loading condition	90–196 kg (198–432 lb) (FZ1-N(X))
	90–190 kg (198–419 lb) (FZ1-S(X))
	90–189 kg (198–417 lb) (FZ1-NA)
	90–184 kg (198–406 lb) (FZ1-SA)
Front	250 kPa (36 psi) (2.50 kgf/cm <sup>2</sup> ) (2.50 bar)
Rear	290 kPa (42 psi) (2.90 kgf/cm <sup>2</sup> ) (2.90 bar)
High-speed riding	
Front	250 kPa (36 psi) (2.50 kgf/cm <sup>2</sup> ) (2.50 bar)
Rear	290 kPa (42 psi) (2.90 kgf/cm <sup>2</sup> ) (2.90 bar)

### Front brake

Type	Dual disc brake
Operation	Right hand operation
Front brake lever free play	2.3–11.5 mm (0.09–0.45 in)

### 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)

# CHASSIS SPECIFICATIONS

---

Brake disc deflection limit	0.10 mm (0.0039 in)
Brake pad lining thickness (inner)	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Brake pad lining thickness (outer)	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Master cylinder inside diameter	16.00 mm (0.63 in)
Caliper cylinder inside diameter	30.20 mm (1.19 in)
Caliper cylinder inside diameter	27.00 mm (1.06 in)
Recommended fluid	DOT 4

---

## Rear brake

Type	Single disc brake
Operation	Right foot operation
Brake pedal free play	4.3–9.3 mm (0.17–0.37 in)

---

## Rear disc brake

Disc outside diameter × thickness	245.0 × 5.0 mm (9.65 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Brake pad lining thickness (outer)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	38.20 mm (1.50 in)
Recommended fluid	DOT 4

---

## Steering

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

---

## Front suspension

Type	Telescopic fork
Spring/shock absorber type	Coil spring/oil damper
Front fork travel	130.0 mm (5.12 in)
Fork spring free length	243.5 mm (9.59 in)
Collar length	100.0 mm (3.94 in)
Installed length	239.0 mm (9.41 in)
Spring rate K1	9.31 N/mm (53.16 lb/in) (0.95 kgf/mm)
Spring stroke K1	0.0–130.0 mm (0.00–5.12 in)
Inner tube outer diameter	43.0 mm (1.69 in)
Inner tube bending limit	0.2 mm (0.01 in)
Optional spring available	No
Recommended oil	Suspension oil 01 or equivalent
Quantity	539.0 cm <sup>3</sup> (18.22 US oz) (19.01 Imp.oz)
Level	96.0 mm (3.78 in)

---

## Rear suspension

Type	Swingarm (link suspension)
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	60.0 mm (2.36 in)
Spring free length	194.8 mm (7.67 in) (FZ1-N(X)), (FZ1-S(X)) 169.8 mm (6.69 in) (FZ1-SA), (FZ1-NA)
Installed length	181.8 mm (7.16 in) (FZ-N(X)), (FZ1-S(X)) 156.8 mm (6.17 in) (FZ1-SA), (FZ1-NA)
Spring rate K1	102.90 N/mm (587.56 lb/in) (10.49 kgf/mm)

## CHASSIS SPECIFICATIONS

---

Spring stroke K1	0.0–60.0 mm (0.00–2.36 in)
Optional spring available	No
Enclosed gas/air pressure (STD)	1000 kPa (142.2 psi) (10.0 kgf/cm <sup>2</sup> )

---

### Drive chain

Type/manufacturer	50VA8/DAIDO
Link quantity	122
Drive chain slack	25.0–35.0 mm (0.98–1.38 in)
15-link length limit	239.3 mm (9.42 in)

# ELECTRICAL SPECIFICATIONS

EAS20310

## ELECTRICAL SPECIFICATIONS

### Voltage

System voltage 12 V

### Ignition system

Ignition system Transistorized coil ignition (digital)  
Ignition timing (B.T.D.C.) 5.0 °/1200 r/min

### Engine control unit

Model/manufacture TBDF20/DENSO

### Transistorized coil ignition

Crankshaft position sensor resistance 336–504  $\Omega$  at 20 °C (68 °F)

### Ignition coil

Model/manufacture F6T558/MITSUBISHI  
Minimum ignition spark gap 6.0 mm (0.24 in)  
Primary coil resistance 1.19–1.61  $\Omega$  at 20 °C (68 °F)  
Secondary coil resistance 8.5–11.5 k $\Omega$  at 20 °C (68 °F)

### AC magneto

Model/manufacture STATOR:F074T85073/MITSUBISHI (FZ1-N(X)), (FZ1-S(X))  
STATOR:F074T85074/MITSUBISHI (FZ1-SA)  
STATOR:F074T85075/MITSUBISHI (FZ1-NA)  
Standard output 14.0 V, 40.0 A at 6500 r/min  
Stator coil resistance 0.144–0.176  $\Omega$  at 20 °C (68 °F) (FZ1-S(X), FZ1-N(X), FZ1-SA)  
0.153–0.187  $\Omega$  at 20 °C (68 °F) (FZ1-NA)

### Rectifier/regulator

Regulator type Semi conductor-short circuit  
Model/manufacture FH012AA/SHINDENGEN  
Regulated voltage (DC) 14.2–14.8 V  
Rectifier capacity 50.0 A  
Withstand voltage 40.0 V

### Battery

Model YTZ14S  
Voltage, capacity 12 V, 11.2 Ah  
Specific gravity 1.310  
Manufacturer GS YUASA  
Ten hour rate amperage 1.12 A

### Headlight

Bulb type Halogen bulb

### Bulb voltage, wattage $\times$ quantity

Headlight 12 V, 60 W/55.0 W  $\times$  1 (FZ1-N(X)), (FZ1-NA)  
12 V, 60 W/55.0 W  $\times$  2 (FZ1-S(X)), (FZ1-SA)  
Auxiliary light 12 V, 5.0 W  $\times$  2  
Tail/brake light 12 V, 5.0 W/21.0 W  $\times$  1  
Front turn signal light 12 V, 10.0 W  $\times$  2  
Rear turn signal light 12 V, 10.0 W  $\times$  2  
License plate light 12 V, 5.0 W  $\times$  1

# ELECTRICAL SPECIFICATIONS

---

Meter lighting	LED
----------------	-----

---

<b>Indicator light</b>	
Neutral indicator light	LED
Turn signal indicator light	LED
Oil level warning light	LED
High beam indicator light	LED
Coolant temperature warning light	LED
Engine trouble warning light	LED
ABS warning light	LED
Immobilizer system indicator light	LED

---

<b>Electric starting system</b>	
System type	Constant mesh

---

<b>Starter motor</b>	
Model/manufacturer	SM13/MITSUBA
Power output	0.80 kW
Armature coil resistance	0.0250–0.0350 $\Omega$
Brush overall length	12.5 mm (0.49 in)
Limit	5.00 mm (0.20 in)
Brush spring force	7.65–10.01 N (27.54–36.03 oz) (780–1021 gf)
Commutator diameter	28.0 mm (1.10 in)
Limit	27.0 mm (1.06 in)
Mica undercut (depth)	0.70 mm (0.03 in)

---

<b>Starter relay</b>	
Model/manufacturer	2768109-A/JIDECO
Amperage	180.0 A
Coil resistance	4.18–4.62 $\Omega$ at 20 °C (68 °F)

---

<b>Horn</b>	
Horn type	Plane
Quantity	1 pcs
Model/manufacturer	YF-12/NIKKO
Maximum amperage	3.0 A
Coil resistance	1.15–1.25 $\Omega$ at 20 °C (68 °F)
Performance	105–113 dB/2m

---

<b>Turn signal/hazard relay</b>	
Relay type	Full transistor
Model/manufacturer	FE218BH/DENSO
Built-in, self-canceling device	No
Turn signal blinking frequency	75.0–95.0 cycles/min
Wattage	10 W $\times$ 2.0 +3.4 W

---

<b>Oil level gauge</b>	
Model/manufacturer	5VY/SOMIC ISHIKAWA

---

<b>Servo motor</b>	
Model/manufacturer	2D1/YAMAHA

---

<b>Fuses</b>	
Main fuse	50.0 A
Headlight fuse	15.0 A (FZ1-N(X)), (FZ1-NA) 25.0 A (FZ1-S(X)), (FZ1-SA)
Taillight fuse	10.0 A
Signaling system fuse	10.0 A

## ELECTRICAL SPECIFICATIONS

---

Ignition fuse	15.0 A
Radiator fan fuse	10.0 A × 2
Fuel injection system fuse	15.0 A
ABS motor fuse	30.0 A (FZ1-SA), (FZ1-NA)
ABS control unit fuse	10.0 A (FZ1-SA), (FZ1-NA)
Backup fuse	10.0 A
Reserve fuse	30.0 A (FZ1-SA), (FZ1-NA)
Reserve fuse	25.0 A (FZ1-S(X)), (FZ1-SA)
Reserve fuse	15.0 A
Reserve fuse	10.0 A

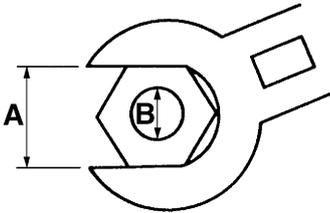
EAS20320

## 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 nut	M10	10	See NOTE	
Cylinder head bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Camshaft caps bolt	M6	28	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Cylinder head cover bolt	M6	6	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Cylinder head stud bolt (exhaust pipe)	M8	8	15 Nm (1.5 m·kg, 11 ft·lb)	
Air indication system cap bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Camshaft sprocket bolt	M7	4	24 Nm (2.4 m·kg, 17 ft·lb)	
Cylinder head and throttle body clamp	M5	4	3 Nm (0.3 m·kg, 2.2 ft·lb)	
Connecting rod cap bolt (1st)	M8	8	20 Nm (2.0 m·kg, 14 ft·lb)	
Connecting rod cap bolt (final)	M8	8	Specified angle 150°	
Generator rotor bolt	M10	1	60 Nm (6.0 m·kg, 43 ft·lb)	
Timing chain tensioner bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Water pump outlet pipe bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Water pump inlet pipe bolt (water pump side)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Water pump inlet pipe bolt (front side)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil/water pump drive sprocket bolt	M6	1	15 Nm (1.5 m·kg, 11 ft·lb)	
Water pump bolt	M6	5	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Thermostat cover nut	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Thermostat inlet pipe bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil cooler bolt	M20	1	63 Nm (6.3 m·kg, 46 ft·lb)	
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kg, 31 ft·lb)	
Oil pipe bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil strainer bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil delivery pipe bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil filter union bolt	M20	1	70 Nm (7.0 m·kg, 51 ft·lb)	
Oil filter	M20	1	17 Nm (1.7 m·kg, 12 ft·lb)	
Oil pan bolt	M6	14	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil pan bolt	M6	1	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Air filter case cover screw	M5	11	1.2 Nm (0.12 m·kg, 0.9 ft·lb)	
Throttle body and throttle body joint clamp	M5	4	3 Nm (0.3 m·kg, 2.2 ft·lb)	
Throttle body and funnel bolt	M5	6	4.2 Nm (0.42 m·kg, 3.0 ft·lb)	
Throttle cable adjusting bolt	M6	1	4.5 Nm (0.45 m·kg, 3.3 ft·lb)	
Cylinder head and exhaust pipe nut	M8	8	20 Nm (2.0 m·kg, 14 ft·lb)	
Exhaust pipe and muffler bolt	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	

## TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
EXUP pulley and shaft arm nut	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
EXUP valve pulley cover bolt	M6	2	14 Nm (1.4 m·kg, 10 ft·lb)	
EXUP cable nut	M6	2	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Exhaust pipe and exhaust pipe bracket bolt	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
EXUP servo motor cover bolt	M5	2	2 Nm (0.2 m·kg, 1.4 ft·lb)	
EXUP servo motor nut	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Crankcase stud bolt	M10	10	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Crankcase bolt (main journal)	M9	10	See NOTE	
Crankcase bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Crankcase bolt	M6	8	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Crankcase bolt	M8	1	24 Nm (2.4 m·kg, 17 ft·lb)	 
Crankcase bolt	M8	5	24 Nm (2.4 m·kg, 17 ft·lb)	
Generator rotor cover bolt	M6	4	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Generator rotor cover bolt	M8	3	22 Nm (2.2 m·kg, 16 ft·lb)	
Drive sprocket cover bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Crankcase cover screw	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Clutch cover bolt	M6	7	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Clutch cover bolt	M6	1	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Pickup rotor cover bolt	M6	6	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Breather cover bolt	M6	4	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Breather plate bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Plate bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Pickup rotor cover blind bolt	M8	1	15 Nm (1.5 m·kg, 11 ft·lb)	
Generator rotor cover plug	M20	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Main gallery plug (oil return)	M16	3	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Main gallery plug	M20	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Oil return pipe bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil return plug	M12	2	24 Nm (2.4 m·kg, 17 ft·lb)	
AC magneto lead bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Stator coil screw	M6	3	14 Nm (1.4 m·kg, 10 ft·lb)	
Generator rotor cover screw	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Thermostat assembly stay bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Starter clutch idler gear bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Clutch boss nut	M20	1	95 Nm (9.5 m·kg, 69 ft·lb)	Stake
Clutch spring bolt	M6	6	10 Nm (1.0 m·kg, 7.2 ft·lb)	Use a lock washer
Drive sprocket nut	M22	1	85 Nm (8.5 m·kg, 61 ft·lb)	
Bearing plate bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Shift fork stopper plate bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Stopper screw	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	
Shift rod locknut (front)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	

## TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Shift rod locknut (rear)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	Left thread
Shift rod joint bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Shift arm bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Neutral switch	M10	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Sub-throttle servo motor cover bolt	M4	3	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Coolant temperature sensor	M12	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Cylinder identification sensor bolt	M6	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Atmospheric pressure sensor bolt	M5	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Crankshaft position sensor bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil level switch bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Starter motor bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	

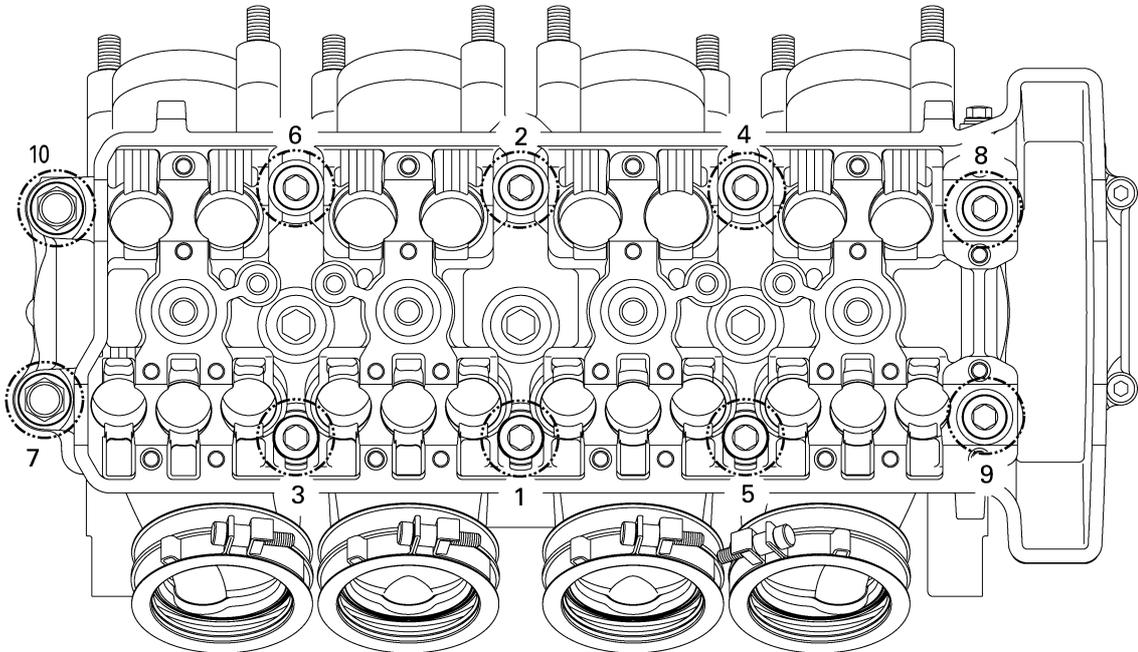
**NOTE:**

- Cylinder head nut
  1. First, tighten the bolts to approximately 19 Nm (1.9 m•kg, 14 ft•lb) with a torque wrench following the tightening order.
  2. Retighten the bolts 67 Nm (6.7 m•kg, 48 ft•lb) with a torque wrench.
- Connecting rod cap bolt
  1. Tighten the connecting rod bolts to 20 Nm (2.0 m•kg, 14 ft•lb) and then tighten them further to reach the specified angle 150°.
- Crankcase bolt (main journal)
  1. First, tighten the bolts to approximately 20 Nm (2.0 m•kg, 14 ft•lb) with a torque wrench following the tightening order.
  2. Loosen all the bolts one by one following the tightening order and then tighten them to 20 Nm (2.0 m•kg, 14 ft•lb) again.
  3. Retighten the bolts further to reach the specified angle (60°)

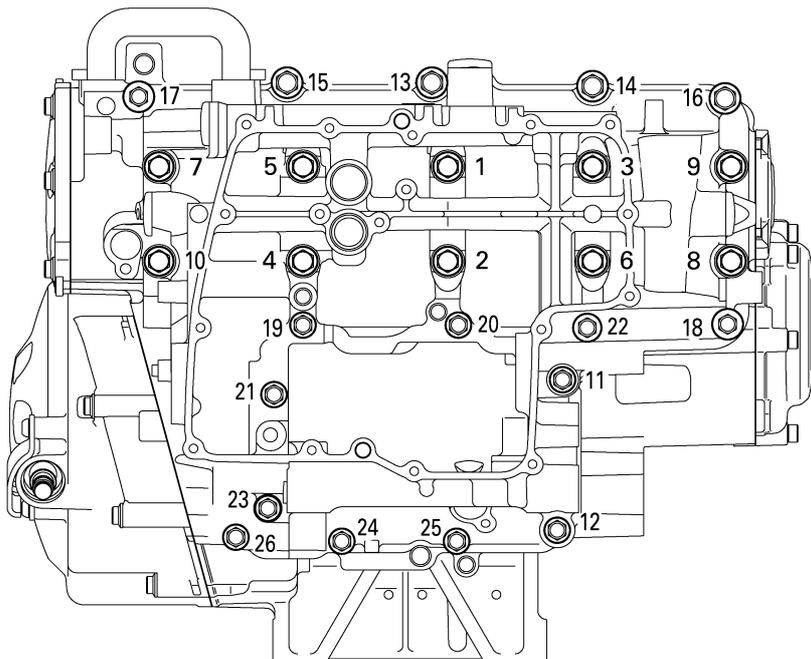
# TIGHTENING TORQUES

---

Cylinder head tightening sequence:



Crankcase tightening sequence:



# TIGHTENING TORQUES

EAS20350

## CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Upper bracket pinch bolt	M8	2	26 Nm (2.6 m·kg, 19 ft·lb)	
Steering stem nut	M28	1	113 Nm (11.3 m·kg, 82 ft·lb)	
Upper handlebar holder bolt	M8	4	24 Nm (2.4 m·kg, 17 ft·lb)	
Lower handlebar holder nut	M10	2	32 Nm (3.2 m·kg, 23 ft·lb)	
Lower bracket pinch bolt	M8	4	23 Nm (2.3 m·kg, 17 ft·lb)	
Lower ring nut	M30	1	SEE NOTE	
Cap bolt	M46	2	23 Nm (2.3 m·kg, 17 ft·lb)	
Damper rod assembly bolt	M10	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Brake master cylinder bracket bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Brake master cylinder reservoir cap screw	M4	2	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Front brake hose union bolt	M10	3	30 Nm (3.0 m·kg, 22 ft·lb)	
Front brake hose holder bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Cowling stay bolt (FZ1-S(X)), (FZ1-SA)	M8	2	33 Nm (3.3 m·kg, 24 ft·lb)	
Cowling bracket bolt (FZ1-S(X)), (FZ1-SA)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front fender bolt	M6	4	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Clutch lever holder pinch bolt	M6	1	11 Nm (1.1 m·kg, 8.0 ft·lb)	
Right front engine mounting bolt 1	M10	1	45 Nm (4.5 m·kg, 33 ft·lb)	
Right front engine mounting bolt 2	M10	1	50 Nm (5.0 m·kg, 36 ft·lb)	
Left front engine mounting bolt	M10	1	45 Nm (4.5 m·kg, 33 ft·lb)	
Upper self-locking nut	M10	1	51 Nm (5.1 m·kg, 37 ft·lb)	
Lower self-locking nut	M10	1	51 Nm (5.1 m·kg, 37 ft·lb)	
Engine mounting adjust bolt (upper)	M11	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Engine mounting adjust bolt (lower)	M11	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Pivot shaft nut	M18	1	105 Nm (11 m·kg, 76 ft·lb)	
Connecting arm nut (connecting arm and frame)	M10	1	44 Nm (4.4 m·kg, 32 ft·lb)	
Relay arm nut (relay arm and swingarm)	M10	1	44 Nm (4.4 m·kg, 32 ft·lb)	
Relay arm nut (relay arm and connecting arm)	M10	1	44 Nm (4.4 m·kg, 32 ft·lb)	
Main frame and rear frame nut	M10	4	41 Nm (4.1 m·kg, 30 ft·lb)	
Clutch cable locknut	M8	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Throttle cable locknut	M6	2	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Rear shock absorber assembly upper nut	M10	1	44 Nm (4.4 m·kg, 32 ft·lb)	
Rear shock absorber assembly lower nut	M10	1	44 Nm (4.4 m·kg, 32 ft·lb)	
Drive chain guard bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	

## TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Drive chain guide bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear fender screw	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake hose holder screw	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank bolt (front)	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank bolt (rear)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank bracket screw	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank cap bolt	M5	5	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Fuel pump bolt	M5	6	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Seat lock assembly nut	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Mud guard assembly bolt	M8	4	16 Nm (1.6 m·kg, 12 ft·lb)	
License plate light screw	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Rear reflector nut	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Mud guard assembly bracket screw	M5	6	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Tail/brake light bracket bolt	M8	3	16 Nm (1.6 m·kg, 12 ft·lb)	
Rear fender bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Seat bracket bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Exhaust pipe assembly bracket bolt	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Side cover screw	M6	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Lean angle sensor bolt	M4	2	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Coolant reservoir tank bolt	M6	1	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Front wheel axle shaft	M18	1	72 Nm (7.2 m·kg, 52 ft·lb)	
Front wheel axle pinch bolt	M8	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Front brake caliper bolt	M10	4	40 Nm (4.0 m·kg, 29 ft·lb)	
Front brake disc screw	M6	10	18 Nm (1.8 m·kg, 13 ft·lb)	
Brake caliper bleed screw	M8	3	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Rear wheel axle nut	M24	1	150 Nm (15.0 m·kg, 108 ft·lb)	
Rear brake disc screw	M8	5	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear brake caliper bolt (front)	M12	1	27 Nm (2.7 m·kg, 20 ft·lb)	
Rear brake caliper bolt (rear)	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	
Rear wheel sprocket nut	M10	6	100 Nm (10.0 m·kg, 72 ft·lb)	
Drive chain adjusting locknut	M8	2	16 Nm (1.6 m·kg, 12 ft·lb)	
Rear brake hose union bolt	M10	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Sidestand nut	M10	1	48 Nm (4.8 m·kg, 35 ft·lb)	
Sidestand bracket bolt	M10	2	63 Nm (6.3 m·kg, 46 ft·lb)	
Sidestand switch bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Footrest bracket bolt	M8	4	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear brake fluid reservoir tank bolt	M5	1	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Rear brake master cylinder bolt	M8	2	23 Nm (2.3 m·kg, 17 ft·lb)	
Centerstand nut (FZ1-S(X)), (FZ1-SA)	M10	2	56 Nm (5.6 m·kg, 41 ft·lb)	
Footrest bolt	M10	4	55 Nm (5.5 m·kg, 40 ft·lb)	

## TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Throttle cable adjust nut	M6	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Clutch cable adjust nut	M8	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Centerstand bracket nut (FZ1-S(X), (FZ1-SA))	M10	4	55 Nm (5.5 m·kg, 40 ft·lb)	
Centerstand bracket adapter bolt (FZ1-S(X), (FZ1-SA))	M10	2	73 Nm (7.3 m·kg, 53 ft·lb)	
Front wheel sensor bolt (FZ1-SA), (FZ1-NA)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear wheel sensor bolt (FZ1-SA), (FZ1-NA)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear wheel sensor protector bolt (FZ1-SA), (FZ1-NA)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear wheel sensor stay bolt (FZ1-SA), (FZ1-NA)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Hydraulic unit bracket 1 and hydraulic unit bracket 2 bolt (FZ1-SA), (FZ1-NA)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Hydraulic unit bracket 1 and hydraulic unit bracket 2 nut (FZ1-SA), (FZ1-NA)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear wheel sensor rotor bolt (FZ1-SA), (FZ1-NA)	M5	5	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Hydraulic unit and brake hose union bolt (FZ1-SA), (FZ1-NA)	M10	4	30 Nm (3.0 m·kg, 22 ft·lb)	
Brake hose holder and hydraulic unit bracket 2 bolt (FZ1-SA), (FZ1-NA)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Hydraulic unit bracket 1 and frame (left side) bolt (FZ1-SA), (FZ1-NA)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Hydraulic unit bracket 2 and frame (right side) bolt (FZ1-SA), (FZ1-NA)	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Rear brake hose holder bolt (FZ1-SA), (FZ1-NA)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	

**NOTE:**

1. First, tighten the ring nut to approximately 52 Nm (5.2 m·kg, 38 ft·lb) with a torque wrench, then loosen the lower ring nut completely.
2. Retighten the lower ring nut 18 Nm (1.8 m·kg, 13 ft·lb).

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

# LUBRICATION POINTS AND LUBRICANT TYPES

EAS20380

## CHASSIS

Lubrication point	Lubricant
Steering bearings and bearing races (upper and lower)	
Throttle grip inner surface	
Brake lever pivoting point and metal-to-metal moving parts	
Clutch lever pivoting point and metal-to-metal moving parts	
Engine mount bolts (rear upper and lower)	
Engine mount bolts (front left and right)	
Relay arm, connecting rod and rear shock absorber collar	
Pivot shaft	
Swingarm pivot bearing	
Swingarm head pipe end, oil seal and bush	
Oil seal (relay arm, connecting arm and rear shock absorber)	
Seat lock assembly moving parts	
Sidestand pivoting point and metal-to-metal moving parts	
Sidestand switch contact point	
Sidestand hook and spring contact point	
Shift shaft joint rod moving parts	
Shift pedal pivoting parts	
Rear footrest ball and metal-to-metal moving parts	
Centerstand metal-to-metal moving parts (FZ1-S(X)), (FZ1-SA)	
Front wheel oil seal (left and right)	
Rear wheel oil seal	
Rear wheel drive hub oil seal	
Rear wheel drive hub mating surface	
Brake caliper piston seal	
Brake caliper piston dust seal	
Rubber parts inside the master cylinder	
Brake lever retaining bolt	
Sliding area between brake lever and master cylinder	
Caliper bracket slide pins and/or retaining bolts	

# LUBRICATION POINTS AND LUBRICANT TYPES

---

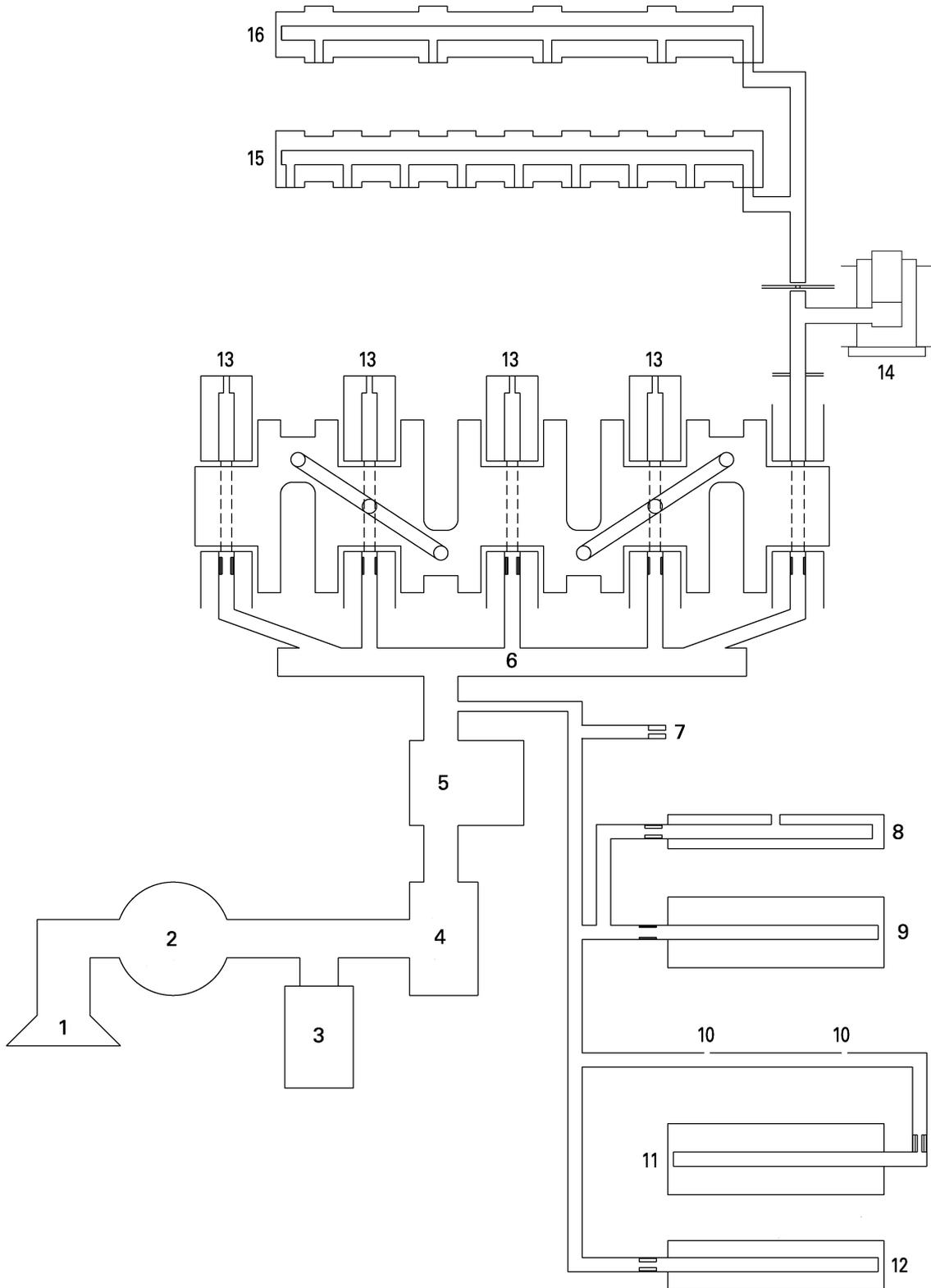
# LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20390

## LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20400

### ENGINE OIL LUBRICATION CHART



# LUBRICATION SYSTEM CHART AND DIAGRAMS

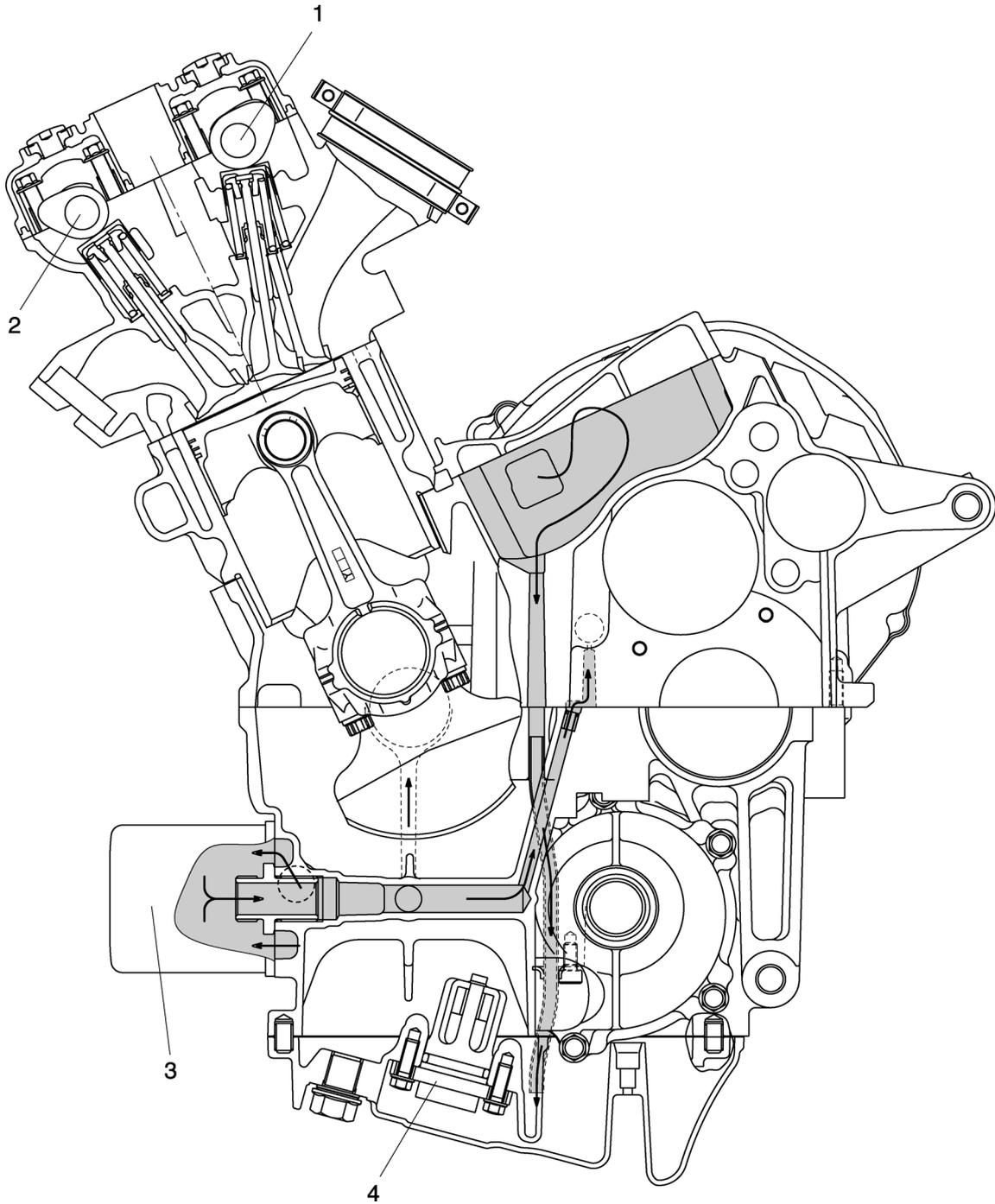
---

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20410

## LUBRICATION DIAGRAMS



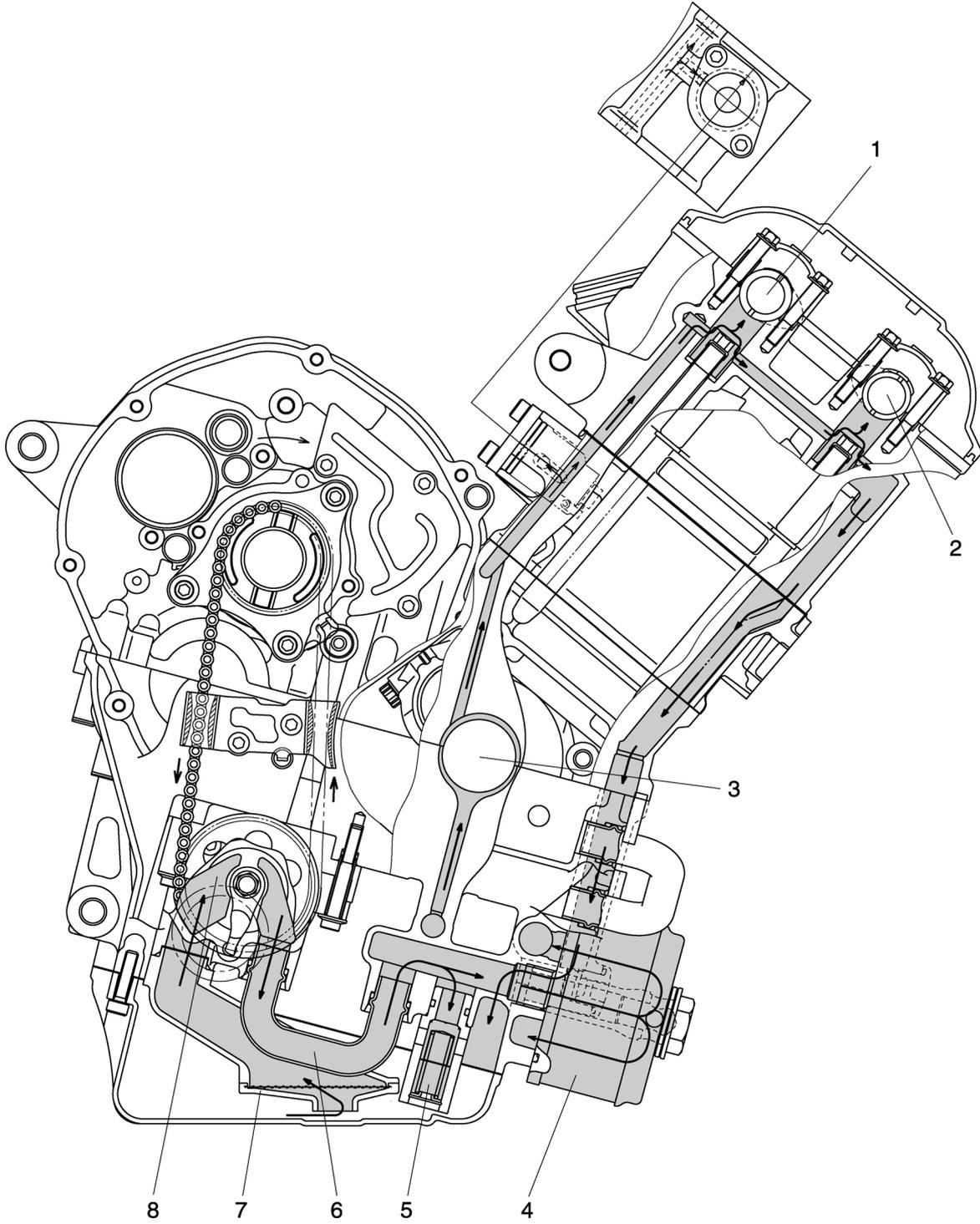
# LUBRICATION SYSTEM CHART AND DIAGRAMS

---

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

---



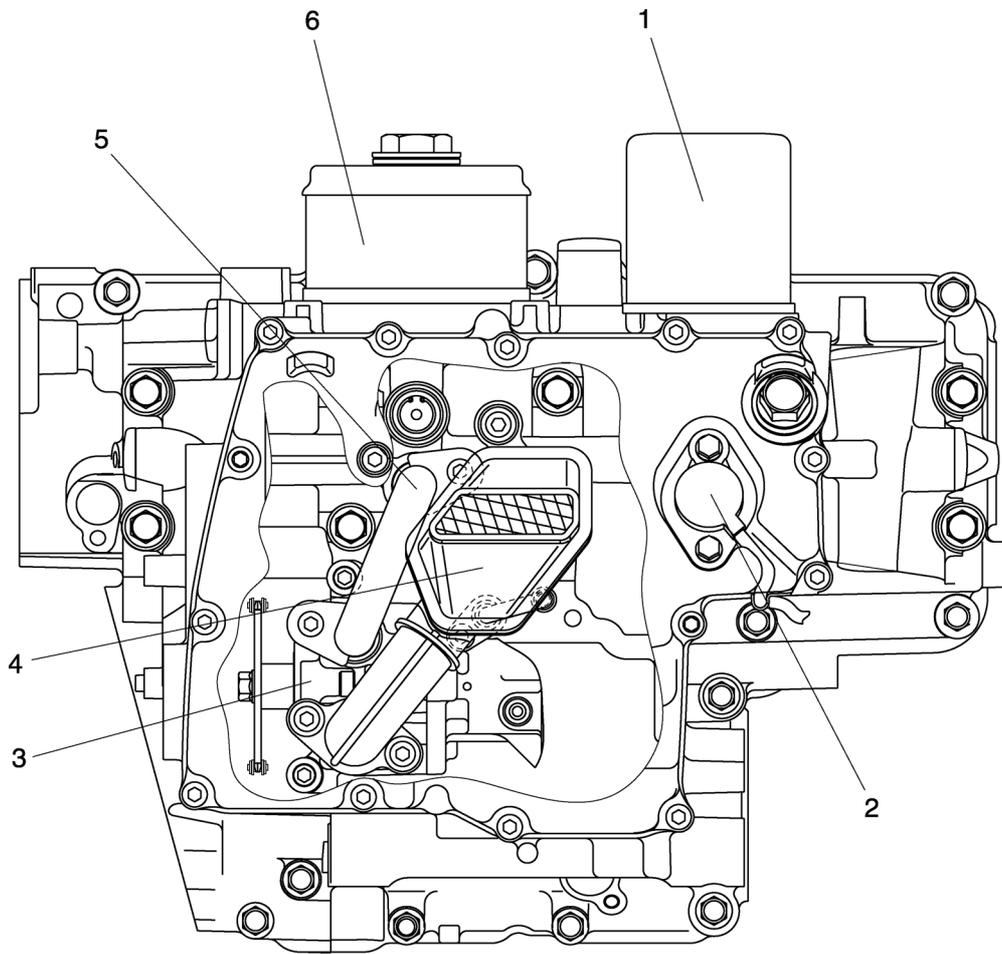
# LUBRICATION SYSTEM CHART AND DIAGRAMS

---

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

---



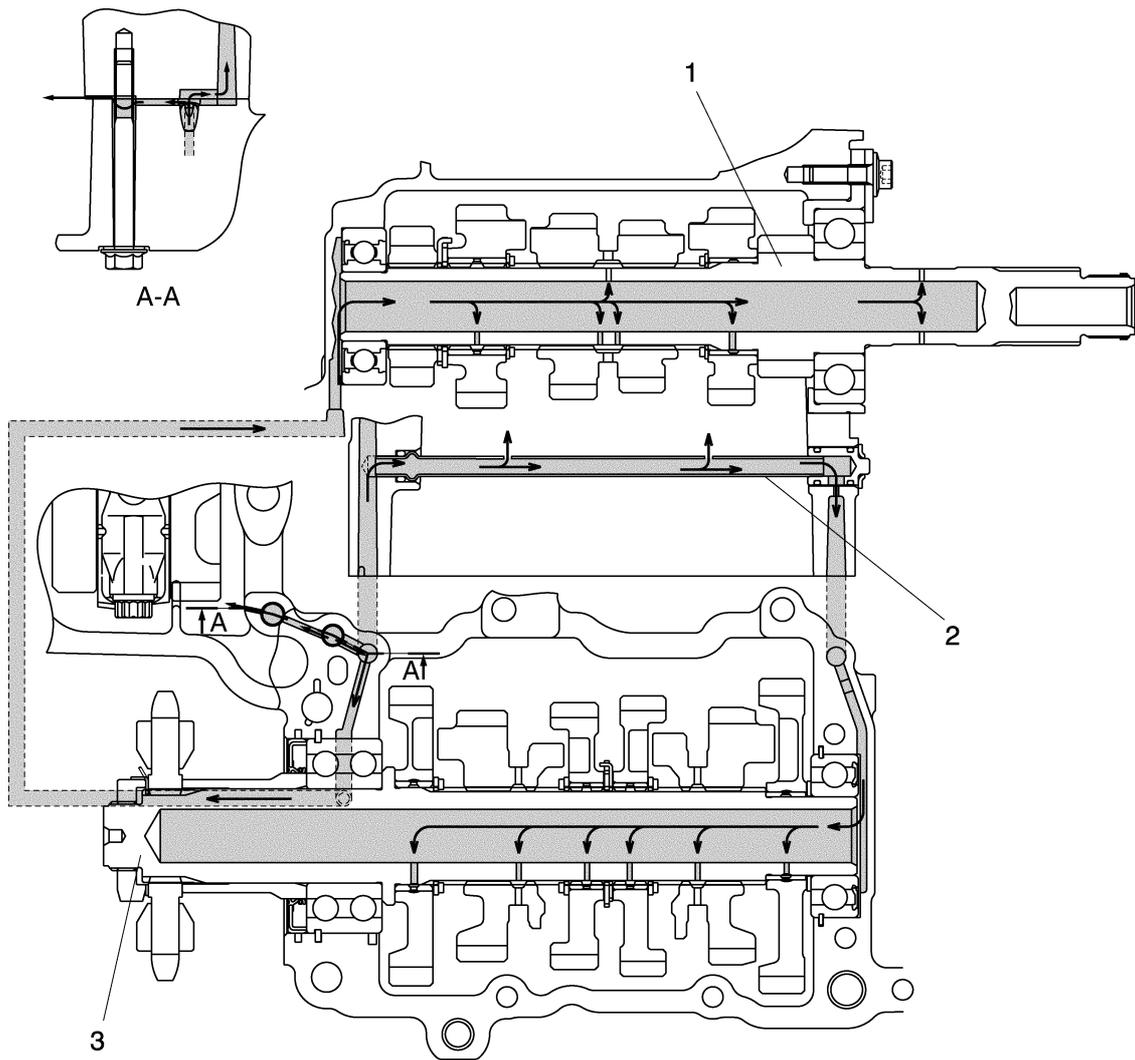
# LUBRICATION SYSTEM CHART AND DIAGRAMS

---

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

---



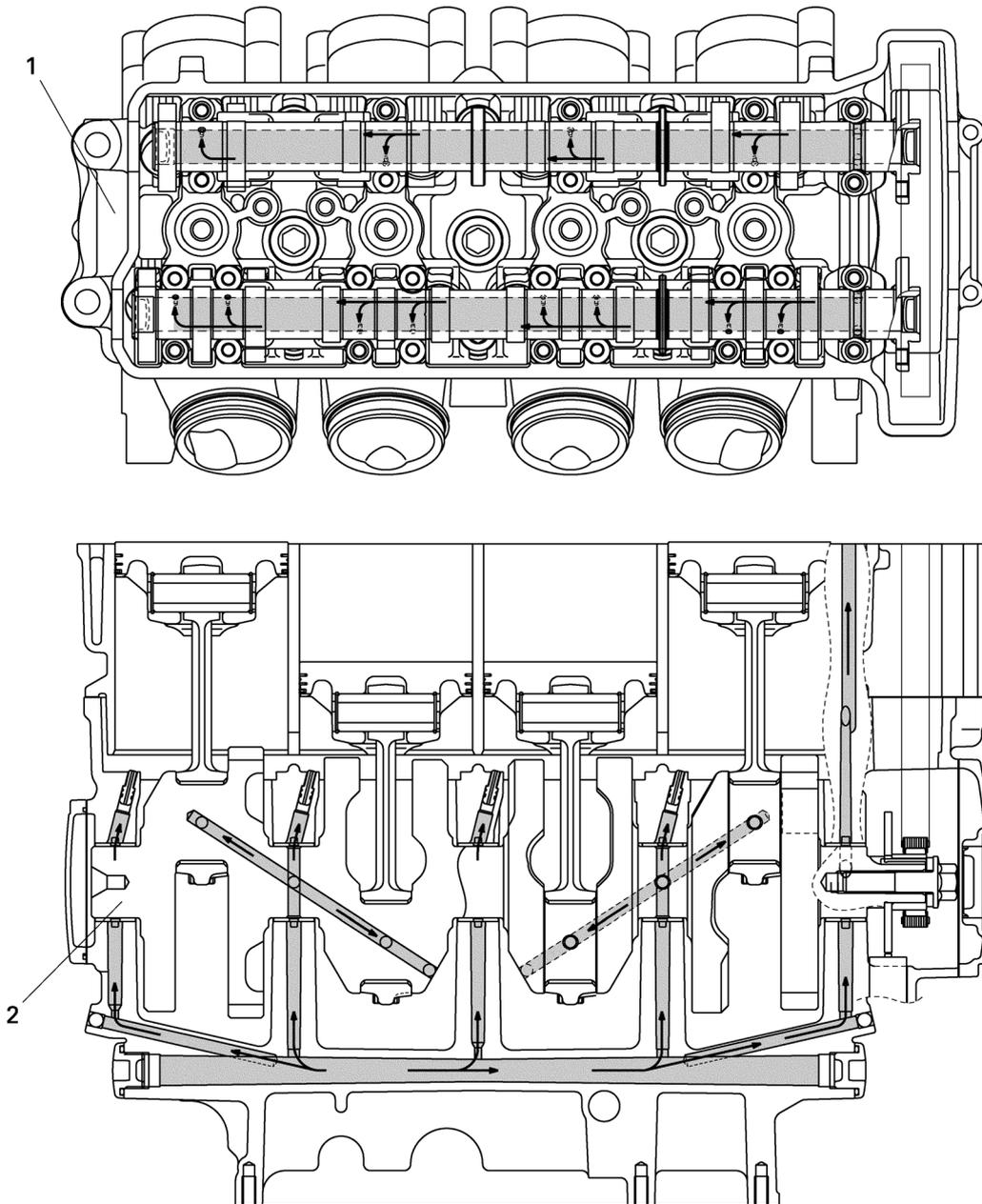
# LUBRICATION SYSTEM CHART AND DIAGRAMS

---

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

---



# LUBRICATION SYSTEM CHART AND DIAGRAMS

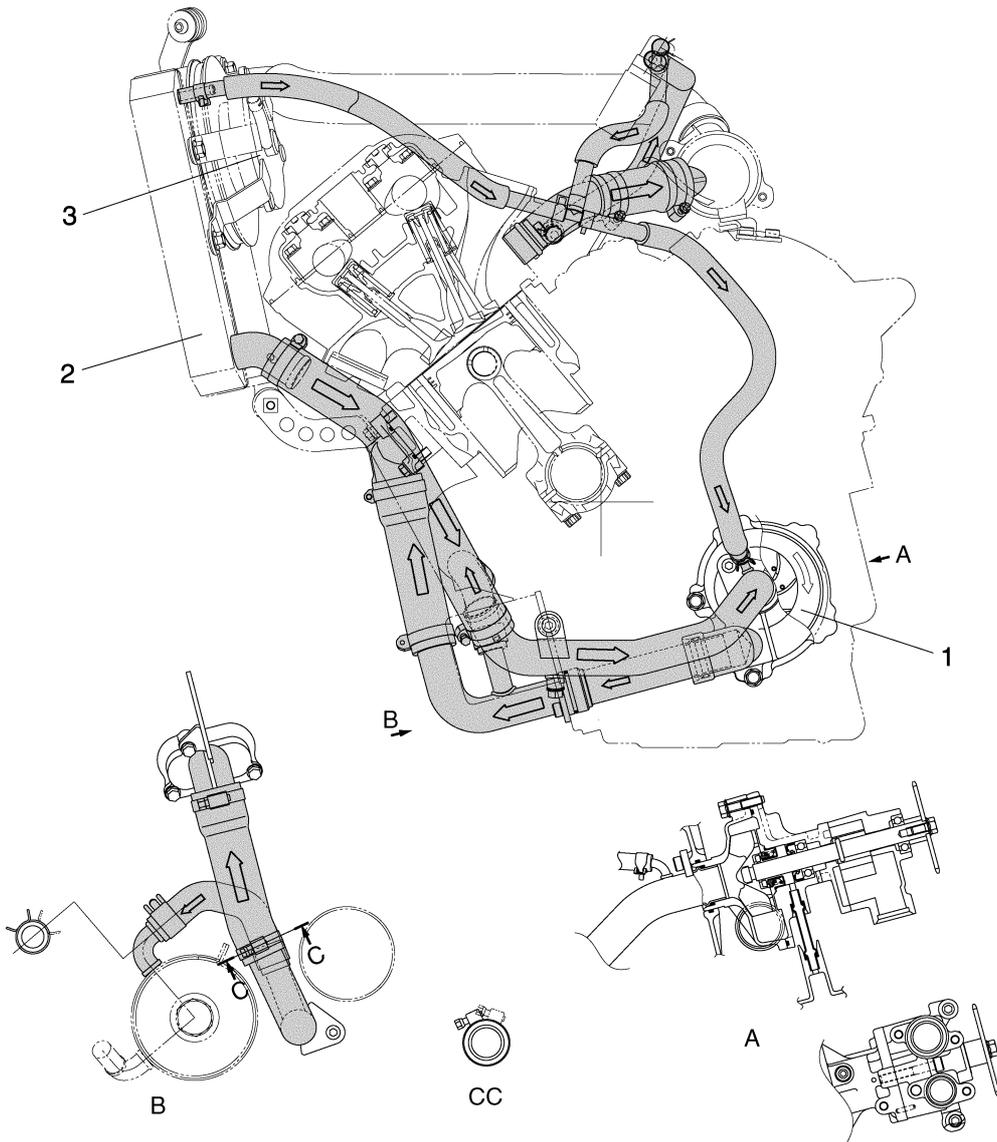
---

1. Cylinder head
2. Crankshaft

# COOLING SYSTEM DIAGRAMS

EAS20420

## COOLING SYSTEM DIAGRAMS



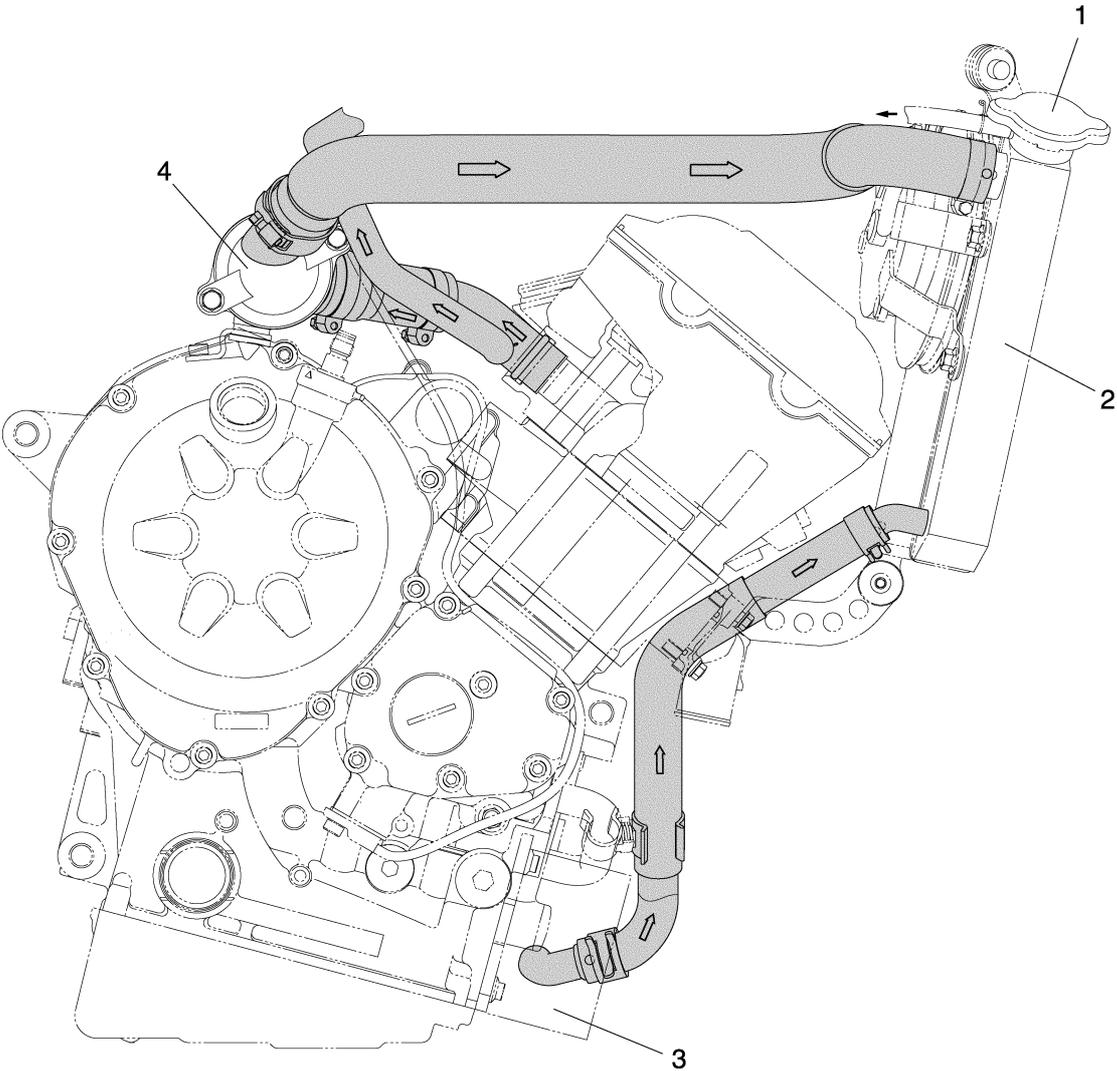
# COOLING SYSTEM DIAGRAMS

---

1. Water pump
2. Radiator
3. Radiator fan

# COOLING SYSTEM DIAGRAMS

---



# COOLING SYSTEM DIAGRAMS

---

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



## FZ1-N(X)/FZ1-S(X)/FZ1-SA/FZ1-NA

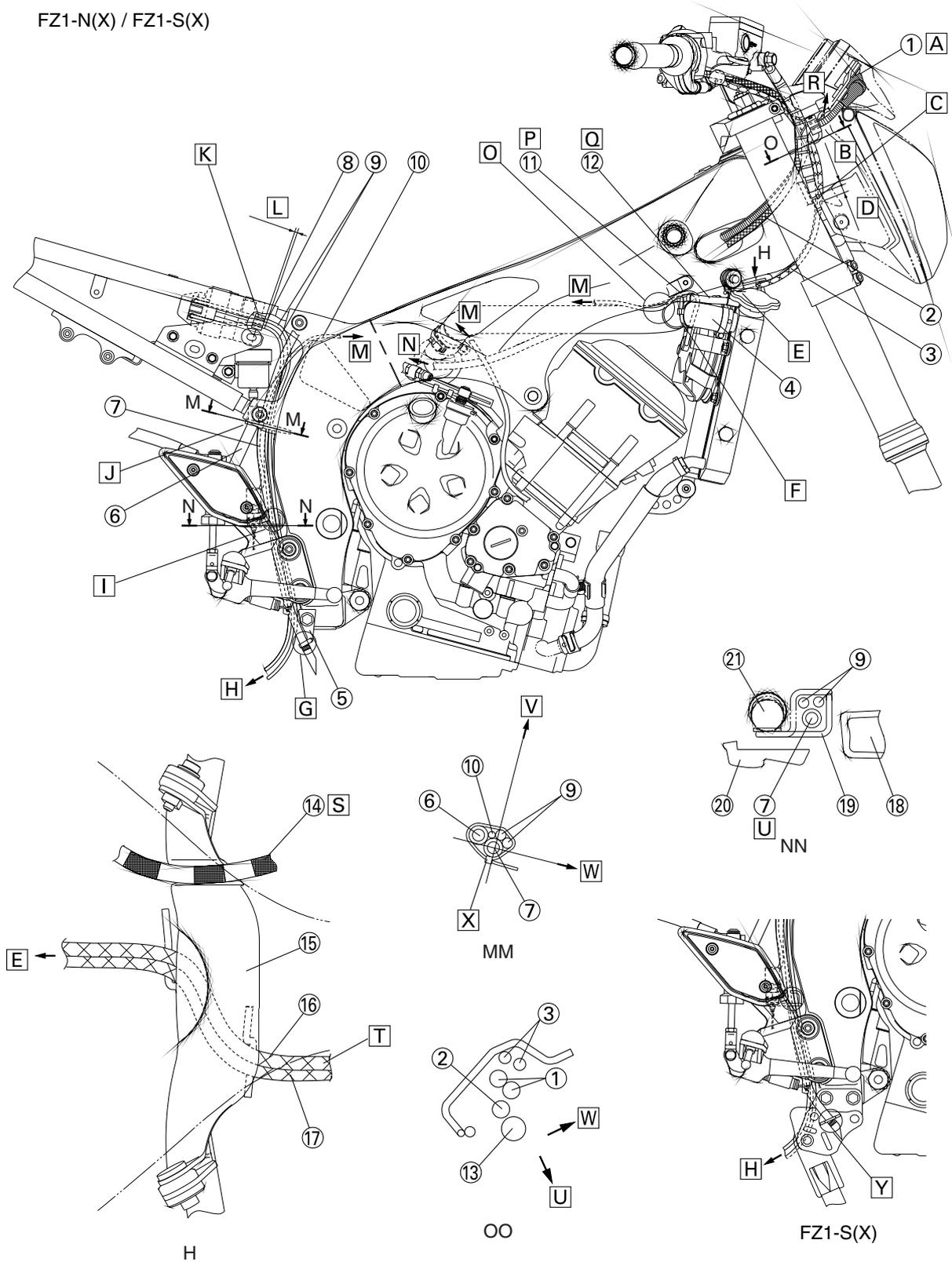
1. Clutch cable
2. Left handlebar switch lead
3. Main switch lead
4. Immobilizer lead
5. Horn lead
6. Horn stay assembly
7. Throttle cable (pull side)
8. Throttle cable (return side)
9. Wire harness
10. Brake hose
11. Throttle cables
12. Right handlebar switch lead
13. Front wheel sensor lead

- A. Connect the wire to the meter.
- B. To the headlight lead coupler
- C. Route the main switch lead above the central wire guide of the stay assembly.
- D. Route the horn lead behind the branching section of the handlebar switch lead to under the upper part of the wire guide of the stay assembly (from front of the vehicle to the back).
- E. Route the immobilizer lead under the central wire guide of the stay assembly.
- F. Clamp the horn lead to the stay assembly. Position the binding section toward the front of the vehicle and cut off the excess end of the tip to 2–4 mm (0.08 to 0.16 in).
- G. Clamp the wire harness at the white tape mark and insert it to the stay assembly 1. Point the clamp opening to the outside of the vehicle.
- H. Route the rear brake light switch lead above the throttle cable.
- I. Secure the brake hose to the front fork.
- J. Secure the horn lead to the front fork. Cut the tip of the clamp head leaving 2 to 4 mm (0.08 to 0.16 in) toward the outside of the vehicle.
- K. The center position of the clamp shall be within this numeric range. (20°)
- L. Outside of the vehicle.
- M. Inside of the vehicle.
- N. Pass the brake hose in the space by the right side of the vehicle from this wire and pass the throttle cables and right handlebar switch lead in the left side space. Next, route the right handlebar switch lead to the vehicle rear side where the throttle cables are routed.
- O. 64–84 mm (2.52–3.31 in)
- P. 50–60 mm (1.97–2.36 in.)
- Q. Route the throttle cable inside and insert it into the steering handle. Clamp opening should be positioned at the back of the vehicle.

- R. The clamp attaching position should be in a range from 20 mm to 40 mm (0.79 in to 1.57 in) from the end of the brake hose grommet. The front wheel sensor lead should be positioned at the front outside of the vehicle.
- S. Route the front wheel sensor lead at the innermost side of the vehicle as shown in the illustration.
- T. Route the front wheel sensor lead through the central wire guide of the stay assembly and between the light handlebar switch lead and clutch cable.

# CABLE ROUTING

FZ1-N(X) / FZ1-S(X)



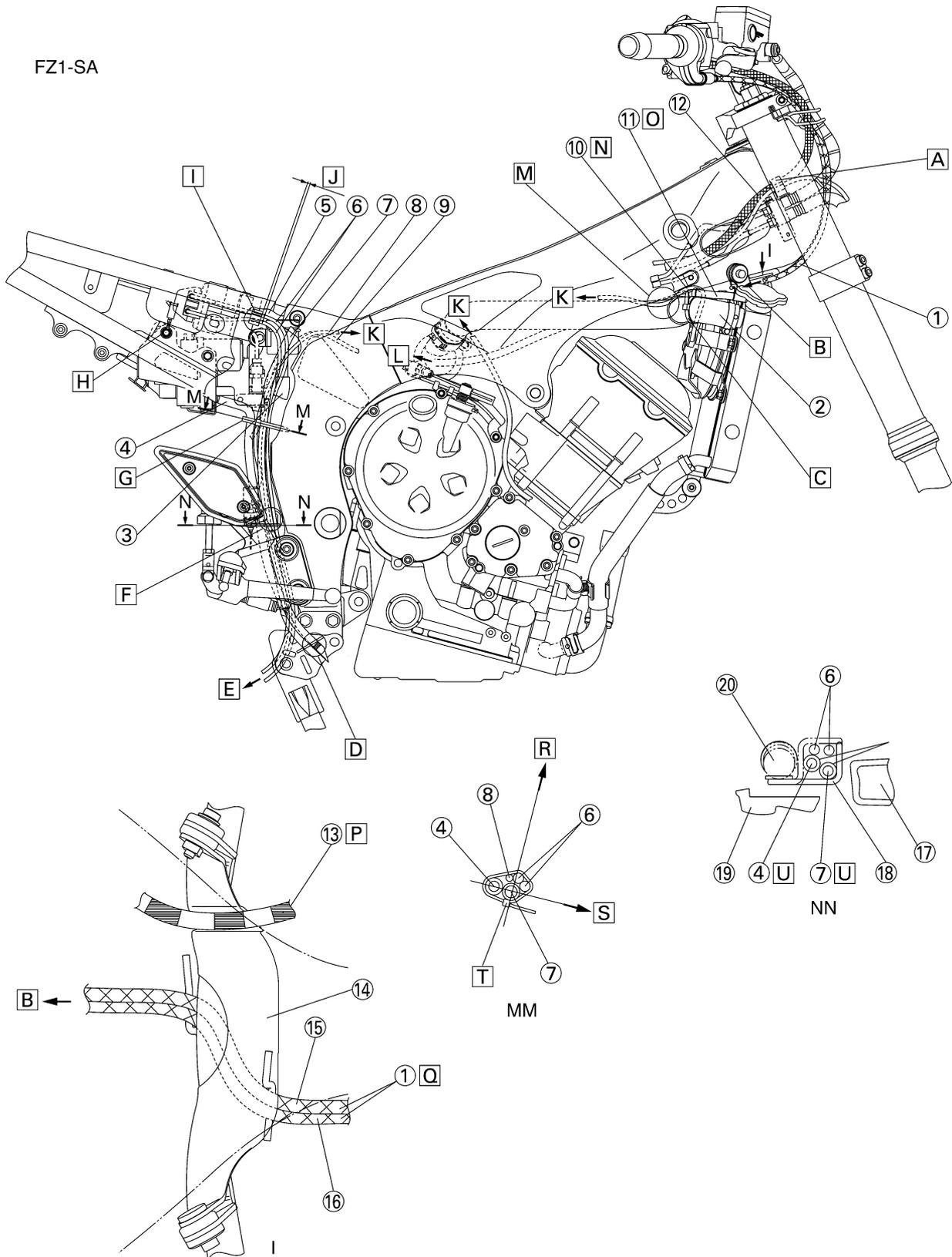
## FZ1-N(X)/FZ1-S(X)

1. Wire harness
  2. Right handlebar switch lead
  3. Throttle cable
  4. Radiator inlet hose
  5. Wire guide
  6. Brake fluid reservoir hose
  7. Fuel tank breather hose
  8. EXUP cable wire bending attachment
  9. EXUP cables
  10. Rear brake light switch lead
  11. Radiator fan motor lead (right)
  12. Coolant reservoir tank hose
  13. Brake hose
  14. Clutch cable
  15. Radiator stay
  16. Throttle cable (return side)
  17. Throttle cable (pull side)
  18. Frame
  19. Rear brake light switch stay
  20. Footrest bracket (right)
  21. Rear brake light switch
- A. Wire is connected to the meter.
- B. 5 mm (0.20 in)
- C. Clamp the brake hose to the stay assembly. Clamping position should be 5 mm (0.20 in) or more away and less than 10 mm (0.39 in) from the top end of the brake hose protector. Point the clamp head to the outside of the vehicle and cut the tip of the clamp head leaving 2 to 4 mm (0.08 to 0.16 in).
- D. 10 mm (0.39 in)
- E. To the throttle bodies
- F. Clamp the coolant reservoir hose and radiator inlet hose. Point the clamp opening to the outside of the vehicle and the tip of the clamp to the front upper side of the vehicle, and pay attention so that the tip does not protrude from the radiator cover. (FZ1-N(X))
- G. Route the fuel tank breather hose by the wire guide. The white paint position of the hose shall be lower than the wire guide.
- H. To the EXUP
- I. Pass the fuel tank breather hose and EXUP cable through the wire guide of the rear brake light switch stay.
- J. The clamp position shall be at the center of bending section of the brake fluid reservoir hose as shown in the illustration.
- K. Bind the two EXUP cables with the clamp. For the clamping position, a part of the clamp should be located within a range of 10 mm (0.39 in) from the end of wire bending attachment. Any direction of the clamp opening can be accepted.
- L. 0–10 mm (0.39 in)

- M. To the wire harness
- N. To the coolant reservoir tank
- O. Route the radiator fan motor lead (right) so that there is no slack as much as possible in this section.
- P. Pass the radiator fan motor lead (right) above the coolant reservoir hose and route it to the inside of the frame.
- Q. Pass the coolant reservoir hose to the vehicle inner side of the radiator inlet hose and route it to the lower outside of the vehicle of the thermostat assembly.
- R. To the headlight
- S. Route in the concavity section of the radiator stay.
- T. Route the wire guide of the radiator stay as shown in the illustration. (Twisting not allowed)
- U. The outside of the vehicle.
- V. The inside of the vehicle.
- W. The front side of the vehicle.
- X. Point the clamp head to the outside of the vehicle and fit it so that the band tip is positioned at the vehicle front side.
- Y. Pass the fuel tank breather hose through the guide wire of the sidestand bracket. Make sure to place the white paint position of the hose lower than the guide wire.

# CABLE ROUTING

FZ1-SA

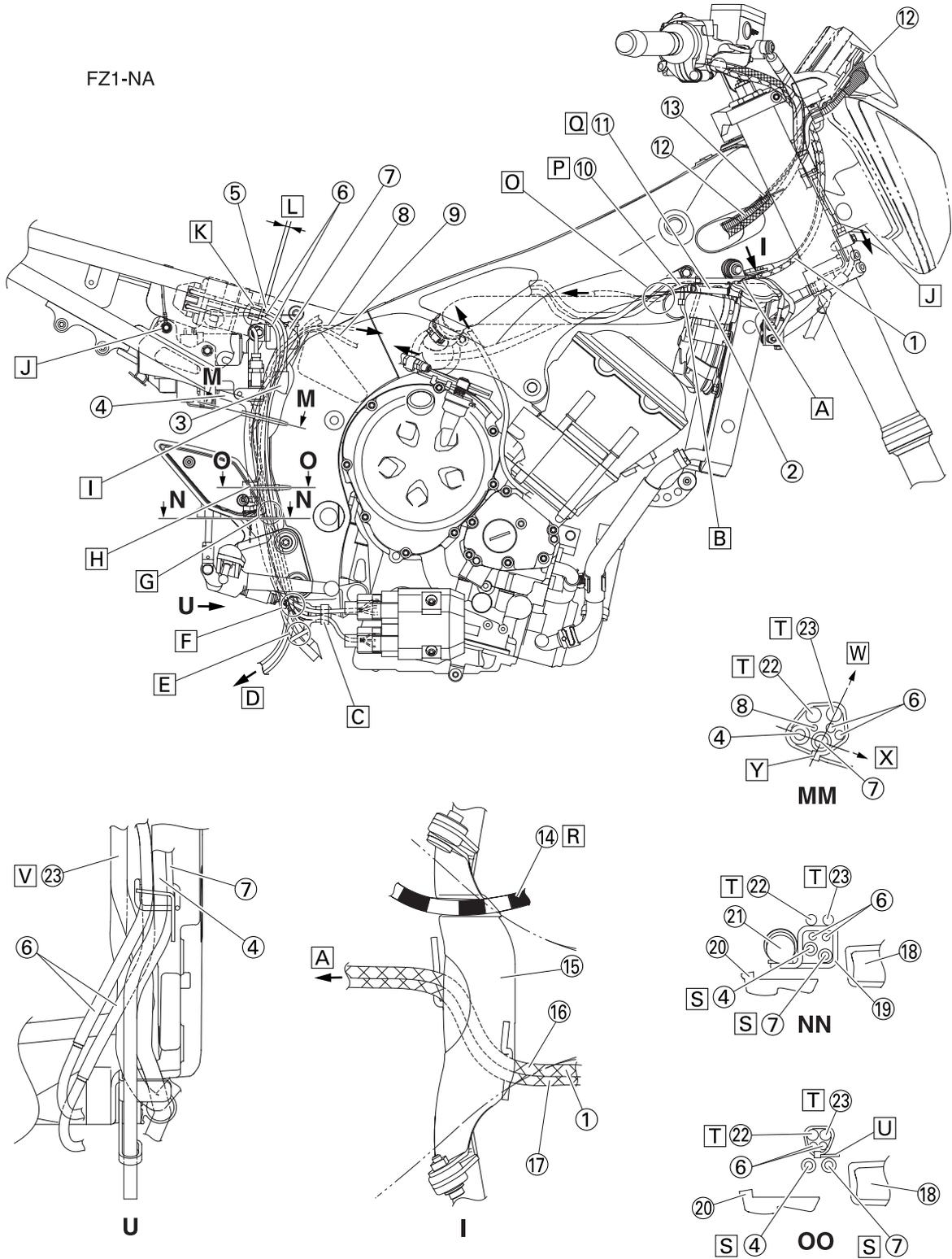


## FZ1-SA

1. Throttle cables
  2. Radiator inlet hose
  3. Brake fluid reservoir hose
  4. ABS breather hose
  5. EXUP cable wire bending attachment
  6. EXUP cable
  7. Fuel tank breather hose
  8. Rear brake light switch lead
  9. Rear wheel sensor lead
  10. Radiator fan motor lead (right)
  11. Coolant reservoir tank hose
  12. Right handlebar switch lead
  13. Clutch cable
  14. Radiator stay
  15. Throttle cable (return side)
  16. Throttle cable (pull side)
  17. Frame
  18. Rear brake light switch stay
  19. Footrest bracket (right)
  20. Rear brake light switch
- A. Clamp the front wheel sensor lead
- B. To the throttle bodies
- C. Clamp the coolant reservoir hose and radiator inlet hose. Point the clamp opening to the outside of the vehicle and the tip of the clamp to the front upper side of the vehicle, and pay attention so that the tip does not protrude from the radiator cover.
- D. Route the fuel tank breather hose and ABS breather hose by the wire guide. The white paint position of the hose shall be lower than the wire guide
- E. To the EXUP
- F. Pass the fuel tank breather hose, ABS breather hose and EXUP cable through the wire guide of the rear brake light switch stay
- G. Clamping position should be placed by the inner side of the back stay tightening section.
- H. Tighten the rear brake ground lead together with the hydraulic unit.
- I. Bind the two EXUP cables with the clamp. For the clamping position, a part of the clamp should be located within a range of 10 mm (0.39 in) from the end of wire bending attachment. Any direction of the clamp opening can be accepted
- J. 0–10 mm (0–0.39 in)
- K. To the wire harness
- L. To the coolant reservoir tank
- M. Route the radiator fan motor lead (right) so that there is no slack as much as possible in this section
- N. Pass the radiator fan motor lead (right) above the coolant reservoir hose and route it to the inside of the frame.

- O. Pass the coolant reservoir hose to the vehicle inner side of the radiator inlet hose and route it to the lower outside of the vehicle of the thermostat assembly.
- P. Route in the concavity section of the radiator stay
- Q. Route the wire guide of the radiator stay as shown in the illustration. (Twisting not allowed)
- R. The inside of the vehicle.
- S. The front side of the vehicle.
- T. Point the clamp head to the outside of the vehicle and fit it so that the band tip is positioned at the vehicle front side.
- U. The outside of the vehicle.

# CABLE ROUTING



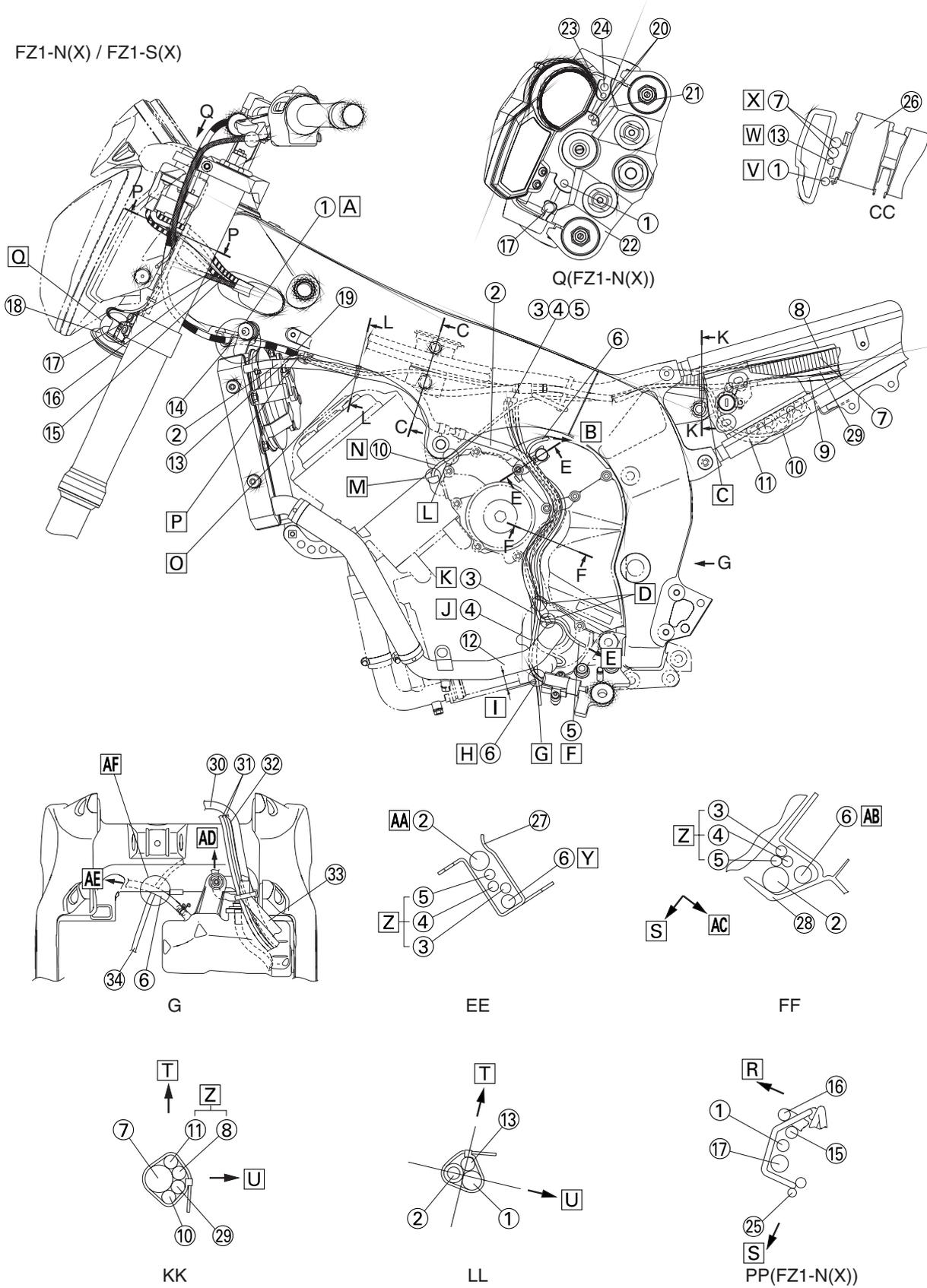
## FZ1-NA

1. Throttle cables
  2. Radiator inlet hose
  3. Brake fluid reservoir hose
  4. ABS breather hose
  5. EXUP cable wire bending attachment
  6. EXUP cable
  7. Fuel tank breather hose
  8. Rear brake light switch lead
  9. Rear wheel sensor lead
  10. Radiator fan motor lead (right)
  11. Coolant reservoir tank hose
  12. Wire harness
  13. Right handlebar switch lead
  14. Clutch cable
  15. Radiator stay
  16. Throttle cable (return side)
  17. Throttle cable (pull side)
  18. Frame
  19. Rear brake light switch stay
  20. Footrest bracket (right)
  21. Rear brake light switch
  22. Rectifier/regulator lead
  23. AC magneto lead
- A. To the throttle bodies
- B. Clamp the coolant reservoir hose and inlet hose. Point the clamp opening to the outside of the vehicle and the tip of the clamp to the front upper side of the vehicle, and pay attention so that the tip does not protrude from the radiator cover.
- C. Clamp the AC magneto lead and rectifier/regulator lead. Point the clamp opening to upward.
- D. To the EXUP
- E. Route the fuel tank breather hose and ABS breather hose through the wire guide. White paint mark on the hose should be lower than the wire guide.
- F. Route the AC magneto lead and rectifier/regulator lead in front of the wire guide.
- G. Route the fuel tank breather hose, ABS breather hose and EXUP cable through the wire guide of the rear brake light switch stay.
- H. Clamping position should be above the wire guide of the rear brake light switch.
- I. Clamping position should be placed by the inner side of the back stay tightening section.
- J. Tighten the rear brake ground lead together with the hydraulic unit. Tighten the terminals so that the leads are routed through the shortest distance.

- K. Bind the two EXUP cables with the clamp. A part of the clamp should be located within 10 mm (0.39 in) from the edge of wire bending attachment. Clamp opening can be facing in any direction.
- L. 0–10 mm (0–0.39 in)
- M. To the wire harness
- N. To the coolant reservoir tank
- O. Route the radiator fan motor lead (right) so that there is no slack as much as possible in this section.
- P. Route the radiator fan motor lead (right) above the coolant reservoir hose and route it to the inside of the frame.
- Q. Route the coolant reservoir hose to the inner side of the radiator inlet hose and then route it to the lower outside of the thermostat assembly.
- R. Route the clutch cable through the concavity (concave) section of the radiator stay.
- S. Outside of the vehicle.
- T. Can be routed in any order.
- U. Clamp all the leads. Point the end of the clamp toward outside and cut off the excess end of the clamp to 2–4 mm (0.08–0.16 in). When inserting the band, point the end toward front of the vehicle.
- V. Route the AC magneto lead and rectifier/regulator lead in front of the EXUP cable.
- W. Inside of the vehicle.
- X. Front of the vehicle.
- Y. Point the clamp head toward outside and the end should be placed at the front of the vehicle.

# CABLE ROUTING

FZ1-N(X) / FZ1-S(X)



## FZ1-N(X)/FZ1-S(X)

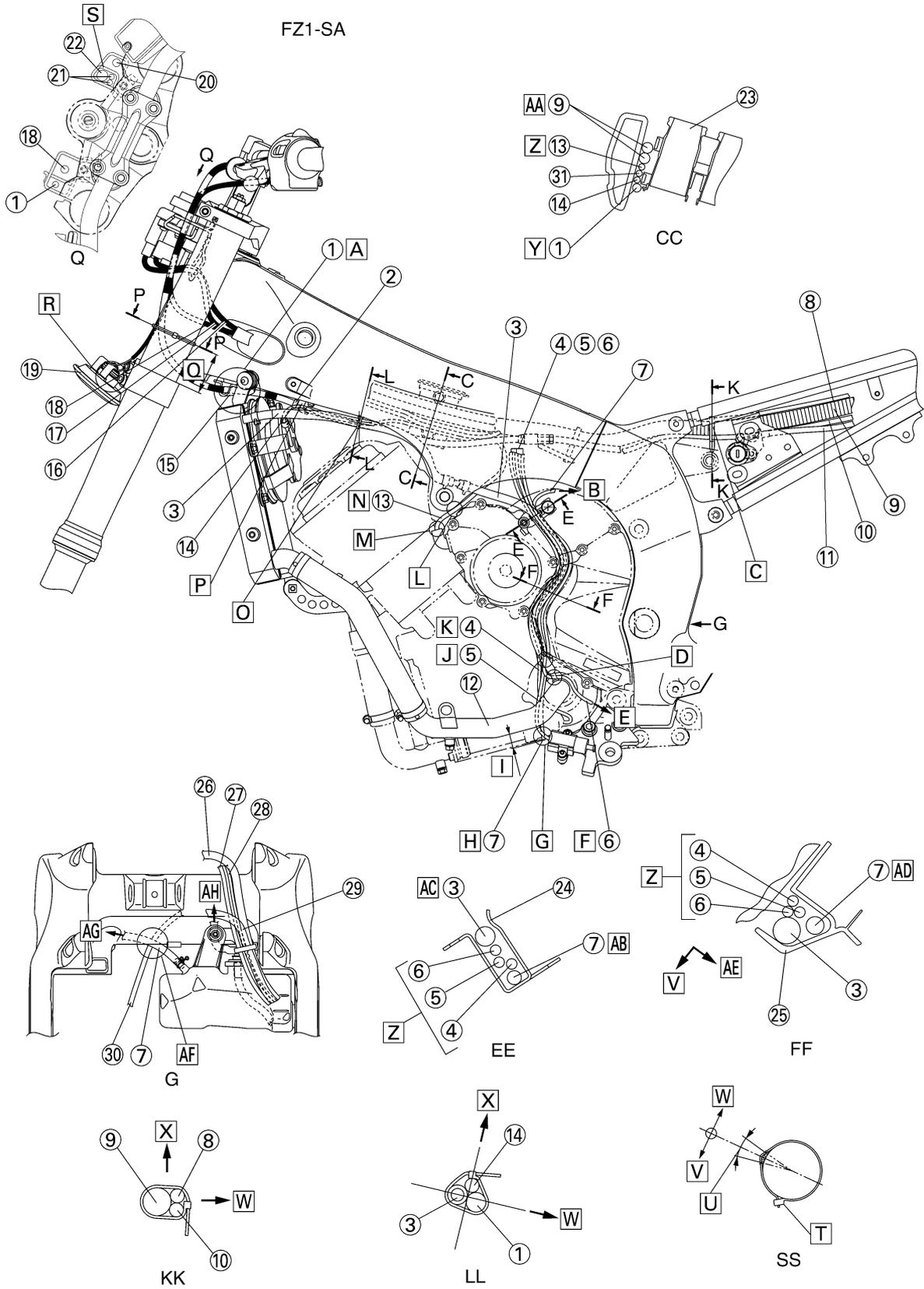
1. Clutch cable
  2. Water pump breather hose
  3. Oil level switch lead
  4. Sidestand switch lead
  5. O<sub>2</sub> sensor lead
  6. Coolant reservoir tank drain hose
  7. Wire harness
  8. Battery negative lead
  9. Seat lock cable
  10. AC magneto lead
  11. Rectifier/regulator lead
  12. Water pump inlet pipe
  13. Radiator fan motor lead (left)
  14. Radiator stay
  15. Main switch lead
  16. Immobilizer lead
  17. Left handlebar switch lead
  18. Horn
  19. Clutch cable swaging metal
  20. Throttle cables
  21. Stay assembly
  22. Upper bracket
  23. Right handlebar switch lead
  24. Brake hose
  25. Horn lead
  26. Throttle body
  27. Stay 1
  28. Drive chain case cover
  29. Starter motor lead
  30. Fuel tank breather hose
  31. EXUP cables
  32. Rear brake light switch lead
  33. Rear brake fluid reservoir hose
  34. Speed sensor lead
- A. Route in the concavity section of the radiator stay.
- B. To the coolant reservoir tank
- C. Clamp the wire harness, AC magneto lead, rectifier/regulator lead, starter motor lead and battery negative lead. Point the clamp head to the inside of the vehicle and fit it so that the band tip is pointed downward.
- D. Pass the O<sub>2</sub> sensor lead through the vehicle inner side of the hose assembly 1 junction pipe of the water pump inlet pipe and route it by the outer down side of the hose assembly 1 and to the upper direction as shown in the illustration.
- E. To the exhaust
- F. Route the O<sub>2</sub> sensor lead to the vehicle rear side where the water pump inlet pipe is routed.
- G. Physical relationship between the coolant reservoir tank drain hose tip and sidestand switch lead can be in random order.
- H. Route the hose assembly 1 by the vehicle front side where the water pump inlet pipe is routed. For the hose tip position, route the hose so that 10 mm (0.39 in) or more can be assured as shown in the illustration.
- I. More than 10 mm (0.39 in)
- J. Route the sidestand switch lead by the vehicle front side where the hose assembly 1 and water pump inlet pipe are routed.
- K. Pass the oil level switch lead to the vehicle front side of the water pump breather hose and water pipe.
- L. Route the AC magneto lead by the inside of the frame.
- M. There should be no exposure of bare conductors due to the misalignment of tubes.
- N. Route the AC magneto lead by the inside of vehicle away from the water hose.
- O. Clamp the clutch cable, radiator fan motor lead (left) and water pump breather hose. Point the clamp head to the upper side of the vehicle and fit it so that the band tip is positioned inside. For the band position, install the band using the engine position as a guide as shown in the illustration.
- P. Insert the clamp to the frame and clamp the clutch cable. For the clamping position, place the clamp so that the caulking attachment on the clutch cable side is positioned at the vehicle front side where the clamp is located. Clamp opening should be positioned at the outside of the vehicle.
- Q. The inserting direction of the onion-head of the horn lead shall be as shown in the illustration.
- R. The front side of the vehicle.
- S. The outside of the vehicle.
- T. The upper side of the vehicle.
- U. The inside of the vehicle.
- V. Route the clutch cable under the convexity sections of the throttle bodies.
- W. Route the radiator fan motor lead (left) between the convexity sections of the throttle bodies.
- X. Route the wire harness between the convexity sections of the throttle bodies.
- Y. Innermost section of the vehicle.
- Z. Can be routed in any order.
- AA. Route the water pump breather hose finally in the guide after passing other hoses so that it can be positioned on the outside of the vehicle.
- AB. Route the coolant reservoir tank drain hose so that it is positioned at the innermost part in hoses and leads.
- AC. The rear side of the vehicle.
- AD. To the radiator
- AE. Open to the air
- AF. The coolant reservoir tank drain hose shall cross with the speed sensor lead under the rear arm bracket. The coolant reservoir tank drain hose shall be positioned above the vehicle.



## FZ1-SA

1. Clutch cable
  2. Clutch cable swaging metal
  3. Water pump breather hose
  4. Oil level switch lead
  5. Sidestand switch lead
  6. O<sub>2</sub> sensor lead
  7. Coolant reservoir tank drain hose
  8. Battery negative lead
  9. Wire harness
  10. Starter motor lead
  11. Seat lock cable
  12. Water pump inlet pipe
  13. AC magneto lead
  14. Radiator fan motor lead (left)
  15. Radiator stay
  16. Main switch lead
  17. Immobilizer lead
  18. Left handlebar switch lead
  19. Horn
  20. Right handlebar switch lead
  21. Throttle cables
  22. Brake hose
  23. Throttle body
  24. Stay 1
  25. Drive chain case cover
  26. Fuel tank breather hose
  27. EXUP cable
  28. Rear brake light switch lead
  29. ABS breather hose
  30. Speed sensor lead
  31. Rectifier/regulator lead
- A. Route in the concavity section of the radiator stay.
- B. To the coolant reservoir tank
- C. Clamp the wire harness, starter motor lead and battery negative lead. Point the clamp head to the inside of the vehicle and fit it so that the band tip is pointed downward.
- D. Pass the O<sub>2</sub> sensor lead through the vehicle inner side of the water pump breather hose junction pipe of the water pump inlet pipe and route it by the outer down side of the water pump breather hose and to the upper direction as shown in the illustration.
- E. To the exhaust
- F. Route the O<sub>2</sub> sensor lead to the vehicle rear side where the water pump inlet pipe is routed.
- G. Physical relationship between the coolant reservoir tank drain hose tip and sidestand switch lead can be in random order.
- H. Route the water pump breather hose by the vehicle front side where the water pump inlet pipe is routed. For the hose tip position, route the hose so that 10 mm (0.39 in) or more can be assured as shown in the illustration.
- I. More than 10 mm (0.39 in)
- J. Route the sidestand switch lead by the vehicle front side where the water pump breather hose and water pump inlet pipe are routed.
- K. Pass the oil level switch lead to the vehicle front side of the water pump breather hose and water pipe.
- L. Route the AC magneto lead by the inside of the frame.
- M. There should be no exposure of bare conductors due to the misalignment of tubes.
- N. Route the AC magneto lead by the inside of vehicle away from the water pump breather hose.
- O. Clamp the clutch cable, radiator fan motor lead (left) and water pump breather hose. Point the clamp head to the upper side of the vehicle and fit it so that the band tip is positioned inside. For the band position, install the band using the engine position as a guide as shown in the illustration.
- P. Insert the clamp to the frame and clamp the clutch cable. For the clamping position, place the clamp so that the caulking attachment on the clutch cable side is positioned at the vehicle front side where the clamp is located. Clamp opening should be positioned at the outside of the vehicle.
- Q. 50–60 mm (1.97–2.36 in)
- R. The inserting direction of the onion-head of the horn lead shall be as shown in the illustration.
- S. Pass the brake hose in the space by the right side of the vehicle from this wire and pass the brake hose and right handlebar switch lead in the left side space. Next, route the throttle cables to the vehicle rear side where the brake hose are routed.
- T. Secure the horn lead to the front fork. Cut the tip of the clamp head leaving 2 to 4 mm (0.08 to 0.16 in) toward the outside of the vehicle.
- U. The center position of the clamp shall be within this numeric range. (20°)
- V. The outside of the vehicle.
- W. The inside of the vehicle.
- X. The upper side of the vehicle.
- Y. Route the clutch cable under the convexity sections of the throttle bodies.
- Z. Can be routed in any order.
- AA. Route the wire harness between the convexity sections of the throttle bodies.
- AB. Innermost section of the vehicle.

# CABLE ROUTING



AC.Route the water pump breather hose finally in the guide after passing other hoses so that it can be positioned on the outside of the vehicle.

AD.Route the coolant reservoir tank drain hose so that it is positioned at the innermost part in hoses and leads.

AE.The rear side of the vehicle.

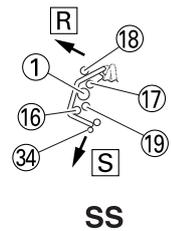
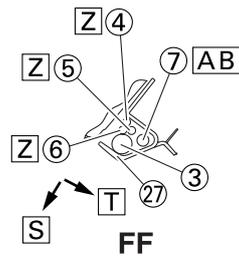
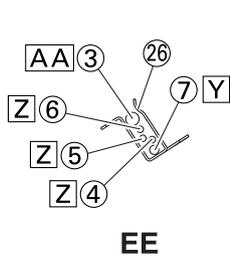
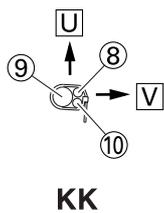
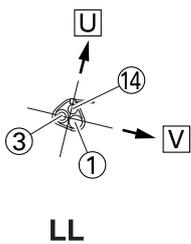
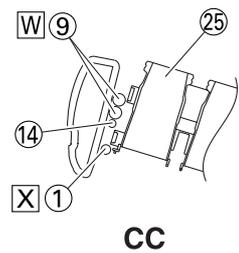
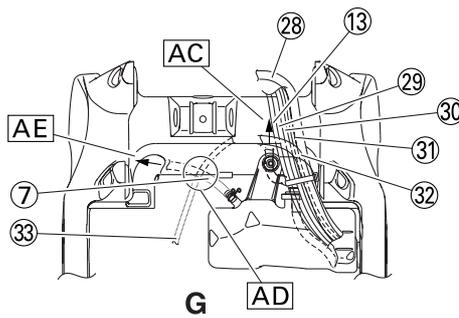
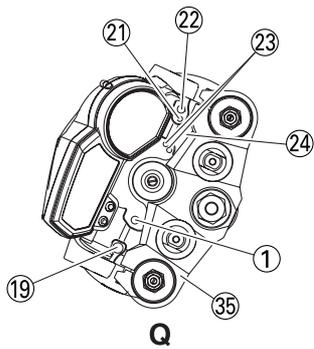
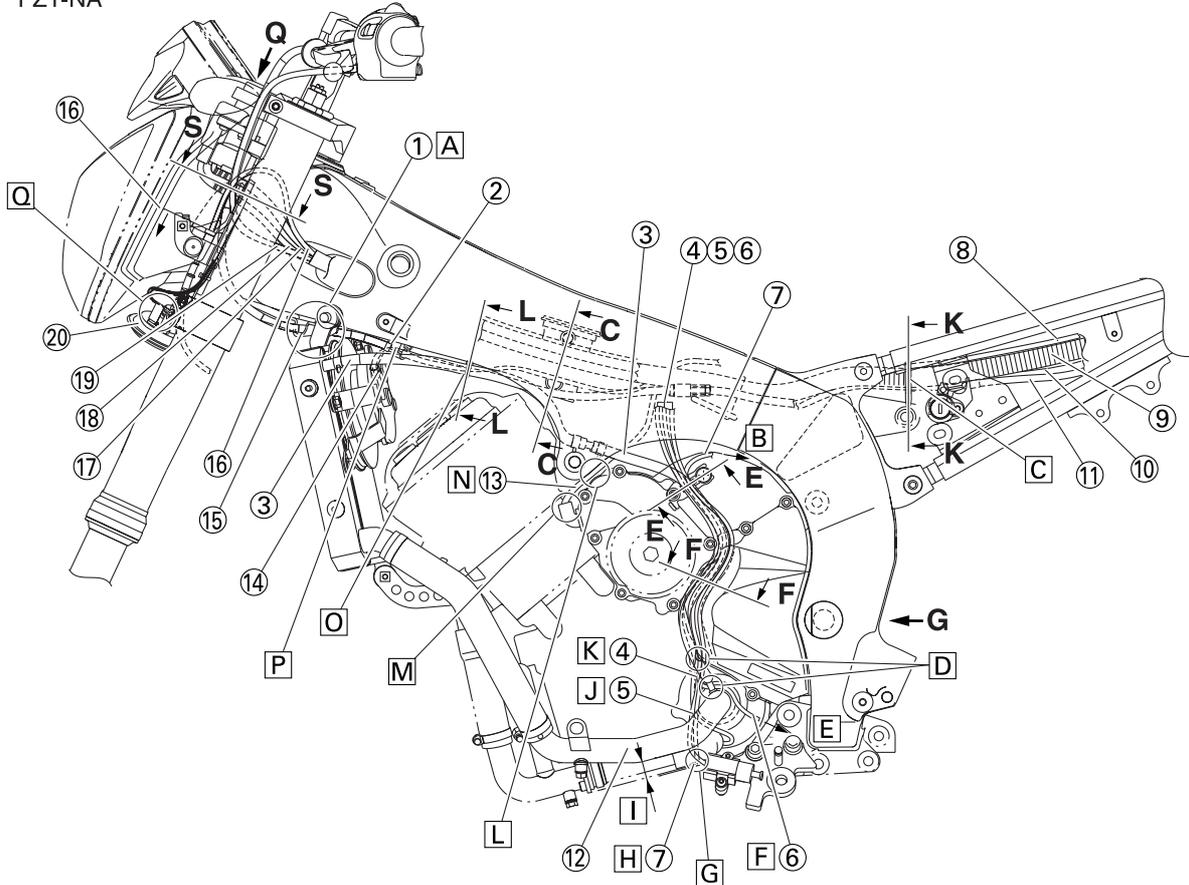
AF.The coolant reservoir tank drain hose shall cross with the speed sensor lead under the rear arm bracket. The coolant reservoir tank drain hose shall be positioned above the vehicle.

AG.Open to the air

AH.To the radiator

# CABLE ROUTING

FZ1-NA

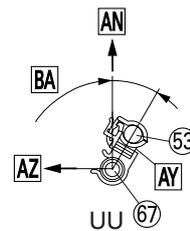
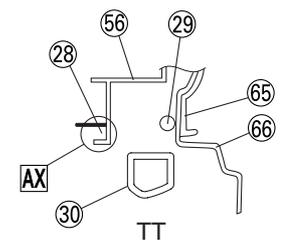
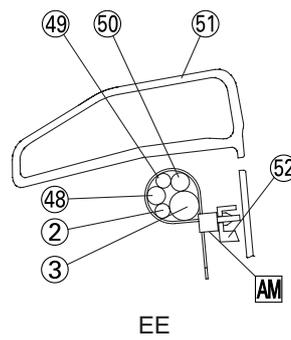
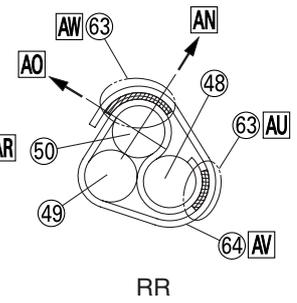
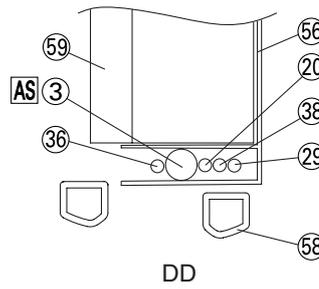
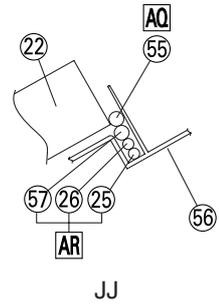
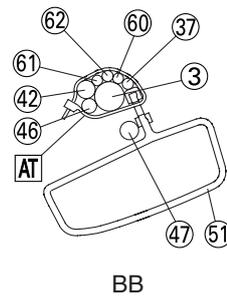
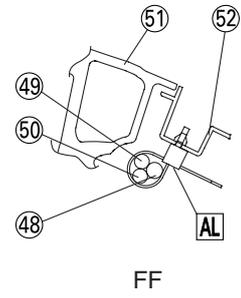
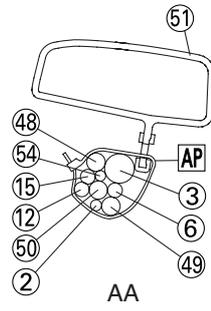
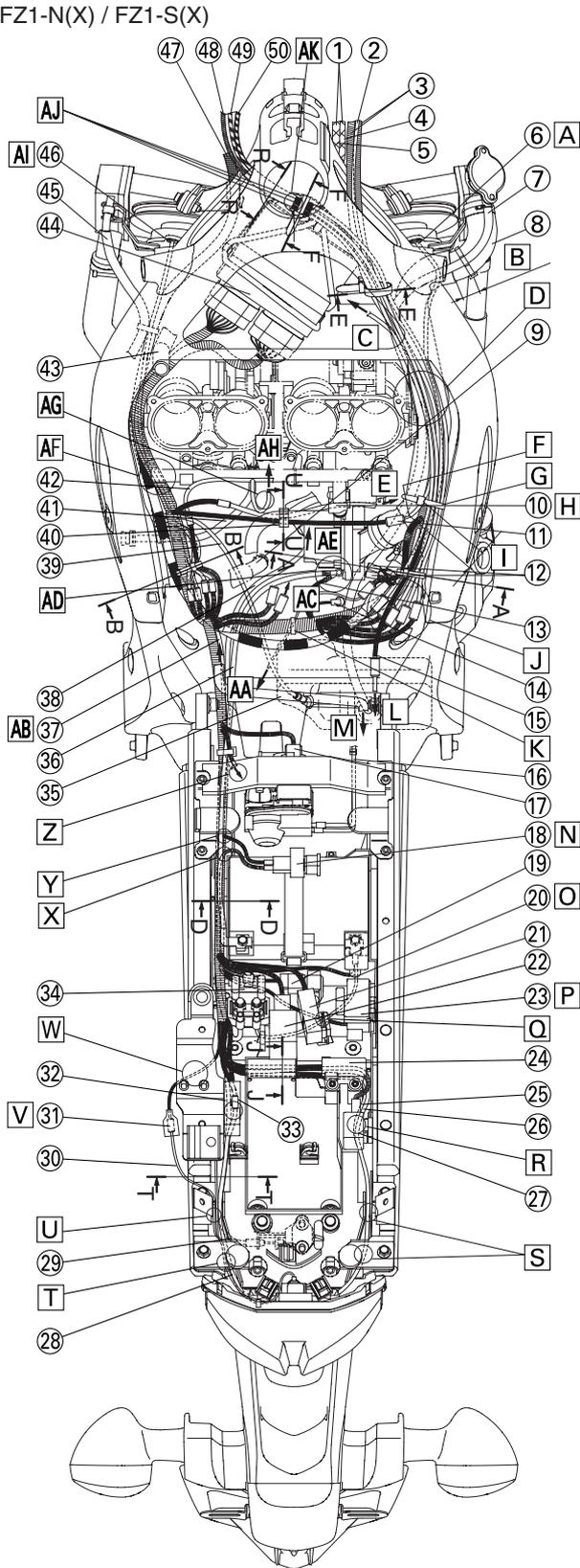


## FZ1-NA

1. Clutch cable
  2. Clutch cable swaging metal
  3. Water pump breather hose
  4. Oil level switch lead
  5. Sidestand switch lead
  6. O<sub>2</sub> sensor lead
  7. Coolant reservoir tank drain hose
  8. Battery negative lead
  9. Wire harness
  10. Starter motor lead
  11. Seat lock cable
  12. Water pump inlet pipe
  13. AC magneto lead
  14. Radiator fan motor lead (left)
  15. Radiator stay
  16. Front wheel sensor lead
  17. Main switch lead
  18. Immobilizer lead
  19. Left handlebar switch lead
  20. Horn
  21. Right handlebar switch lead
  22. Brake hose
  23. Throttle cables
  24. Stay assembly
  25. Throttle body
  26. Stay 1
  27. Drive chain case cover
  28. Fuel tank breather hose
  29. Rectifier/regulator lead
  30. EXUP cable
  31. Rear brake light switch lead
  32. ABS breather hose
  33. Speed sensor lead
  34. Horn lead
  35. Upper bracket
- A. Route through the concavity (concave) section of the radiator stay.
- B. To the coolant reservoir tank
- C. Clamp the wire harness, starter motor lead and battery negative lead. Point the clamp head to inside of the vehicle and the end should face downward.
- D. Route the O<sub>2</sub> sensor lead through the inner side of the water pump breather hose pipe and route it by the outer down side of the water pump breather hose and to the upper direction as shown in the illustration.
- E. To the exhaust
- F. Route the O<sub>2</sub> sensor lead behind the water pump inlet pipe.
- G. Positioning of the coolant reservoir tank drain hose tip and sidestand switch lead can be in any order.
- H. Route the water pump breather hose in front of the water pump inlet pipe. Route the hose so that 10 mm (0.39 in) or more can be assured as shown in the illustration.
- I. More than 10 mm (0.39 in)
- J. Route the sidestand switch lead in front of the water pump breather hose and water pump inlet pipe.
- K. Route the oil level switch lead in front of the water pump breather hose and water pipe.
- L. Route the AC magneto lead by the inside of the frame.
- M. There should be no exposure of bare conductors due to the misalignment of tubes.
- N. Route the AC magneto lead by the inner side of the water pump breather hose.
- O. Clamp the clutch cable, radiator fan motor lead (left) and water pump breather hose. Point the clamp head upward and install it so that the end of the band is positioned inside. For the band position, install the band using the engine position as a guide as shown in the illustration.
- P. Insert the clamp to the frame and clamp the clutch cable. For the clamping position, place the clamp so that the caulking attachment on the clutch cable is positioned at the front of the vehicle where the clamp is located. Clamp opening should point outside.
- Q. Direction of inserting the horn lead terminal is shown in the illustration.
- R. Front of the vehicle.
- S. Outside of the vehicle.
- T. Rear of the vehicle.
- U. Upper side of the vehicle.
- V. Inside of the vehicle.
- W. Route the wire harness between the convexity sections of the throttle body.
- X. Route the clutch cable under the convexity sections of the throttle body.
- Y. Innermost section of the vehicle.
- Z. Can be routed in any order.
- AA. After routing all the other hoses in the guide, route the water pump breather hose so that it is toward the outer side of the vehicle.
- AB. Route the coolant reservoir tank drain hose so that it is positioned behind all the hoses and leads.
- AC. To the radiator
- AD. The coolant reservoir tank drain hose should cross with the speed sensor lead under the rear arm bracket. The coolant reservoir tank drain hose should be above the speed sensor lead.
- AE. Open to air.

# CABLE ROUTING

FZ1-N(X) / FZ1-S(X)



## FZ1-N(X)/FZ1-S(X)

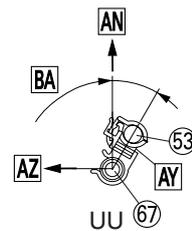
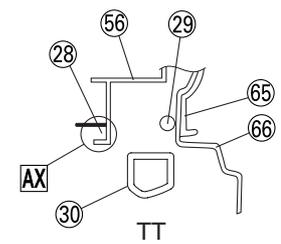
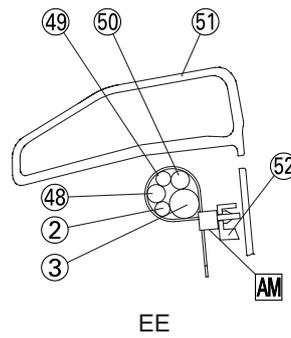
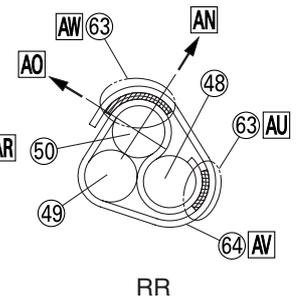
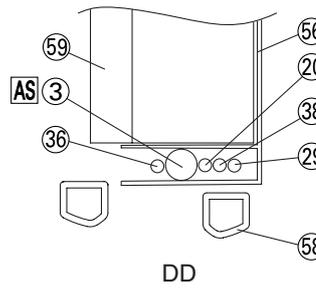
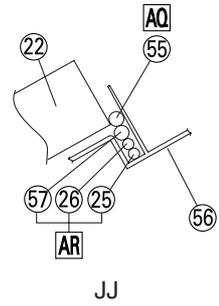
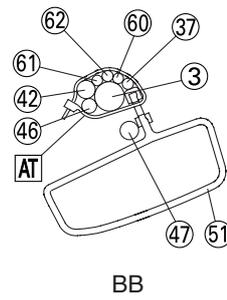
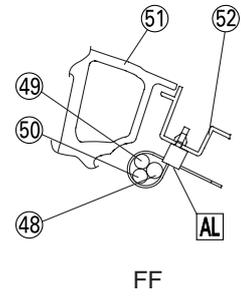
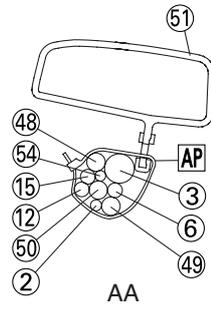
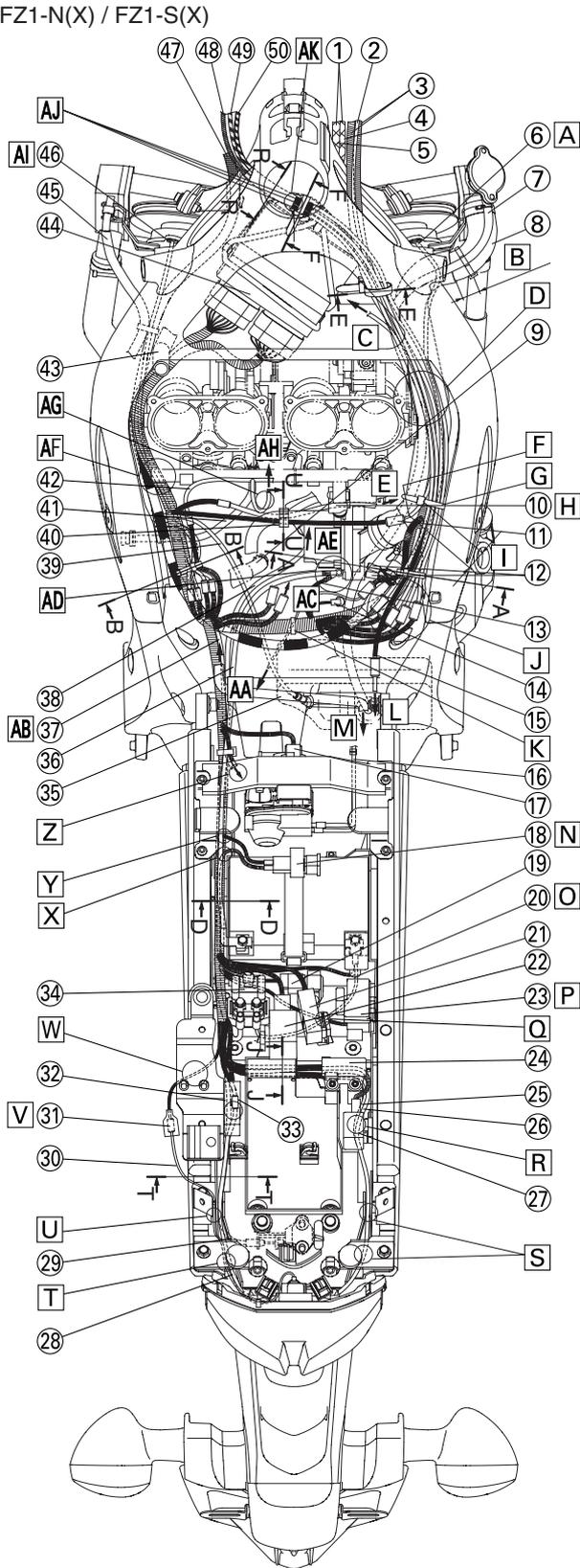
1. Throttle cables
2. Right handlebar switch lead
3. Wire harness
4. Throttle cable (pull side)
5. Throttle cable (return side)
6. Radiator fan motor lead (Right)
7. Coolant reservoir tank hose
8. Radiator inlet hose
9. Air filter drain hose
10. Crankshaft position sensor lead
11. Direct ignition coil lead coupler
12. Immobilizer anti-theft alarm coupler
13. Engine ground lead
14. Neutral switch lead
15. Rear brake light switch lead
16. EXUP cable
17. EXUP servo motor
18. Main fuse
19. Atmospheric pressure sensor
20. Battery positive lead
21. Radiator fan motor relay
22. Starting circuit cut-off relay
23. Fuse box
24. Lean angle sensor
25. Turn signal light lead (right)
26. License plate light lead
27. Turn signal relay
28. Turn signal light lead (left)
29. Seat lock cable
30. Tail/brake light lead
31. Tail/brake light lead coupler
32. Headlight relay
33. Turn signal light lead coupler (left)
34. Starter relay
35. Fuel tank breather hose
36. Battery negative lead
37. AC magneto lead
38. Starter motor lead
39. Coolant reservoir tank drain hose
40. Fuel hose bend R section
41. Idle adjust screw wire
42. Throttle body lead
43. Air cut-off valve hose
44. ECU (engine control unit)
45. Water pump breather hose
46. Radiator fan motor lead (left)
47. Clutch cable
48. Left handlebar switch lead
49. Immobilizer lead
50. Main switch lead
51. Frame
52. Cover

53. Direct ignition coil lead
54. Speed sensor lead
55. Lean angle sensor lead
56. Battery box
57. Turn signal light relay lead
58. Rear frame
59. Battery
60. Sidestand switch lead
61. Oil level switch lead
62. O<sub>2</sub> sensor lead
63. Velcro
64. Protector
65. Mud guard
66. Fender
67. Fuel hose

- A. Check that it is secured with the guide of the radiator stay.
- B. 10–30 mm (0.39 to 1.18 in)
- C. To the direct ignition coil lead
- D. Make sure to install the air filter after checking that the leads are positioned outside of the vehicle from the throttle body side cover.
- E. To the engine
- F. Direct ignition coil lead protector edge
- G. Bind the left handle bar switch leads, main switch leads, right handle bar switch leads, immobilizer leads, radiator fan motor leads (right), wire harness and direct ignition leads (in random order). Make sure to set the clamping position to be ahead of the immobilizer anti-theft alarm coupler and rear brake switch leads branch position, and to be within a range of 0 to 30 mm (0 to 1.18 inches) away from the protector end of the direct ignition coil lead. Install the band pointing its tip end downward inside the vehicle.
- H. Route the pickup coil lead below the fuel hose, throttle body hoses and air filter drain hose.
- I. 0–30 mm (0 to 1.18 in)
- J. Route the wire harness below the clutch cable and route the coupler branched from the wire harness below the clutch cable and then connect it.
- K. Insert the wire harness wrapping clamp to the hole of the frame.
- L. To the rear brake light switch
- M. Open to the air
- N. Insert the main fuse to the battery band. Soapy water can be spread.
- O. Route the battery positive lead under the relays.
- P. Route the fuse box lead under the radiator fan motor relay.
- Q. Route the battery positive lead under the fuse box lead.

# CABLE ROUTING

FZ1-N(X) / FZ1-S(X)



- R. Pass the license plate light lead and turn signal light lead under the turn signal relay.
- S. Pass the turn signal light lead (right) and license plate light lead under the rear fender bracket and route between the ribs of the battery box.
- T. Pass the turn signal light lead (left) and tail/brake light lead under the rear fender bracket and route between the ribs of the battery box.
- U. Route the tail/brake light lead by the inner side of the rear fender bracket and the outside of the battery box ribs. When installing the tail cover assembly, pay attention so that it does not catch anything between rear frame and rear fender bracket surface.
- V. After wiring the coupler, make sure to cover the connector with the squid-shaped protective cover on the wire harness side and then insert it to the space made by the external side of rear frame and tail cover assembly. At this time, the lead should be pushed in so that the lead does not hook on the seat loading acceptor.
- W. Route the tail/brake light lead in the space made by the top surface of the rear frame and the bottom face of the seat bracket. When installing the seat bracket, pay attention so that the lead is not caught by the rear frame surface.
- X. Route the battery positive lead from the inner side of the vehicle to the down side of the wire harness. It is not allowed to route the lead over the wire harness.
- Y. Route it so that the branch connection of the main fuse lead is placed in the upper side.
- Z. To the rectifier/regulator. Route the AC magneto lead and rectifier/regulator lead inside the battery box.
- AA. To the speed sensor
- AB. Route the AC magneto lead under the clutch cable.
- AC. To the fuel pump
- AD. Fit so that the engine ground lead is positioned below and the battery negative lead above. Fit the leads so that each projection of lead is positioned on the upper side of the vehicle.
- AE. To the starter motor
- AF. Route the leads under the throttle bodies.
- AG. Route the intake air temperature sensor by the upper side of the air filter drain hose.
- AH. To the air filter case
- AI. Check that the radiator fan motor lead (left) is secured with the guide of the radiator stay.
- AJ. Positioning tape (shaded area)
- AK. Fit the protector by aligning the positioning tape end and protector end for the main switch lead, immobilizer lead and left handlebar switch lead. The misalignment tolerance of ends is 0 to 5 mm (0 to 0.20 in).
- AL. Clamp each lead at the positioning taping section (white) and then insert it to the cover. (In random order)
- AM. Clamp each lead at the positioning taping section (blue) and then insert it to the cover. For routing leads, the wire harness shall be downside but others can be in random order. Positioning tape is only used for the wire harness and right handlebar switch.
- AN. The upper side of the vehicle.
- AO. The inside of the vehicle.
- AP. Secure the leads with a clamp. The cut position of the tip of the clamp shall be on the upper side of the vehicle. (Cut clamp leaving 2 to 4 mm (0.08 to 0.16 in) of the tip). Route the leads over the frame plate and insert them through the hole into the inside of the vehicle. Route the wire harness and rear brake light switch lead at the position shown in the illustration and other leads can be in random order. Inserting the band can be in any direction.
- AQ. Route the lean angle sensor lead at the uppermost side of the vehicle. Also, it must not be protruded from the battery box ribs toward the upper side.
- AR. Routing can be in random order.
- AS. Push the wire harness securely in as far as it will go.
- AT. Secure the leads with a clamp. The cut position of the tip of the clamp shall be on the upper side of the vehicle. (Cut it leaving 2 to 4 mm (0.08 to 0.16 in) of the tip). Route the leads over the frame plate and insert them through the hole into the inside of the vehicle. Route the wire harness at the position shown in the illustration and other leads can be in random order. Inserting the band can be in any direction.
- AU. 15 × 20 mm (0.59 × 0.79 in) (shaded area)
- AV. Installation procedure 1. Secure the main switch lead and immobilizer lead with Velcro strap. 2. Secure the left handlebar switch lead with Velcro strap. The main switch lead and immobilizer lead shall not be twisted in the protector. The installation position is where the protector end and lead positioning tape end align.
- AW. 20 × 58 mm (0.79 × 2.28 in) (shaded area)
- AX. Route it between the battery box ribs in the order indicated in the figure.
- AY. Clamp the fuel hose and direct ignition coil lead. Point the latch and the opening sections of the clamp to the front side of the vehicle and install it at the position as shown in the illustration. Clamp it tightly until the last (the third) latch is hooked.
- AZ. The front side of the vehicle.
- BA. 0 to 90 angle



## FZ1-SA

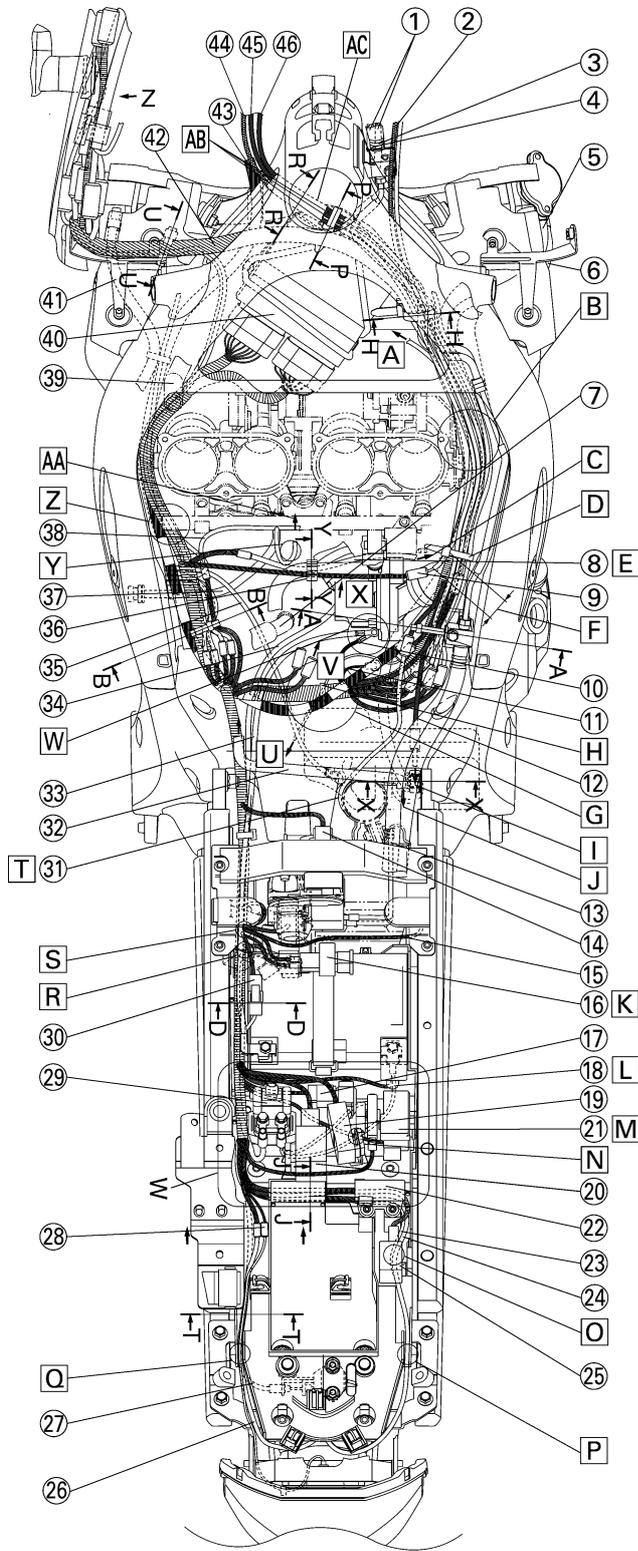
1. Throttle cables
2. Right handlebar switch lead
3. Throttle cable (pull side)
4. Throttle cable (return side)
5. Coolant reservoir tank hose
6. Radiator inlet hose
7. Air filter drain hose
8. AC magneto lead
9. Direct ignition coil lead coupler
10. Engine ground lead
11. Neutral switch lead
12. Rear brake light switch lead
13. EXUP cable
14. EXUP servo motor
15. Rear frame ground lead
16. Main fuse
17. Atmospheric pressure sensor
18. Battery positive lead
19. Radiator fan motor relay
20. Starting circuit cut-off relay
21. Fuse box
22. Lean angle sensor
23. Turn signal light lead (right)
24. License plate light lead
25. Turn signal relay
26. Turn signal light lead (left)
27. Seat lock cable
28. Turn signal light lead coupler (left)
29. Starter relay
30. ABS motor coupler
31. Rear wheel sensor lead
32. Fuel tank breather hose
33. Battery negative lead
34. Starter motor lead
35. Coolant reservoir tank drain hose
36. Fuel hose bend R section
37. Idle adjust screw wire
38. Throttle body lead
39. Air cut-off valve hose
40. ECU (engine control unit)
41. Water pump breather hose
42. Wire harness
43. Clutch cable
44. Left handlebar switch lead
45. Immobilizer lead
46. Main switch lead
47. Velcro
48. Frame
49. Cover
50. Direct ignition coil lead
51. Fuel hose
52. Immobilizer anti-theft alarm coupler

53. Radiator fan motor lead (left)
54. Oil level switch lead
55. O<sub>2</sub> sensor lead
56. Sidestand switch lead
57. Speed sensor lead
58. Radiator fan motor lead (Right)
59. Rear frame
60. Battery box
61. Battery
62. Turn signal light relay lead
63. ABS fuse lead
64. Lean angle sensor lead
65. Mud guard
66. Fender
67. Tail/brake light lead
68. Headlight leads
69. Rectifier/regulator lead
70. AC magneto lead
71. Stay
72. Front upper body
73. Cap nut
74. Alarm lead
75. Ground lead

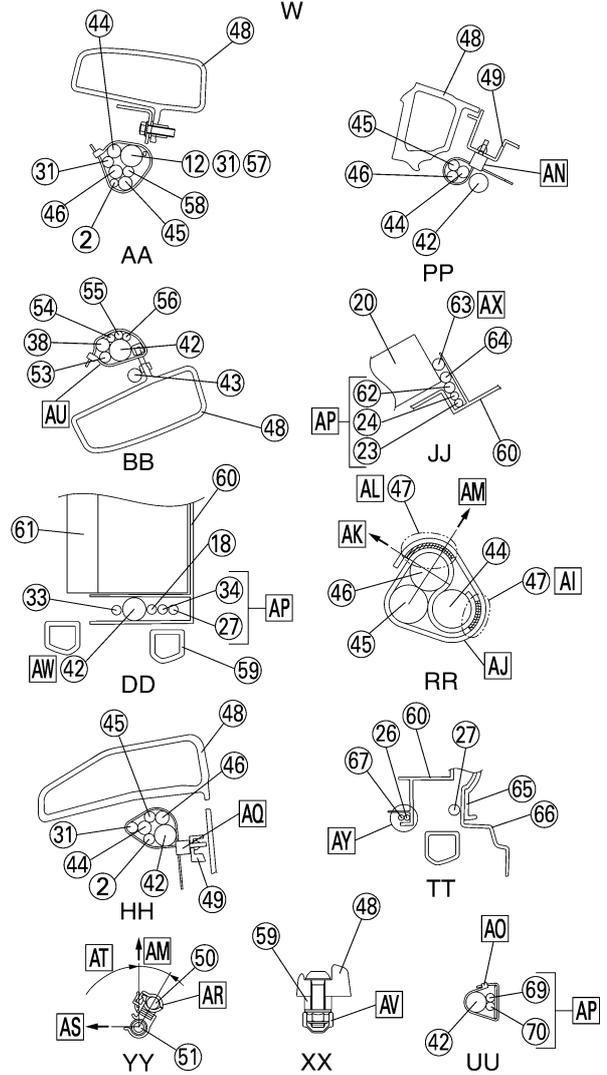
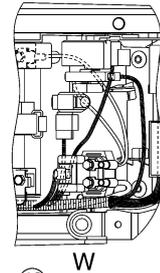
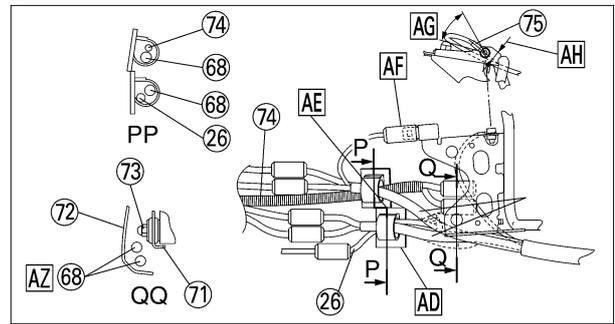
- A. To the direct ignition coil lead
- B. Make sure to install the air filter after checking that the leads are positioned outside of the vehicle from the throttle body side cover.
- C. Direct ignition coil lead protector edge
- D. Bind the left handle bar switch leads, main switch leads, right handle bar switch leads, immobilizer leads, front wheel sensor lead, radiator fan motor leads (right), wire harness and direct ignition leads (in random order). Make sure to set the clamping position to be ahead of the immobilizer anti-safety alarm coupler and rear brake switch leads branch position, and to be within a range of 0 to 30 mm (0 to 1.18 in) away from the protector end of the direct ignition coil lead. Install the band pointing its tip end downward inside the vehicle.
- E. Route the pickup coil lead below the fuel hose, throttle body hoses and air filter drain hose.
- F. 0–30 mm (0–1.18 in)
- G. Route the wire harness below the clutch cable.
- H. Insert the wire harness wrapping clamp to the hole of the frame.
- I. To the rear brake light switch
- J. Open to the air
- K. Insert the main fuse to the battery band. Soapy water can be spread.
- L. Route the battery positive lead under the relays.

# CABLE ROUTING

FZ1-SA



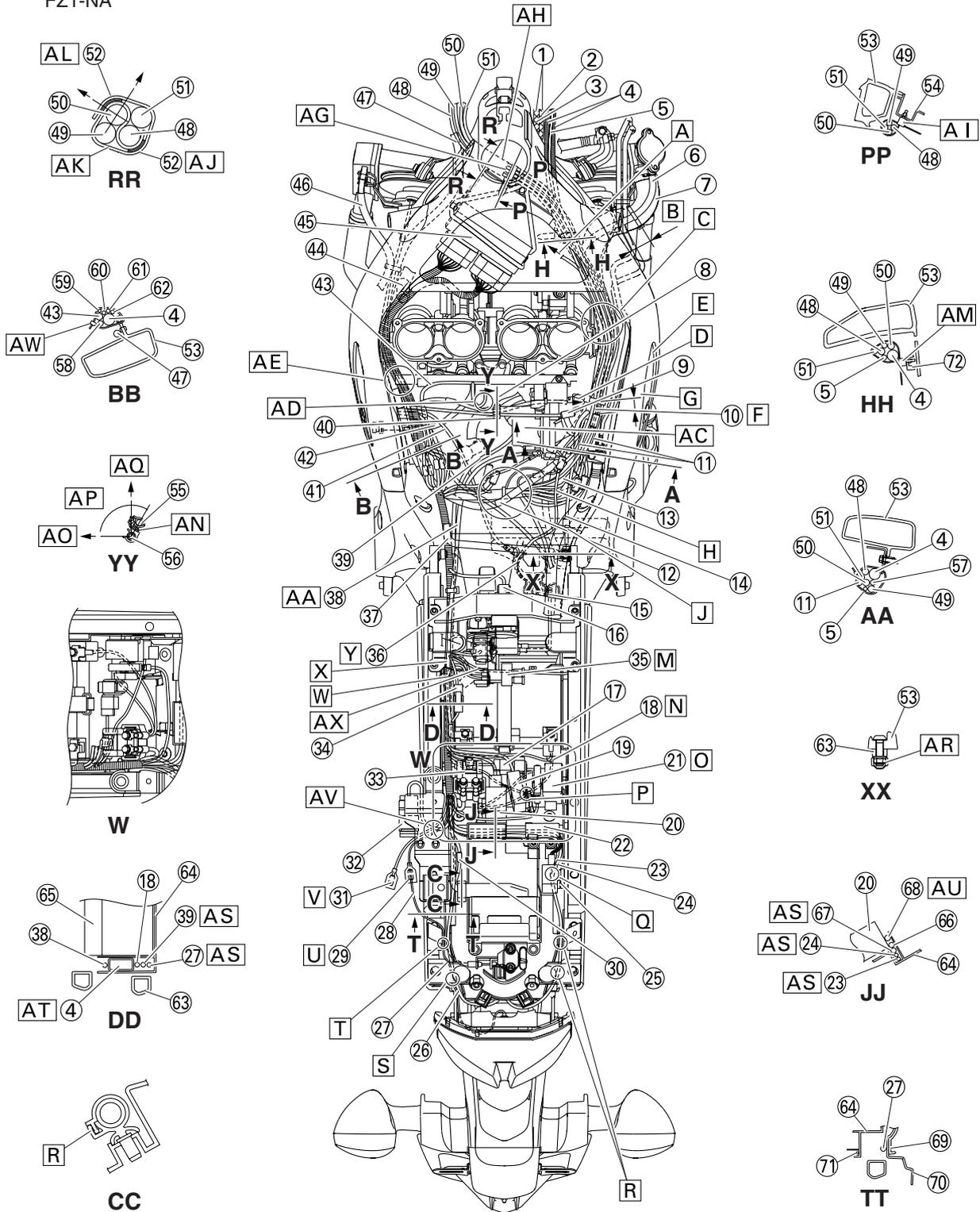
Z



- M. Route the fuse box lead under the radiator fan motor relay.
- N. Route the battery positive lead under the fuse box lead.
- O. Pass the license plate light lead and turn signal light lead under the turn signal relay.
- P. Pass the turn signal light lead (right) and license plate light lead under the rear fender bracket and route between the ribs of the battery box.
- Q. Pass the turn signal light lead (left) and tail/brake light lead under the rear fender bracket and route between the ribs of the battery box.
- R. Route the battery positive lead from the inner side of the vehicle to the down side of the wire harness. It is not allowed to route the lead over the wire harness.
- S. Route it so that the branch connection of the main fuse lead is placed in the upper side.
- T. Route the rear wheel sensor lead under the rear brake fluid reservoir tank.
- U. To the speed sensor
- V. To the fuel pump
- W. Fit so that the engine ground lead is positioned below and the battery negative lead above. Fit the leads so that each projection of lead is positioned on the upper side of the vehicle.
- X. To the starter motor
- Y. Route the intake air temperature sensor by the upper side of the air filter drain hose.
- Z. Route the leads under the throttle bodies.
- AA. To the air filter case
- AB. Positioning tape (shaded area)
- AC. Fit the protector by aligning the positioning tape end and protector end for the main switch lead, immobilizer lead and left handlebar switch lead. The misalignment tolerance of ends is 0 to 5 mm (0 to 0.20 in).
- AD. Paste wire harness aligning with the marking-off on the front upper body so that the opening points toward the upper side of the vehicle.
- AE. Place clamp along with the lower side clamp and paste with the clamp width shifted by half to the rear side of the vehicle. Point the opening section of the clamp is upward on the vehicle.
- AF. Insert the ABS check coupler to the stay so that the attaching section points to the outside of the vehicle.
- AG. Attach the ground lead at 45° or less.
- AH. Point the ground lead to the direction in parallel to the bracket end face.
- AI. 15 × 20 mm (0.59 × 0.79 in) (shaded area)
- AJ. Installation procedure 1. Secure the main switch lead and immobilizer lead with Velcro strap. 2. Secure the left handlebar switch lead with Velcro strap. The main switch lead and immobilizer lead shall not be twisted in the protector. The installation position is where the protector end and lead positioning tape end align.
- AK. The inside of the vehicle.
- AL. 20 × 58 mm (0.79 × 2.28 in) (shaded area)
- AM. The upper side of the vehicle.
- AN. Clamp each lead at the positioning taping section (white) and then insert it to the cover. (In random order)
- AO. Cut clamp leaving 2 to 4 mm (0.08 to 0.16 in) of the tip.
- AP. Can be routed in random order.
- AQ. Clamp each lead at the positioning taping section (blue) and then insert it to the cover. For routing leads, the wire harness shall be downside but others can be in random order. Positioning tape is only used for the handlebar switch lead and ABS sensor lead.
- AR. Clamp the fuel hose and direct ignition coil lead. Point the latch and the opening sections of the clamp to the front side of the vehicle and install it at the position as shown in the illustration. Clamp it tightly until the last (the third) latch is hooked.
- AS. The front side of the vehicle.
- AT. 0 to 90 angle
- AU. Secure the leads with a clamp. The cut position of the tip of the clamp shall be on the upper side of the vehicle. (Cut it leaving 2 to 4 mm (0.08 to 0.16 in) of the tip). Route the leads over the frame plate and insert them through the hole into the inside of the vehicle. Route the wire harness at the position shown in the illustration and other leads can be in random order. Inserting the band can be in any direction.
- AV. Attach so that the outer groove of the cap is to be positioned at the corner of the nut.
- AW. Push the wire harness securely in as far as it will go.
- AX. Route the ABS fuse lead at the uppermost side of the vehicle. Also, it must not be protruded from the battery box ribs toward the upper side.
- AY. Route it between the battery box ribs in the order indicated in the illustration.
- AZ. Route the two headlight leads under the cap nut.

# CABLE ROUTING

FZ1-NA



## FZ1-NA

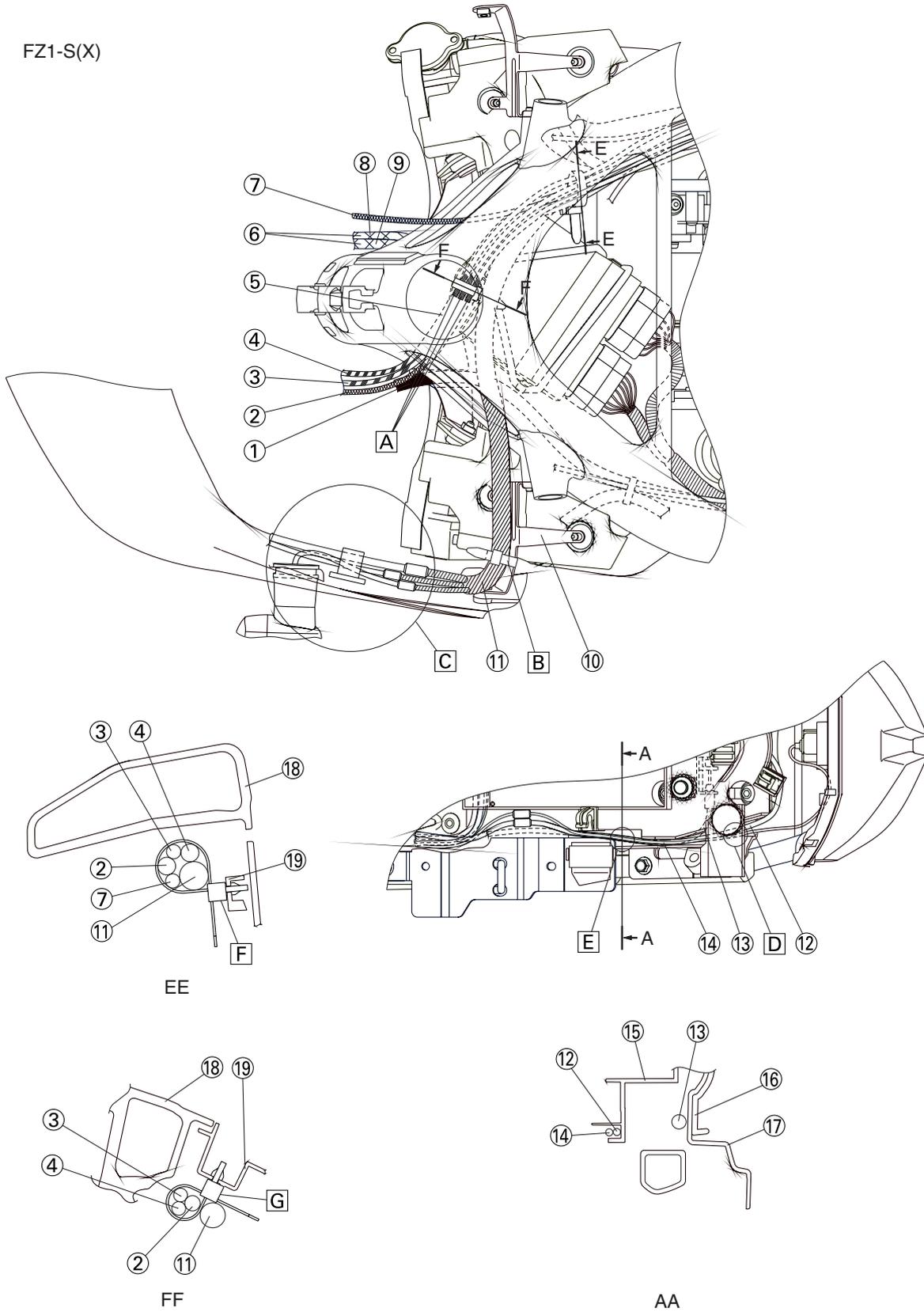
1. Throttle cables
  2. Throttle cable (pull side)
  3. Throttle cable (return side)
  4. Wire harness
  5. Right handlebar switch lead
  6. Coolant reservoir tank hose
  7. Radiator inlet hose
  8. Air filter drain hose
  9. Direct ignition coil lead coupler
  10. AC magneto lead
  11. Immobilizer anti-theft alarm coupler
  12. Engine ground lead
  13. Neutral switch lead
  14. Rear brake light switch lead
  15. EXUP cable
  16. EXUP servo motor
  17. Atmospheric pressure sensor
  18. Battery positive lead
  19. Radiator fan motor relay
  20. Starting circuit cut-off relay
  21. Fuse box
  22. Lean angle sensor
  23. Turn signal light lead (right)
  24. License plate light lead
  25. Turn signal relay
  26. Turn signal light lead (left)
  27. Seat lock cable
  28. Tail/brake light lead
  29. Tail/brake light lead coupler
  30. Turn signal light lead coupler (left)
  31. ABS motor coupler
  32. Headlight relay
  33. Starter relay
  34. ABS motor fuse
  35. Main fuse
  36. Rear wheel sensor lead
  37. Fuel tank breather hose
  38. Battery negative lead
  39. Starter motor lead
  40. Fuel hose bend R section
  41. Coolant reservoir tank drain hose
  42. Idle adjust screw wire
  43. Throttle body lead
  44. Air cut-off valve hose
  45. ECU (engine control unit)
  46. Water pump breather hose
  47. Clutch cable
  48. Left handlebar switch lead
  49. Immobilizer lead
  50. Main switch lead
  51. Front wheel sensor lead
  52. Velcro
  53. Frame
  54. Cover
  55. Direct ignition coil lead
  56. Fuel hose
  57. Radiator fan motor lead (right)
  58. Radiator fan motor lead (left)
  59. Oil level switch lead
  60. O<sub>2</sub> sensor lead
  61. Sidestand switch lead
  62. Rear frame
  63. Battery box
  64. Battery
  65. Lean angle sensor lead
  66. Turn signal light relay lead
  67. ABS fuse lead
  68. Mud guard
  69. Fender
  70. Turn signal light lead
- A. To the direct ignition coil lead
  - B. 10–30 mm (0.39–1.18 in)
  - C. Make sure to install the air cleaner after checking that the leads are positioned outside of the throttle body side cover and toward the outer side of the vehicle.
  - D. Protector end (direct ignition coil lead)
  - E. Bind the left handlebar switch lead, main switch lead, right handlebar switch lead, immobilizer lead, front wheel sensor lead, radiator fan motor lead (right), wire harness and direct ignition lead (in random order). Make sure to set the clamping position ahead of the branching section of the rear stop switch lead and to be within 0 to 30 mm (0 to 1.18 in) away from the protector end of the direct ignition coil lead. Install the band end downward and inner side of the vehicle.
  - F. Route the pickup coil lead below the fuel hose, throttle body hoses and air filter drain hose.
  - G. 0–30 mm (0–1.18 in)
  - H. Route the wire harness below the clutch cable.
  - I. Insert the wire harness wrapping clamp to the hole of the frame.
  - J. Clamp bottom of the front brake hose and rear wheel sensor lead. Clamping position should be above the cross section of the frame. Face the end of the band to outside and install so that it is positioned between the brake hose and frame and ahead of the cross section.
  - K. To the rear brake light switch
  - L. Open to air.
  - M. Insert the main fuse to the battery band. Soapsuds can be applied.
  - N. Route the battery positive lead under the relays.



- O. Route the fuse box lead under the radiator fan motor relay.
- P. Route the battery positive lead under the fuse box lead.
- Q. Route the license plate light lead and turn signal light lead under the turn signal relay.
- R. Route the turn signal light lead (right) and license plate light lead under the rear fender bracket and route between the ribs of the battery box.
- S. Route the turn signal light lead (left) and tail/brake light lead under the rear fender bracket and route between the ribs of the battery box.
- T. Route the tail/brake light lead through the inner side of the rear fender bracket and outside of the ribs of the battery box. When installing the tail cover assembly, make sure that it is not pinched under the seat.
- U. After wiring the coupler, make sure to cover with the coupler cover on the wire harness side and push it into the space between the outside of the rear frame and tail cover assembly. At this time, the lead should be pushed in so that the lead does not hook on the seat loading acceptor.
- V. After covering with the ABS motor coupler, push it into the space between the outside of the rear frame and tail cover assembly.
- W. Route the battery positive lead from the inner side of the vehicle to below the wire harness. It is not allowed to route the lead over the wire harness.
- X. Route it so that the branch section of the main fuse lead is placed above.
- Y. Route the rear wheel sensor lead inner side of the rear brake fluid reservoir tank.
- Z. To the speed sensor
- AA. Install the battery negative lead so that the engine ground lead is positioned below and the battery negative lead is positioned above. Install the leads so that each projection of the lead is positioned on the upper side of the vehicle.
- AB. To the fuel pump
- AC. To the starter motor
- AD. Route the intake air temperature sensor lead by the upper side of the air filter drain hose.
- AE. To the air filter case
- AF. Route the leads under the throttle body.
- AG. Positioning tape (shaded area)
- AH. Install the protector by aligning the main switch lead, immobilizer lead, left handlebar switch lead and front wheel sensor lead with the positioning tape end and protector end. The misalignment tolerance of the end is 0 to 5 mm (0 to 0.20 in).
- AI. Clamp each lead at the positioning taping section (white) and then insert it into the cover 3 (in random order).
- AJ. 15 × 20 mm (0.59 × 0.79 in) (shaded area)
- AK. Installation procedure 1. Secure the main switch lead and immobilizer lead with Velcro strap. 2. Secure the left handlebar switch lead with Velcro strap. The main switch lead and immobilizer lead shall not be twisted in the protector. The installation position is where the protector end and lead positioning tape end align.
- AL. 20 × 58 mm (0.79 × 2.28 in) (shaded area)
- AM. Clamp each lead at the positioning taping section (blue) and then insert it into the cover 3. When routing the leads, the wire harness should be on downside and others can be in random order. Positioning tape is only used for the wire harness and handlebar switch lead.
- AN. Clamp the fuel hose and direct ignition coil lead. Point the latch and the opening section of the clamp to the front side of the vehicle and install it at the position shown in the illustration. Clamp it tightly until the last (the third) latch is hooked.
- AO. Front of the vehicle
- AP. 0 to 90 degrees
- AQ. Upper side of the vehicle
- AR. Install so that the outer groove of the cap is positioned at the corner of the nut.
- AS. Can be routed in any order.
- AT. Push the wire harness securely in as far as it will go.
- AU. Route the ABS fuse lead at the uppermost side of the vehicle. It must not protrude above the ribs of the battery box.
- AV. Route the tail brake light lead, headlight relay lead and ABS motor coupler lead between the space of the upper rear frame and bottom of the seat bracket. When installing the seat bracket, make sure that the lead is not pinched under the seat.
- AW. Clamp each lead. Cut off the excess end of the clamp to 2 to 4 mm (0.08 to 0.16 in). Route the leads over the frame plate and insert them through the hole toward the inside of the vehicle. Route the wire harness at the position shown in the illustration and other leads can be routed in random order. Inserting of the band can be in any direction.
- AX. Route the rear frame ground lead under the battery band, and then through the space between the battery box and rear frame to the outside.

# CABLE ROUTING

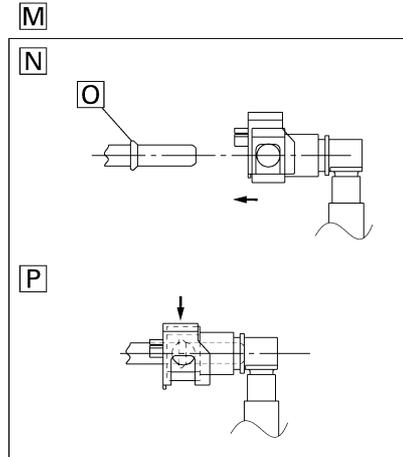
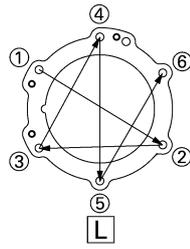
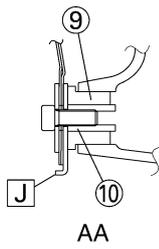
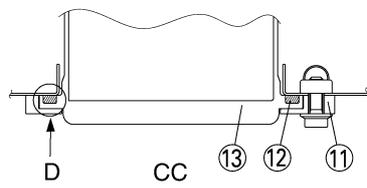
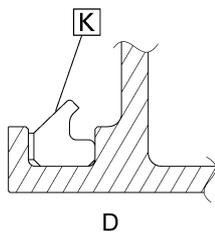
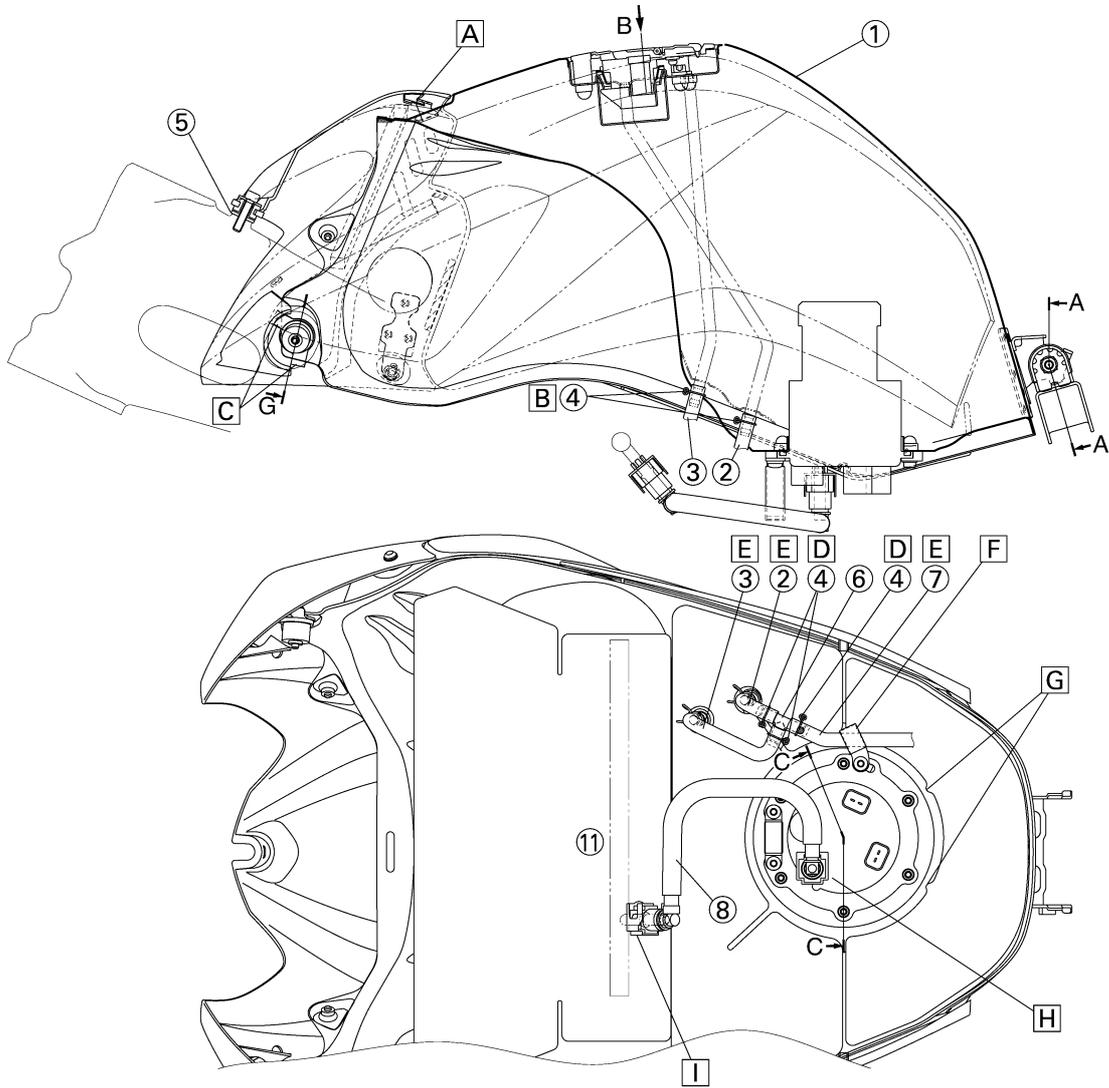
FZ1-S(X)



## FZ1-S(X)

1. Clutch cable
  2. Left handlebar switch lead
  3. Immobilizer lead
  4. Main switch lead
  5. Protector
  6. Throttle cables
  7. Right handlebar switch lead
  8. Throttle cable (pull side)
  9. Throttle cable (return side)
  10. Bracket
  11. Wire harness
  12. Turn signal light lead
  13. Seat lock cable
  14. Tail/brake light lead
  15. Battery box
  16. Mud guard
  17. Fender
  18. Frame
  19. Cover
- 
- A. Positioning tape (shaded area)
  - B. Secure the wire harness to the bracket. Position the clamp head on the upper side of the vehicle and point the tip to the front side of the vehicle.
  - C. Attach the clamp to the front upper cowling. Clamp the turn signal light lead (left) and headlight lead.
  - D. Pass the turn signal light lead (left) and tail/brake light lead under the rear fender bracket.
  - E. Pass the turn signal light lead (left) and tail/brake light lead the route between the ribs of the battery box.
  - F. Clamp each lead at the positioning taping section and then insert it to the cover. (In random order) Positioning tape is only used for the right handlebar switch. Fit other leads so that they are not slack.
  - G. Clamp each lead at the positioning taping section and then insert it to the cover. (In random order) Route the rear side of the vehicle to the wire harness.

# CABLE ROUTING



1. Fuel tank
  2. Fuel tank drain hose
  3. Fuel tank breather hose
  4. Clip
  5. Air filter bracket
  6. 3 way connector
  7. Hose
  8. Fuel hose
  9. Damper
  10. Collar
  11. Fuel tank bracket
  12. O-ring
  13. Fuel pump
- 
- A. Hook the cover pawl to the fuel tank bracket.
  - B. The knob of the clip can be positioned in any direction.
  - C. Assemble the two folding sections of the collar flange as shown in the illustration.
  - D. Fit the knob of the clip as shown in the illustration.
  - E. Fit the white paint section of the hose pointed downward.
  - F. Pass the hose through the fuel tank bracket clamp. There should be no bend of the hose between the fuel tank nipple and clamp.
  - G. Align the projection part with the pump seat nut.
  - H. Fit the orange double lock side to the pump side.
  - I. Fit the black double lock side to the engine side.
  - J. The fuel tank bracket shall not run on the tank flange as shown in the illustration.
  - K. Fit the O-ring with its lip pointed upward.
  - L. Tightening sequence
  - M. Fuel piping connector attachment directions. (fuel pump side) Always perform the connection/disconnection works by hand. Do not use tools.
  - N. 1. Insert the connector until the click sound is heard and check that the connector does not come off. Make sure that no foreign matter is caught in the sealing section. (It is prohibited to wear the cotton work gloves or equivalent coverings.)
  - O. This part works as a dropout stopper.
  - P. 2. After Step [N] as above is finished, check that the connector is completely attached by sliding the double lock (orange part) on the connector as shown in the illustration and seeing if it touches firmly or not.



---

## PERIODIC CHECKS AND ADJUSTMENTS

<b>PERIODIC MAINTENANCE</b> .....	3-1
INTRODUCTION .....	3-1
<b>ENGINE</b> .....	3-4
ADJUSTING THE VALVE CLEARANCE .....	3-4
SYNCHRONIZING THE THROTTLE BODIES .....	3-6
ADJUSTING THE EXHAUST GAS VOLUME.....	3-8
ADJUSTING THE ENGINE IDLING SPEED .....	3-9
ADJUSTING THE THROTTLE CABLE FREE PLAY .....	3-9
CHECKING THE SPARK PLUGS.....	3-10
MEASURING THE COMPRESSION PRESSURE .....	3-10
CHECKING THE ENGINE OIL LEVEL.....	3-11
CHANGING THE ENGINE OIL.....	3-12
MEASURING THE ENGINE OIL PRESSURE .....	3-13
ADJUSTING THE CLUTCH CABLE FREE PLAY .....	3-14
REPLACING THE AIR FILTER ELEMENT .....	3-15
CHECKING THE THROTTLE BODY JOINTS .....	3-16
CHECKING THE FUEL LINE .....	3-16
CHECKING THE CRANKCASE BREATHER HOSE .....	3-16
CHECKING THE EXHAUST SYSTEM.....	3-17
ADJUSTING THE EXUP CABLES .....	3-17
CHECKING THE EXUP SERVO MOTOR.....	3-18
CHECKING THE COOLANT LEVEL.....	3-18
CHECKING THE COOLING SYSTEM .....	3-19
CHANGING THE COOLANT.....	3-19
<b>CHASSIS</b> .....	3-22
ADJUSTING THE FRONT DISC BRAKE .....	3-22
ADJUSTING THE REAR DISC BRAKE .....	3-22
CHECKING THE BRAKE FLUID LEVEL.....	3-23
CHECKING THE FRONT BRAKE PADS.....	3-23
CHECKING THE REAR BRAKE PADS .....	3-23
CHECKING THE FRONT BRAKE HOSES.....	3-24
CHECKING THE REAR BRAKE HOSE .....	3-24
ADJUSTING THE REAR BRAKE LIGHT SWITCH .....	3-24
BLEEDING THE HYDRAULIC BRAKE SYSTEM.....	3-25
ADJUSTING THE SHIFT PEDAL .....	3-27
ADJUSTING THE DRIVE CHAIN SLACK .....	3-27
LUBRICATING THE DRIVE CHAIN.....	3-28
CHECKING AND ADJUSTING THE STEERING HEAD .....	3-28
CHECKING THE FRONT FORK .....	3-29
ADJUSTING THE FRONT FORK LEGS .....	3-30
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY.....	3-32
CHECKING THE TIRES.....	3-33
CHECKING THE WHEELS .....	3-35
CHECKING AND LUBRICATING THE CABLES .....	3-35
LUBRICATING THE LEVERS.....	3-35
LUBRICATING THE PEDAL .....	3-35
LUBRICATING THE SIDESTAND.....	3-35

---

LUBRICATING THE CENTERSTAND (FZ1-S(X)/FZ1-SA).....	3-35
LUBRICATING THE REAR SUSPENSION .....	3-35
<b>ELECTRICAL SYSTEM</b> .....	3-36
CHECKING AND CHARGING THE BATTERY.....	3-36
CHECKING THE FUSES.....	3-36
REPLACING THE HEADLIGHT BULBS.....	3-36
ADJUSTING THE HEADLIGHT BEAM .....	3-37

---

# 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.

### Periodic maintenance and lubrication chart

#### NOTE:

- The annual checks must be performed every year, except if a kilometer-based maintenance is performed instead.
- From 50000 km, repeat the maintenance intervals starting from 10000 km.
- 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 (X 1000 km)					Annual check
			1	10	20	30	40	
1	*	Fuel line		√	√	√	√	√
2	*	Spark plugs	• Check condition.	√		√		
			• Clean and regap.					
		• Replace.			√		√	
3	*	Valves	• Check valve clearance.					Every 40000 km
			• Adjust.					
4	*	Air filter element	• Replace.					
							√	
5		Clutch	• Check operation.					
			• Adjust.					
			√	√	√	√	√	
6	*	Front brake	• Check operation, fluid level and vehicle for fluid leakage.					√
			• Replace brake pads.					
7	*	Rear brake	• Check operation, fluid level and vehicle for fluid leakage.					√
			• Replace brake pads.					
8	*	Brake hoses	• Check for cracks or damage.					√
			• Replace.					
9	*	Wheels		√	√	√	√	
10	*	Tires	• Check tread depth and for damage.					√
			• Replace if necessary.					
			• Check air pressure.					
			• Correct if necessary.					
11	*	Wheel bearings		√	√	√	√	
12	*	Swingarm		√	√	√	√	

## PERIODIC MAINTENANCE

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (X 1000 km)					Annual check
			1	10	20	30	40	
13	Drive chain	<ul style="list-style-type: none"> <li>• Check chain slack, alignment and condition.</li> <li>• Adjust and lubricate chain with a special O-ring chain lubricant thoroughly.</li> </ul>	Every 1000 km and after washing the motorcycle or riding in the rain					
14	* Steering bearings	<ul style="list-style-type: none"> <li>• Check bearing play and steering for roughness.</li> </ul>	√	√	√	√	√	
		<ul style="list-style-type: none"> <li>• Lubricate with lithium-soap-based grease.</li> </ul>	Every 20000 km					
15	* Chassis fasteners	<ul style="list-style-type: none"> <li>• Make sure that all nuts, bolts and screws are properly tightened.</li> </ul>		√	√	√	√	√
16	Brake and clutch lever pivot shafts (FZ1-SA)	<ul style="list-style-type: none"> <li>• Lubricate with lithium-soap-based grease.</li> </ul>		√	√	√	√	√
17	Brake and shift pedal pivot shafts (FZ1-SA)	<ul style="list-style-type: none"> <li>• Lubricate with lithium-soap-based grease.</li> </ul>		√	√	√	√	√
18	Sidestand (FZ1-N(X))/ (FZ1-NA)	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Lubricate.</li> </ul>		√	√	√	√	√
19	* Sidestand, center stand (FZ1-S(X)/FZ1-SA)	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Lubricate.</li> </ul>		√	√	√	√	√
20	* Sidestand switch	<ul style="list-style-type: none"> <li>• Check operation.</li> </ul>	√	√	√	√	√	√
21	* Front fork	<ul style="list-style-type: none"> <li>• Check operation and for oil leakage.</li> </ul>		√	√	√	√	
22	* Shock absorber assembly	<ul style="list-style-type: none"> <li>• Check operation and shock absorber for oil leakage.</li> </ul>		√	√	√	√	
23	* Rear suspension relay arm and connecting arm pivoting points	<ul style="list-style-type: none"> <li>• Check operation.</li> </ul>		√	√	√	√	
24	* Fuel injection	<ul style="list-style-type: none"> <li>• Adjust engine idling speed and synchronization.</li> </ul>	√	√	√	√	√	√
25	Engine oil	<ul style="list-style-type: none"> <li>• Change.</li> <li>• Check oil level and vehicle for oil leakage.</li> </ul>	√	√	√	√	√	√
26	Engine oil filter cartridge	<ul style="list-style-type: none"> <li>• Replace.</li> </ul>	√		√		√	
27	* Cooling system	<ul style="list-style-type: none"> <li>• Check coolant level and vehicle for coolant leakage.</li> </ul>		√	√	√	√	√
		<ul style="list-style-type: none"> <li>• Change.</li> </ul>	Every 3 years					
28	* Front and rear brake switches	<ul style="list-style-type: none"> <li>• Check operation.</li> </ul>	√	√	√	√	√	√

## PERIODIC MAINTENANCE

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (X 1000 km)					Annual check
			1	10	20	30	40	
29	Moving parts and cables	<ul style="list-style-type: none"> <li>Lubricate.</li> </ul>		√	√	√	√	√
30	* Throttle grip housing and cable	<ul style="list-style-type: none"> <li>Check operation and free play.</li> <li>Adjust the throttle cable free play if necessary.</li> <li>Lubricate the throttle grip housing and cable.</li> </ul>		√	√	√	√	√
31	* Air induction system	<ul style="list-style-type: none"> <li>Check the air cut-off valve, reed valve, and hose for damage.</li> <li>Replace the entire air induction system if necessary.</li> </ul>		√	√	√	√	√
32	* Muffler and exhaust pipe	<ul style="list-style-type: none"> <li>Check the screw clamp for looseness.</li> </ul>	√	√	√	√	√	
33	* Lights, signals and switches	<ul style="list-style-type: none"> <li>Check operation.</li> <li>Adjust headlight beam.</li> </ul>	√	√	√	√	√	√

**NOTE:** \_\_\_\_\_

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

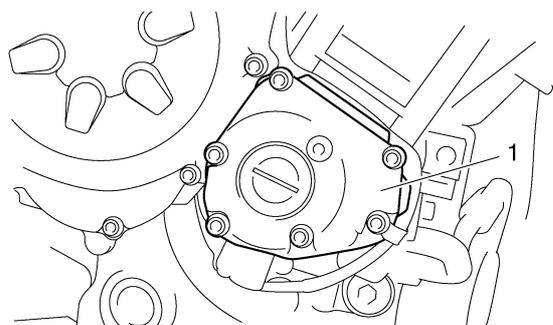
EAS20470  
**ENGINE**

EAS20490  
**ADJUSTING THE VALVE CLEARANCE**  
The following procedure applies to all of the valves.

**NOTE:**

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

1. Remove:
  - Rider and passenger seat  
Refer to "GENERAL CHASSIS" on page 4-1.
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
  - Air filter case  
Refer to "GENERAL CHASSIS" on page 4-1.
  - Throttle body assembly  
Refer to "THROTTLE BODIES" on page 7-4.
  - Air cut-off valve  
Refer to "AIR INDUCTION SYSTEM" on page 7-12.
  - Radiator
  - Radiator fan motor  
Refer to "RADIATOR" on page 6-1.
2. Remove:
  - Ignition coils
  - Spark plugs
  - Cylinder head cover
  - Cylinder head cover gasket  
Refer to "CAMSHAFTS" on page 5-9.
3. Remove:
  - Pickup rotor cover "1"



4. Measure:

- Valve clearance  
Out of specification → Adjust.



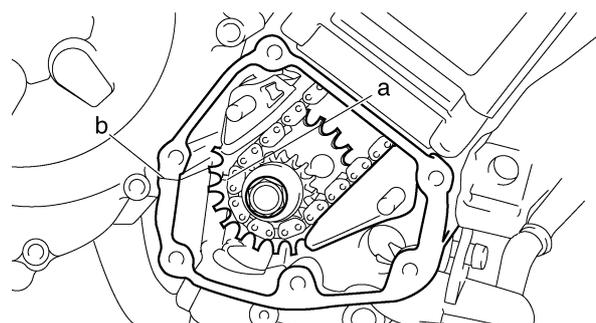
**Valve clearance (cold)**  
**Intake valve**  
 0.11–0.20 mm (0.0043–0.0079 in)  
**Exhaust valve**  
 0.21–0.25 mm (0.0083–0.0098 in)



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

**NOTE:**

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

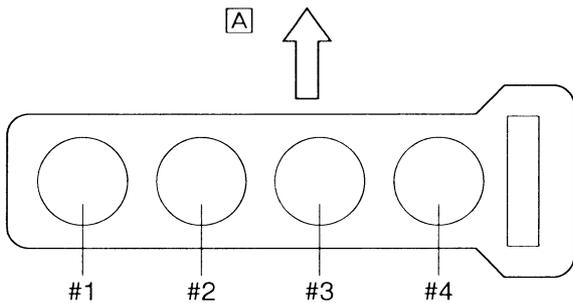
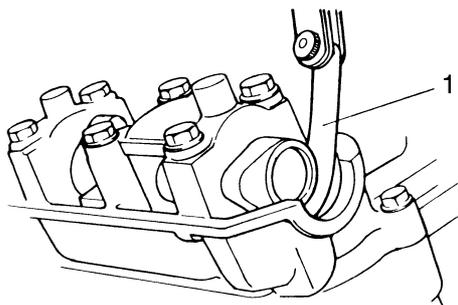


- c. Measure the valve clearance with a thickness gauge "1".

**NOTE:**

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

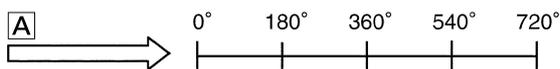
**Valve clearance measuring sequence**  
 Cylinder #1 → #2 → #4 → #3



A. Front

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

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



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

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



5. Remove:
- Camshaft

**NOTE:**

- Refer to "CAMSHAFTS" on page 5-9.
- 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

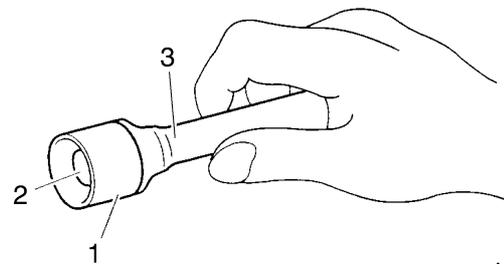


- a. Remove the valve lifter "1" and the valve pad "2" with a valve lapper "3".

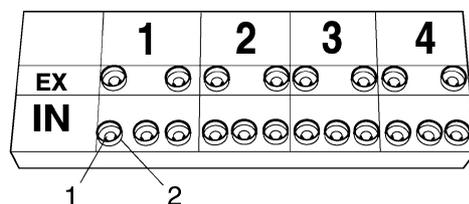
	<b>Valve lapper</b> <b>90890-04101</b>
	<b>Valve lapping tool</b> <b>YM-A8998</b>

**NOTE:**

- 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.



11171102



11172202

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

Example:

Specified valve clearance = 0.11–0.20 mm (0.004–0.008 in)

Measure valve clearance = 0.25 mm (0.010 in)

0.25 mm (0.010 in)–0.20 mm (0.008 in) = 0.05 mm (0.002 in)

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

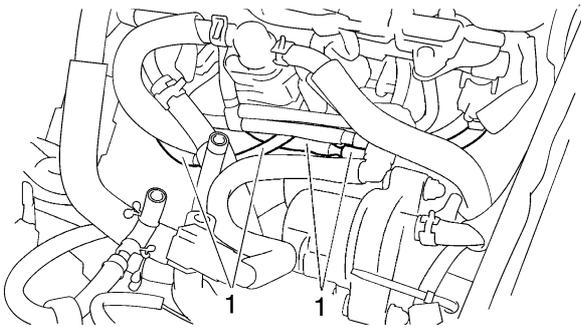
**NOTE:**

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



2. Remove:
  - Rider and passenger seat  
Refer to "GENERAL CHASSIS" on page 4-1.
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.

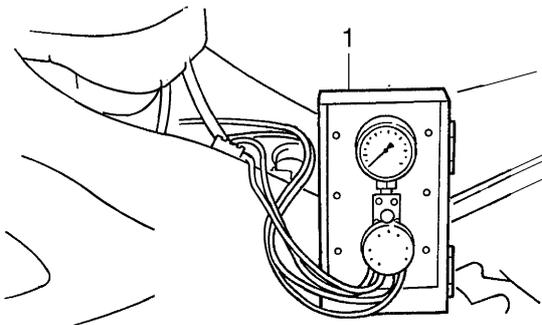
3. Remove:
  - Synchronizing hoses "1"



4. Install:
  - Vacuum gauge "1"  
(onto the synchronizing hose)
  - Digital tachometer  
(near the spark plug)



**Vacuum gauge**  
**90890-03094**  
**Carburetor synchronizer**  
**YU-44456**



5. Install:
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
6. Start the engine and let it warm up for several minutes.
7. Check:
  - Engine idling speed  
Out of specification → Adjust.  
Refer to "ADJUSTING THE ENGINE IDLING SPEED" on page 3-9.



**Engine idling speed**  
**1100–1300 r/min**

8. Adjust:
  - Throttle body synchronization



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

**NOTE:**

- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If the air screw is removed, turn the screw 3/4 turn in and be sure to synchronize the throttle body.

ECA5D01027

**CAUTION:**

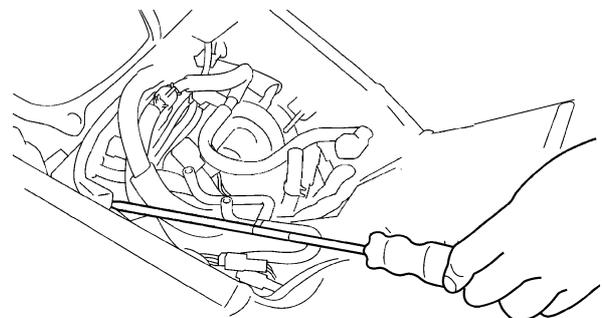
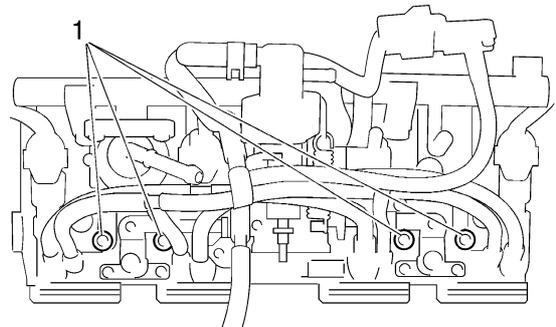
**Do not use the throttle valve adjusting screws to adjust the throttle body synchronization.**



**Vacuum pressure at engine idling speed**  
**30 kPa (225 mmHg, 8.9 inHg)**

**NOTE:**

The difference in vacuum pressure between two throttle bodies should not exceed 1.33 kPa (10 mmHg, 0.39 inHg).



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



**Throttle cable free play (at the flange of the throttle grip)**  
3.0–5.0 mm (0.12–0.20 in)

12. Install:
  - Synchronizing hoses
  - Fuel tank  
Refer to “FUEL TANK” on page 7-1.
  - Rider and passenger seat  
Refer to “GENERAL CHASSIS” on page 4-1.

EAS20600

## ADJUSTING THE EXHAUST GAS VOLUME

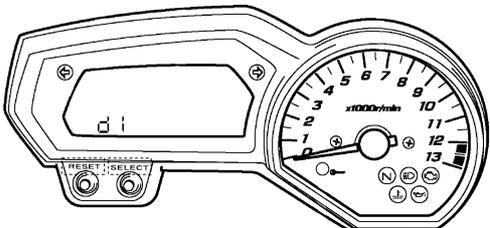
### NOTE:

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

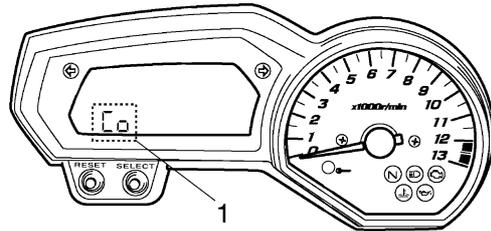
1. Turn the main switch to “OFF” and set the engine stop switch to “ON”.
2. Simultaneously press and hold the “SELECT” and “RESET” buttons, turn the main switch to “ON”, and continue to press the buttons for 8 seconds or more.

### NOTE:

“dl” appears on the clock LCD.



3. Press the “SELECT” button to select the CO adjustment mode “Co” “1” or the diagnostic mode “dl”.

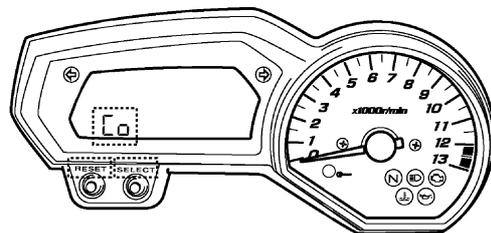


4. After selecting “Co”, simultaneously press the “SELECT” and “RESET” buttons for 2 seconds or more to execute the selection.

### NOTE:

The selected cylinder number appears on the clock LCD.

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



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

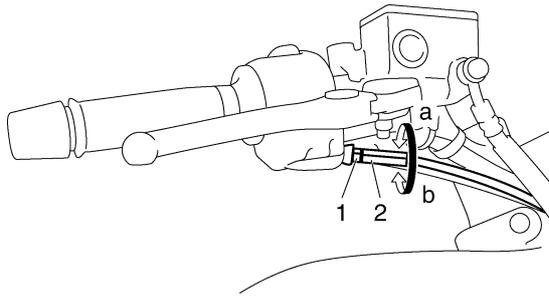
### NOTE:

The CO adjustment volume appears on the tripmeter LCD.

- To decrease the CO adjustment volume, press the “RESET” button.
- To increase the CO adjustment volume, press the “SELECT” button.

7. Release the switch to execute the selection.





c. Tighten the locknut.

EWA5D01003

**WARNING**

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



EAS20680

**CHECKING THE SPARK PLUGS**

The following procedure applies to all of the spark plugs.

1. Remove:
  - Radiator upper bolts
  - Radiator lower bolt
 Refer to "RADIATOR" on page 6-1.
2. Remove:
  - Ignition coils
  - Spark plugs

ECA13320

**CAUTION:**

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

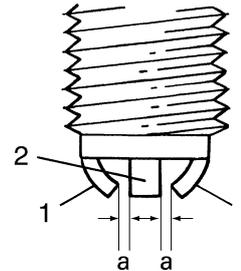
3. Check:
  - Spark plug type
 Incorrect → Change.

	<p><b>Spark plug type (manufacturer)</b> <b>CR9EK (NGK)</b></p>
--	---

4. Check:
  - Electrode "1"  
Damage/wear → Replace the spark plug.
  - Insulator "2"  
Abnormal color → Replace the spark plug.  
Normal color is medium-to-light tan.
5. Clean:
  - Spark plug

- (with a spark plug cleaner or wire brush)
6. Measure:
    - Spark plug gap "a"  
(with a wire thickness gauge)
 Out of specification → Regap.

	<p><b>Spark plug gap</b> <b>0.6–0.7 mm (0.0236–0.0276 in)</b></p>
--	---



7. Install:
  - Spark plugs
  - Ignition coils

	<p><b>Spark plug</b> <b>13 Nm (1.3 m·kg, 9.4 ft·lb)</b></p>
--	---

**NOTE:**

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

8. Install:
  - Radiator upper bolts
  - Radiator lower bolt
 Refer to "RADIATOR" on page 6-1.

EAS20710

**MEASURING THE COMPRESSION PRESSURE**

The following procedure applies to all of the cylinders.

**NOTE:**

Insufficient compression pressure will result in a loss of performance.

1. Measure:
  - Valve clearance  
Out of specification → Adjust.  
Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-4.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
  - Ignition coils
  - Spark plugs





**Type**  
**SAE10W-30 or SAE10W-40 or**  
**SAE15W-40 or SAE20W-40 or**  
**SAE20W-50**  
**Recommended engine oil grade**  
**API service SG type or higher,**  
**JASO standard MA**

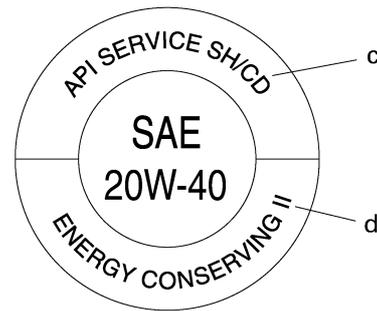
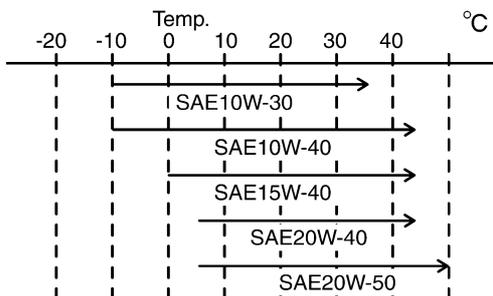
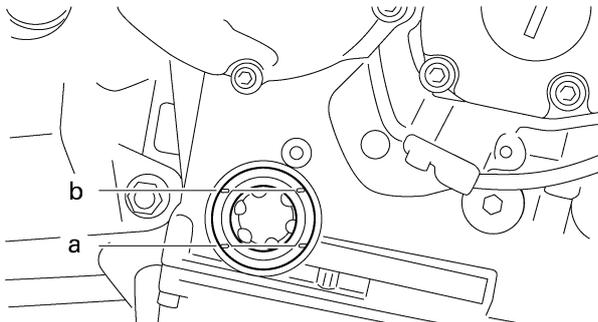
ECA13360

**CAUTION:**

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

**NOTE:**

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



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

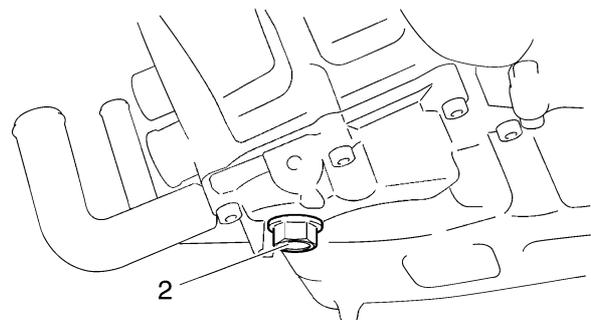
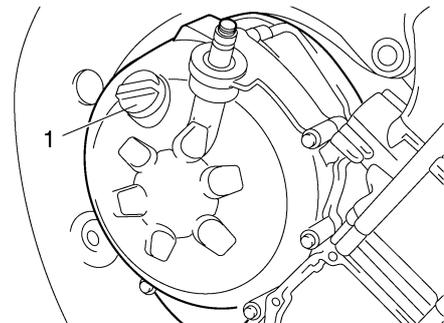
**NOTE:**

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

EAS20790

**CHANGING THE ENGINE OIL**

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



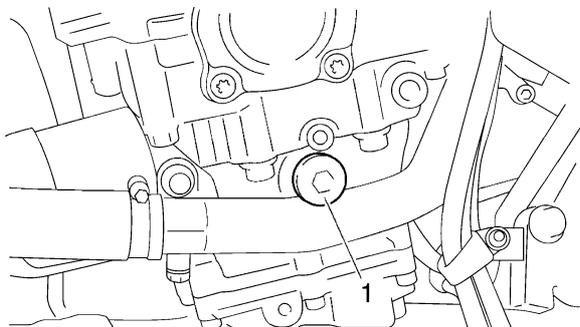
4. Drain:
  - Engine oil (completely from the crankcase)



EWA12980

**WARNING**

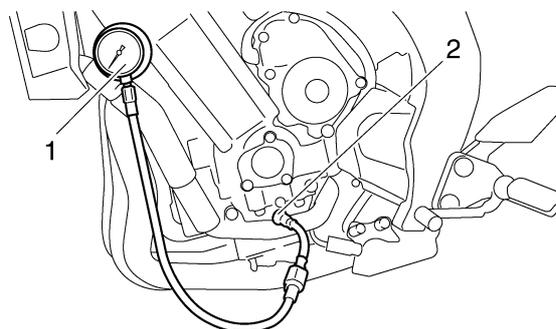
The engine, muffler and engine oil are extremely hot.



4. Install:

- Oil pressure gauge "1"
- Adapter "2"

	<p><b>Pressure gauge</b> 90890-03153 YU-03153</p> <p><b>Oil pressure adapter H</b> 90890-03139</p>
---	--



5. Measure:

- Engine oil pressure (at the following conditions)

	<p><b>Engine oil pressure</b> 230 kPa (2.3 kg/cm<sup>2</sup>, 2.3 bar, 32.71 psi)</p> <p><b>Engine speed</b> Approx. 5,000 r/min</p> <p><b>Engine oil temperature</b> 100 °C (212 °F)</p>
---	---

**NOTE:**

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

only as a reference when measuring the engine oil pressure.

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

6. Install:

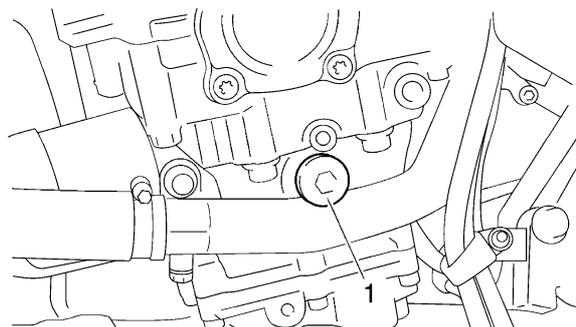
- Oil gallery bolt "1"

	<p><b>Oil gallery bolt</b> 8 Nm (0.8 m·kg, 5.8 ft·lb)</p>
---	---

ECA5D01031

**CAUTION:**

Be careful to tighten too much.



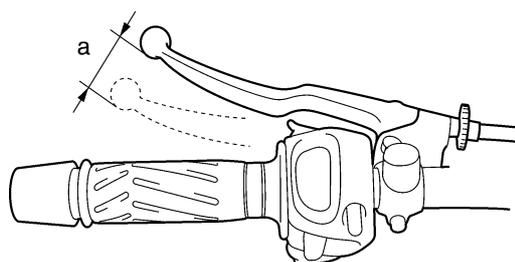
EAS20870

**ADJUSTING THE CLUTCH CABLE FREE PLAY**

1. Check

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

	<p><b>Clutch cable free play (at the end of the clutch lever)</b> 10–15 mm (0.39–0.59 in)</p>
---	---



2. Adjust
  - Clutch cable free play



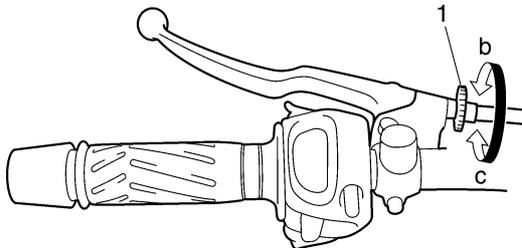
### Handlebar side

- a. Turn the adjusting dial "1" in direction "b" or "c" until the specified clutch cable free play is obtained.

**Direction "b"**  
Clutch cable free play is increased.

**Direction "c"**  
Clutch cable free play is decreased.

**NOTE:** \_\_\_\_\_  
If the specified clutch cable free play cannot be obtained on the handlebar side of the cable, use the adjusting nut on the engine side.



### Engine side

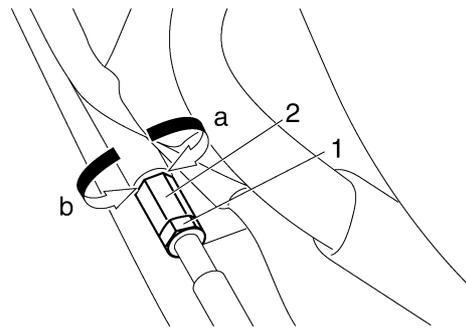
- a. Loosen the locknut "1"
- b. Turn the adjusting nut "2" in direction "a" or "b" until the specified clutch cable free play is obtained.

**Direction "a"**  
Clutch cable free play is increased.

**Direction "b"**  
Clutch cable free play is decreased.

- c. Tighten the locknuts.

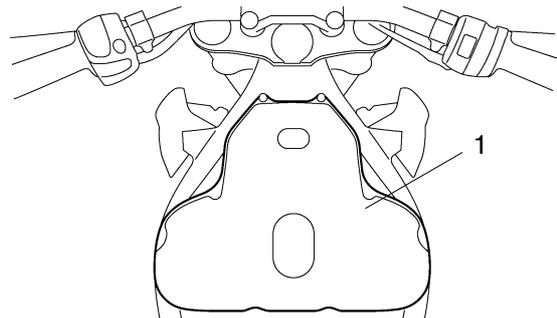
**Locknut**  
7 Nm (0.7 m·kg, 5.1 ft·lb)



EAS20960

### REPLACING THE AIR FILTER ELEMENT

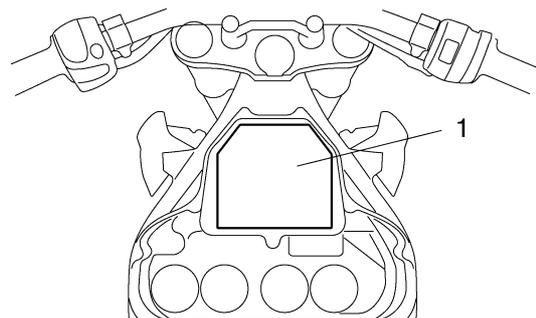
1. Remove:
  - Rider and passenger seat  
Refer to "GENERAL CHASSIS" on page 4-1.
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
2. Remove:
  - Air filter case cover "1"



3. Check:
  - Air filter element "1"  
Damage → Replace.

**NOTE:** \_\_\_\_\_

- Replace the air filter element every 40000 km (2400 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.



4. Install:
  - Air filter case cover

ECA14400

**CAUTION:**

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

**NOTE:**

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

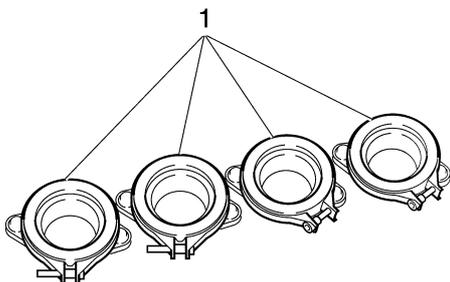
5. Install:
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
  - Rider and passenger seat  
Refer to "GENERAL CHASSIS" on page 4-1.

EAS21010

**CHECKING THE THROTTLE BODY JOINTS**

The following procedure applies to all of the throttle body joints and intake manifolds.

1. Remove:
  - Throttle bodies  
Refer to "THROTTLE BODIES" on page 7-4.
2. Check:
  - Throttle body joints "1"  
Cracks/damage → Replace.



3. Install:
  - Throttle bodies  
Refer to "THROTTLE BODIES" on page 7-4.

EAS21030

**CHECKING THE FUEL LINE**

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

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

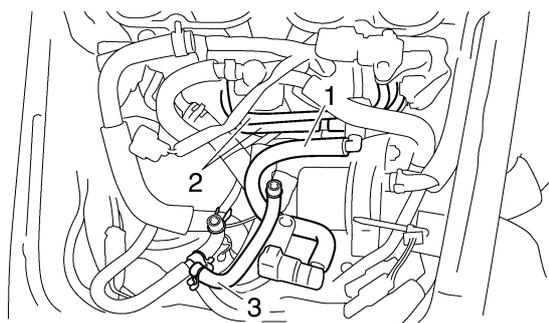
**NOTE:**

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

ECA14940

**CAUTION:**

Make sure the fuel tank breather hose is routed correctly.



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

ECA5D01029

**CAUTION:**

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

EAS21070

**CHECKING THE CRANKCASE BREATHER HOSE**

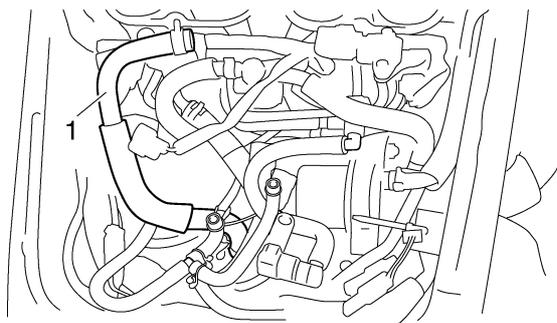
1. Remove:
  - Rider and passenger seat  
Refer to "GENERAL CHASSIS" on page 4-1.
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.

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

ECA13450

**CAUTION:**

**Make sure the crankcase breather hose is routed correctly.**



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

ECA5D01030

**CAUTION:**

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

EAS21080

**CHECKING THE EXHAUST SYSTEM**

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

1. Check:
  - Exhaust pipe "1"
  - Muffler "2"  
Cracks/damage → Replace.
  - Gaskets "3"  
Exhaust gas leaks → Replace.
2. Check:
 

Tightening torque

  - Exhaust pipe nut "4"
  - Exhaust pipe and exhaust pipe bracket bolt "5"
  - Exhaust pipe and muffler bolt "6"
  - Muffler and rear footrest bracket bolt "7"

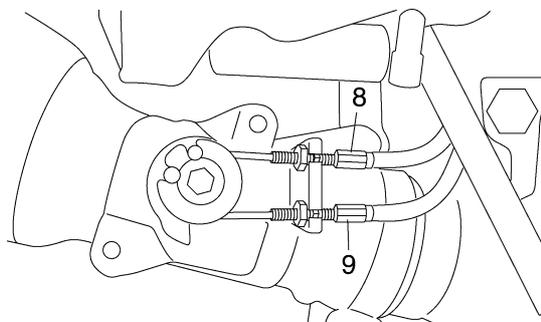
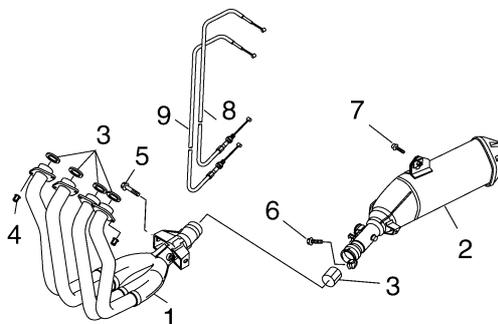


**Exhaust pipe nut**  
20 Nm (2.0 m·kg, 14 ft·lb)  
**Exhaust pipe and exhaust pipe bracket bolt**  
20 Nm (2.0 m·kg, 14 ft·lb)  
**Exhaust pipe and muffler bolt**  
20 Nm (2.0 m·kg, 14 ft·lb)  
**Muffler and rear footrest bracket bolt**  
48 Nm (4.8 m·kg, 35 ft·lb)

**NOTE:**

When installing the EXUP cables, make sure they are parallel and not twisted.

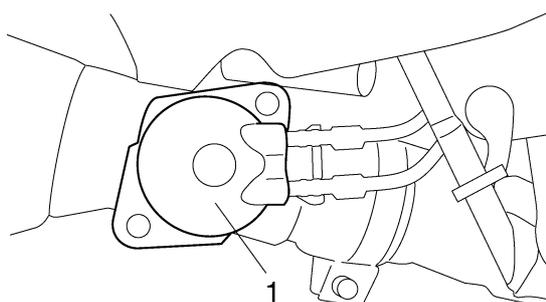
- Upper cable: White metal section "8"
- Lower cable: Black metal section "9"



EAS21100

**ADJUSTING THE EXUP CABLES**

1. Remove:
  - EXUP valve pulley cover "1"





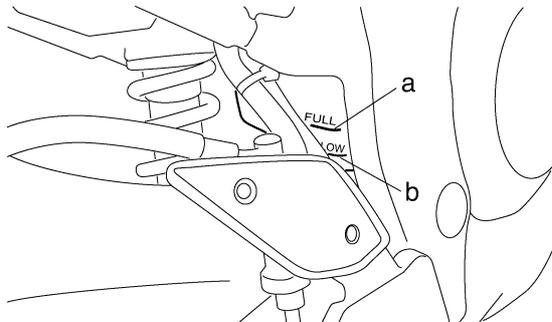
## 2. Check:

- Coolant level  
The coolant level should be between the maximum level mark “a” and minimum level mark “b”.  
Below the minimum level mark → Add the recommended coolant to the proper level.

ECA13470

### CAUTION:

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



3. Start the engine, warm it up for several minutes, and then turn it off.
4. Check:
  - Coolant level

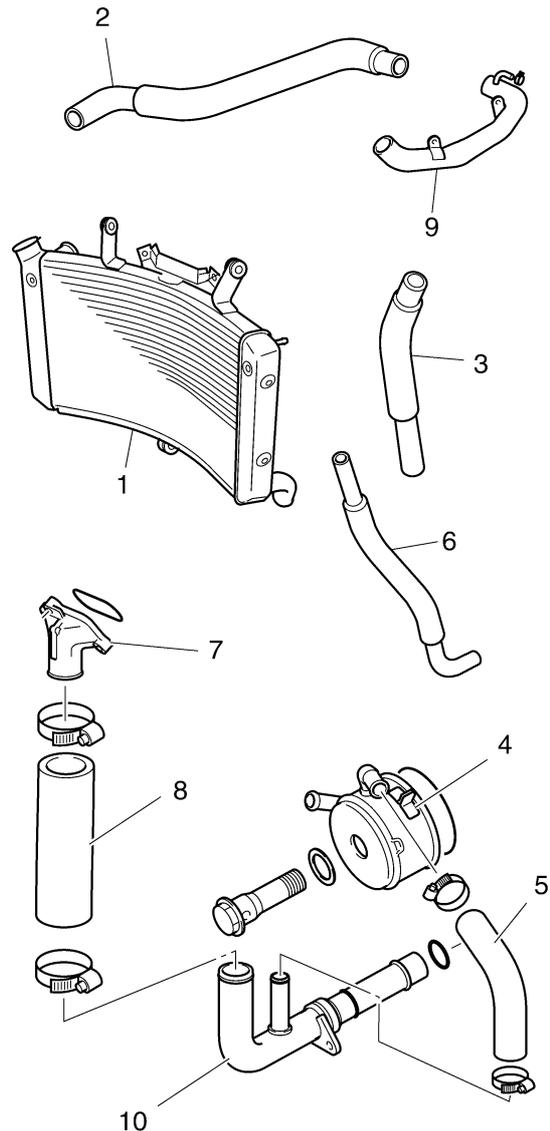
### NOTE:

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

EAS21120

## CHECKING THE COOLING SYSTEM

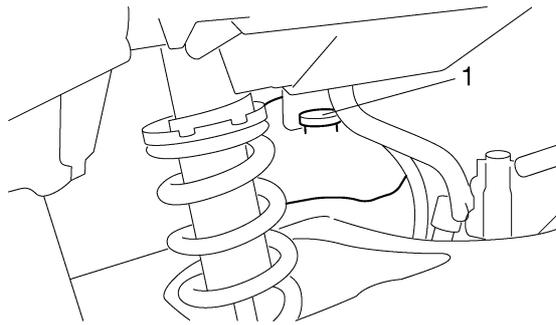
1. Check:
  - Radiator “1”
  - Radiator inlet hose “2”
  - Radiator outlet hose “3”
  - Oil cooler “4”
  - Oil cooler inlet hose “5”
  - Oil cooler outlet hose “6”
  - Water jacket joint “7”
  - Water jacket joint inlet hose “8”
  - Water pump inlet pipe “9”
  - Water pump outlet pipe “10”
 Cracks/damage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



EAS21130

## CHANGING THE COOLANT

1. Remove:
  - Rider and passenger seat  
Refer to “GENERAL CHASSIS” on page 4-1.
2. Remove:
  - Coolant reservoir tank
  - Coolant reservoir hose
3. Disconnect:
  - Coolant reservoir cap “1”



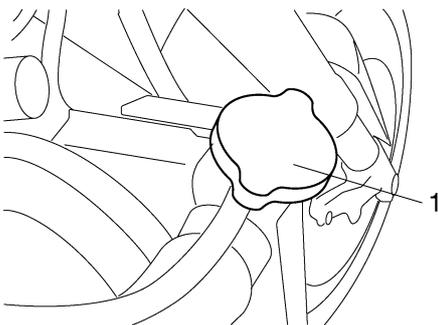
4. Drain:
  - Coolant  
(from the coolant reservoir)
5. Remove:
  - Radiator cap "1"

EWA13030

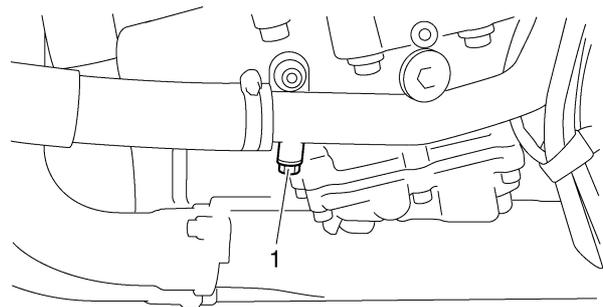
**⚠ WARNING**

**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.**

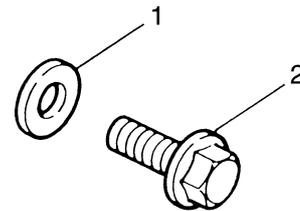
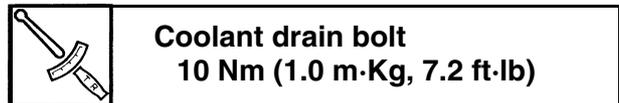
The following procedure applies to all of the coolant drain bolts and copper washers.



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



7. Drain:
  - Coolant  
(from the water pump inlet pipe and outlet pipe)
8. Check:
  - Copper washers "1" **New**
9. Install:
  - Coolant drain bolts "2"



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

	<b>Recommended antifreeze</b>
	High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines
	<b>Mixing ratio</b>
	1:1 (antifreeze: water)
	<b>Quantity</b>
	Total amount 2.25 L (1.98 Imp qt, 2.38 US qt)
Coolant reservoir capacity 0.25 L (0.22 Imp qt, 0.26 US qt)	

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

EWA13040

## **WARNING**

- If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.
- If coolant is swallowed, induce vomiting and get immediate medical attention.

ECA13480

## **CAUTION:**

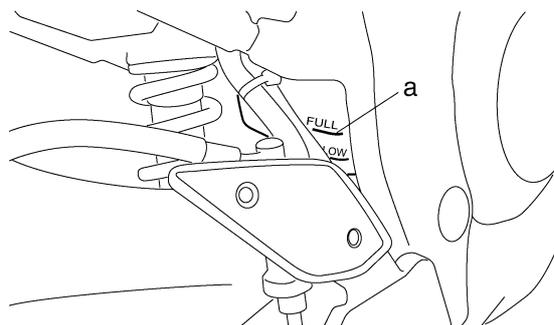
- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- If coolant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

13. Install:

- Radiator cap

14. Fill:

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



15. Install:

- Coolant reservoir cap

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

17. Check:

- Coolant level  
Refer to "CHECKING THE COOLANT LEVEL" on page 3-18.

## **NOTE:**

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

18. Install:

- Rider and passenger seat  
Refer to "GENERAL CHASSIS" on page 4-1.

EAS21140

## CHASSIS

EAS21160

### ADJUSTING THE FRONT DISC BRAKE

1. Adjust:

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

**NOTE:**

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

**Direction “b”**  
Distance “a” is the largest.  
**Direction “c”**  
Distance “a” is the smallest.

EWA13060

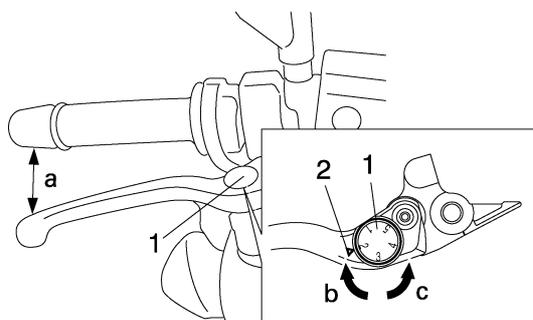
**WARNING**

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

ECA13490

**CAUTION:**

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



EAS21190

### ADJUSTING THE REAR DISC BRAKE

1. Adjust:

- Brake pedal position

- Loosen the locknut “1”.
- 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”.

- Tighten the locknut “1” to specification.



**Locknut**  
18 Nm (1.8 m·kg, 13 ft·lb)

EWA13050

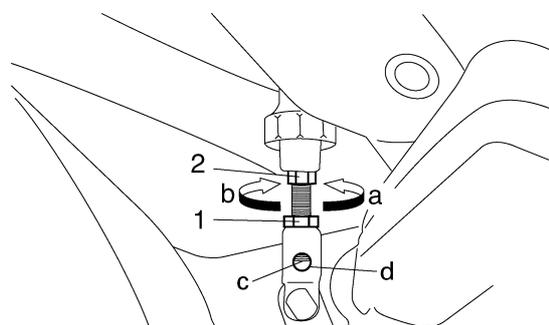
**WARNING**

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

**CAUTION:**

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



2. Adjust:

- Rear brake light switch  
Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-24.

EAS21240

## CHECKING THE BRAKE FLUID LEVEL

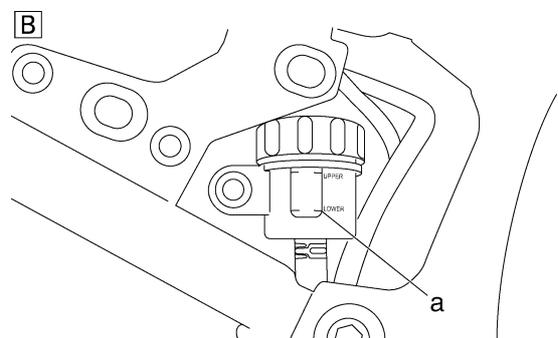
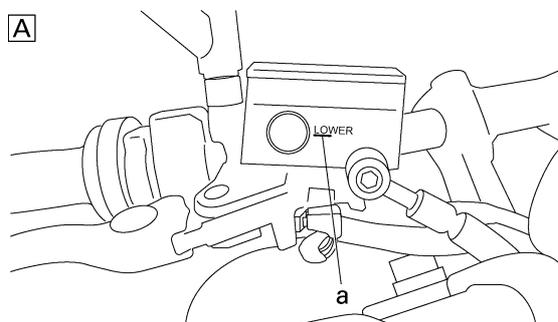
1. Stand the vehicle on a level surface.

### NOTE:

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

2. Check:

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



- A. Front brake  
B. Rear brake

EWA13090

### WARNING

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

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

ECA13540

### CAUTION:

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

### NOTE:

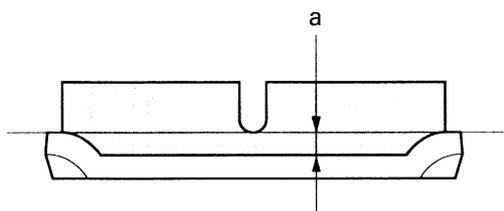
In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

EAS21250

## CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
  - Front brake pad  
Wear indicators "a" almost touch the brake disc → Replace the brake pads as a set.  
Refer to "FRONT BRAKE" on page 4-26.



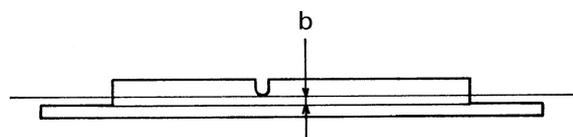
I2220404

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 "b" almost touch the brake disc → Replace the brake pads as a set.  
Refer to "REAR BRAKE" on page 4-38.



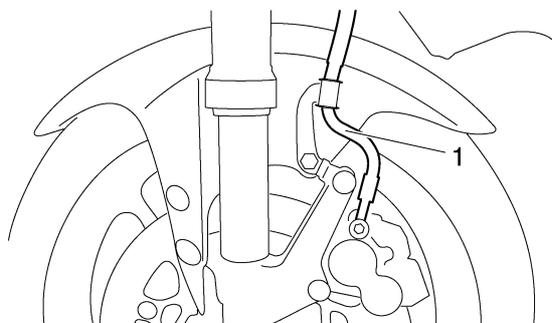
EAS21280

## CHECKING THE FRONT BRAKE HOSES

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

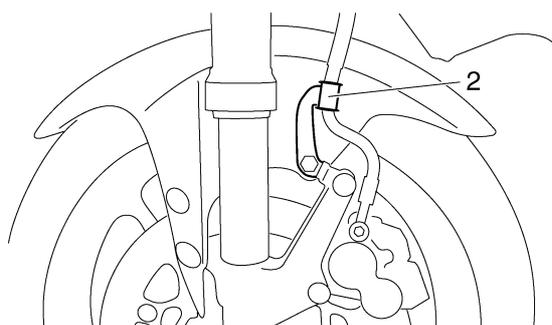
1. Check:

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



2. Check:

- Brake hose clamp "2"  
Loose → Tighten the clamp bolt.



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

4. Check:

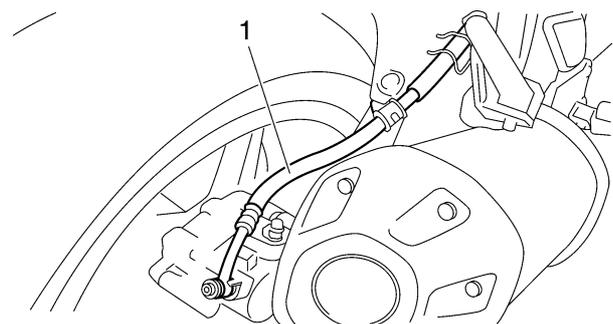
- Brake hose  
Brake fluid leakage → Replace the damaged hose.  
Refer to "FRONT BRAKE" on page 4-26.

EAS21290

## CHECKING THE REAR BRAKE HOSE

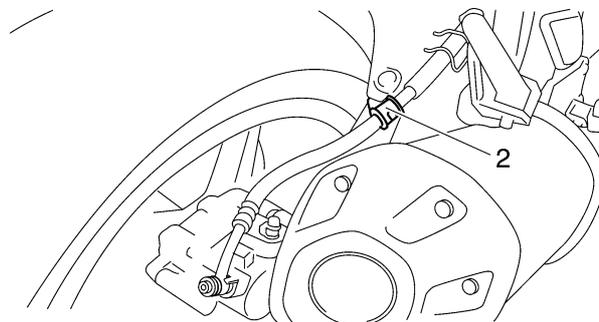
1. Check:

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



2. Check:

- Brake hose clamp "2"  
Loose Connection → Tighten the clamp bolt.



3. Hold the vehicle upright and apply the rear brake several times.

4. Check:

- Brake hose  
Brake fluid leakage → Replace the damaged hose.  
Refer to "REAR BRAKE" on page 4-38.

EAS21330

## ADJUSTING THE REAR BRAKE LIGHT SWITCH

**NOTE:**

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

1. Check:

- Rear brake light operation timing  
Incorrect → Adjust.

2. Adjust:

- Rear brake light operation timing



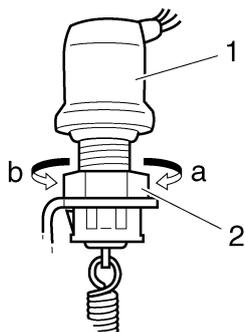
- a. Lifting the brake light switch, hold the main body "1" of the rear brake light switch so that it does not rotate and turn the adjusting nut "2" in direction "a" or "b" until the rear brake light comes on at the proper time.

**Direction "a"**

**Brake light comes on sooner.**

**Direction "b"**

**Brake light comes on later.**



EAS21350

## BLEEDING THE HYDRAULIC BRAKE SYSTEM

EWA13100

### **WARNING**

**Bleed the hydraulic brake system whenever:**

- The system is disassembled.
- A brake hose is loosened, disconnected or replaced.
- The brake fluid level is very low.
- Brake operation is faulty.

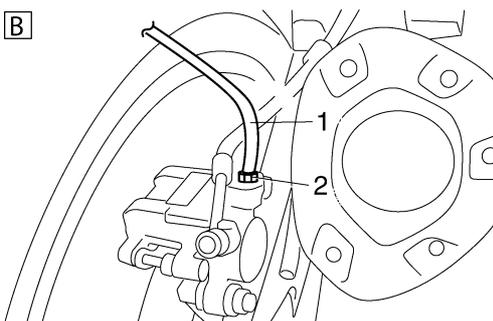
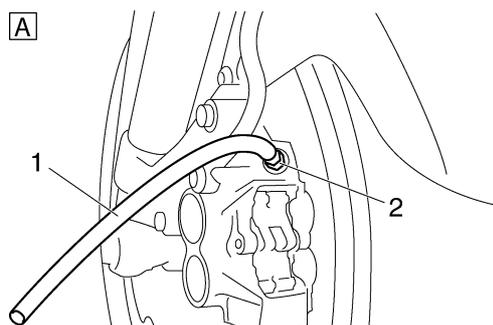
### NOTE:

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

#### 1. Bleed:

- Hydraulic brake system

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



- A. Front brake caliper  
B. Rear brake caliper

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

### NOTE:

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

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



**Bleed screw**  
**5 Nm (0.5 m·kg, 3.6 ft·lb)**

- k. Fill the brake fluid reservoir to the proper level with the recommended brake fluid. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.

EWA13110

**WARNING**

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



**Bleeding the ABS brake**

EWA14010

**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.

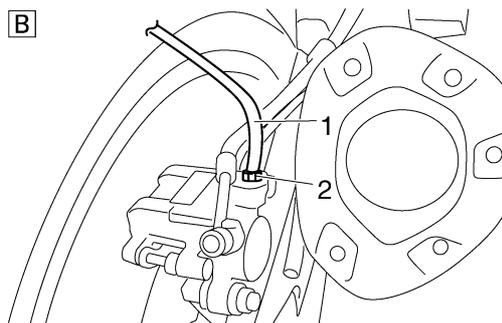
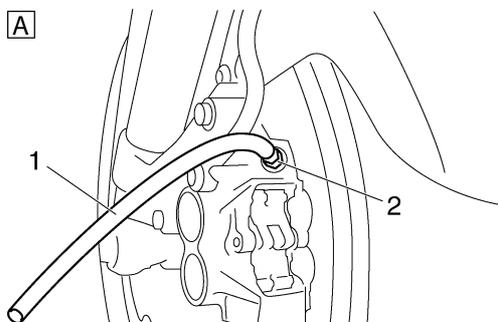
**NOTE:**

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

1. Bleed:
  - ABS



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



- A. Front
- B. Rear

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

**NOTE:**

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 TEST" on page 4-53.

ECA14780

**CAUTION:**

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

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

	<p><b>Brake caliper bleed screw</b>  <b>5 Nm (0.5 m·kg, 3.6 ft·lb)</b></p>
--	--

- m. Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the recommended brake fluid. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.

EWA14020

**WARNING**

After bleeding the ABS, check the brake operation.



EAS5D01015

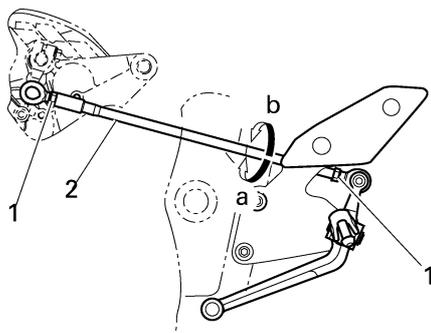
**ADJUSTING THE SHIFT PEDAL**

1. Adjust:
  - Shift pedal position



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

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



- c. Tighten both locknuts.



EAS5D01016

**ADJUSTING THE DRIVE CHAIN SLACK**

**NOTE:**

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

ECA13550

**CAUTION:**

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

1. Stand the vehicle on a level surface.

EWA13120

**WARNING**

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

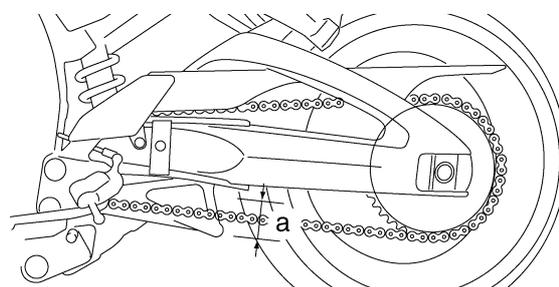
**NOTE:**

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

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



**Drive chain slack**  
25.0–35.0 mm (0.98–1.38 in)



4. Adjust:
  - Drive chain slack

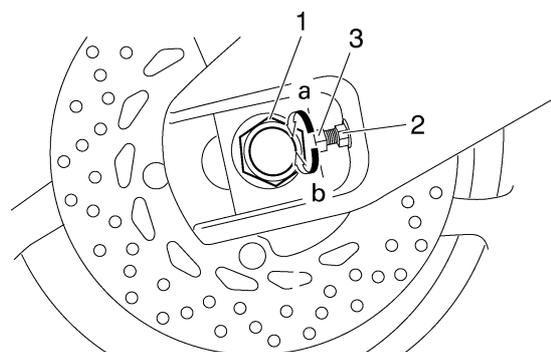


- a. Loosen the wheel axle nut "1"
- b. Loosen both locknuts "2"
- c. Turn both adjusting bolts "3" in direction "a" or "b" until the specified drive chain slack is obtained.

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

**NOTE:**

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



- d. Tighten both locknuts to specification.



**Locknut**  
16 Nm (1.6 m·kg, 12 ft·lb)

e. Tighten the wheel axle nut to specification.



**Wheel axle nut**  
150 Nm (15 m·kg, 108 ft·lb)

EAS5D01017

## LUBRICATING THE DRIVE CHAIN

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

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



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

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.**

### NOTE:

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.

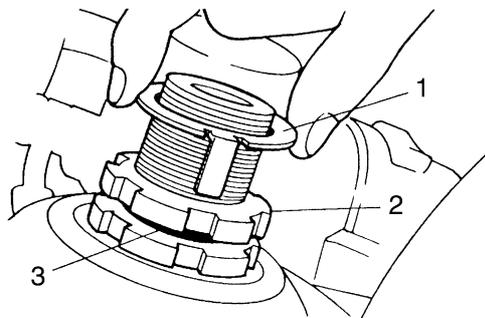
3. Remove:

- Upper bracket

Refer to “STEERING HEAD” on page 4-71.

4. Adjust:
- Steering head

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



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

### NOTE:

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



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



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

- c. Loosen the lower ring nut “4” completely, and then tighten it to specification.

EWA13140

### **WARNING**

**Do not overtighten the lower ring nut.**



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



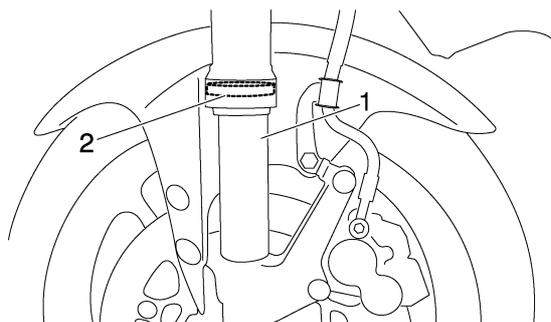
EWA13120

**WARNING**

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

2. Check:

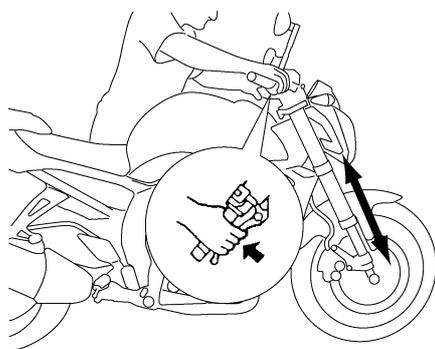
- Inner tube "1"  
Damage/scratches → Replace.
- Oil seal "2"  
Oil leakage → Replace.



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

4. Check:

- Front fork operation  
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.  
Rough movement → Repair.  
Refer to "FRONT FORK" on page 4-62.



EAS21580

**ADJUSTING THE FRONT FORK LEGS**

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

**NOTE:**

Each front fork leg is equipped with a spring preload adjusting bolt, the right front fork leg is equipped with a rebound damping force adjusting screw and left front fork leg with a compression damping force adjusting screw.

EWA13150

**WARNING**

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

**Spring preload**

ECA13570

**CAUTION:**

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

1. Adjust:

- Spring preload



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).



**Spring preload adjusting positions**

Minimum

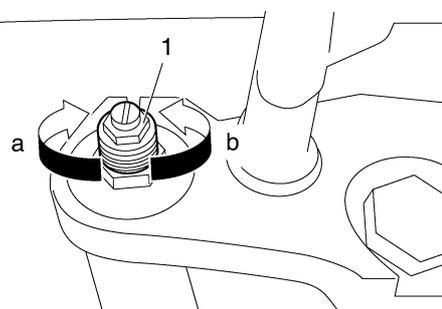
8

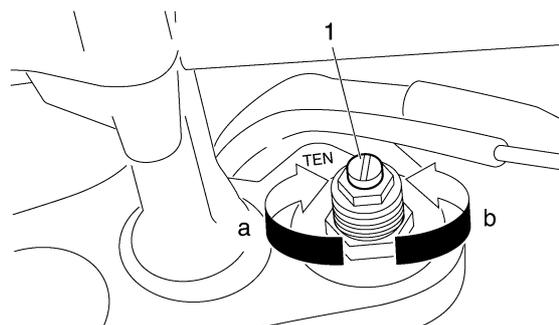
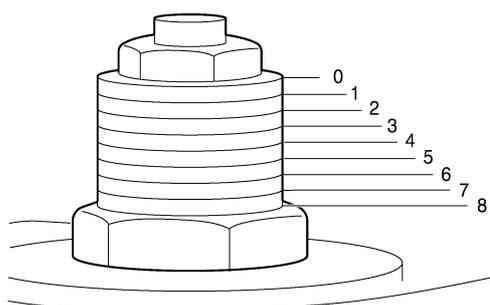
Standard

6

Maximum

0





## Rebound damping (Right side front fork)

ECA5D01014

### CAUTION:

- Never go beyond the maximum or minimum adjustment positions.
- When assembling the front forks, be careful not to assemble them to the opposite position because there are two kinds of forks (for the rebound side and for the compression side).

1. Adjust:
  - Rebound damping

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

Direction "a" (turn in)	Rebound damping is increased (suspension is harder).
Direction "b" (turn out)	Rebound damping is decreased (suspension is softer).

	<b>Rebound damping adjusting positions</b> Minimum 26 clicks in direction: "b"* Standard 15 clicks in direction: "b"* Maximum 1 clicks in direction: "b"* * With the adjusting screw fully turned-in direction "a"
---	---

## Compression damping (Left side front fork)

ECA5D01019

### CAUTION:

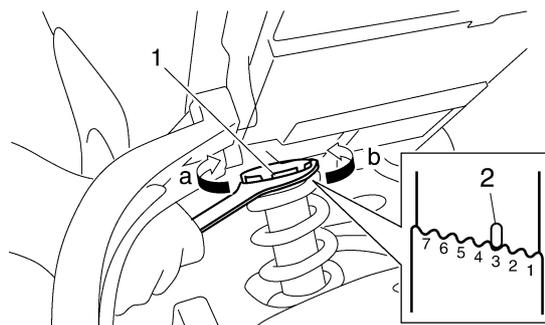
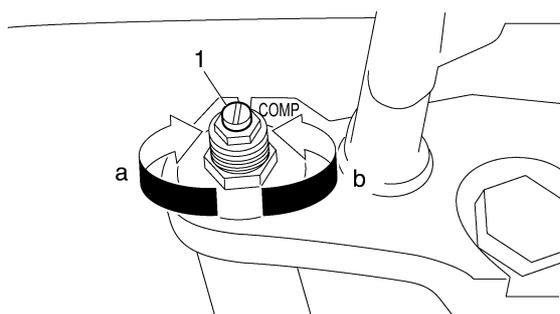
- Never go beyond the maximum or minimum adjustment positions.
- When assembling the front forks, be careful not to assemble them to the opposite position because there are two kinds of forks (for the rebound side and for the compression side).

1. Adjust:
  - Compression damping

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

Direction "a" (turn in)	Compression damping is increased (suspension is harder).
Direction "b" (turn out)	Compression damping is decreased (suspension is softer).

	<b>Compression damping adjusting positions</b> Minimum 26 clicks in direction: "b"* Standard 5 clicks in direction: "b"* Maximum 1 clicks in direction: "b"* * With the adjusting screw fully turned-in direction "a"
---	--



EAS21620

## 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

### **CAUTION:**

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
  - Spring preload

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

#### Direction "a"

Spring preload is increased  
(suspension is harder).

#### Direction "b"

Spring preload is decreased  
(suspension is softer).



#### Spring preload adjusting positions

Minimum

1

Standard

3

Maximum

7

### Rebound damping

ECA13590

### **CAUTION:**

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
  - Rebound damping



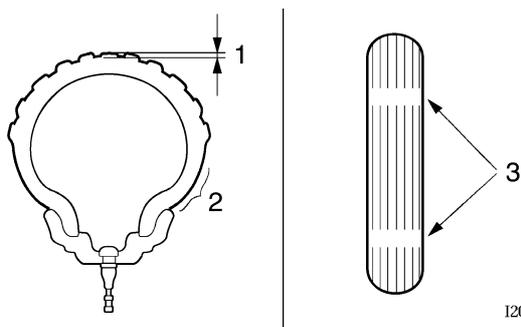
EWA13190

**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.



I2070302

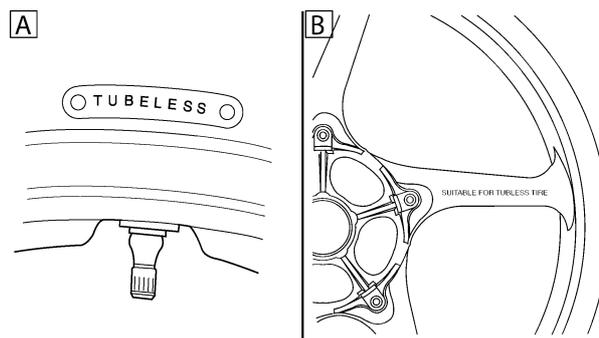
1. Tire tread depth
2. Side wall
3. Wear indicator

 **Minimum tire tread depth**  
1.6 mm (0.06 in)

EWA14080

**WARNING**

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



- A. Tire
- B. Wheel

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

EWA14090

**WARNING**

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

 **Front tire**  
Size  
120/70 ZR17 M/C (58W)  
Manufacturer/model  
DUNLOP/D221FA  
MICHELIN/PILOT ROAD S

 **Rear tire**  
Size  
190/50 ZR17 M/C (73W)  
Manufacturer/model  
DUNLOP/D221G  
MICHELIN/PILOT ROAD D

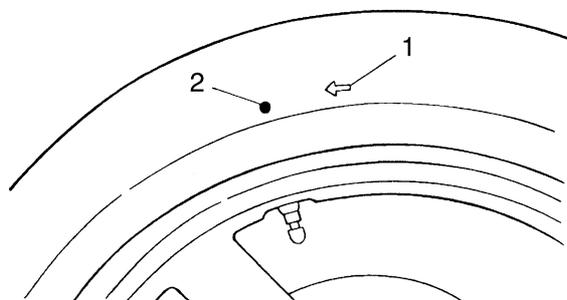
EWA13210

**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.**

**NOTE:**  
For tires with a direction of rotation mark "1":

- Install the tire with the mark pointing in the direction of wheel rotation.
- Align the mark "2" with the valve installation point.



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.**

### NOTE:

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

EAS21690

## CHECKING AND LUBRICATING THE CABLES

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

EWA13270

### **WARNING**

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

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

	<b>Recommended lubricant</b> <b>Engine oil or a suitable cable lubricant</b>
---	---

### NOTE:

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

EAS21700

## LUBRICATING THE LEVERS

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

	<b>Recommended lubricant</b> <b>Lithium - soap - based grease</b>
---	--

EAS21710

## LUBRICATING THE PEDAL

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

	<b>Recommended lubricant</b> <b>Lithium - soap - based grease</b>
---	--

EAS21720

## LUBRICATING THE SIDESTAND

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

	<b>Recommended lubricant</b> <b>Lithium - soap - based grease</b>
---	--

EAS21730

## LUBRICATING THE CENTERSTAND (FZ1-S(X)/FZ1-SA)

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

	<b>Recommended lubricant</b> <b>Lithium - soap - based grease</b>
---	--

EAS21740

## LUBRICATING THE REAR SUSPENSION

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

	<b>Recommended lubricant</b> <b>Molybdenum disulfide grease</b>
---	--

EAS21750

## ELECTRICAL SYSTEM

EAS21760

### CHECKING AND CHARGING THE BATTERY

Refer to "ELECTRICAL COMPONENTS" on page 8-131.

EAS21770

### CHECKING THE FUSES

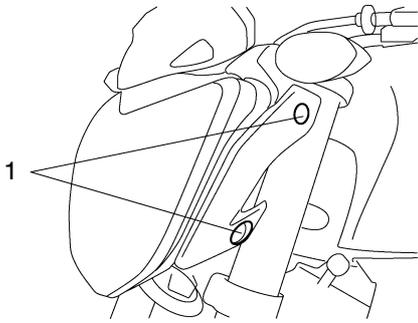
Refer to "ELECTRICAL COMPONENTS" on page 8-131.

EAS21780

### REPLACING THE HEADLIGHT BULBS

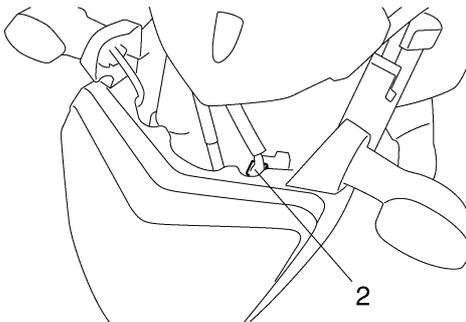
1. Remove:

- Headlight side cover bolts "1" (FZ1-N(X)), (FZ1-NA)



2. Disconnect:

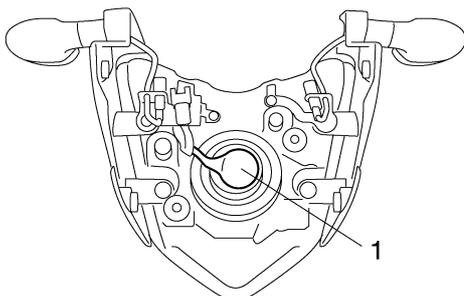
- Headlight sub-wire harness coupler "2" (FZ1-N(X)), (FZ1-NA)



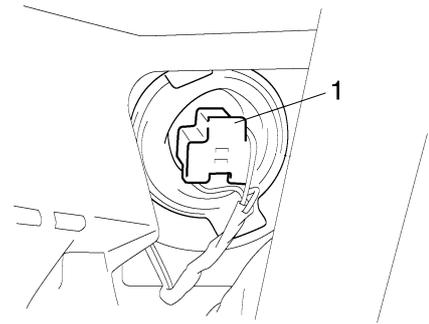
3. Disconnect:

- Headlight coupler "1"

A



B

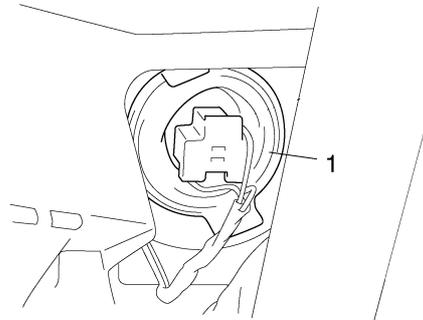


A. FZ1-N(X)/FZ1-NA

B. FZ1-S(X)/FZ1-SA

4. Remove:

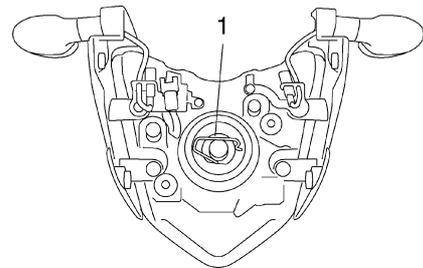
- Headlight bulb cover "1" (FZ1-S(X)/FZ1-SA)



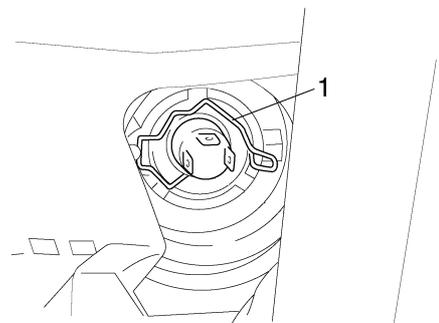
5. Remove:

- Headlight bulb holder "1"

A



B

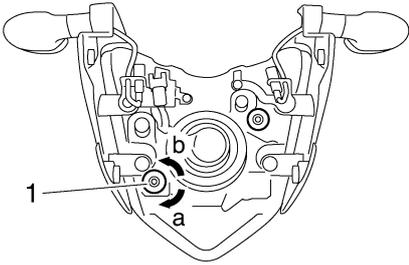


A. FZ1-N(X)/FZ1-NA

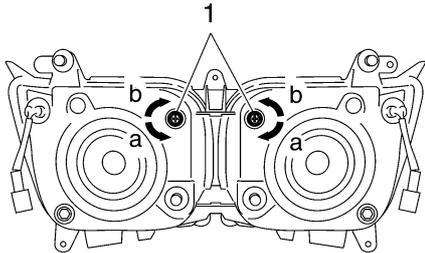
B. FZ1-S(X)/FZ1-SA



A



B



- A. FZ1-N(X)/FZ1-NA
- B. FZ1-S(X)/FZ1-SA





---

# CHASSIS

<b>GENERAL CHASSIS</b> .....	4-1
REMOVING THE COVER.....	4-8
INSTALLING THE COVER .....	4-8
<b>FRONT WHEEL</b> .....	4-9
REMOVING THE FRONT WHEEL .....	4-12
CHECKING THE FRONT WHEEL.....	4-12
[D-3] MAINTENANCE OF THE FRONT WHEEL	
SENSOR AND SENSOR ROTOR .....	4-13
ADJUSTING THE FRONT WHEEL STATIC BALANCE .....	4-14
INSTALLING THE FRONT WHEEL .....	4-15
<b>REAR WHEEL</b> .....	4-17
REMOVING THE REAR WHEEL .....	4-21
CHECKING THE REAR WHEEL.....	4-21
CHECKING THE REAR WHEEL DRIVE HUB .....	4-21
CHECKING AND REPLACING THE REAR WHEEL SPROCKET .....	4-22
[D-4] MAINTENANCE OF THE REAR WHEEL	
SENSOR AND SENSOR ROTOR .....	4-22
ADJUSTING THE REAR WHEEL STATIC BALANCE .....	4-24
INSTALLING THE REAR WHEEL .....	4-24
<b>FRONT BRAKE</b> .....	4-26
INTRODUCTION .....	4-31
CHECKING THE FRONT BRAKE DISCS .....	4-31
REPLACING THE FRONT BRAKE PADS .....	4-32
REMOVING THE FRONT BRAKE CALIPERS.....	4-33
DISASSEMBLING THE FRONT BRAKE CALIPERS .....	4-33
CHECKING THE FRONT BRAKE CALIPERS .....	4-34
ASSEMBLING THE FRONT BRAKE CALIPERS.....	4-34
INSTALLING THE FRONT BRAKE CALIPERS.....	4-34
REMOVING THE FRONT BRAKE MASTER CYLINDER.....	4-35
CHECKING THE FRONT BRAKE MASTER CYLINDER.....	4-36
ASSEMBLING THE FRONT BRAKE MASTER CYLINDER.....	4-36
INSTALLING THE FRONT BRAKE MASTER CYLINDER .....	4-36
<b>REAR BRAKE</b> .....	4-38
INTRODUCTION .....	4-44
CHECKING THE REAR BRAKE DISC.....	4-44
REPLACING THE REAR BRAKE PADS .....	4-44
REMOVING THE REAR BRAKE CALIPER.....	4-45
DISASSEMBLING THE REAR BRAKE CALIPER.....	4-45
CHECKING THE REAR BRAKE CALIPER .....	4-46
ASSEMBLING THE REAR BRAKE CALIPER.....	4-46
INSTALLING THE REAR BRAKE CALIPER.....	4-47
REMOVING THE REAR BRAKE MASTER CYLINDER .....	4-48
CHECKING THE REAR BRAKE MASTER CYLINDER .....	4-48
ASSEMBLING THE REAR BRAKE MASTER CYLINDER.....	4-48

---

INSTALLING THE REAR BRAKE MASTER CYLINDER.....	4-48
<b>ABS (ANTI-LOCK BRAKE SYSTEM).....</b>	<b>4-50</b>
[D-5] MAINTENANCE OF THE HYDRAULIC UNIT.....	4-52
HYDRAULIC UNIT OPERATION TEST.....	4-53
[D-6-5] TRIAL RUN.....	4-57
<b>HANDLEBAR.....</b>	<b>4-58</b>
REMOVING THE HANDLEBAR.....	4-59
CHECKING THE HANDLEBAR.....	4-59
INSTALLING THE HANDLEBAR.....	4-59
<b>FRONT FORK.....</b>	<b>4-62</b>
REMOVING THE FRONT FORK LEGS.....	4-64
DISASSEMBLING THE FRONT FORK LEGS.....	4-64
CHECKING THE FRONT FORK LEGS.....	4-65
ASSEMBLING THE FRONT FORK LEGS.....	4-66
INSTALLING THE FRONT FORK LEGS.....	4-69
<b>STEERING HEAD.....</b>	<b>4-71</b>
REMOVING THE LOWER BRACKET.....	4-73
CHECKING THE STEERING HEAD.....	4-73
INSTALLING THE STEERING HEAD.....	4-74
<b>REAR SHOCK ABSORBER ASSEMBLY.....</b>	<b>4-75</b>
HANDLING THE REAR SHOCK ABSORBER.....	4-76
DISPOSING OF A REAR SHOCK ABSORBER.....	4-76
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY.....	4-76
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY.....	4-76
CHECKING THE CONNECTING ARM AND RELAY ARM.....	4-77
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY.....	4-77
<b>SWINGARM.....</b>	<b>4-78</b>
REMOVING THE SWINGARM.....	4-79
CHECKING THE SWINGARM.....	4-79
INSTALLING THE SWINGARM.....	4-80
<b>CHAIN DRIVE.....</b>	<b>4-81</b>
REMOVING THE DRIVE CHAIN.....	4-82
CHECKING THE DRIVE CHAIN.....	4-82
CHECKING THE DRIVE SPROCKET.....	4-83
CHECKING THE REAR WHEEL SPROCKET.....	4-83
CHECKING THE REAR WHEEL DRIVE HUB.....	4-83
INSTALLING THE DRIVE CHAIN.....	4-83

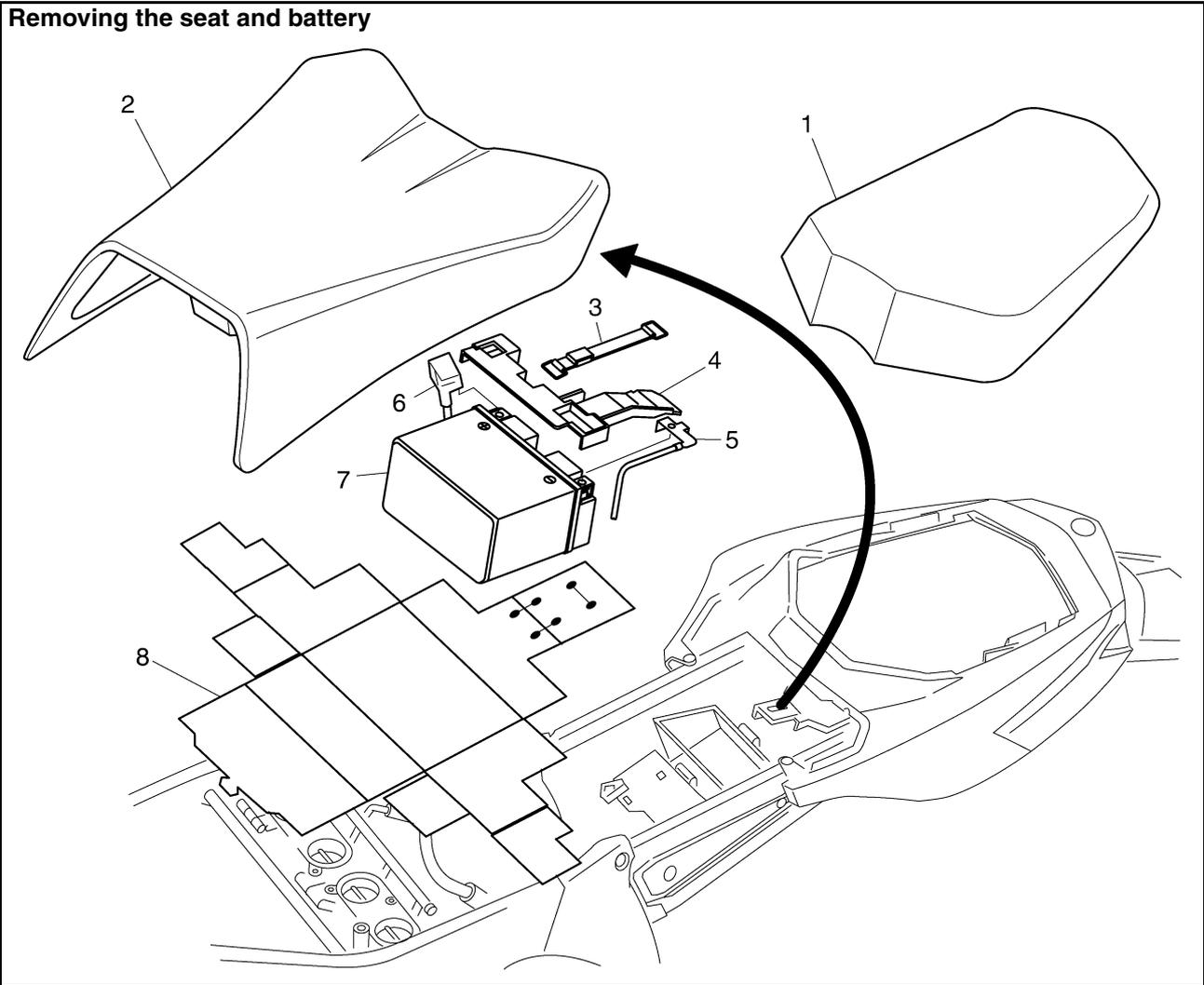
---

# GENERAL CHASSIS

EAS21830

## GENERAL CHASSIS

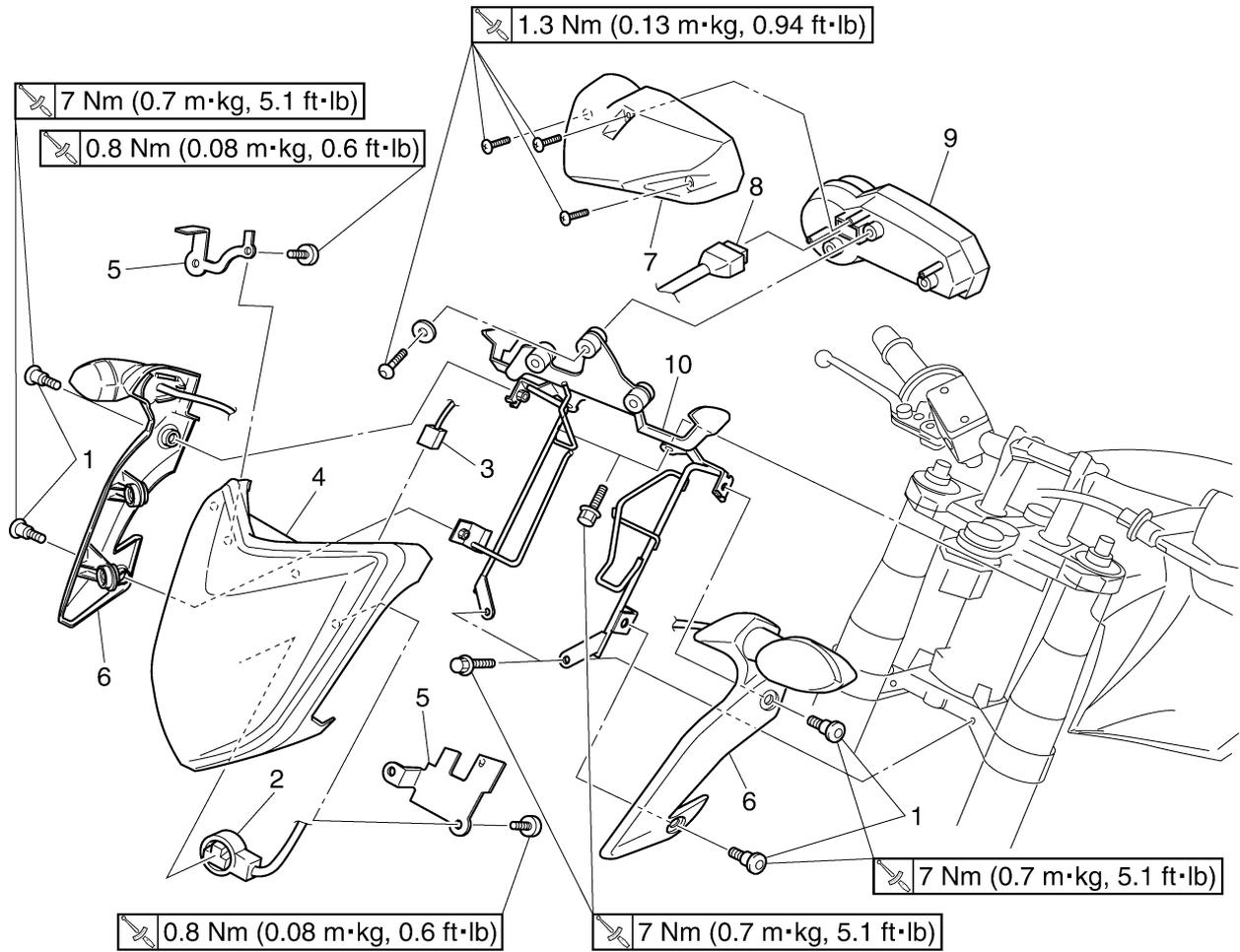
### Removing the seat and battery



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

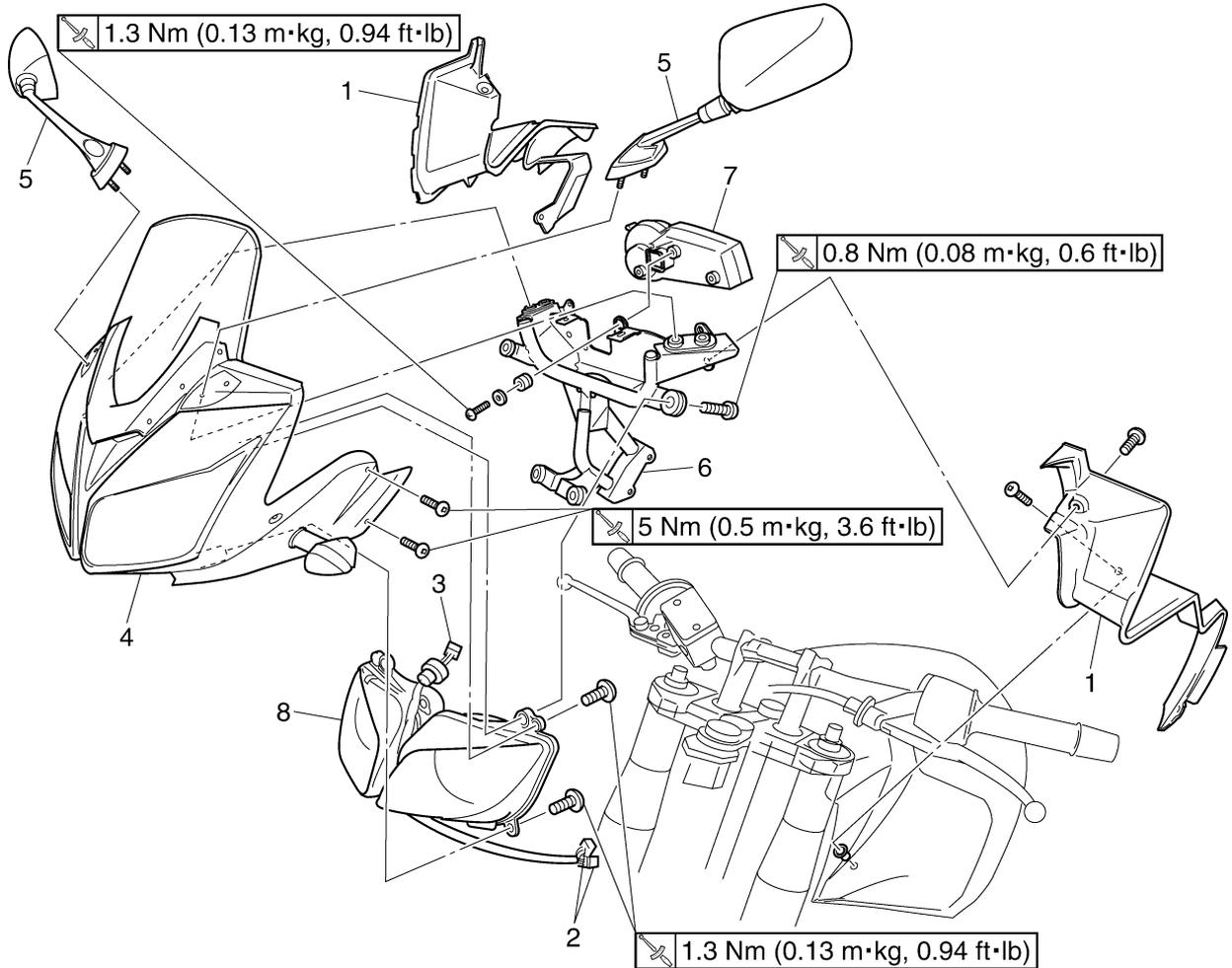
# GENERAL CHASSIS

## Removing the headlight and meter assembly (FZ1-N(X)), (FZ1-NA)



Order	Job/Parts to remove	Q'ty	Remarks
1	Headlight side cover bolt (left and right)	4	
2	Headlight coupler	1	Disconnect.
3	Headlight sub-wire harness coupler	1	Disconnect.
4	Headlight assembly	1	
5	Headlight bracket	2	
6	Headlight side cover (left and right)	2	
7	Meter cover	1	
8	Meter coupler	1	
9	Meter assembly	1	
10	Headlight and meter stay	1	
			For installation, reverse the removal procedure.

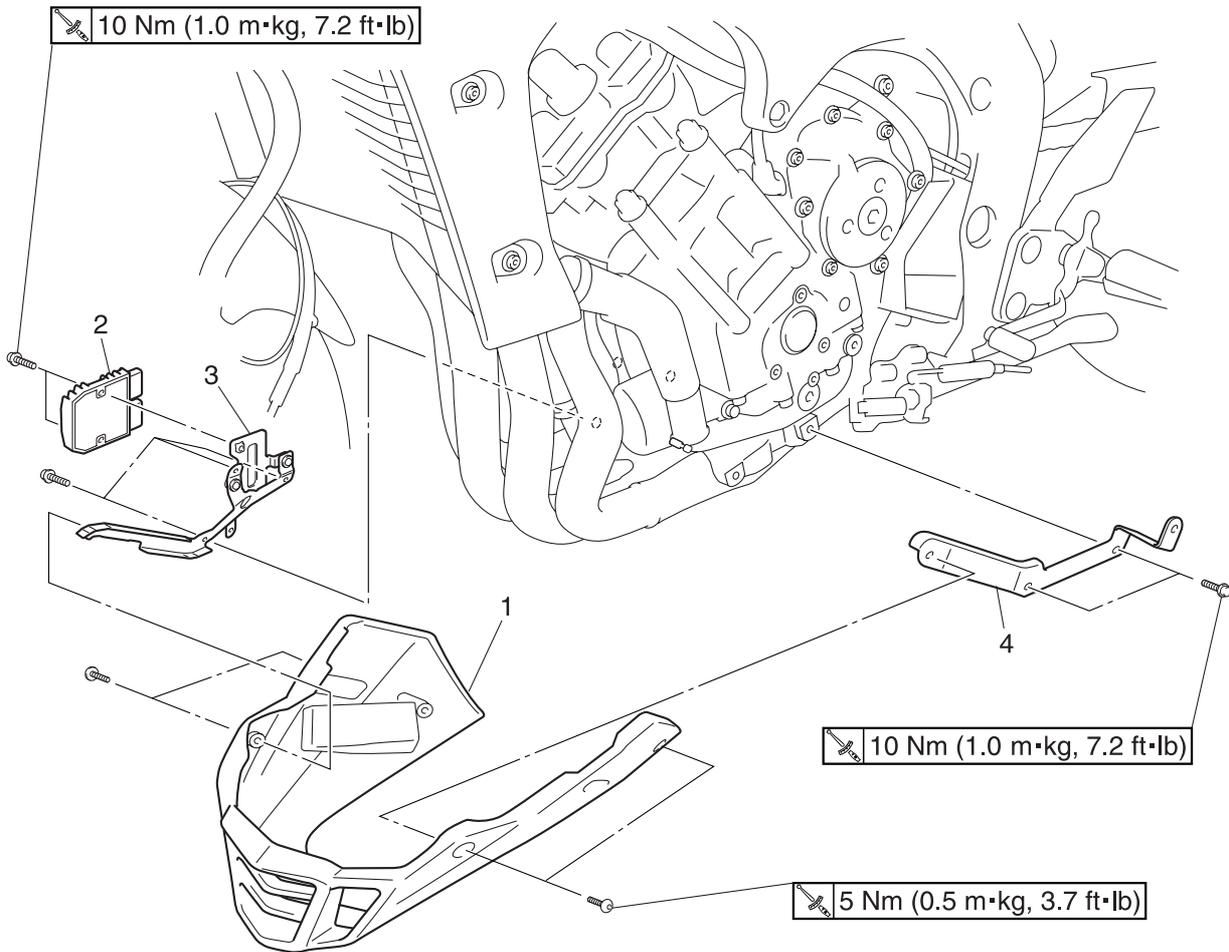
## Removing the front cowling (FZ1-S(X)/FZ1-SA)



Order	Job/Parts to remove	Q'ty	Remarks
1	Inner panel	2	
2	Headlight assembly coupler	1	Disconnect.
3	Meter coupler	1	Disconnect.
4	Front cowling assembly	1	
5	Rear view mirror	2	
6	Cowling stay	1	
7	Meter assembly	1	
8	Headlight unit	1	
			For installation, reverse the removal procedure.

# GENERAL CHASSIS

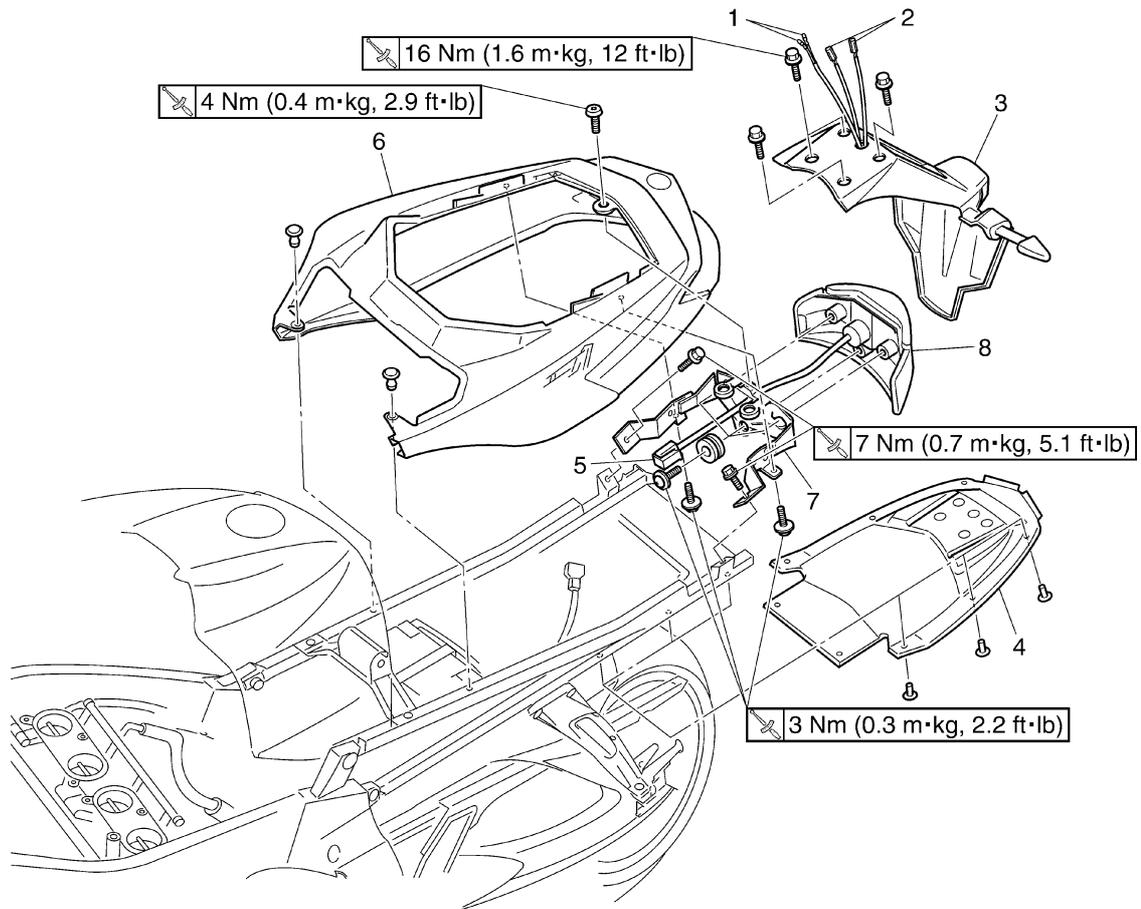
## Removing the under cowling (FZ1-NA)



Order	Job/Parts to remove	Q'ty	Remarks
1	Under cowling	1	
2	Rectifier/regulator	1	
3	Right under cowling bracket	1	
4	Left under cowling bracket	1	
			For installation, reverse the removal procedure.

# GENERAL CHASSIS

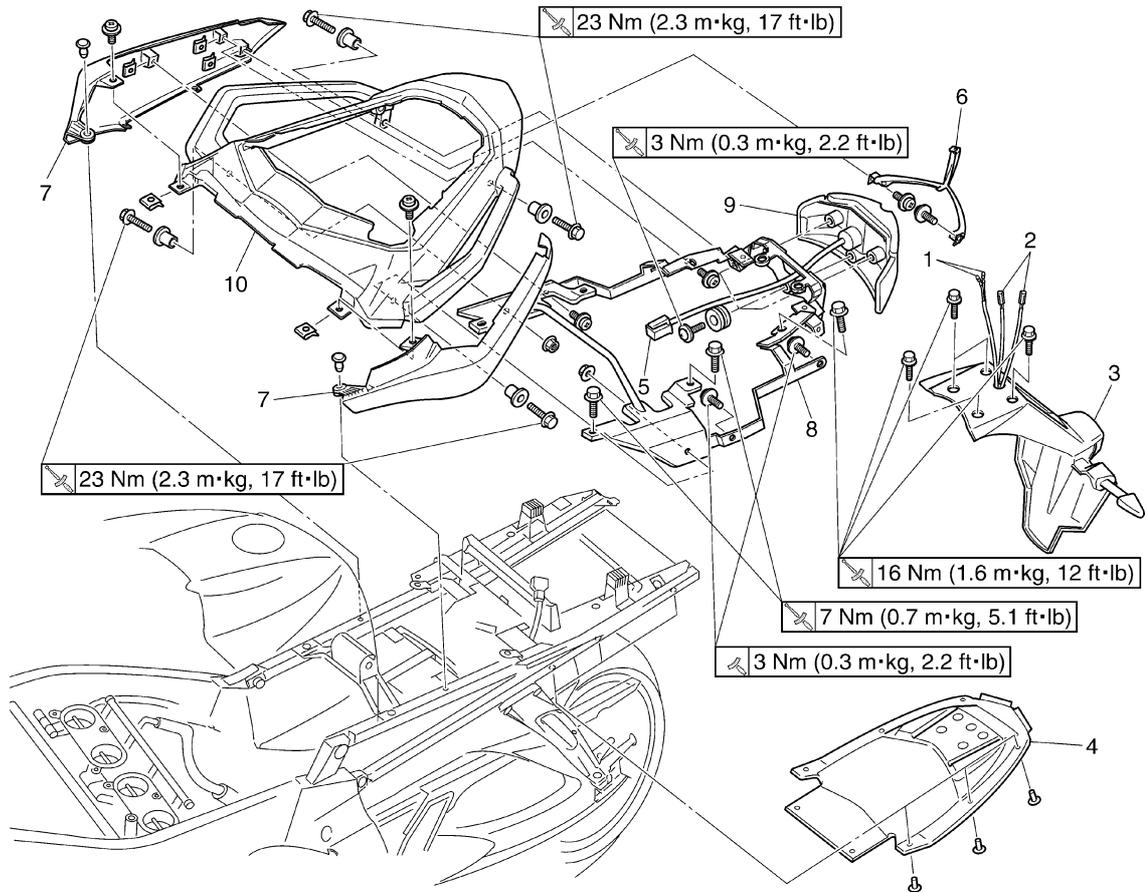
## Removing the rear fender (FZ1-N(X)), (FZ1-NA)



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Licence plate light lead coupler	1	Disconnect.
2	Turn signal light lead coupler	1	Disconnect.
3	Mud guard assembly	1	
4	Rear fender	1	
5	Tail/brake light lead coupler	1	Disconnect.
6	Tail cover	1	
7	Rear fender bracket	1	
8	Tail/brake light	1	
			For installation, reverse the removal procedure.

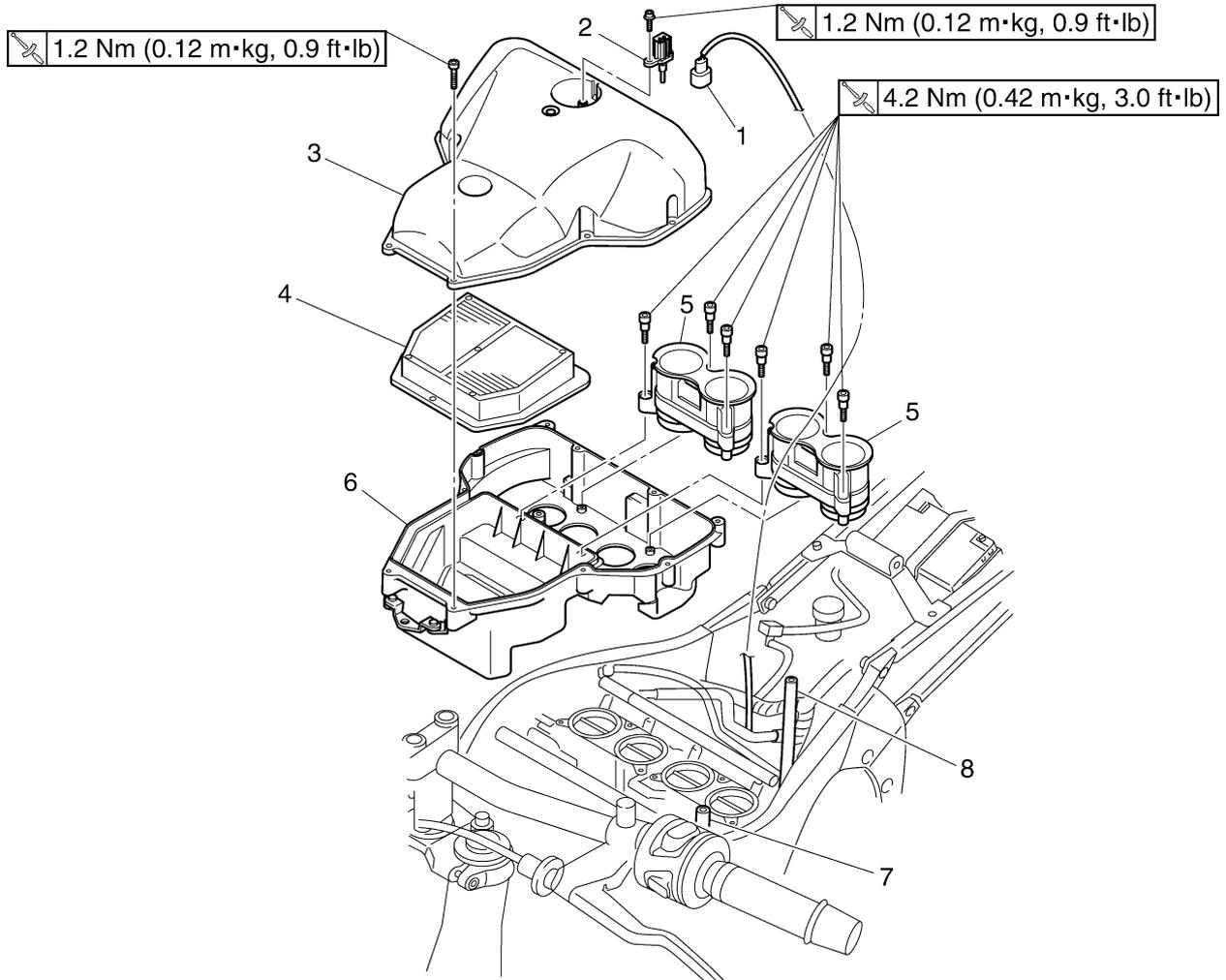
# GENERAL CHASSIS

## Removing the rear fender (FZ1-S(X)/FZ1-SA)



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Licence plate light lead coupler	1	Disconnect.
2	Turn signal light lead coupler	1	Disconnect.
3	Mud guard assembly	1	
4	Rear fender	1	
5	Tail/brake light lead coupler	1	Disconnect.
6	Tail/brake light cover	1	
7	Rear fender side cover (left and right)	2	
8	Rear fender bracket	1	
9	Tail/brake light	1	
10	Tail cover	1	
			For installation, reverse the removal procedure.

## Removing the air filter case



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Intake air temperature sensor lead coupler	1	Disconnect.
2	Intake air temperature sensor	1	
3	Air filter case cover	1	
4	Air filter	1	
5	Funnel	2	
6	Air filter case	1	
7	Air induction system hose	1	
8	Crankcase breather hose	1	
			For installation, reverse the removal procedure.

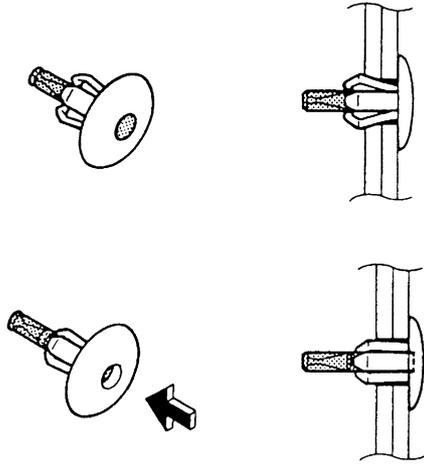
EAS21840

## REMOVING THE COVER

1. Remove:
  - Tail cover
  - Rear fender

### NOTE:

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



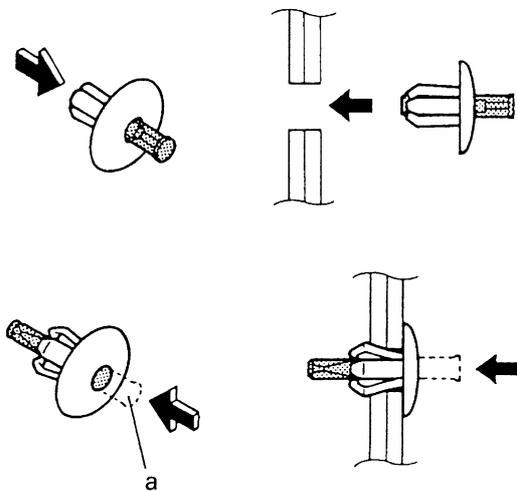
EAS21850

## INSTALLING THE COVER

1. Install:
  - Rear fender
  - Tail cover

### NOTE:

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

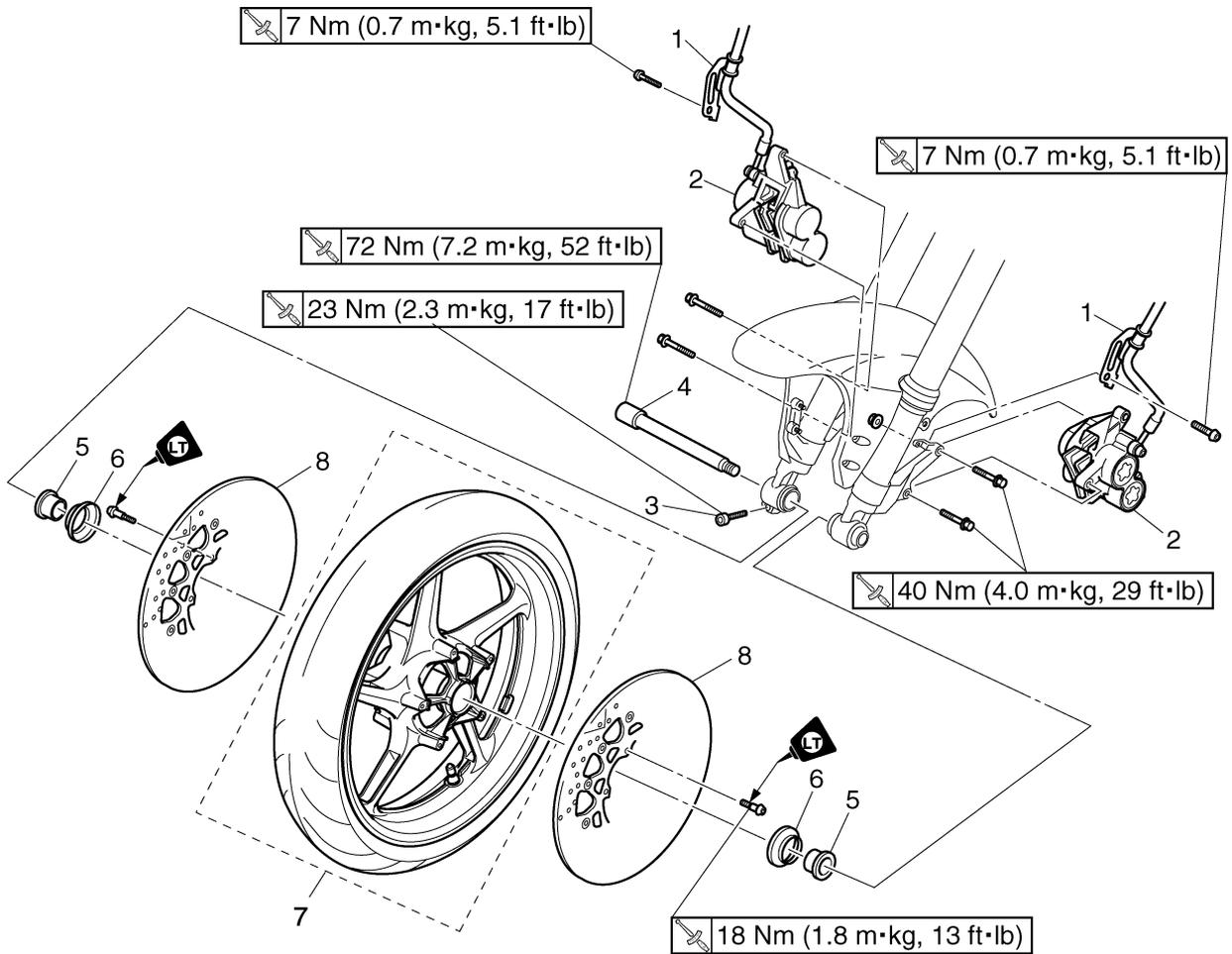


# FRONT WHEEL

EAS21870

## FRONT WHEEL

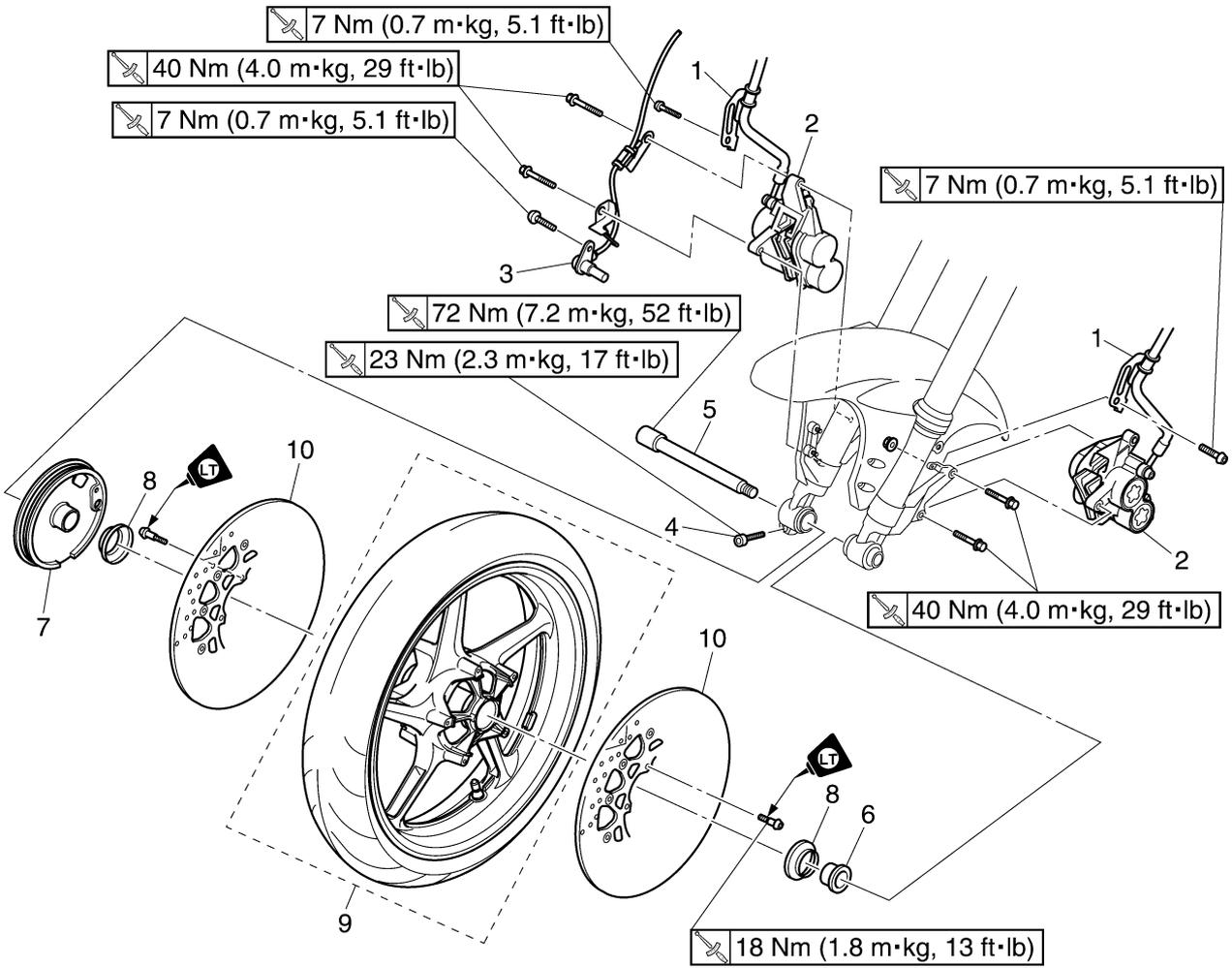
### Removing the front wheel and brake discs (FZ1-N(X)/FZ1-S(X))



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

# FRONT WHEEL

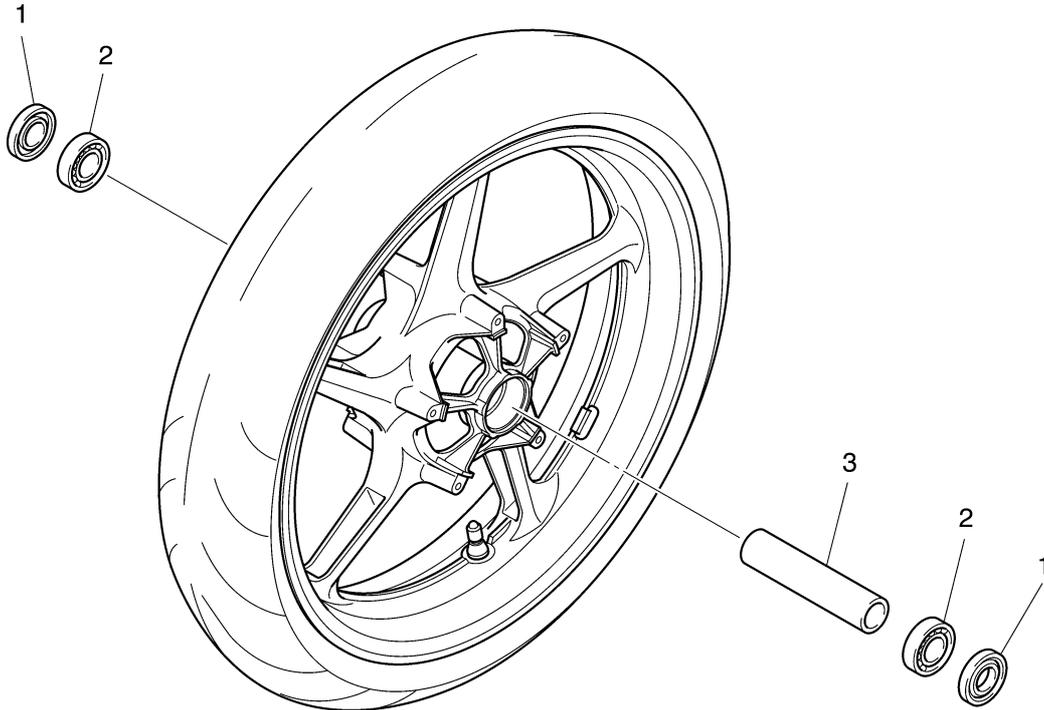
## Removing the front wheel sensor and sensor rotor (FZ1-SA), (FZ1-NA)



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

# FRONT WHEEL

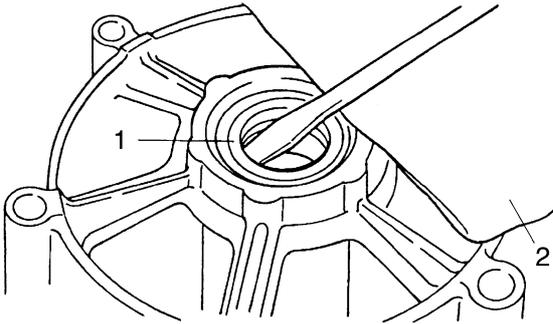
## Disassembling the front wheel



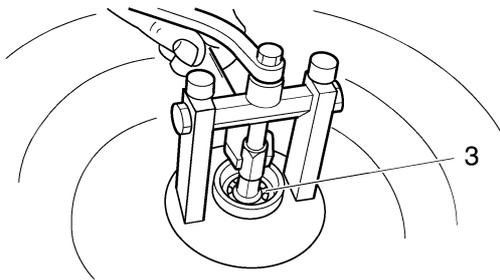
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	2	
2	Wheel bearing	2	
3	Spacer	1	
			For assembly, reverse the disassembly procedure.



# FRONT WHEEL



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



I2010201

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

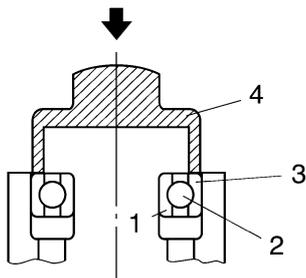
ECA14130

**CAUTION:**

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

**NOTE:**

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



EAS22010

## [D-3] MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

- ABS wheel speed sensor and sensor rotor

ECA14450

**CAUTION:**

- Handle the ABS components with care since they have been accurately adjusted.

Keep them away from dirt and do not subject them to shocks.

- The ABS wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.

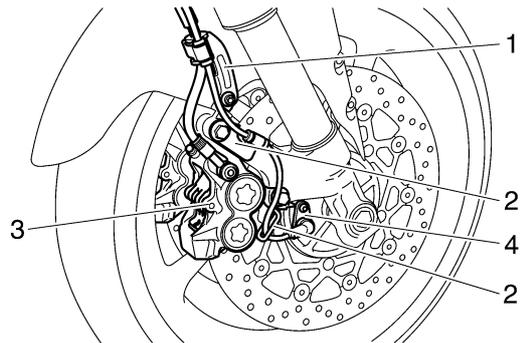
### Removing the front wheel sensor

1. Remove:
  - Brake hose holder "1"
  - Front wheel sensor lead holder "2"
  - Brake caliper "3"
  - Front wheel sensor "4"

ECA4S81011

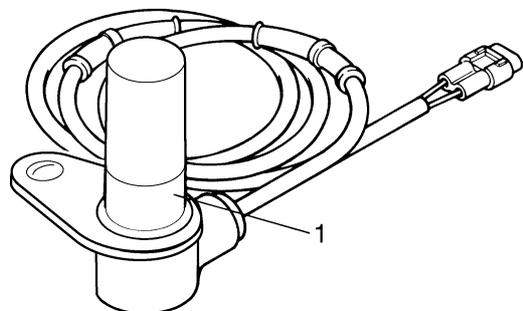
**CAUTION:**

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



### Checking the front wheel sensor and sensor rotor

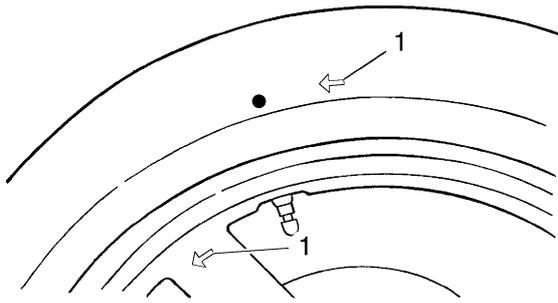
1. Check:
  - Front wheel sensor "1"  
Cracks/bends/distortion → Replace.  
Iron powder/dust → Clean.



2. Check:
  - Front wheel sensor rotor "2"  
Cracks/damage → Replace the front wheel assembly.







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

	<b>Wheel axle nut</b> <b>72 Nm (7.2 m·kg, 52 ft·lb)</b>
---	--

- Wheel axle pinch bolt

	<b>Wheel axle pinch bolt</b> <b>23 Nm (2.3 m·kg, 17 ft·lb)</b>
---	---

ECA14140

**CAUTION:**

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

6. Install:
  - Brake caliper

	<b>Brake caliper bolt</b> <b>40 Nm (4.0 m·kg, 29 ft·lb)</b>
---	--

EWA13490

**⚠ WARNING**

**Make sure the brake cable is routed properly.**

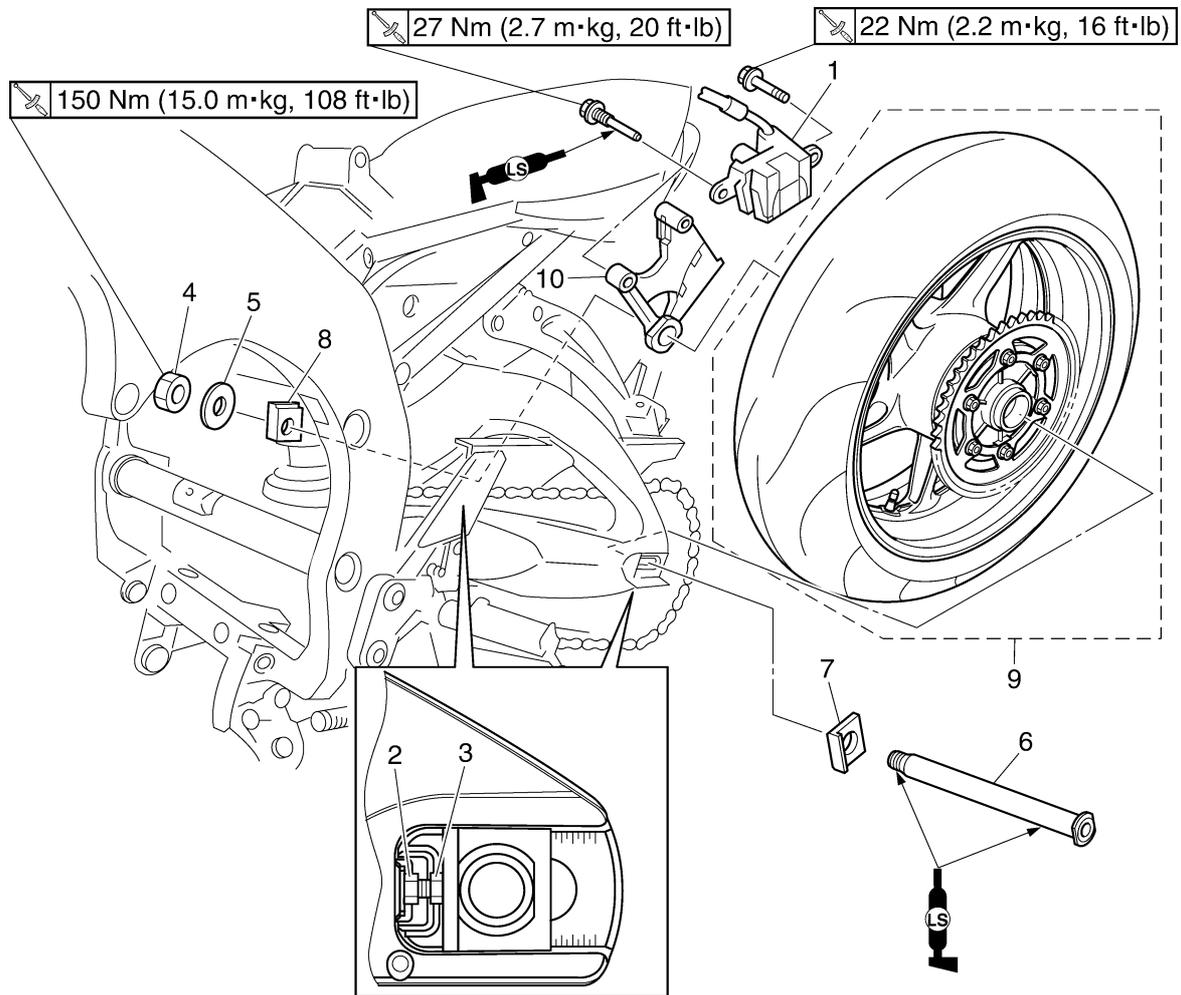
**NOTE:**

Make sure that there is enough space between the brake pads before installing the brake calipers onto the brake discs.

EAS22020

## REAR WHEEL

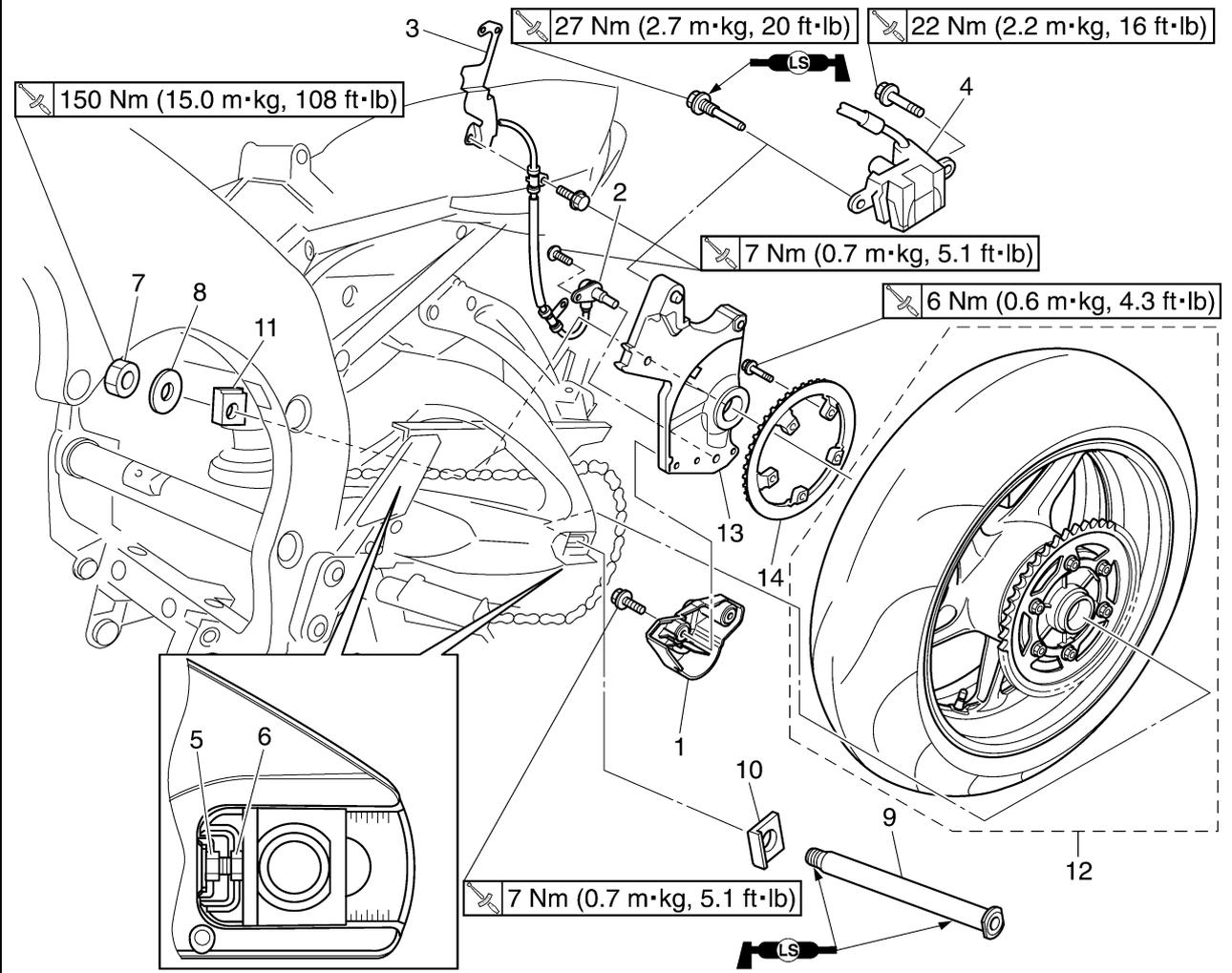
### Removing the rear wheel (FZ1-N(X)/FZ1-S(X))



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake caliper	1	
2	Locknut	2	Loosen.
3	Adjusting bolt	2	Loosen.
4	Wheel axle nut	1	
5	Washer	1	
6	Rear wheel axle	1	
7	Adjusting block (left)	1	
8	Adjusting block (right)	1	
9	Rear wheel	1	
10	Brake caliper bracket	1	
			For installation, reverse the removal procedure.

# REAR WHEEL

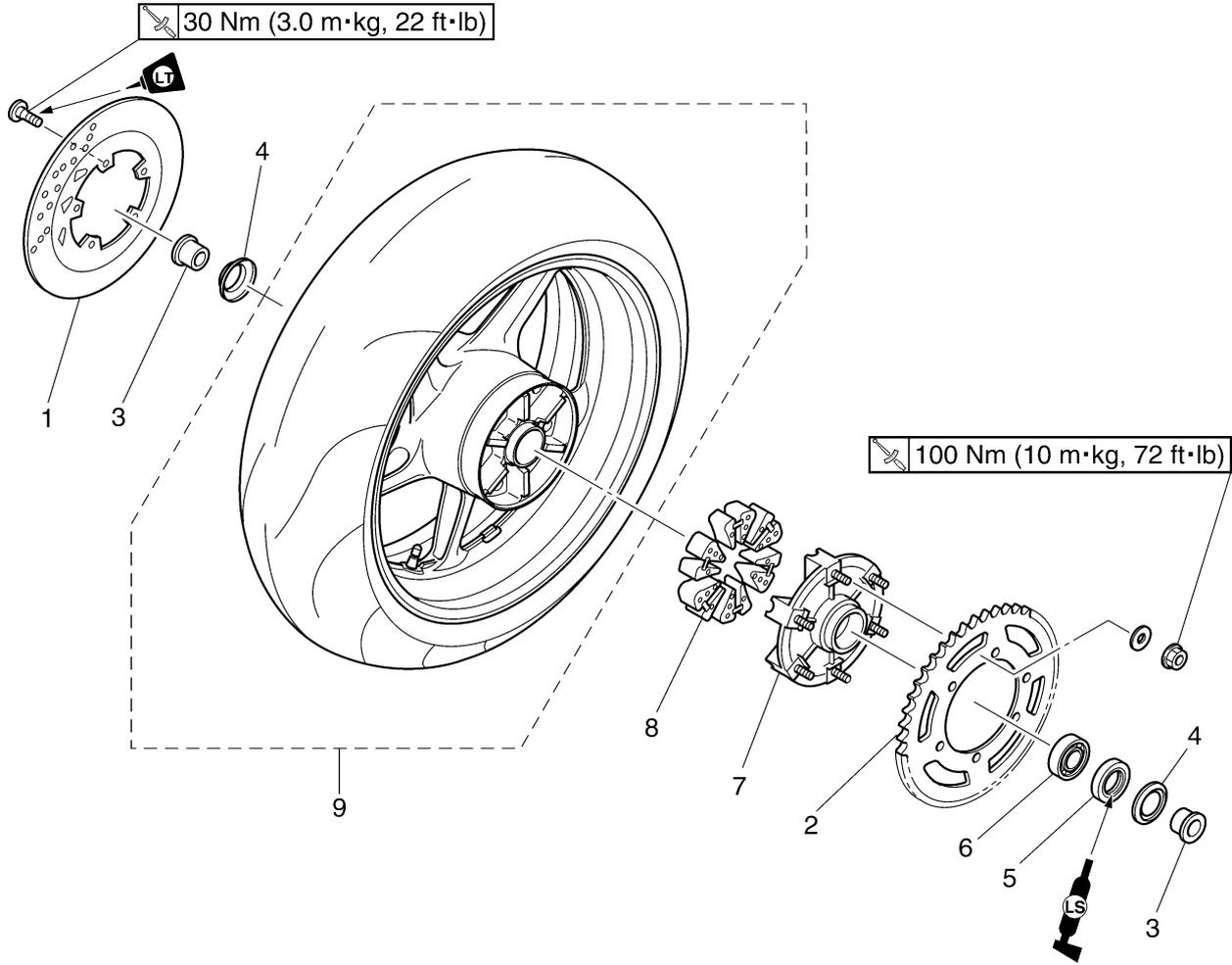
## Removing the rear wheel sensor and sensor rotor (FZ1-SA), (FZ1-NA)



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear wheel sensor protector	1	
2	Rear wheel sensor	1	
3	Rear wheel sensor lead stay	1	
4	Rear brake caliper	1	
5	Lock nut	2	Loosen.
6	Adjusting nut	2	Loosen.
7	Wheel axle nut	1	
8	Washer	1	
9	Rear wheel axle	1	
10	Adjusting block (left)	1	
11	Adjusting block (right)	1	
12	Rear wheel	1	
13	Rear brake caliper bracket	1	
14	Sensor rotor	1	
			For installation, reverse the removal procedure.

# REAR WHEEL

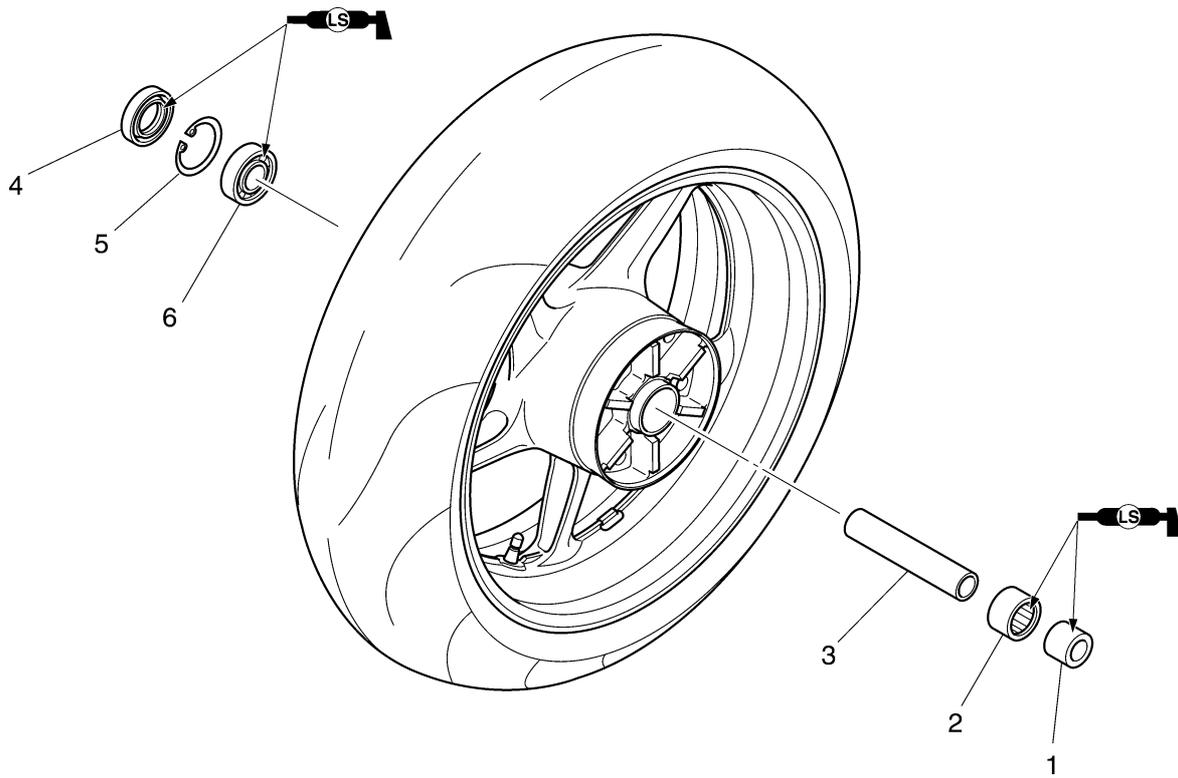
## Removing the brake disc and rear wheel sprocket



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

# REAR WHEEL

## Disassembling the rear wheel



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

EAS22040

## REMOVING THE REAR WHEEL

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

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

### NOTE:

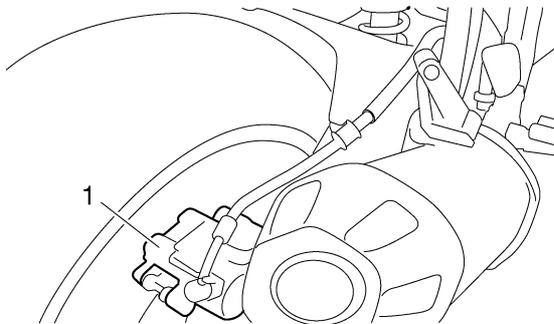
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- Brake caliper "1"

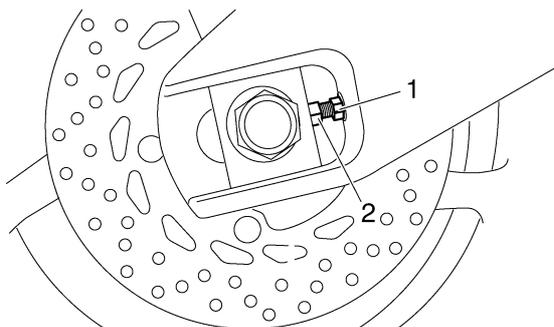
### NOTE:

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



3. Loosen:

- Locknut "1"
- Adjusting bolt "2"

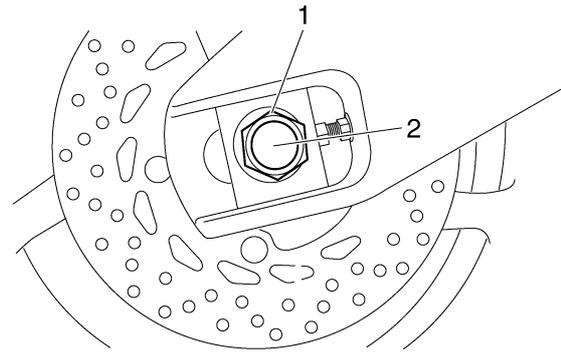


4. Remove:

- Wheel axle nut "1"
- Wheel axle "2"
- Rear wheel

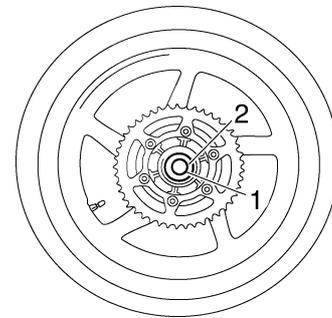
### NOTE:

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



5. Remove:

- Left collar "1"
- Rear wheel drive hub "2"
- Rear wheel drive hub damper
- Right collar



EAS22090

## CHECKING THE REAR WHEEL

1. Check:

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

Refer to "FRONT WHEEL" on page 4-9.

2. Check:

- Tire
- Rear wheel

Damage/wear → Replace.

Refer to "CHECKING THE TIRES" on page 3-33 and "CHECKING THE WHEELS" on page 3-35.

3. Measure:

- Radial wheel runout
- Lateral wheel runout

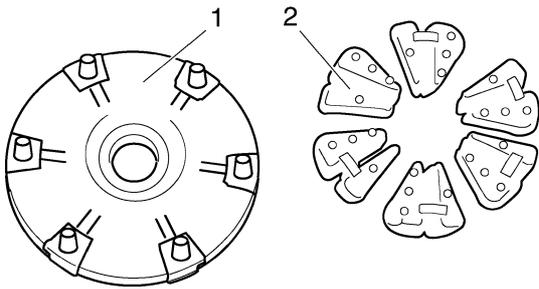
Refer to "FRONT WHEEL" on page 4-9.

EAS22110

## CHECKING THE REAR WHEEL DRIVE HUB

1. Check:

- Rear wheel drive hub "1"  
Cracks/damage → Replace.
- Rear wheel drive hub dampers "2"  
Damage/wear → Replace.

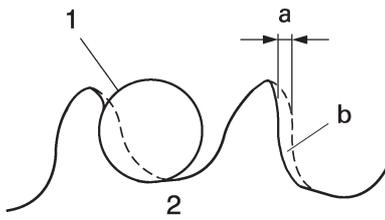


EAS22120

## CHECKING AND REPLACING THE REAR WHEEL SPROCKET

### 1. Check:

- Rear wheel sprocket  
More than 1/4 tooth "a" wear → Replace the rear wheel sprocket.  
Bent teeth → Replace the rear wheel sprocket.



### b. Correct

1. Drive chain roller
2. Rear wheel sprocket

### 2. Replace:

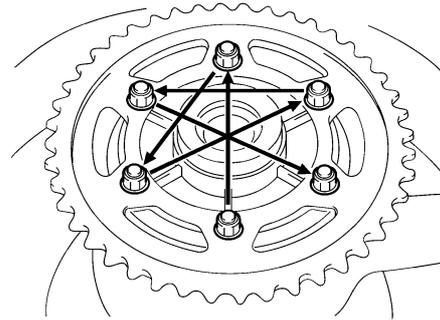
- Rear wheel sprocket

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

	<p><b>Rear wheel sprocket self-locking nut</b> 100 Nm (10 m·kg, 72 ft·lb)</p>
--	---

### NOTE:

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



EAS22200

## [D-4] MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR

ECA5D01002

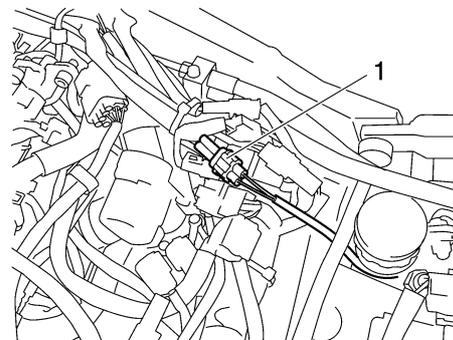
### CAUTION:

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

### Removing the rear wheel sensor

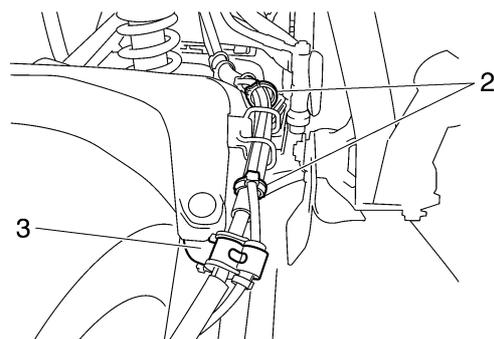
#### 1. Disconnect:

- Rear wheel sensor coupler "1"

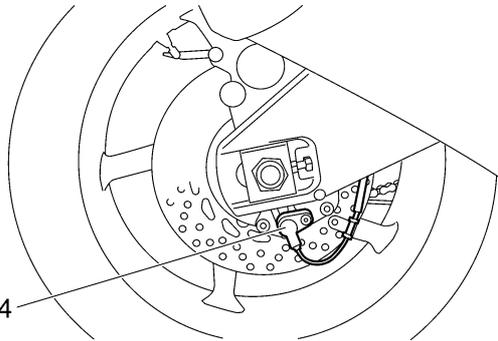


#### 2. Remove:

- Clamp "2"
- Rear wheel sensor lead holder "3"
- Rear wheel sensor lead stay

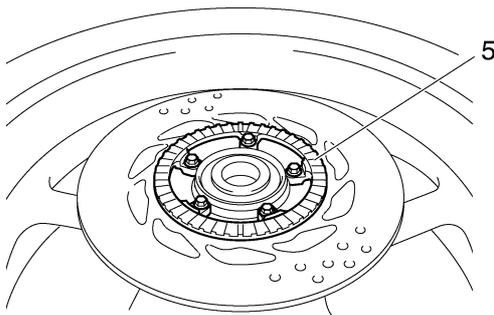


3. Remove:
- Rear wheel sensor protector
  - Rear wheel sensor "4"



4. Remove:
- Rear wheel  
Refer to "REMOVING THE REAR WHEEL" on page 4-21.

5. Remove:
- Sensor rotor "5"



### Checking the rear wheel sensor and sensor rotor

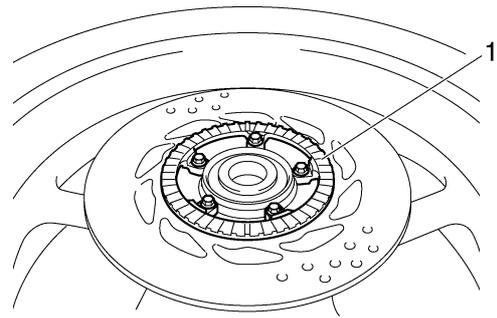
1. Check:
  - Rear wheel sensor  
Cracks/bends/distortion → Replace.  
Iron powder/dust → Clean.
2. Check:
  - Rear wheel sensor rotor  
Cracks/damage → Replace.

### Installing the rear wheel sensor

1. Install:
  - Sensor rotor "1"



**Sensor rotor bolt**  
6 Nm (0.6 m·kg, 4.3 ft·lb)



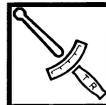
2. Install:
  - Rear wheel  
Refer to "INSTALLING THE REAR WHEEL" on page 4-24.

ECA14470

#### CAUTION:

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

3. Install:
  - Rear wheel sensor "2"
  - Rear wheel sensor protector
  - Rear wheel sensor lead stay



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

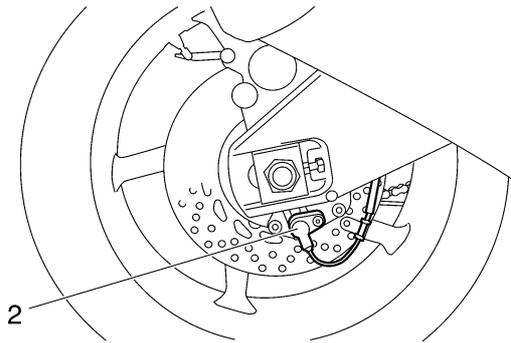
#### NOTE:

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

ECA14500

#### CAUTION:

**To route the rear wheel sensor lead, refer to "CABLE ROUTING" on page 2-41.**



4. Check:

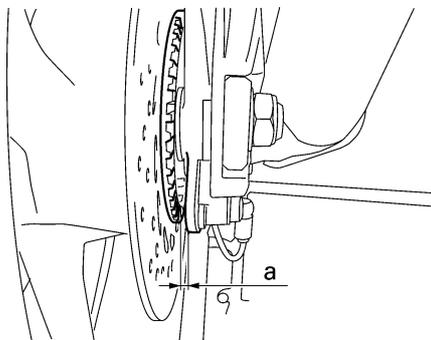
- Check the clearance “a” between the rear wheel sensor and sensor rotor.  
Out of specification → Check the existence of foreign matters in the wheel sensor attaching section, remove if any, and perform the installation.



**Rear wheel sensor and sensor rotor clearance**  
1.0–1.6 mm (0.039–0.063 in)

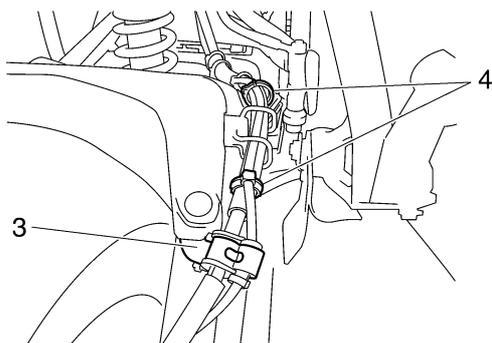


**Thickness gauge**



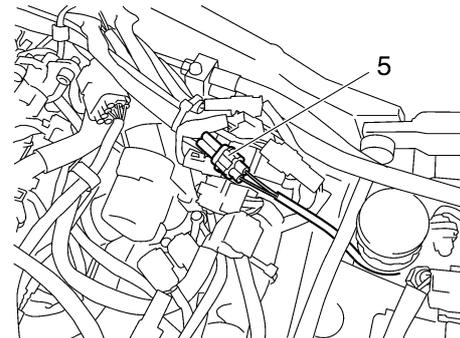
5. Install:

- Rear wheel sensor lead stay
- Rear wheel sensor lead holder “3”
- Clamp “4”



6. Connect:

- Rear wheel sensor coupler “5”



ECA14500

**CAUTION:**

**To route the rear wheel sensor lead, refer to “CABLE ROUTING” on page 2-41.**

7. Check:

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

EAS22150

**ADJUSTING THE REAR WHEEL STATIC BALANCE**

**NOTE:**

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

1. Adjust:

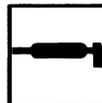
- Rear wheel static balance  
Refer to “ADJUSTING THE FRONT WHEEL STATIC BALANCE” on page 4-14.

EAS22160

**INSTALLING THE REAR WHEEL**

1. Lubricate:

- Wheel axle
- Wheel bearings
- Oil seal lips



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

2. Adjust:

- Drive chain slack  
Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-27.



**Drive chain slack**  
25.0–35.0 mm (0.98–1.38 in)

3. Tighten:

- Wheel axle nut
- Brake caliper bolts



**Wheel axle nut**  
**150 Nm (15 m·kg, 108 ft·lb)**  
**Brake caliper bolt (front)**  
**27 Nm (2.7 m·kg, 20 ft·lb)**  
**Brake caliper bolt (rear)**  
**22 Nm (2.2 m·kg, 16 ft·lb)**

EWA13500



**WARNING**

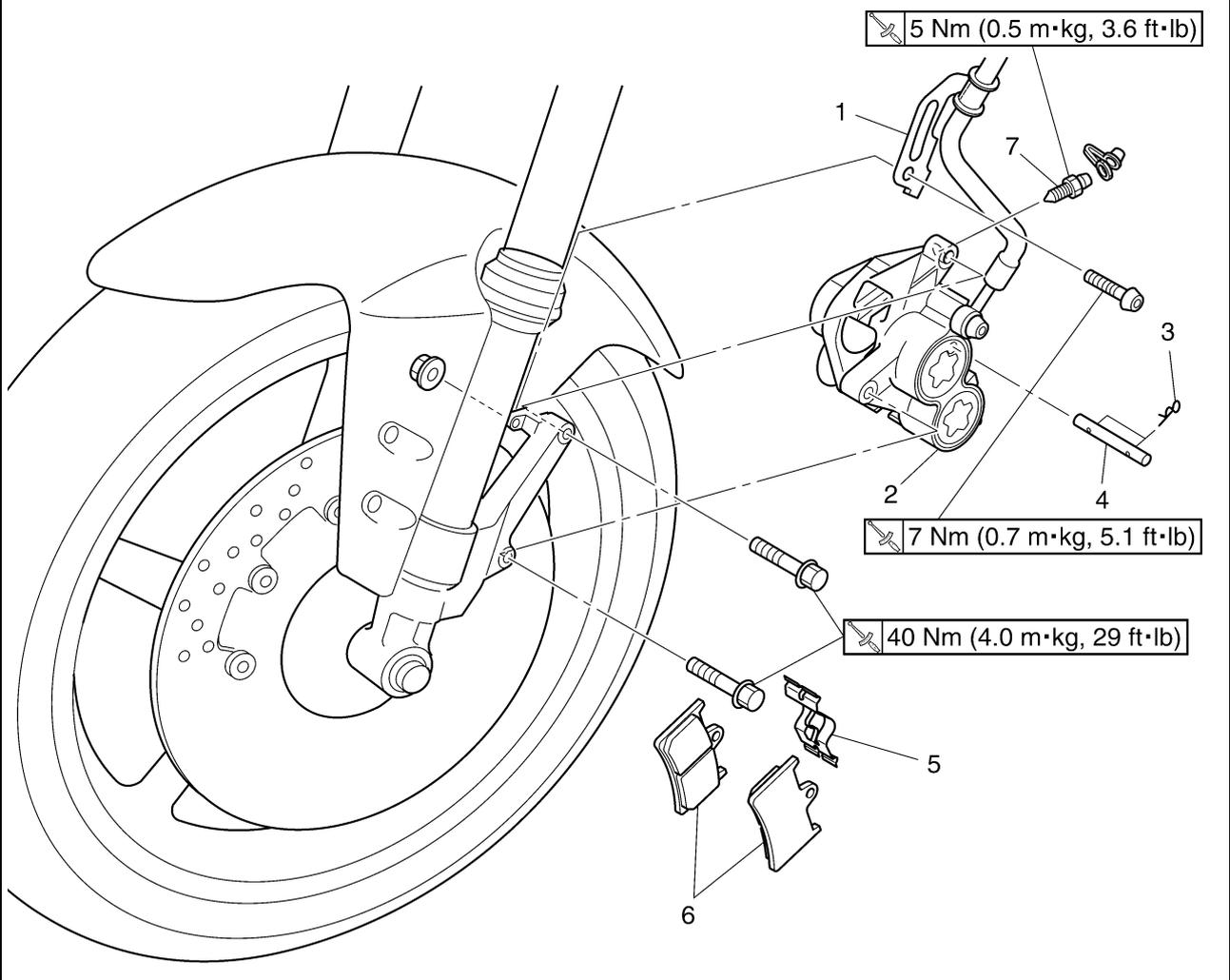
**Make sure the brake hose is routed properly.**

---

EAS22210

## FRONT BRAKE

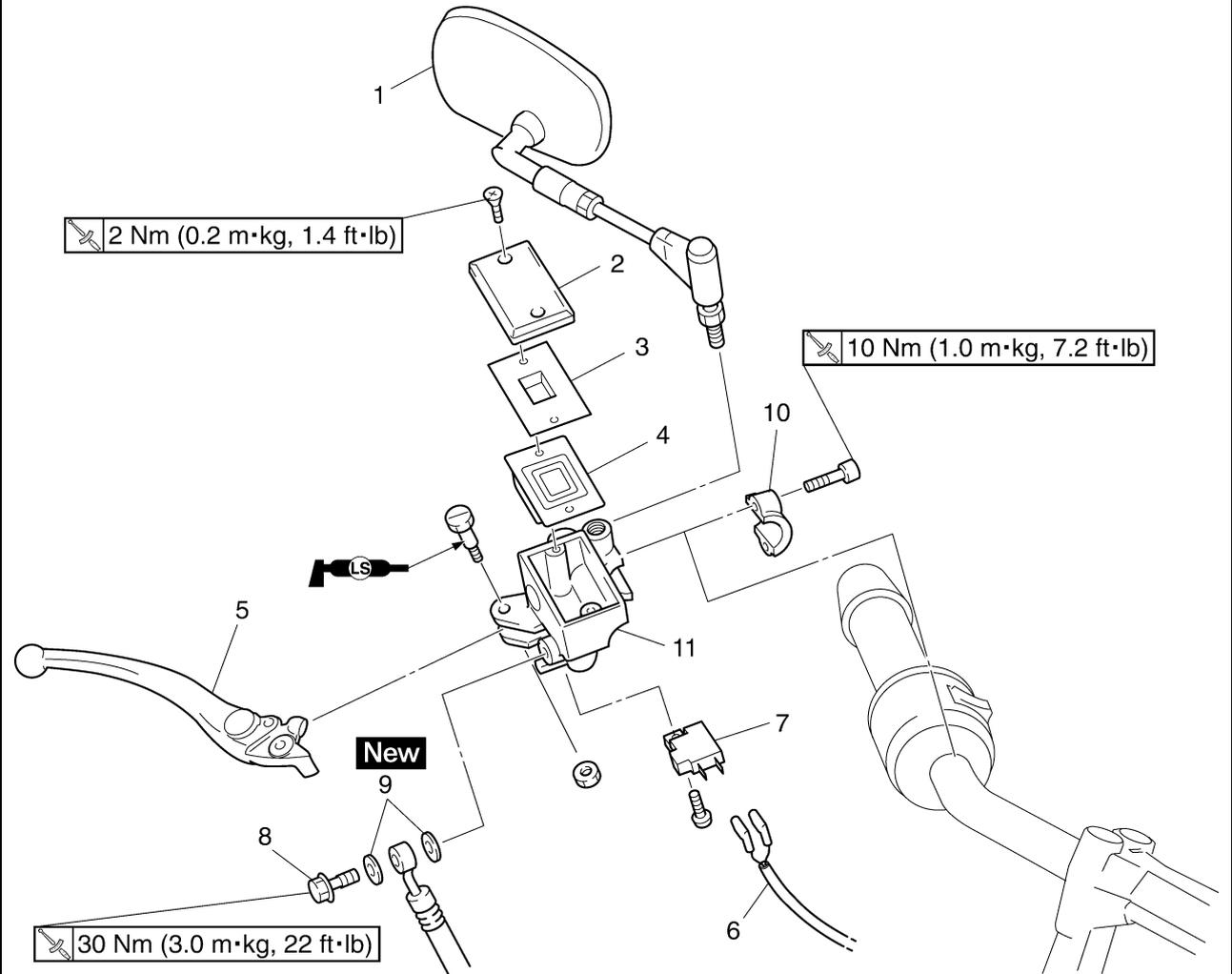
### Removing the front brake pads



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

# FRONT BRAKE

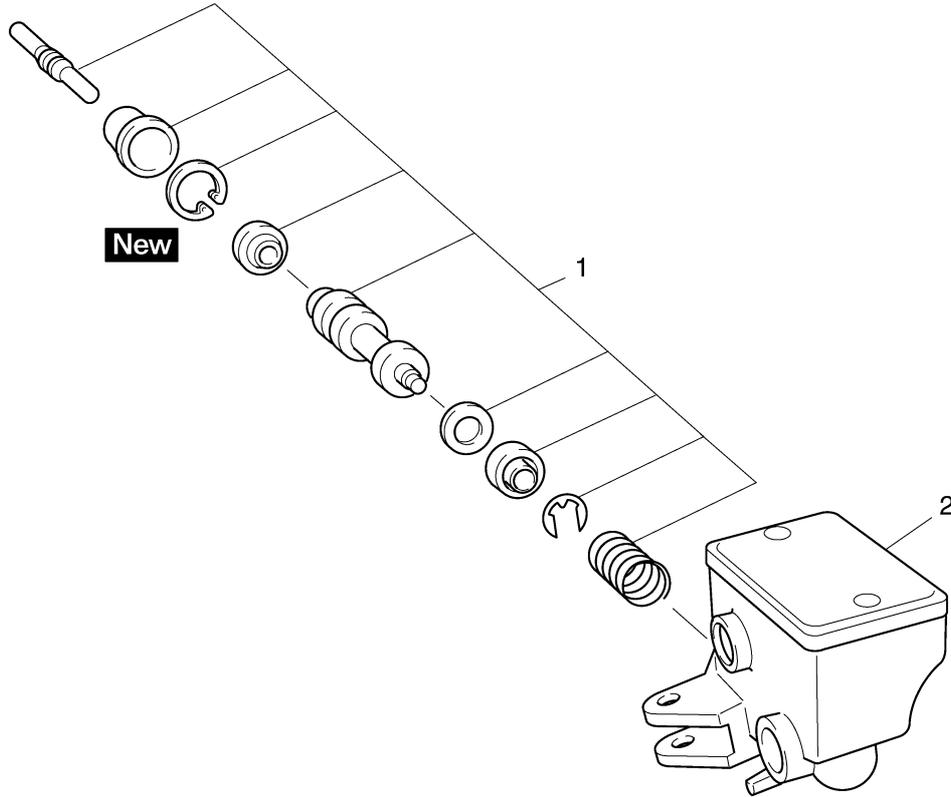
## Removing the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
1	Right rear view mirror (FZ1-N(X)), (FZ1-NA)	1	
2	Brake master cylinder reservoir cap	1	
3	Brake master cylinder reservoir diaphragm holder	1	
4	Brake master cylinder diaphragm	1	
5	Brake lever	1	
6	Front brake light switch lead coupler	1	Disconnect.
7	Front brake light switch	1	
8	Union bolt	1	
9	Copper washer	2	
10	Master cylinder bracket	1	
11	Master cylinder assembly	1	
			For assembly, reverse the disassembly procedure.

# FRONT BRAKE

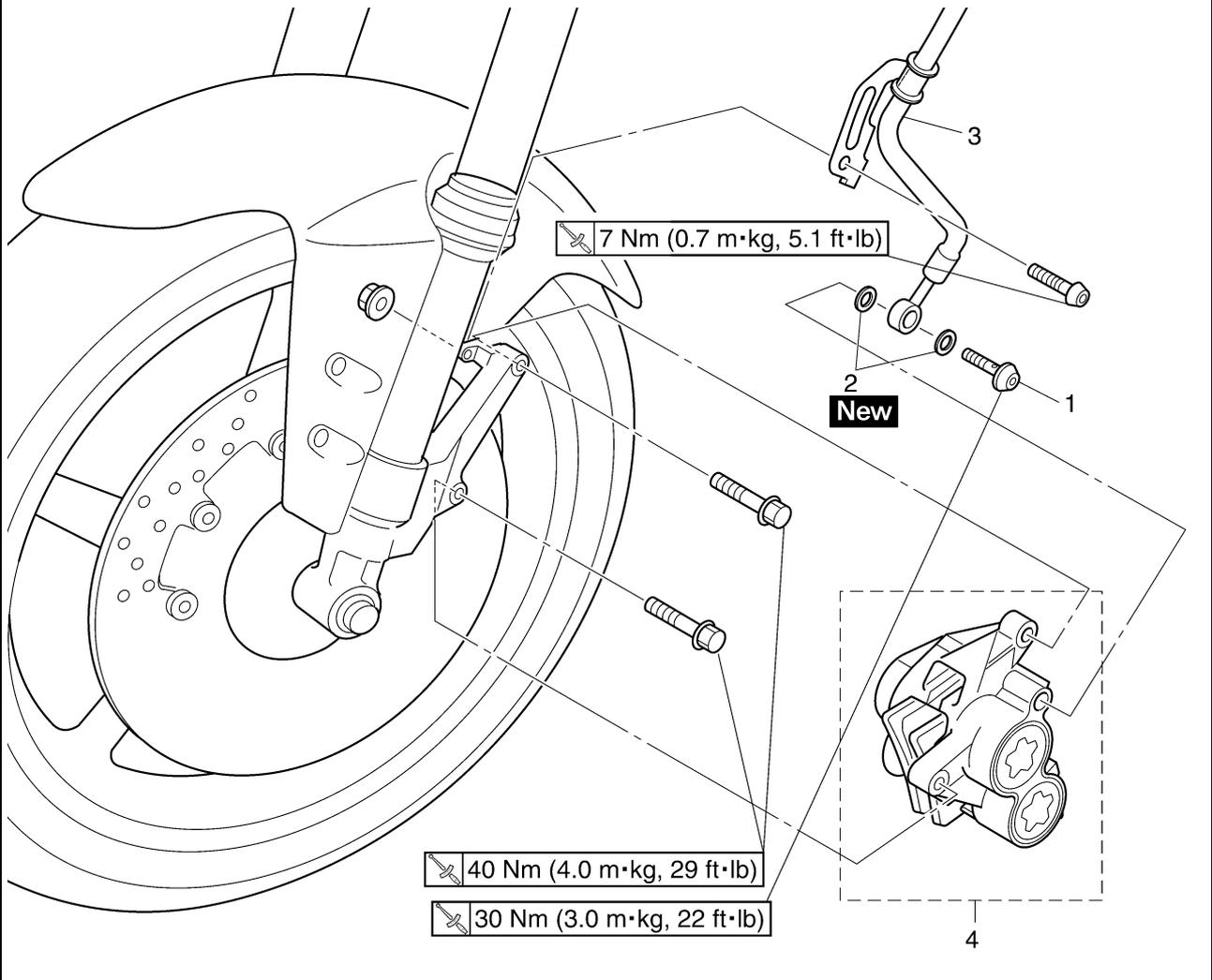
## Disassembling the front brake master cylinder



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

# FRONT BRAKE

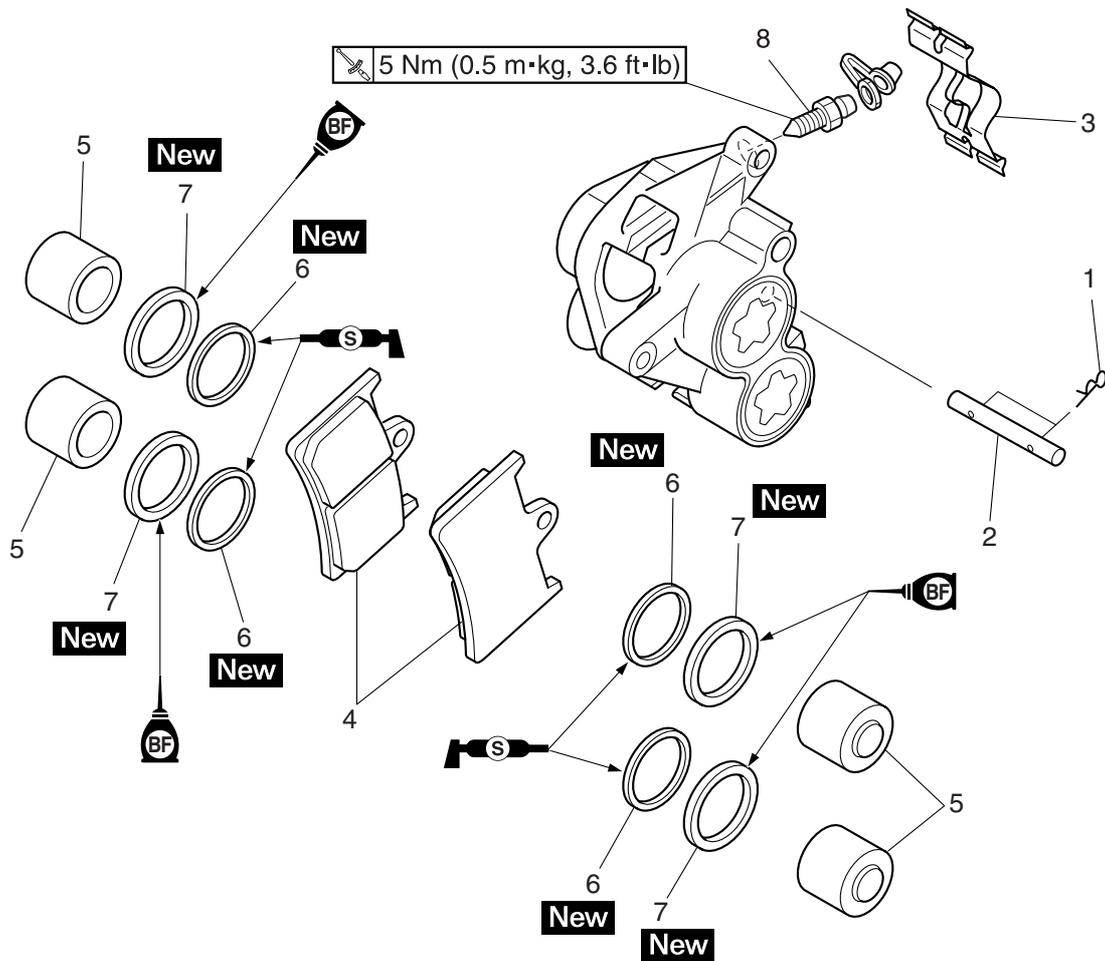
## Removing the front brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
1	Union bolt	1	
2	Copper washer	2	
3	Brake hose	1	
4	Brake caliper	1	
			For installation, reverse the removal procedure.

# FRONT BRAKE

## Disassembling the front brake calipers



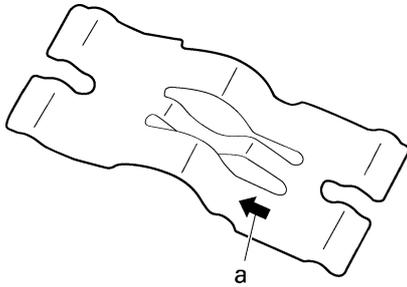
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake pad clip	2	
2	Brake pad pin	1	
3	Brake pad spring	1	
4	Brake pad	2	
5	Brake caliper piston	4	
6	Brake caliper piston dust seal	4	
7	Brake caliper piston seal	4	
8	Bleed screw	1	
			For assembly, reverse the disassembly procedure.





**NOTE:**

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



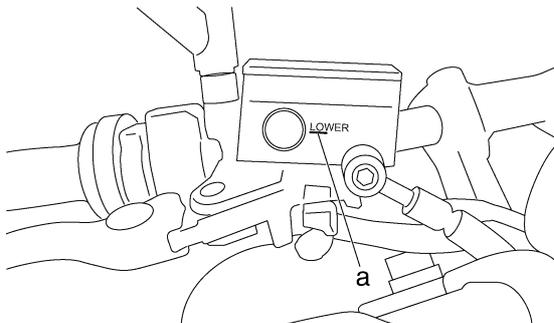
3. Install:

- Brake pad pins
- Brake pad clips
- Brake caliper

	<p><b>Brake caliper bolt</b>  <b>40 Nm (4.0 m·kg, 29 ft·lb)</b></p>
---	---

4. Check:

- Brake fluid level  
 Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.  
 Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-23.



5. Check:

- Brake lever operation  
 Soft or spongy feeling → Bleed the brake system.  
 Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-25.

EAS22300

**REMOVING THE FRONT BRAKE CALIPERS**

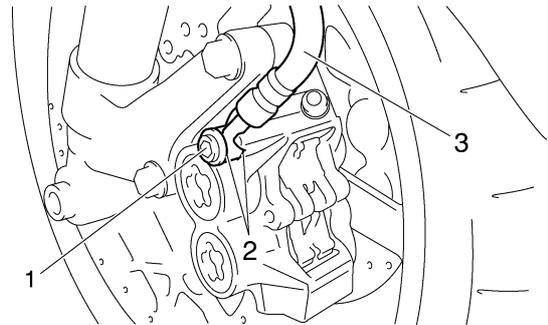
The following procedure applies to both of the brake calipers.

**NOTE:**

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

1. Remove:

- Union bolt “1”
- Copper washers “2”
- Brake hose “3”



**NOTE:**

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

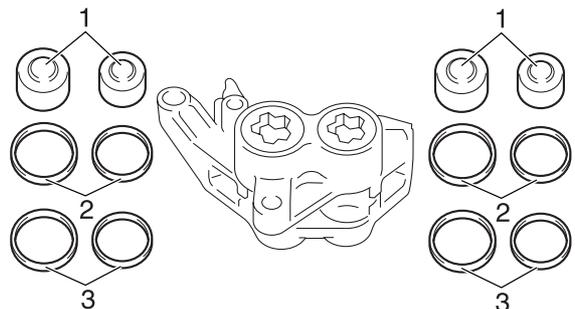
EAS22360

**DISASSEMBLING THE FRONT BRAKE CALIPERS**

The following procedure applies to both of the brake calipers.

1. Remove:

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



a. Secure the brake caliper pistons with a piece of wood “a”.

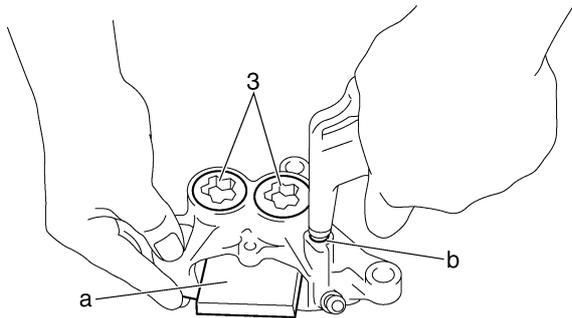
b. Blow compressed air into the brake hose joint opening “b” to force out the left side pistons from the brake caliper.

EWA13570

**WARNING**

- Never try to pry out the brake caliper pistons.

- Do not loosen the bolts “3”.



- Remove the brake caliper piston seals.
- Repeat the previous steps to force out the right side pistons from the brake caliper.



EAS22390

## CHECKING THE FRONT BRAKE CALIPERS

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

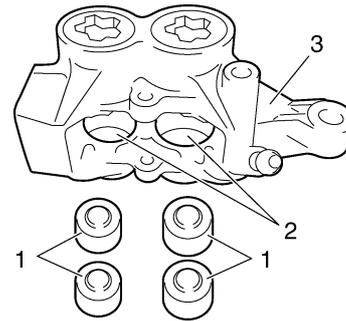
- Check:
  - Brake caliper pistons “1”  
Rust/scratches/wear → Replace the brake caliper pistons.
  - Brake caliper cylinders “2”  
Scratches/wear → Replace the brake caliper assembly.
  - Brake caliper body “3”  
Cracks/damage → Replace the brake caliper assembly.
  - Brake fluid delivery passages (brake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

EWA13600



**WARNING**

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



EAS22410

## ASSEMBLING THE FRONT BRAKE CALIPERS

EWA13620



**WARNING**

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



Recommended brake fluid  
DOT4

EAS22440

## INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

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



Brake hose union bolt  
30 Nm (3.0 m·kg, 22 ft·lb)

EWA13530



**WARNING**

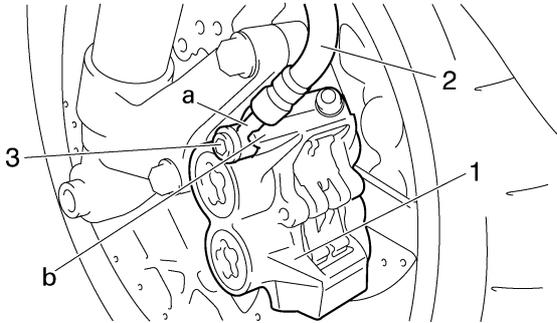
Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-41.

# FRONT BRAKE

ECA14170

## CAUTION:

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 spring
  - Brake pad pin
  - Brake pad clips
  - Brake caliper
  - Brake hose holder



**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)

Refer to "REPLACING THE FRONT BRAKE PADS" on page 4-32.

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



**Recommended brake fluid**  
DOT4

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.

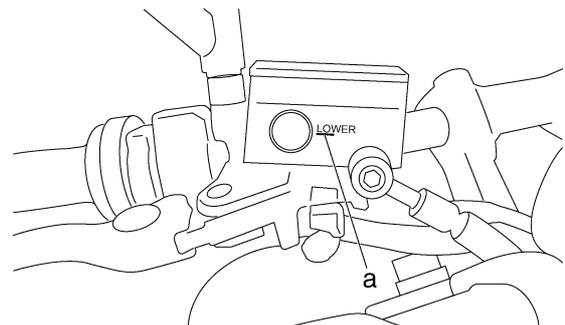
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

## CAUTION:

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

5. Bleed:
  - Brake system  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
6. Check:
  - Brake fluid level  
Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.  
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.



7. Check:
  - Brake lever operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.

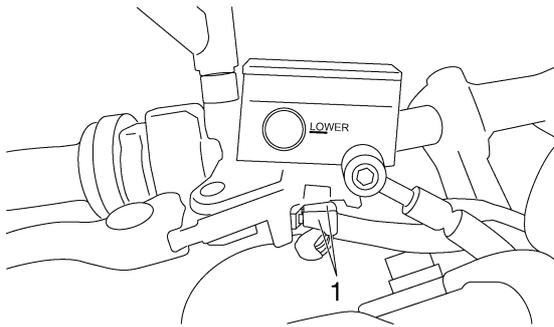
EAS22490

## REMOVING THE FRONT BRAKE MASTER CYLINDER

### NOTE:

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

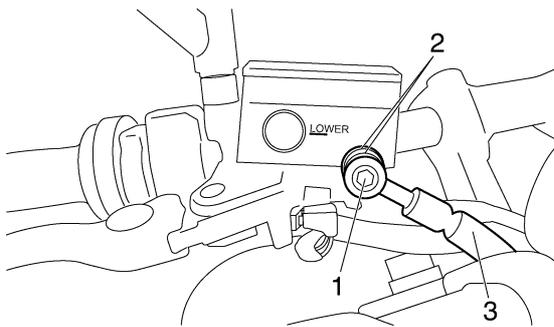
1. Disconnect:
  - Brake switch couplers "1" (from the brake switch)



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

**NOTE:**

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



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 hoses  
Cracks/damage/wear → Replace.

EAS22520

## ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

**⚠ WARNING**

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



**Recommended brake fluid  
DOT4**

EAS22530

## INSTALLING THE FRONT BRAKE MASTER CYLINDER

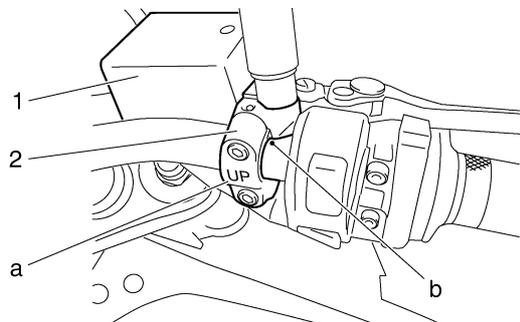
1. Install:
  - Brake master cylinder “1”
  - Brake master cylinder bracket “2”



**Brake master cylinder bracket  
bolt  
10 Nm (1.0 m·kg, 7.2 ft·lb)**

**NOTE:**

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



2. Install:
  - Copper washers **New**
  - Brake hose
  - Union bolt

# FRONT BRAKE



**Brake hose union bolt  
30 Nm (3.0 m·kg, 22 ft·lb)**

EWA13530

## **WARNING**

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-41.

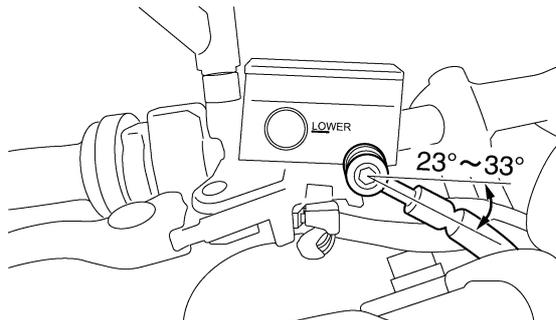
### NOTE:

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

ECA5D01012

## **CAUTION:**

Attach the brake hose so that its angle is  $23^{\circ}$  to  $33^{\circ}$  against the straight line in parallel with the ceiling plane of the master cylinder.



### 3. Fill:

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



**Recommended brake fluid  
DOT4**

EWA13540

## **WARNING**

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

- When refilling, be careful that water does not enter the brake master cylinder reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

## **CAUTION:**

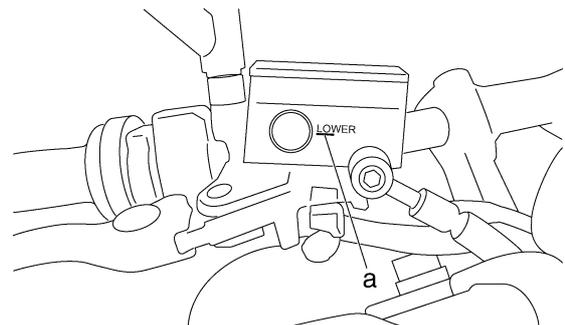
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

### 4. Bleed:

- Brake system  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-25.

### 5. Check:

- Brake fluid level  
Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.  
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-23.



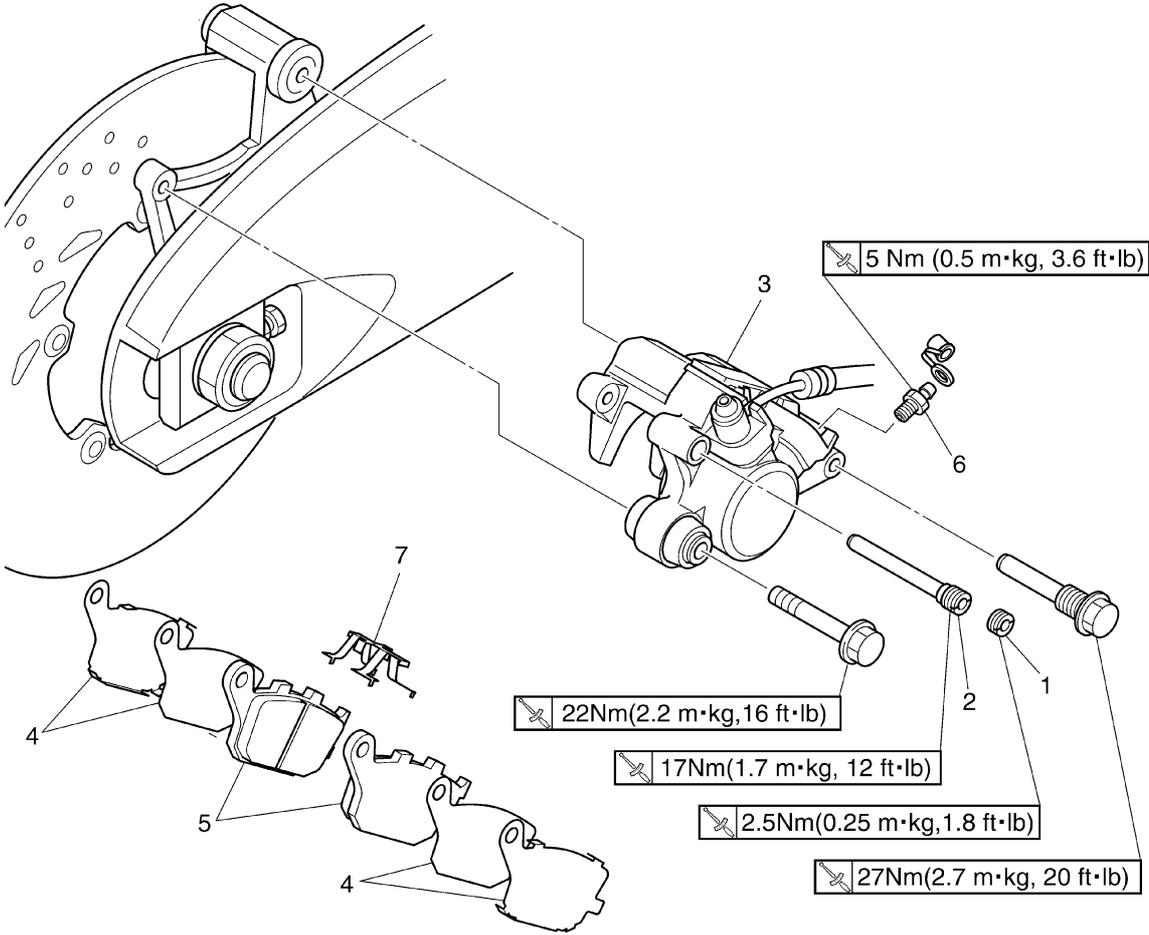
### 6. Check:

- Brake lever operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-25.

EAS22550

## REAR BRAKE

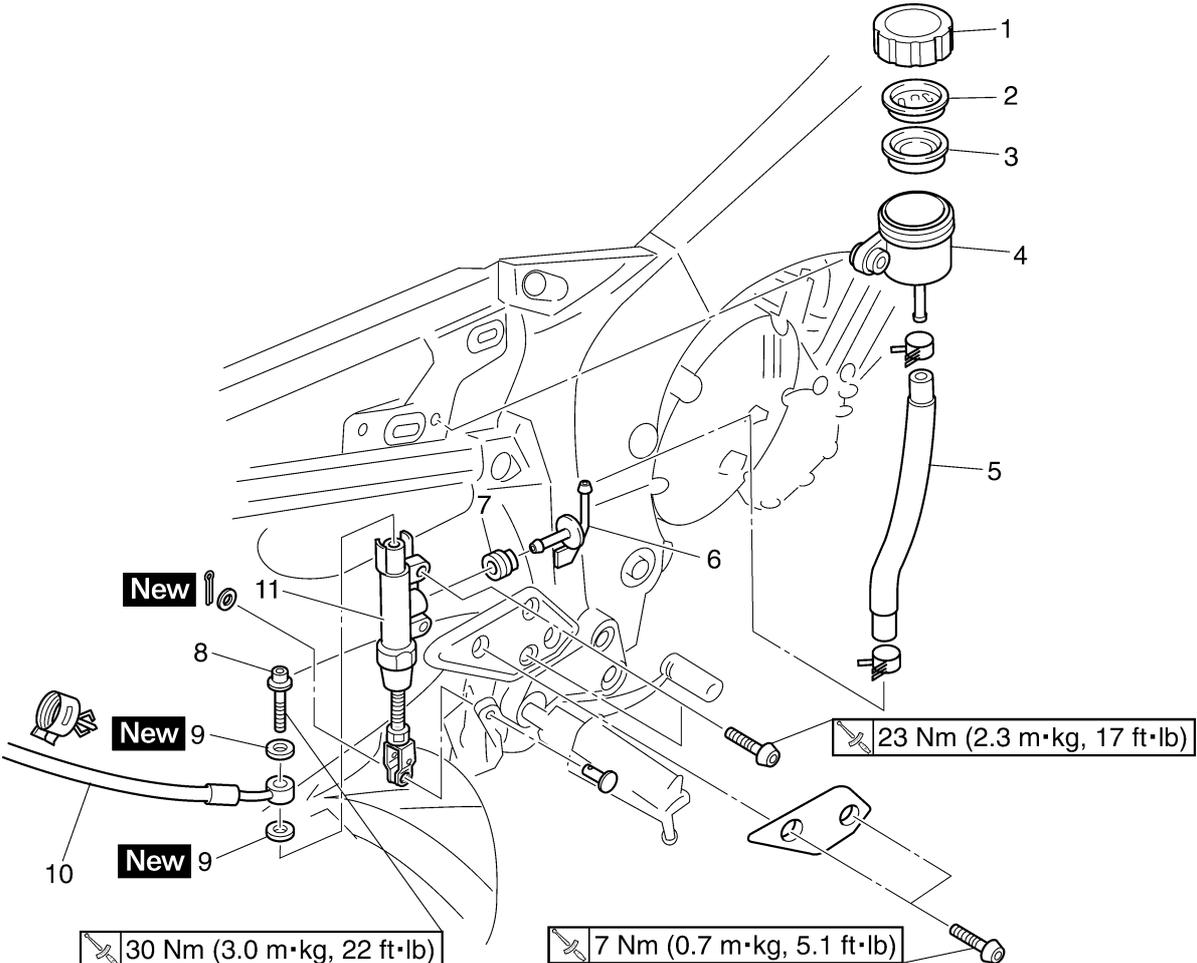
### Removing the rear brake pads



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

# REAR BRAKE

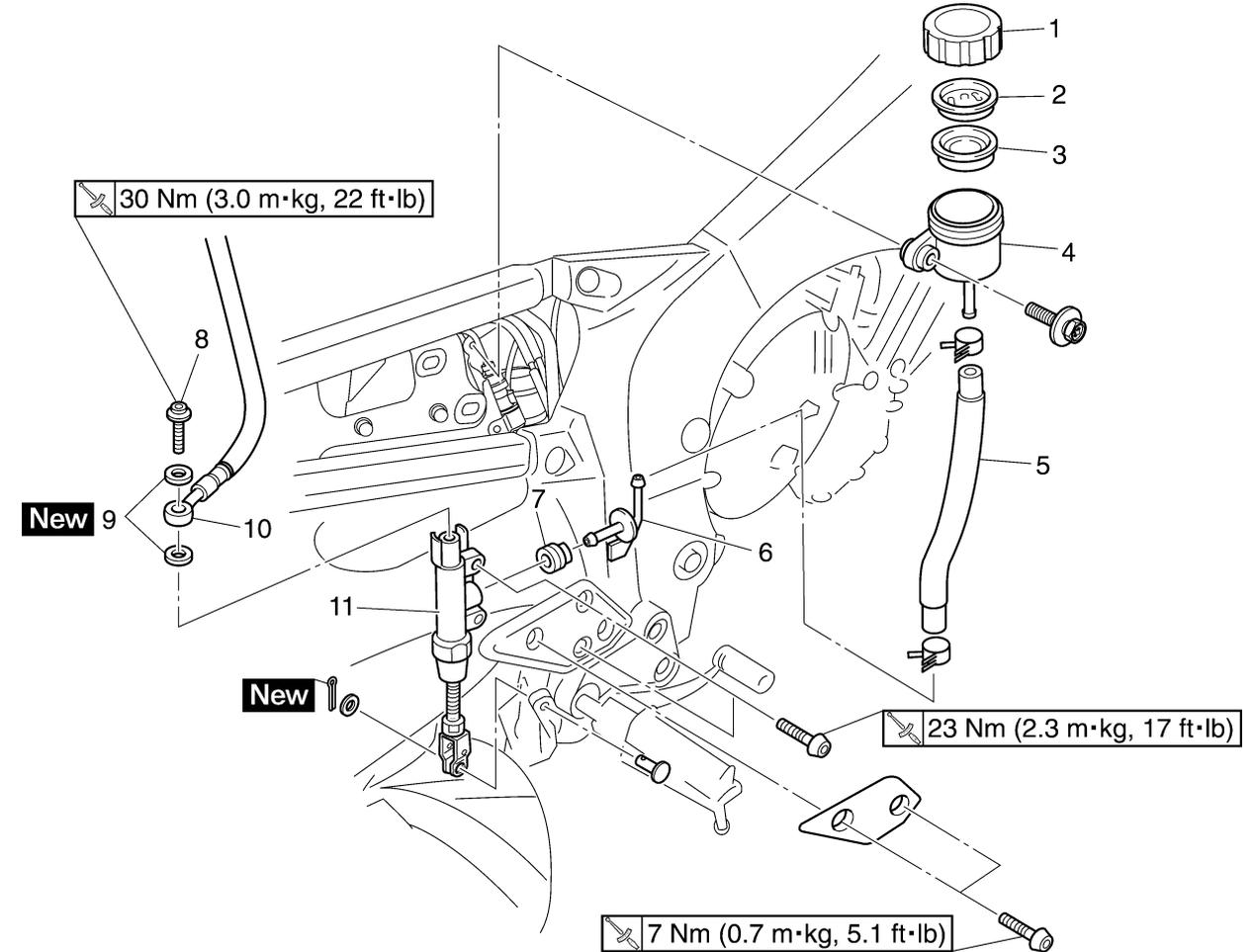
## Removing the rear brake master cylinder (FZ1-N(X)/FZ1-S(X))



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
1	Brake fluid reservoir cap	1	
2	Brake fluid reservoir diaphragm holder	1	
3	Brake fluid reservoir diaphragm	1	
4	Brake fluid reservoir tank	1	
5	Brake fluid reservoir hose	1	
6	Hose joint	1	
7	Bushing	1	
8	Union bolt	1	
9	Copper washer	2	
10	Brake hose	1	
11	Brake master cylinder	1	
			For installation, reverse the removal procedure.

# REAR BRAKE

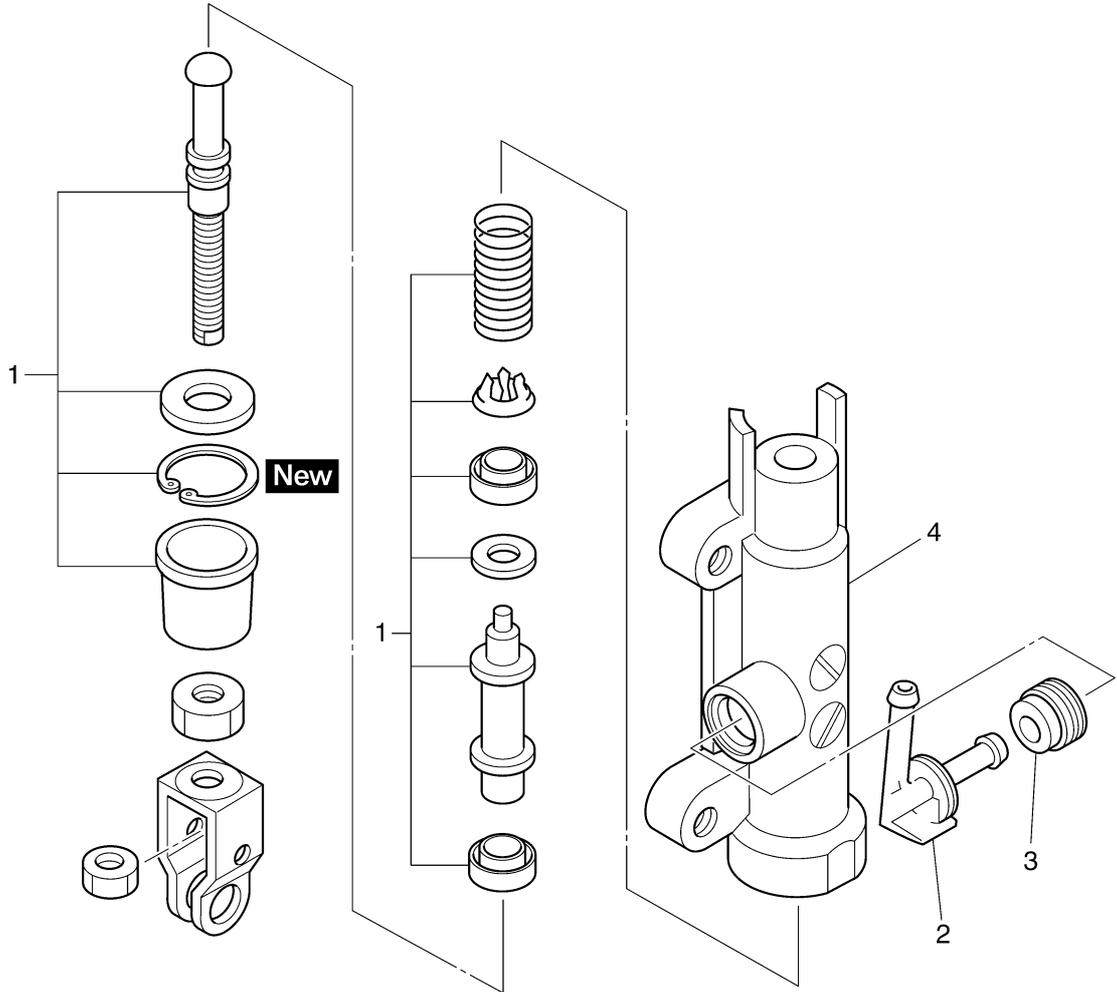
## Removing the rear brake master cylinder (FZ1-SA), (FZ1-NA)



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
1	Brake fluid reservoir cap	1	
2	Brake fluid reservoir diaphragm holder	1	
3	Brake fluid reservoir diaphragm	1	
4	Brake fluid reservoir tank	1	
5	Brake fluid reservoir hose	1	
6	Hose joint	1	
7	Bushing	1	
8	Union bolt	1	
9	Copper washer	2	
10	Brake hose	1	
11	Brake master cylinder	1	
			For installation, reverse the removal procedure.

# REAR BRAKE

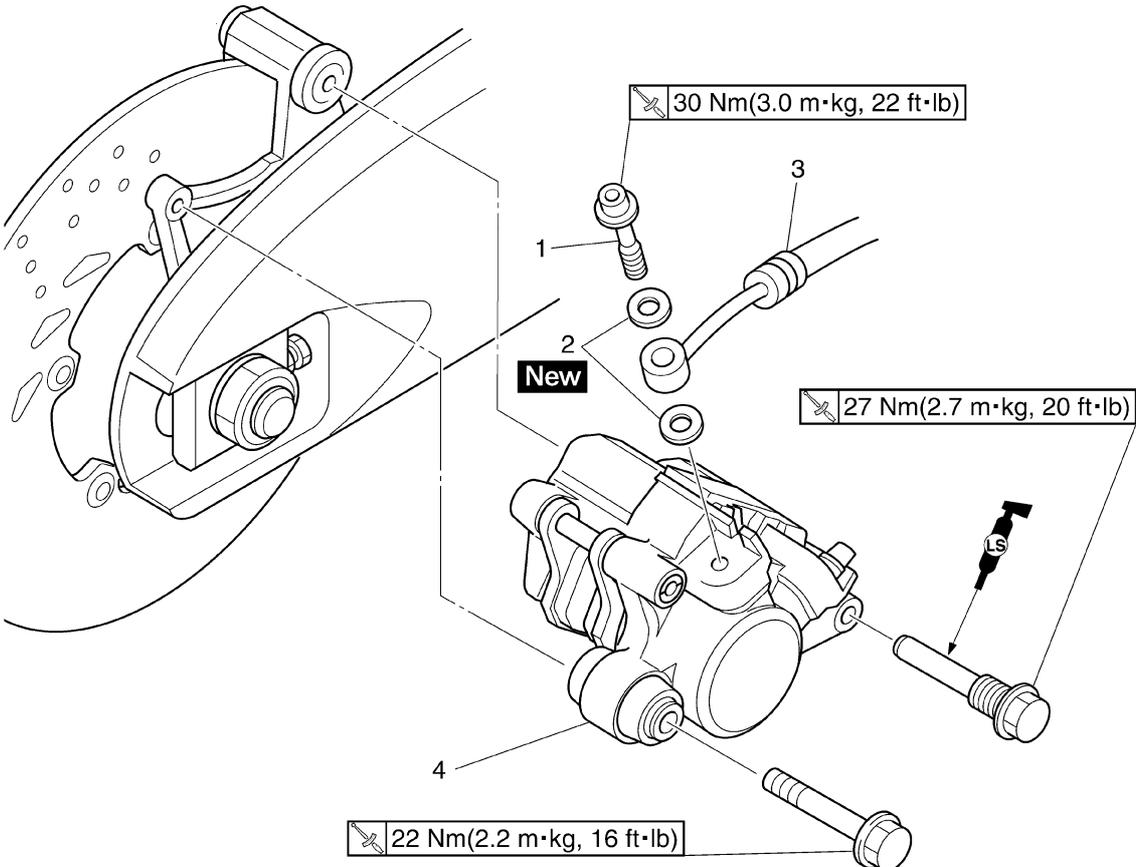
## Disassembling the rear brake master cylinder



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

# REAR BRAKE

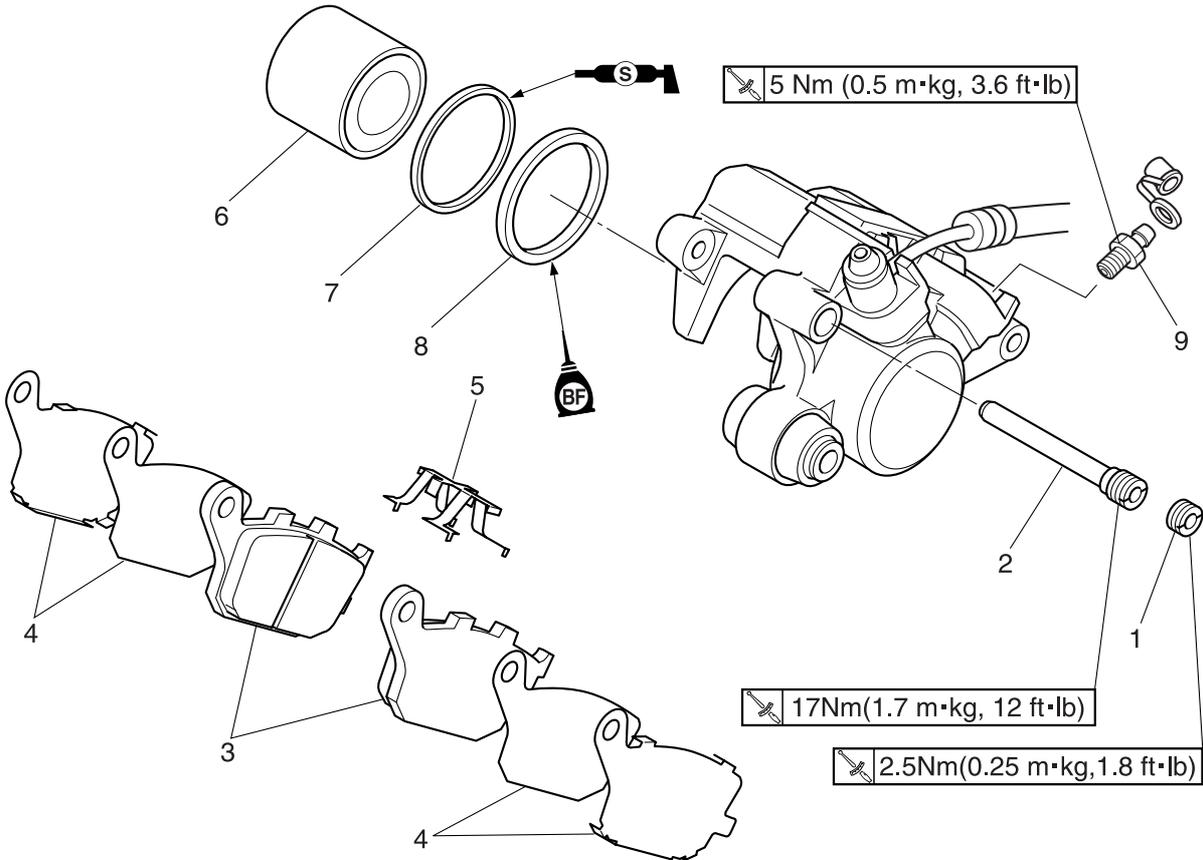
## Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Union bolt	1	
2	Copper washer	2	
3	Brake hose	1	
4	Brake caliper	1	
			For installation, reverse the removal procedure.

# REAR BRAKE

## Disassembling the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Screw plug	1	
2	Brake pad pin	1	
3	Brake pad	2	
4	Brake pad shim	4	
5	Brake pad spring	1	
6	Brake caliper piston	1	
7	Brake caliper piston 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 4-17.
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 4-31.



**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 4-31.



**Brake disc thickness limit**  
**4.5 mm (0.18 in)**

5. Adjust:
  - Brake disc deflection  
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-31.



**Brake disc bolt**  
**30 Nm (3.0 m·kg, 22 ft·lb)**  
**LOCTITE®**

6. Install:
  - Rear wheel  
Refer to "REAR WHEEL" on page 4-17.

EAS22580

## REPLACING THE REAR BRAKE PADS

### NOTE:

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

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



**Brake pad lining thickness (inner)**

**6.0 mm (0.24 in)**

**Limit**

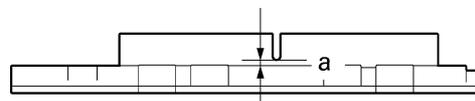
**1.0 mm (0.04 in)**

**Brake pad lining thickness (outer)**

**6.0 mm (0.24 in)**

**Limit**

**1.0 mm (0.04 in)**



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

### NOTE:

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





EAS22670

## INSTALLING THE REAR BRAKE CALIPER

### 1. Install:

- Brake caliper "1"  
(temporarily)
- Copper washers "2" **New**
- Brake hose "3"
- Union bolt "4"



**Brake hose union bolt**  
30 Nm (3.0 m·kg, 22 ft·lb)

EWA13530

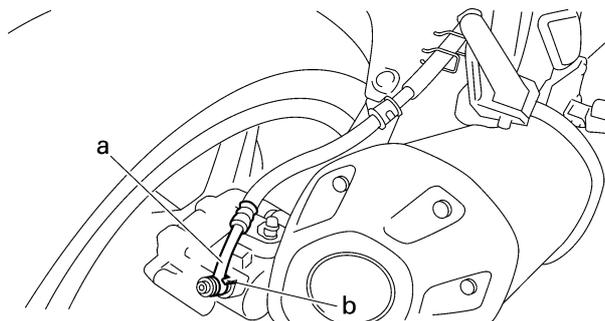
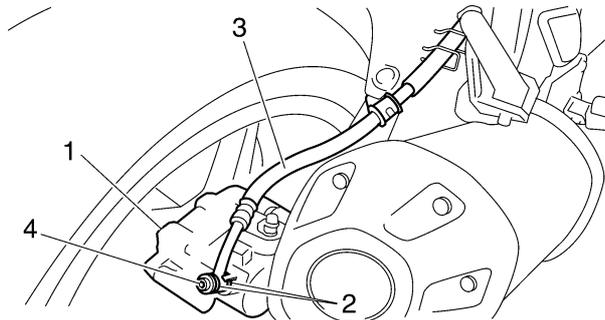
### **WARNING**

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-41.

ECA5D01018

### **CAUTION:**

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



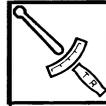
### 2. Remove:

- Brake caliper

### 3. Install:

- Brake pad shims
- Brake pads
- Brake pad spring
- Brake pad pin
- Screw plug
- Brake caliper

Refer to "REPLACING THE REAR BRAKE PADS" on page 4-44.



**Brake caliper bolt (front)**  
27 Nm (2.7 m·kg, 20 ft·lb)  
**Brake caliper bolt (rear)**  
22 Nm (2.2 m·kg, 16 ft·lb)

### 4. Fill:

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



**Recommended brake fluid**  
DOT4

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

### **CAUTION:**

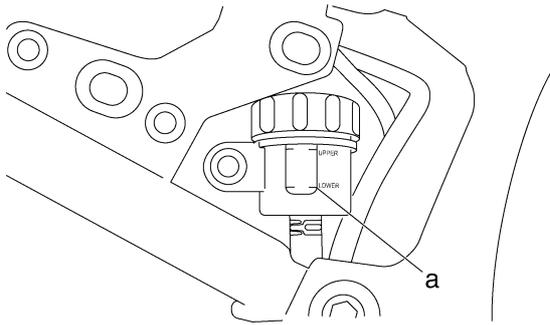
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

### 5. Bleed:

- Brake system  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.

### 6. Check:

- Brake fluid level  
Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.  
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.

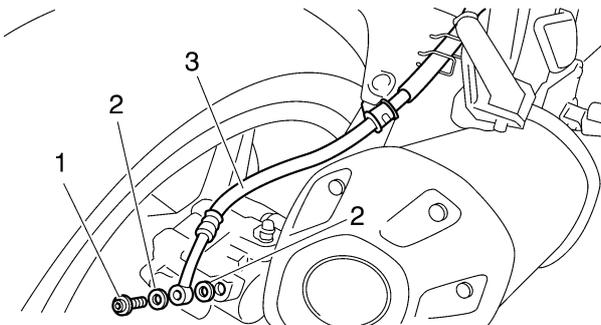


7. Check:
- Brake pedal operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-25.

EAS22700  
**REMOVING THE REAR BRAKE MASTER CYLINDER**

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

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



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.

EAS22730  
**ASSEMBLING THE REAR BRAKE MASTER CYLINDER**

EWA13520

**WARNING**

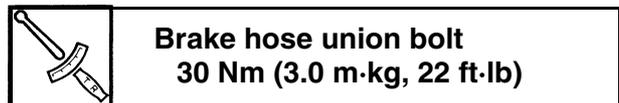
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.



EAS22740

**INSTALLING THE REAR BRAKE MASTER CYLINDER**

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



EWA5D01006

**WARNING**

Proper brake hose routing is essential to insure safe vehicle operation.  
Refer to “CABLE ROUTING” on page 2-41.

ECA5D01013

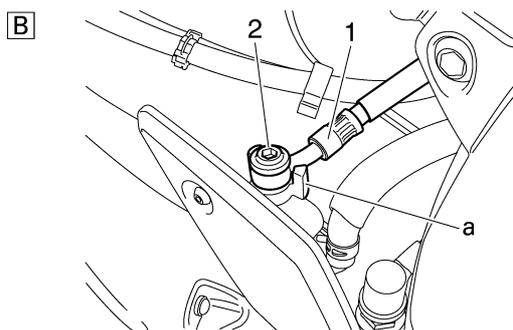
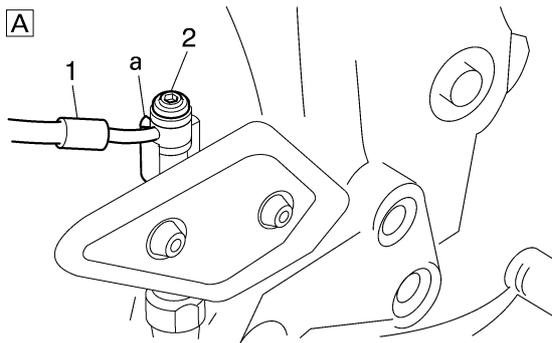
**CAUTION:**

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

ECA5D01025

**CAUTION:**

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



- A. FZ1-N(X)/FZ1-S(X)
- B. FZ1-SA/FZ1-NA

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

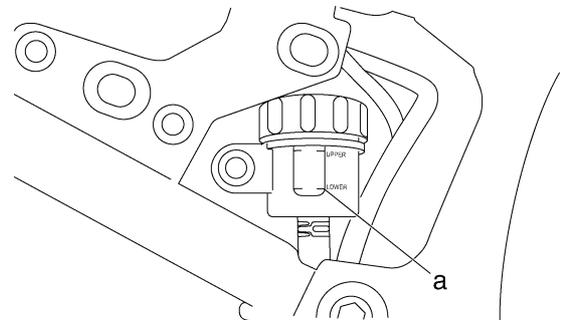


EWA5D01007

**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.

3. Bleed:
  - Brake system  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
4. Check:
  - Brake fluid level  
Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.  
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.



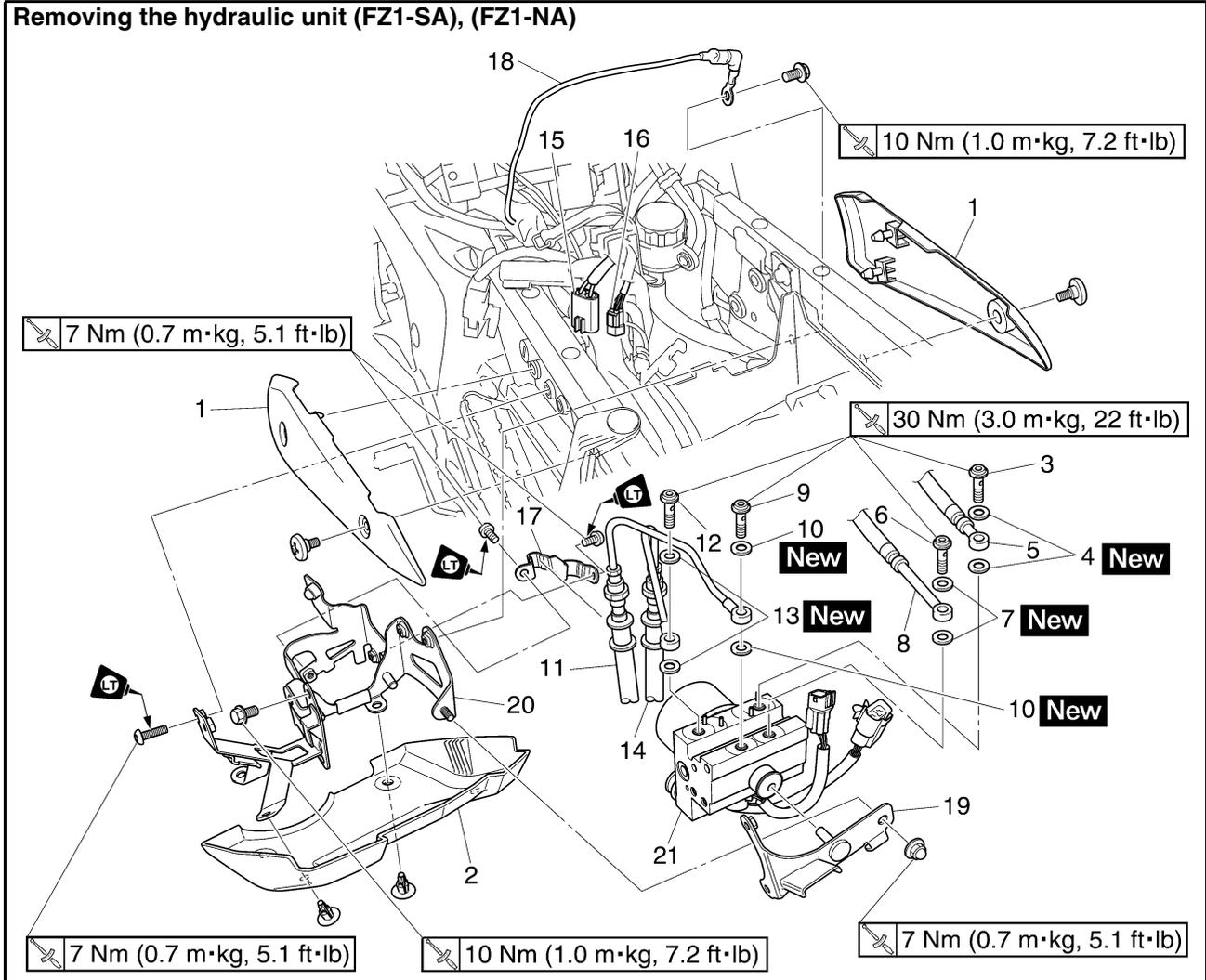
5. Check:
  - Brake pedal operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
6. Adjust:
  - Brake pedal position  
Refer to "ADJUSTING THE REAR DISC BRAKE" on page 3-22.
7. Adjust:
  - Rear brake light operation timing  
Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-24.

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS22760

## ABS (ANTI-LOCK BRAKE SYSTEM)

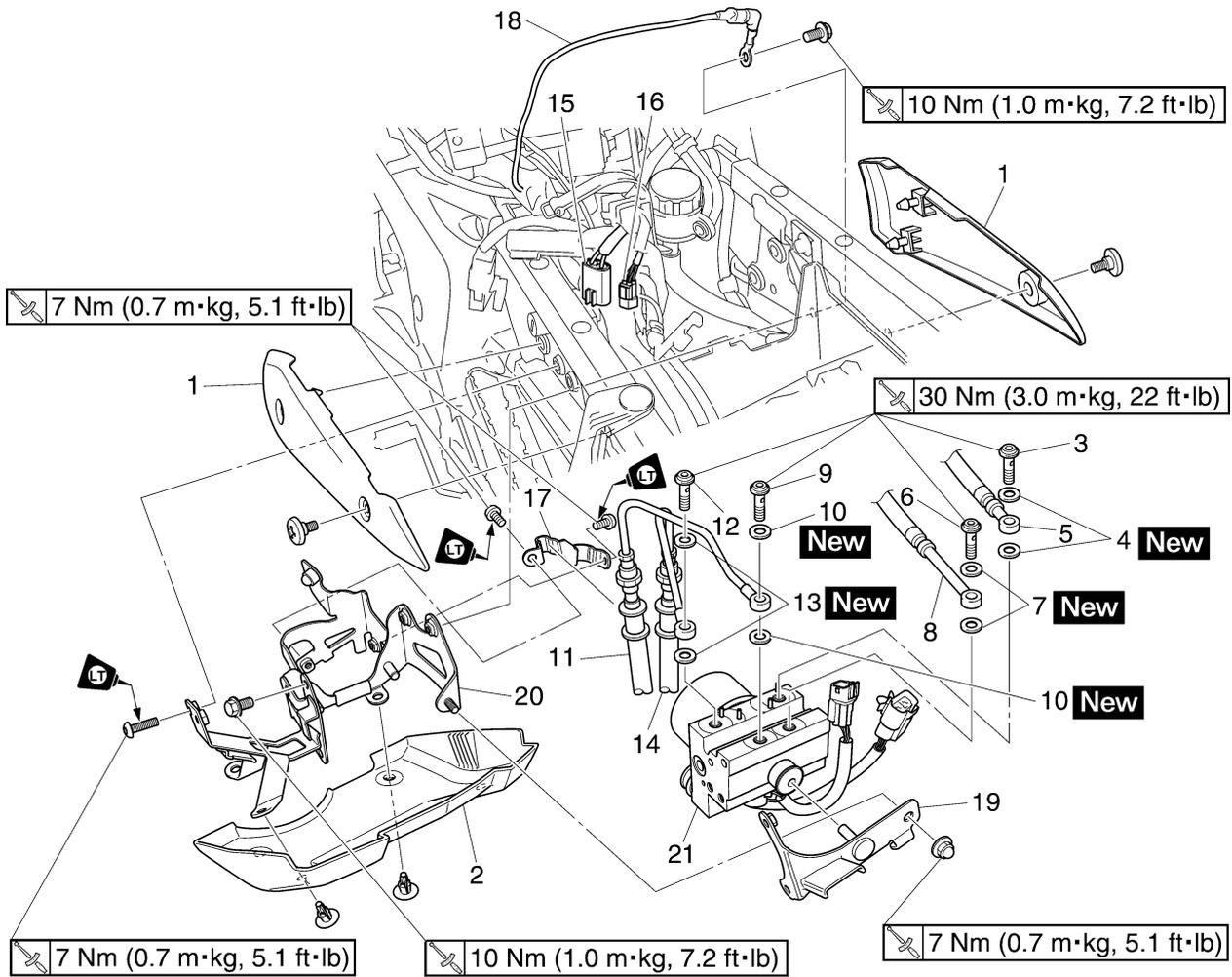
### Removing the hydraulic unit (FZ1-SA), (FZ1-NA)



Order	Job/Parts to remove	Q'ty	Remarks
	Passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	EXUP servo motor		Refer to "ENGINE REMOVAL" on page 5-1.
	Brake fluid reservoir tank		Refer to "REAR BRAKE" on page 4-38.
	ABS motor relay		Refer to "ABS ECU AND ABS MOTOR RELAY" on page 8-101.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
1	Side cover	2	
2	Under cover	1	
3	Union bolt	1	
4	Copper washer	2	
5	Brake hose (front brake master cylinder to hydraulic unit)	1	
6	Union bolt	1	
7	Copper washer	2	
8	Brake hose (hydraulic unit to front brake calipers)	1	

# ABS (ANTI-LOCK BRAKE SYSTEM)

## Removing the hydraulic unit (FZ1-SA), (FZ1-NA)



Order	Job/Parts to remove	Q'ty	Remarks
9	Union bolt	1	
10	Copper washer	2	
11	Brake hose (hydraulic unit to rear brake caliper)	1	
12	Union bolt	1	
13	Copper washer	2	
14	Brake hose (rear brake master cylinder to hydraulic unit)	1	
15	ABS motor coupler	1	
16	Hydraulic unit solenoid coupler	1	
17	Brake hose holder	1	
18	Ground lead	1	
19	Hydraulic unit bracket 1	1	
20	Hydraulic unit bracket 2	1	
21	Hydraulic unit	1	
			For installation, reverse the removal procedure.

# ABS (ANTI-LOCK BRAKE SYSTEM)

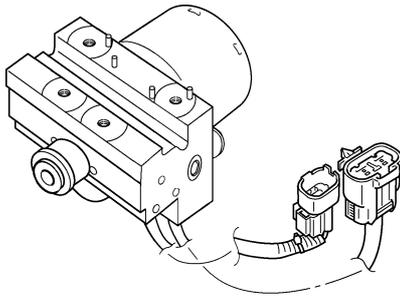
EAS22770

## [D-5] MAINTENANCE OF THE HYDRAULIC UNIT

ECA15060

### CAUTION:

Do not turn the crankshaft when installing the camshaft sprockets to avoid damage or improper valve.



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.

ECA14520

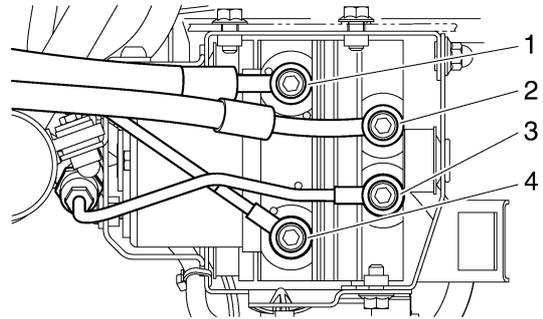
### CAUTION:

- Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.
- The ABS wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.
- Do not turn the main switch to "ON" when removing the hydraulic unit.
- 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 have been removed, be sure to tighten them to the specified torque and bleed the brake system.

### Removing the hydraulic unit

1. Remove:
  - Brake hose "1" (from the front brake master cylinder)
  - Brake hose "2" (to the front brake caliper)

- Brake hose "3" (to the rear brake caliper)
- Brake hose "4" (from the rear brake master cylinder)



### NOTE:

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

ECA14530

### CAUTION:

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

2. Remove:
  - Hydraulic unit bracket

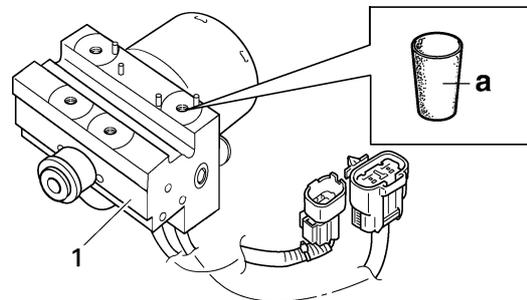
### NOTE:

Loosen the bolt in the proper sequence.

3. Remove:
  - Hydraulic unit "1"

### NOTE:

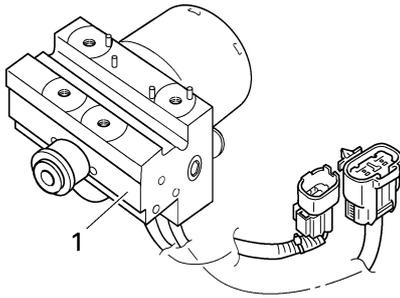
To avoid brake fluid leakage and to prevent foreign materials from entering the hydraulic unit, insert a rubber plug "a" or a bolt (M10 × 1.25) into each union bolt hole.



### Checking the hydraulic unit

1. Check:
  - Hydraulic unit "1"  
Cracks/damage → Replace the hydraulic unit.

# ABS (ANTI-LOCK BRAKE SYSTEM)



## Installing the hydraulic unit

Proceed in the reverse order of disassembly. Pay attention to the following items.

1. Install:
  - Hydraulic unit bracket



**Hydraulic unit bracket bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**

**NOTE:**  
 Tighten the nuts in the proper sequence.

2. Install:
  - Hydraulic unit

**NOTE:**  
 Do not allow any foreign materials to enter the hydraulic unit or the brake hoses when installing the hydraulic unit.

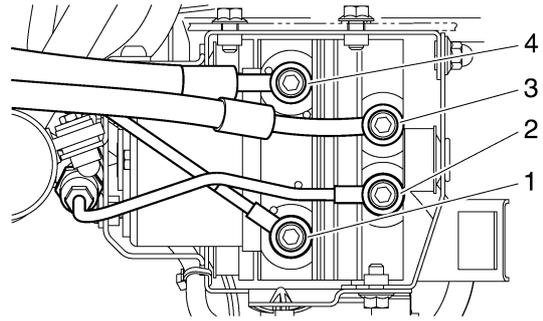
ECA14740

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

3. Remove:
  - Rubber plugs or bolts (M10 × 1.25)
4. Install:
  - Copper washer **New**
  - Brake hose “1” (to the rear brake caliper)
  - Brake hose “2” (from the rear brake master cylinder)
  - Brake hose “3” (to the front brake caliper)
  - Brake hose “4” (from the front brake master cylinder)
  - Union bolt



**Brake hose union bolt**  
**30 Nm (3.0 m·kg, 22 ft·lb)**



EWA13940

### **WARNING**

**The brake hoses to the front and rear brake calipers can be distinguished by the rubber at the end of each hose. Be sure to connect each brake hose to the correct union bolt hole.**

ECA14760

### **CAUTION:**

**To route the front and rear brake hoses, refer to “CABLE ROUTING” on page 2-41.**

5. Fill:
  - Brake master cylinder reservoir



**Recommended brake fluid**  
**DOT 4**

6. Bleed the brake system.
7. Check the operation of the hydraulic unit according to the brake lever and the brake pedal response. (Refer to “HYDRAULIC UNIT OPERATION TEST” on page 4-53.)

ECA14770

### **CAUTION:**

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

8. Delete the malfunction codes. (Refer to “[D-6-4] DELETING THE MALFUNCTION CODE” on page 8-128.)
9. Perform a trial run. (Refer to “[D-6-5] TRIAL RUN” on page 4-57.)

EAS22800

### **HYDRAULIC UNIT OPERATION TEST**

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 by the following two methods.

- Hydraulic unit operation test 1: this test generates the same reaction-force pulsating

# ABS (ANTI-LOCK BRAKE SYSTEM)

action that is generated in the brake lever and brake pedal when the ABS is activated.

- Hydraulic unit operation test 2: this test checks the function of the ABS after the system was disassembled, adjusted, or serviced.

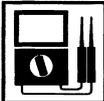
## Hydraulic unit operation test 1

EWA13120

### WARNING

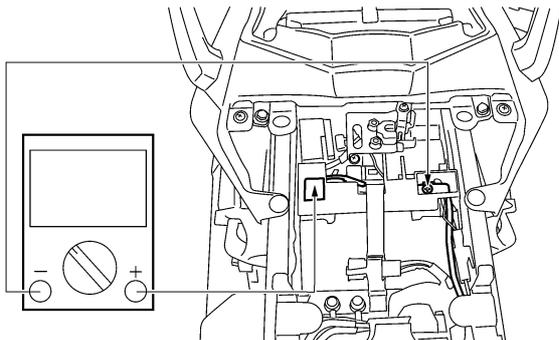
**Securely support the vehicle so that there is no danger of it falling over.**

1. Place the vehicle on the centerstand.
2. Set the main switch to "OFF".
3. Remove:
  - Seat  
Refer to "GENERAL CHASSIS" on page 4-1.
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
  - Front cowling inner panel (left side)  
Refer to "GENERAL CHASSIS" on page 4-1.
4. Check:
  - Battery voltage



### Battery voltage Higher than 12.8 V

Lower than 12.8 V → Charge or replace the battery.



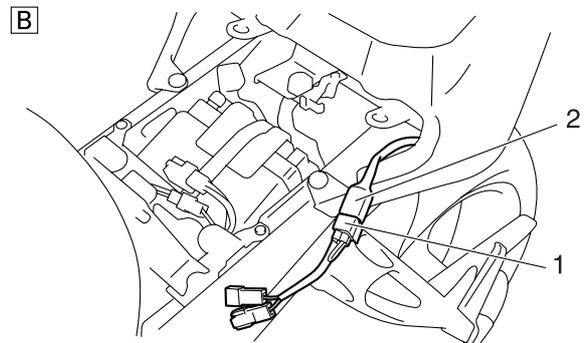
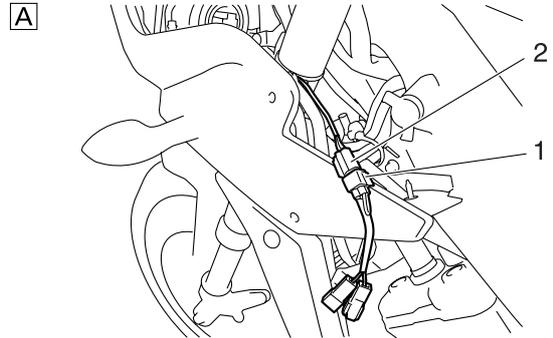
### NOTE:

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

5. Connect the test coupler adaptor "1" to the test coupler "2".



### Test coupler adaptor 90890-03149



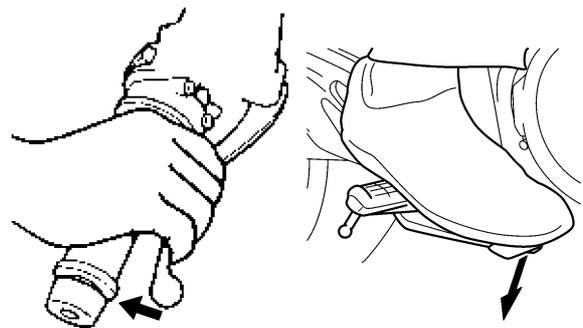
- A. FZ1-SA  
B. FZ1-NA

6. Set the main switch to "ON" while operating the brake lever and the brake pedal simultaneously.

ECA5D01008

### CAUTION:

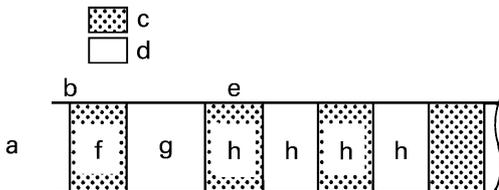
**When the main switch is set to "ON", be sure to operate both the brake levers and the brake pedal simultaneously. If only the brake levers or brake pedal are operated, set the main switch to "OFF" and start the procedure again.**



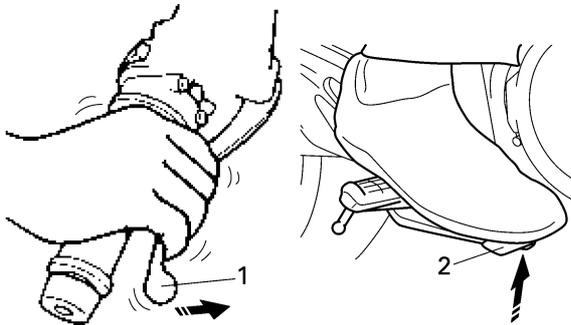
7. Check:
  - Hydraulic unit operation

# ABS (ANTI-LOCK BRAKE SYSTEM)

When the main switch is set to "ON", the ABS warning light comes on for 2 seconds, goes off for 3 seconds, then starts flashing. When the ABS warning light starts flashing, the brake lever "1" will return to its home position. The brake pedal "2" will then return to its home position, then the brake lever will return to its home position again.



- a. ABS warning light
- b. Main switch "ON"
- c. Comes on
- d. Goes off
- e. Flashes
- f. 2.0 seconds
- g. 3.0 second
- h. 0.5 second



ECA14810

**CAUTION:**

- Check that the brake lever returns to its home position before the brake pedal returns to its home position.
- If the brake pedal returns to its home position before the brake lever does, check that the brake hoses are connected correctly to the hydraulic unit.
- If either the brake lever or brake pedal returns its home position slowly, check that the brake hoses are connected correctly to the hydraulic unit.

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

## Hydraulic unit operation test 2

EWA13120

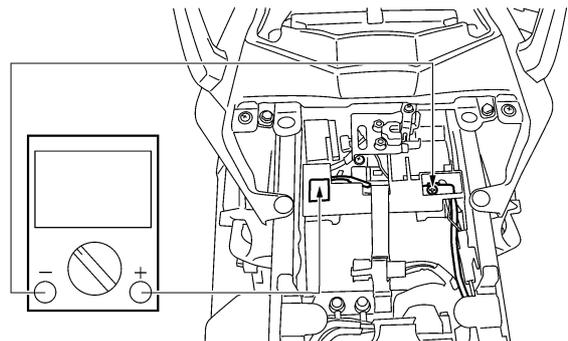
**WARNING**

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

1. Place the vehicle on the centerstand.
2. Set the main switch to "OFF".
3. Remove:
  - Seat  
Refer to "GENERAL CHASSIS" on page 4-1.
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
4. Check:
  - Battery voltage

	<b>Battery voltage Higher than 12.8 V</b>
--	---

Lower than 12.8 V → Charge or replace the battery.



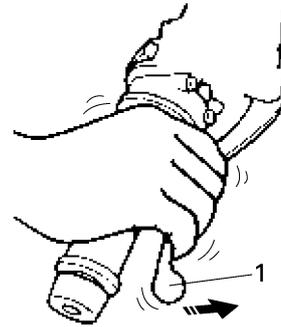
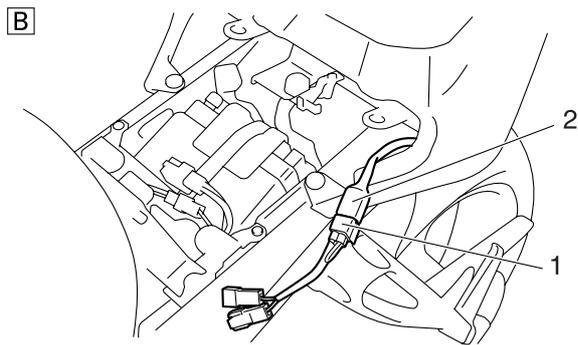
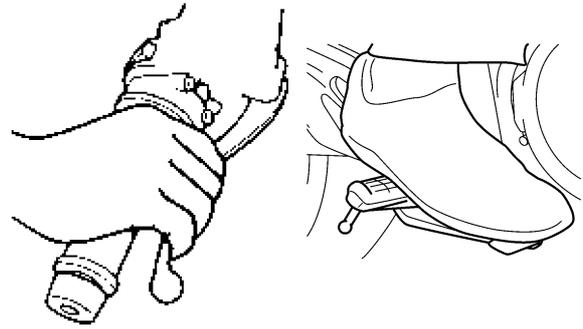
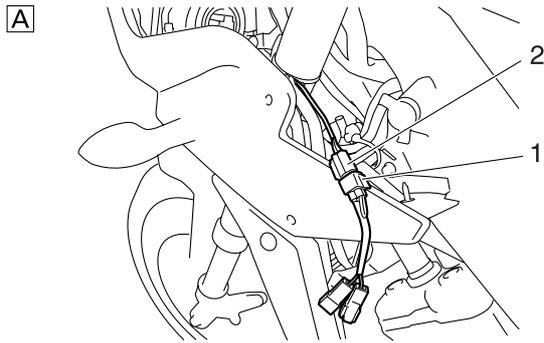
**NOTE:**

- If the battery voltage is lower than 12.8 V, charge the battery and 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 adaptor "1" to the test coupler "2".

	<b>Test coupler adaptor 90890-03149</b>
--	---

# ABS (ANTI-LOCK BRAKE SYSTEM)



- A. FZ1-SA  
B. FZ1-NA

6. Set the engine stop switch to "⊗".  
7. Set the main switch to "ON".

**NOTE:**

After setting the main switch to "ON", wait (approximately 2 seconds) until the ABS warning light goes off.

8. Push the start switch for at least 4 seconds.

ECA14790

**CAUTION:**

**Do not operate the brake lever or the brake pedal.**

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

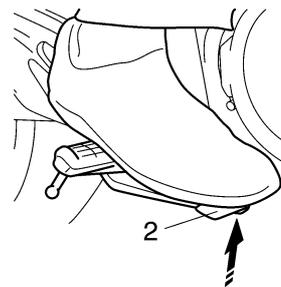
**NOTE:**

- 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 second.
- Be sure to continue to operate the brake lever and brake pedal even after the pulsating action has stopped.

10. After the pulsating action has stopped in the brake lever, it is generated in the brake pedal "2" 0.5 second after and continues for approximately 1 second.

**NOTE:**

Be sure to continue to operate the brake lever and brake pedal even after the pulsating action has stopped.



11. After the pulsating action has stopped in the brake pedal, it is generated in the brake lever 0.5 second after and continues for approximately 1 second.

ECA14800

**CAUTION:**

- Check that the pulsating action is felt in the brake lever, brake pedal, and again in the brake lever, respectively.
- If the pulsating action is felt in the brake pedal before it is felt in the brake lever, check that the brake hoses are connected correctly to the hydraulic unit.

## ABS (ANTI-LOCK BRAKE SYSTEM)

---

- **If the pulsating action is hardly felt in either the brake lever or brake pedal, check that the brake hoses are connected correctly to the hydraulic unit.**
- 

12. Set the main switch to "OFF".
13. Remove the test coupler adaptor from the test coupler.
14. Set the main switch to "ON".
15. Set the engine stop switch to "○".

EAS22820

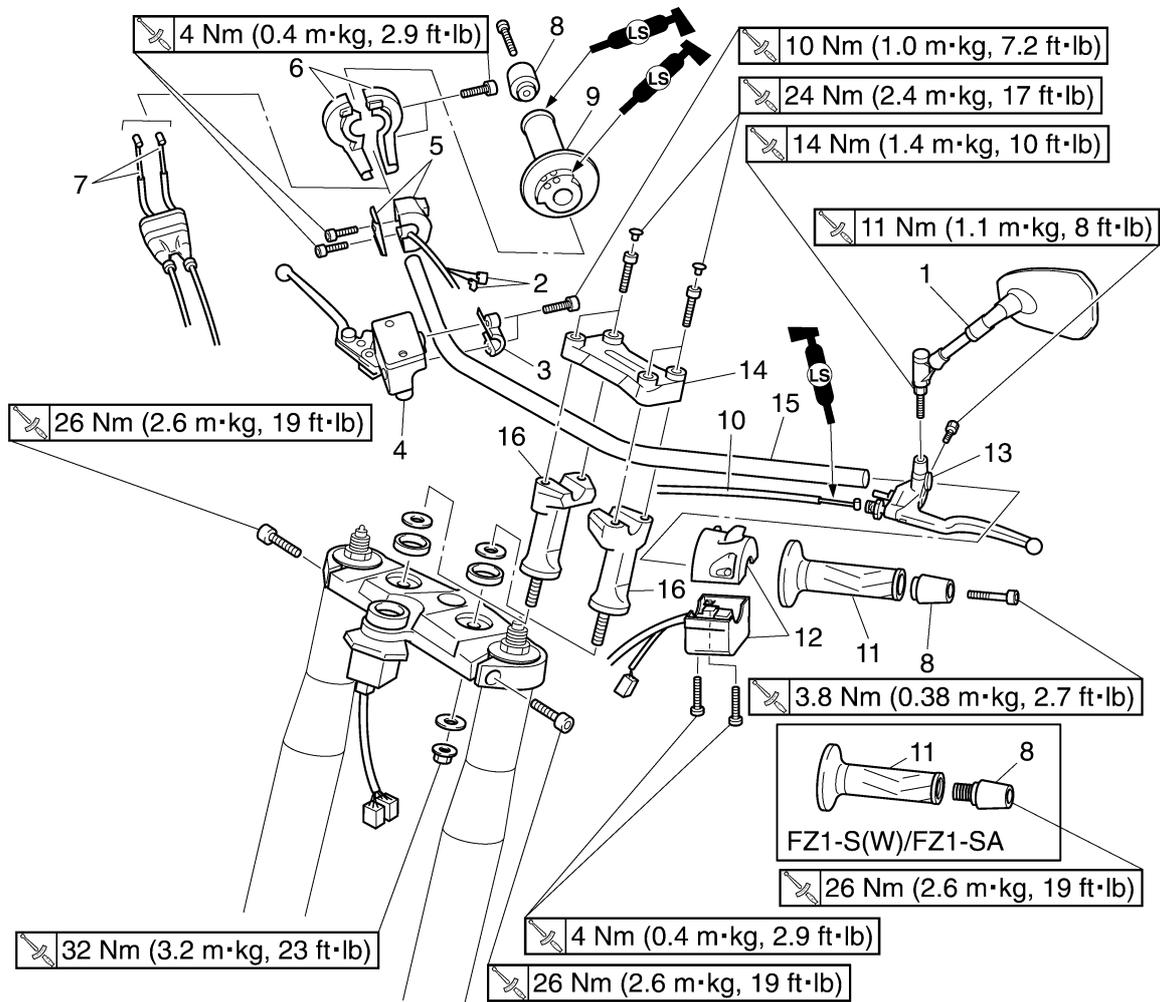
### **[D-6-5] TRIAL RUN**

After all checks and services are completed, always ensure the scooter has no problems by performing the trial running at a speed of faster than 10 km/h.

EAS22840

## HANDLEBAR

### Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
	Front cowling (FZ1-S(X)/FZ1-SA)		Refer to "GENERAL CHASSIS" on page 4-1.
1	Rear view mirror (FZ1-N(X)), (FZ1-NA)	2	
2	Front brake light switch connector	2	Disconnect.
3	Front master cylinder bracket	1	
4	Front brake master cylinder assembly	1	
5	Right handlebar switch	1	
6	Throttle cable housing	1	
7	Throttle cable	2	
8	Grip end	2	
9	Throttle grip	1	
10	Clutch cable	1	
11	Handlebar grip	1	
12	Left handlebar switch	1	
13	Clutch lever holder	1	
14	Upper handlebar holder	1	
15	Handlebar	1	
16	Lower handlebar holder	2	
			For installation, reverse the removal procedure.

EAS22860

## REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

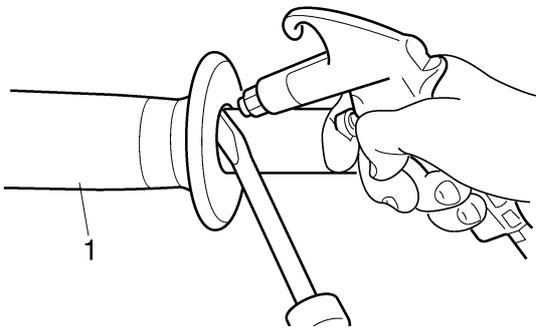
### **WARNING**

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

2. Remove:
  - Handlebar grip "1"

### NOTE:

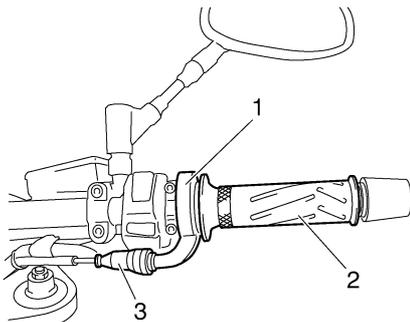
Blow compressed air between the handlebar and the handlebar grip, and gradually push the grip off the handlebar.



3. Remove:
  - Throttle cable housing "1"
  - Throttle grip "2"

### NOTE:

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



EAS22880

## CHECKING THE HANDLEBAR

1. Check:
  - Handlebar

Bends/cracks/damage → Replace.

EWA13690

### **WARNING**

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

EAS22930

## INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

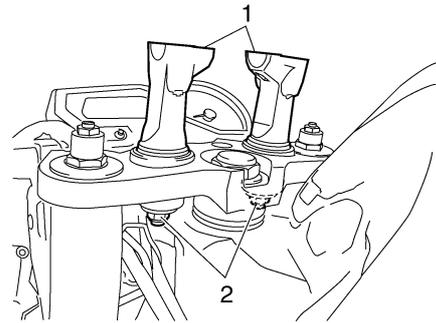
### **WARNING**

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

2. Install:
  - Lower handlebar holders "1"

### NOTE:

Temporarily tighten the nuts "2".



3. Install:
  - Handlebar "1"
  - Upper handlebar holder "2"

	<b>Upper handlebar holder bolt</b> 24 Nm (2.4 m·kg, 17 ft·lb)
---	--

ECA14250

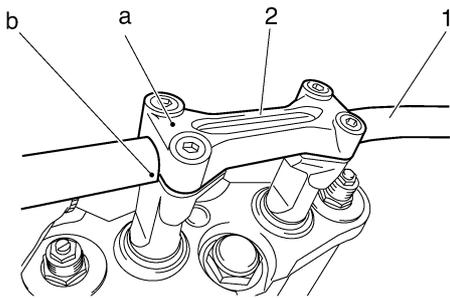
### **CAUTION:**

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

### NOTE:

- The upper handlebar holder should be installed with the punch mark "a" facing forward.
- Align the match marks "b" on the handlebar with the upper surface of the lower handlebar holders.

# HANDLEBAR



4. Tighten:

- Lower handlebar holder nuts



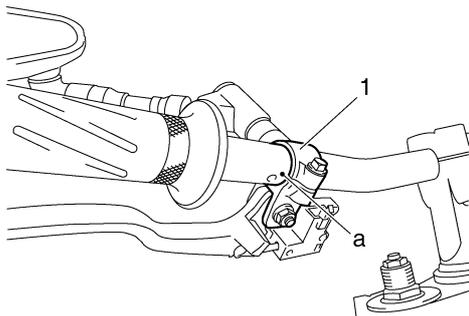
**Lower handlebar holder nut**  
**32 Nm (3.2 m·kg, 23 ft·lb)**

5. Install:

- Clutch lever holder "1"
- Clutch cable

**NOTE:**

Align the slit in the clutch lever holder with the punch mark "a" in the handlebar.

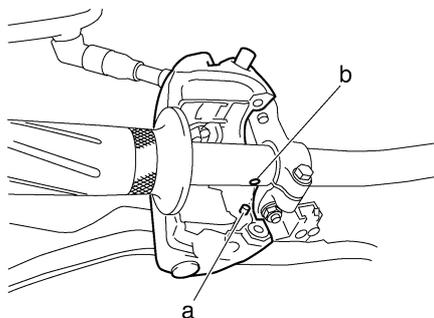


6. Install:

- Left handlebar switch

**NOTE:**

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



7. Install:

- Handlebar grip "1"
- Grip end "2"



**Grip end**  
**26 Nm (2.6 m·kg, 19 ft·lb)**

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

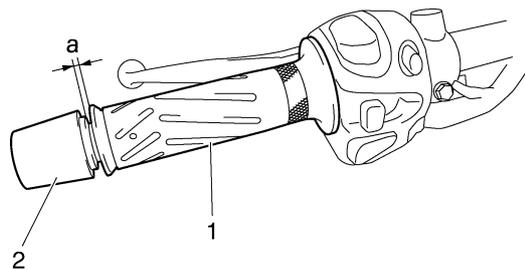
EWA5D01009

**WARNING**

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

**NOTE:**

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

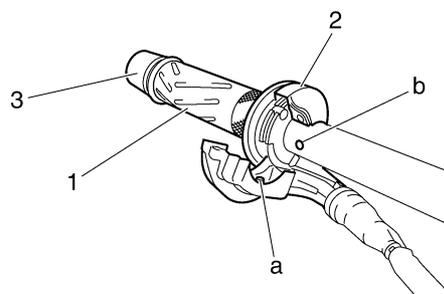


8. Install:

- Throttle grip "1"
- Throttle cable housing "2"
- Throttle cables
- Grip end "3"

**NOTE:**

Align the projections "a" on the throttle cable housing with the hole "b" in the handlebar.

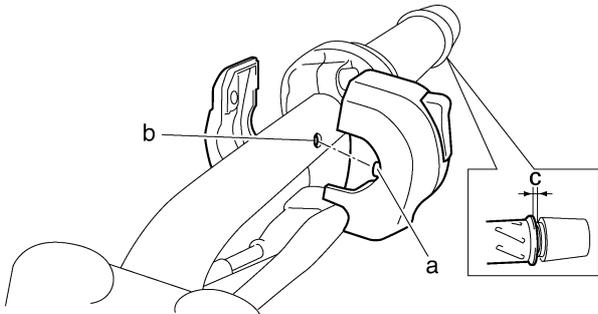


9. Install:

- Right handlebar switch

**NOTE:**

- Align the projections “a” on the handlebar switch with the holes “b” in the handlebar.
- There should be 1–3 mm (0.04–0.12 in) of clearance “c” between the handlebar grip and the grip end.



10. Install:

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



**Front brake master cylinder  
bracket bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**

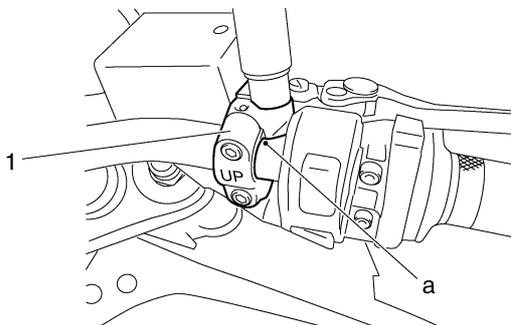
ECA5D01032

**CAUTION:**

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

**NOTE:**

Align the end of the brake master cylinder holder with the punch mark “a” on the handlebar.



11. Adjust:

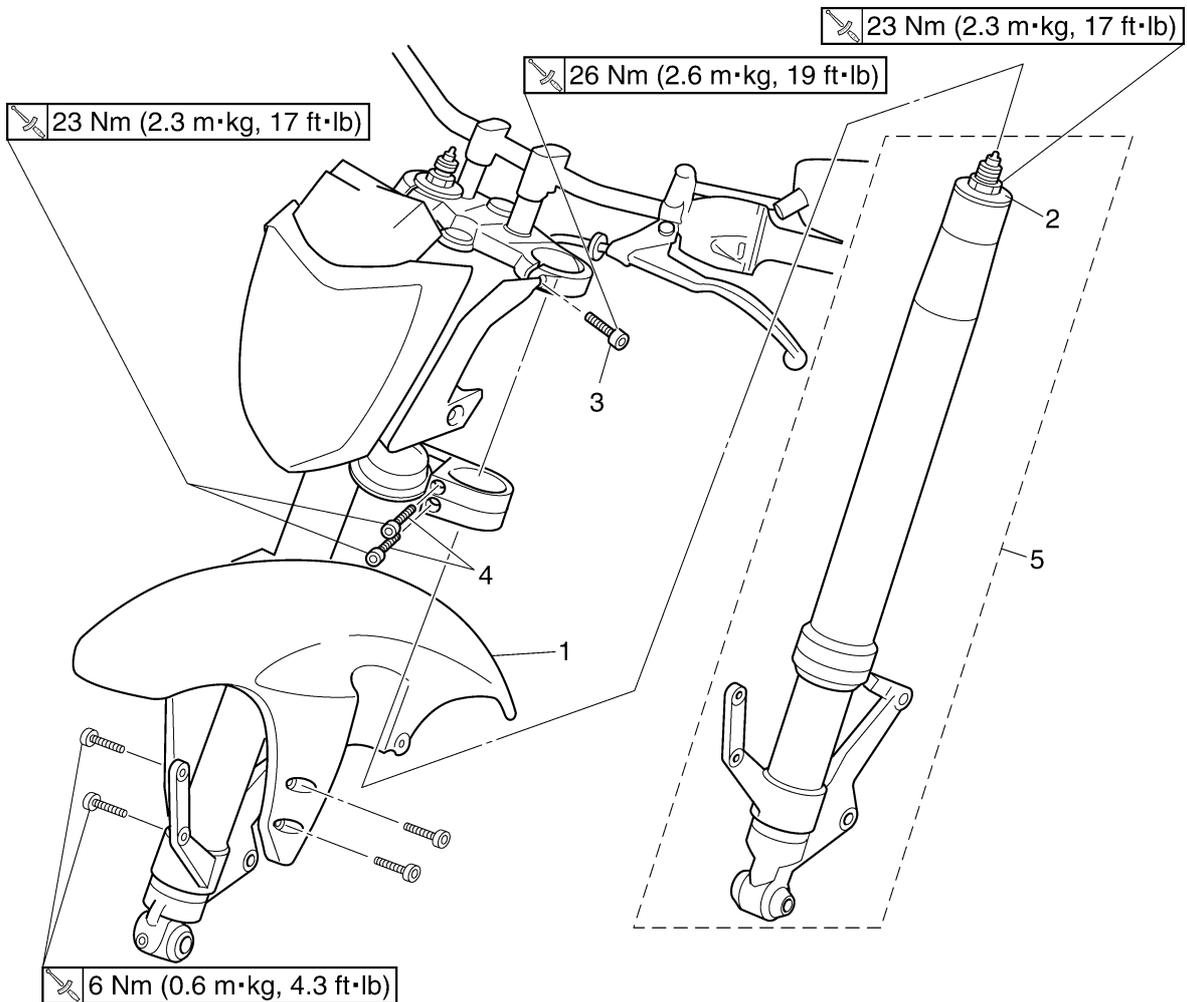
- Throttle cable free play

# FRONT FORK

EAS22950

## FRONT FORK

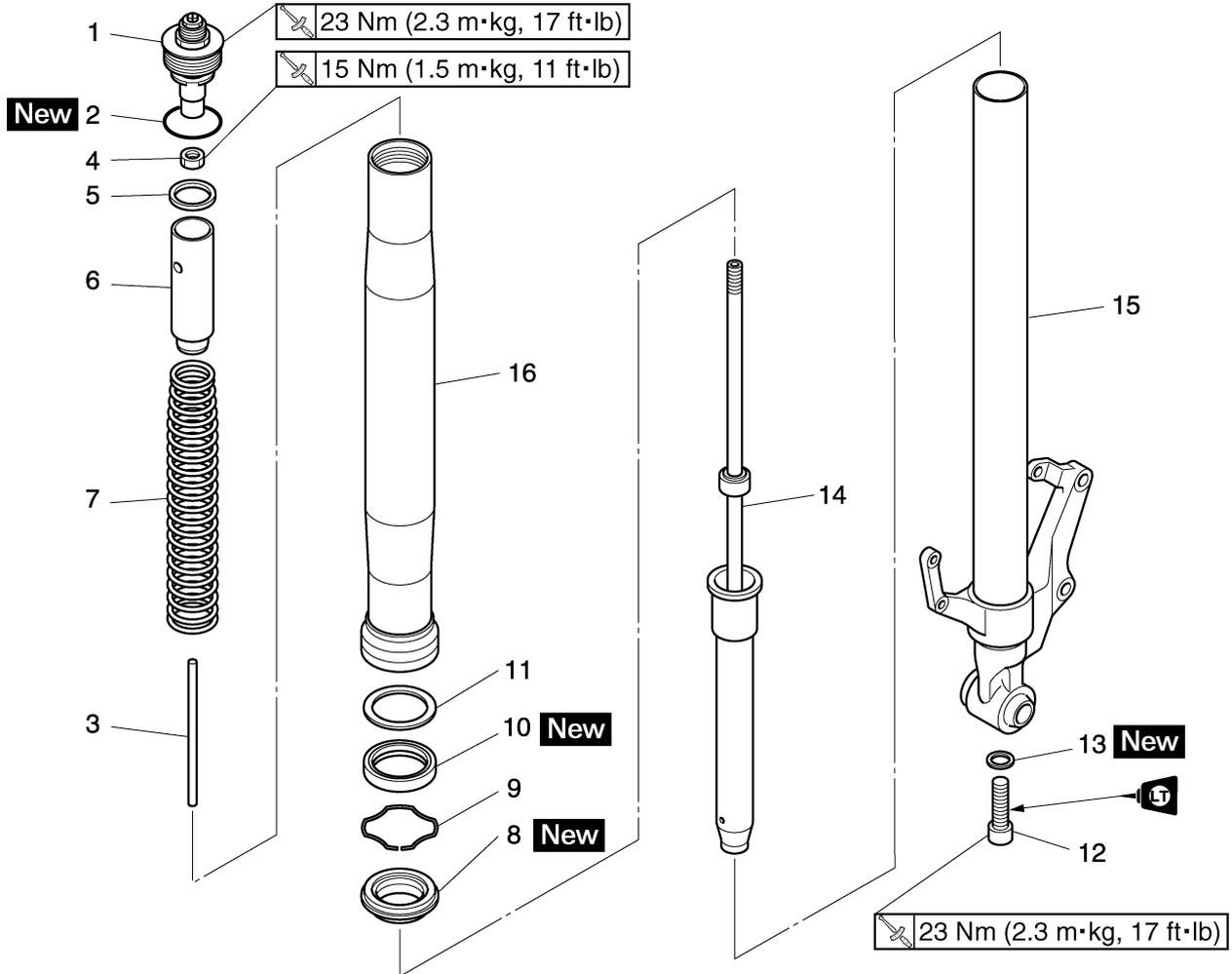
### Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
	Front wheel Front brake calipers		Refer to "CHECKING THE TIRES" on page 3-33 and "CHECKING THE WHEELS" on page 3-35.
1	Front fender	1	
2	Cap bolt	1	Loosen.
3	Upper bracket pinch bolt	1	Loosen.
4	Lower bracket pinch bolt	2	Loosen.
5	Front fork leg	1	
			For installation, reverse the removal procedure.

# FRONT FORK

## Disassembling the front fork legs



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

# FRONT FORK

EAS22970

## REMOVING THE FRONT FORK LEGS

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

**NOTE:**

Each front fork leg is equipped with a spring preload adjusting bolt, the right fork leg is equipped with a rebound damping force adjusting screen and left front fork is equipped with a compression damping force adjusting screw. Pay attention not to mistake the right and left.

1. Stand the vehicle on a level surface.

EWA13120



**WARNING**

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

**NOTE:**

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

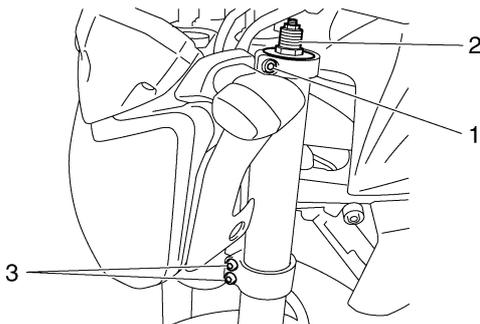
2. Loosen:
  - Upper bracket pinch bolts "1"
  - Cap bolt "2"
  - Lower bracket pinch bolts "3"

EWA13640



**WARNING**

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



3. Remove:
  - Front fork leg

EAS22990

## DISASSEMBLING THE FRONT FORK LEGS

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

1. Remove:
  - Cap bolt "1" (from the damper adjusting rod)
  - Spacers "2"
  - Nut "3"



- a. Press down on the spacer with the fork spring compressor "4".
- b. Install the rod holder "5" between the nut "3" and the spacer "2".

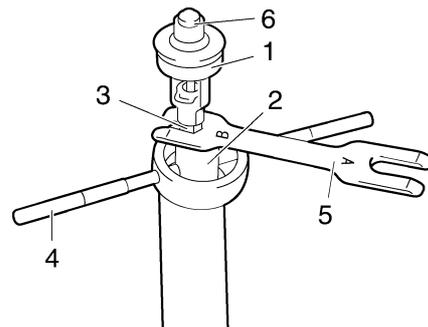


**Fork spring compressor**  
**90890-01441**  
**YM-01441**  
**Rod holder**  
**90890-01434**  
**Damper rod holder double ended**  
**YM-01434**

**NOTE:**

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

- c. Hold the spring preload adjusting bolt "6" and loosen the nut "3".



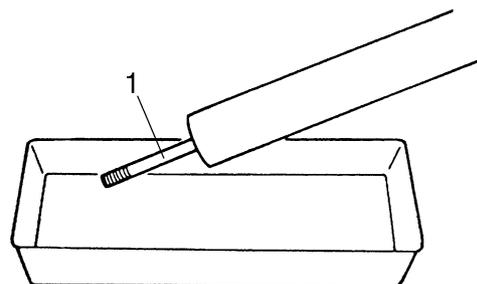
- d. Remove the cap bolt.
- e. Remove the rod holder and fork spring compressor.
- f. Remove the spacer and nut.



2. Drain:
  - Fork oil

**NOTE:**

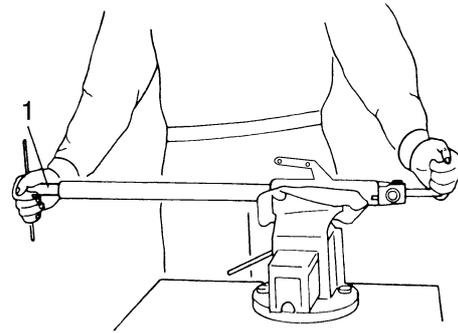
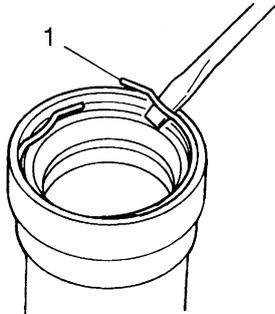
Stroke the damper rod "1" several times while draining the fork oil.



3. Remove:
- Oil seal clip "1" (with a flat-head screwdriver)

ECA14180

**CAUTION:** \_\_\_\_\_  
**Do not scratch the inner tube.**

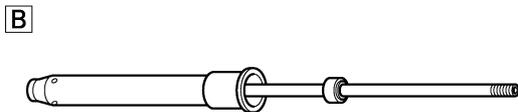
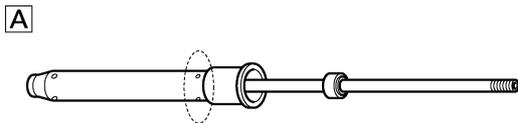


4. Remove:
- Damper rod assembly bolt
  - Damper rod assembly

ECA5D01026

**CAUTION:** \_\_\_\_\_  
**For the damper rod assembly, the right side is used for the rebound operation and left side for the compression. Pay attention not to mistake the right and left.**

**NOTE:** \_\_\_\_\_  
 The left side (for the compression) damper rod assembly has the four holes of oil path, unlike the right side.



- A. Compression side  
 B. Rebound side

**NOTE:** \_\_\_\_\_  
 While holding the damper rod with the damper rod holder "1", loosen the damper rod assembly bolt.

	<b>Damper rod holder</b> 90890-01423
	<b>Damping rod holder</b> YM-01423

EAS23010

## CHECKING THE FRONT FORK LEGS

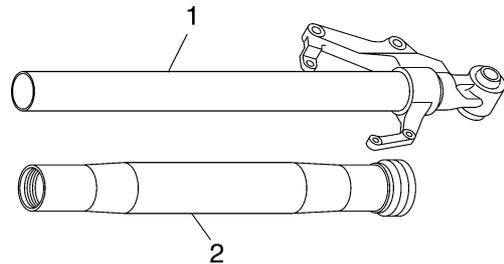
The following procedure applies to both of the front fork legs.

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

EWA13650

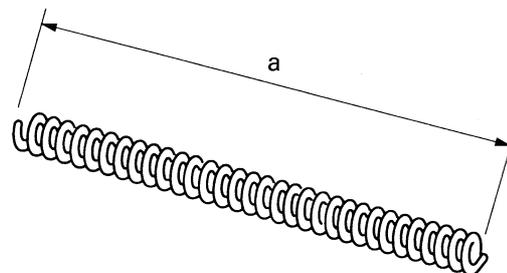
### **WARNING**

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



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

	<b>Spring free length</b>
	243.5 mm (9.59 in)
	<b>Limit</b>
	238.6 mm (9.39 in)



12311703

# FRONT FORK

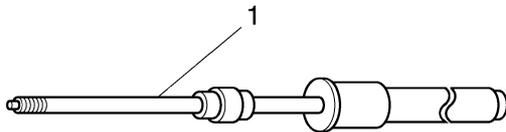
## 3. Check:

- Damper rod "1"  
Damage/wear → Replace.  
Obstruction → Blow out all of the oil passages with compressed air.
- Damper adjusting rod  
Bends/damage → Replace.

ECA14200

### CAUTION:

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



EAS23030

## ASSEMBLING THE FRONT FORK LEGS

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

EWA13660

### WARNING

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

### NOTE:

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

## 1. Install:

- Damper rod assembly "1"
- Inner tube "2"
- Damper rod assembly bolt
- Copper washer **New**

ECA5D01026

### CAUTION:

For the damper rod assembly, the right side is used for the rebound operation and left side for the compression. Pay attention not to mistake the right and left.

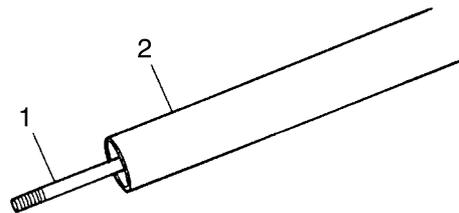
### NOTE:

The left side (for the compression) damper rod assembly has the four holes of oil path, unlike the right side.

ECA14210

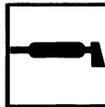
### CAUTION:

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



## 2. Lubricate:

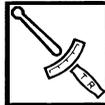
- Inner tube's outer surface



**Recommended oil**  
Suspension oil 01 or equivalent

## 3. Tighten:

- Damper rod assembly bolt "1"



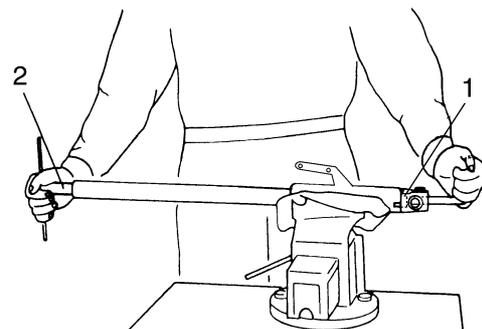
**Damper rod assembly bolt**  
23 Nm (2.3 m·kg, 17 ft·lb)  
LOCTITE®

### NOTE:

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



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



# FRONT FORK

4. Install:
- Dust seal “1”
  - Oil seal clip “2”
  - Oil seal “3”
  - Washer “4”

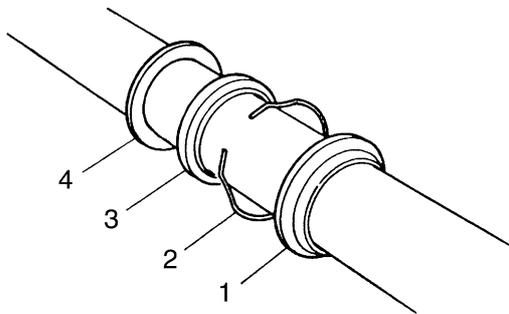
ECA14220

**CAUTION:**

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

**NOTE:**

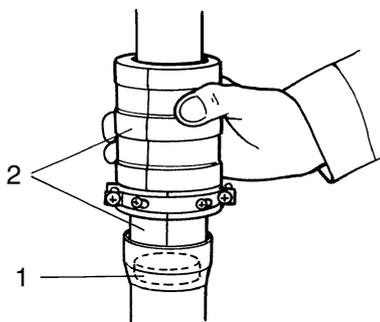
- Before installing the oil seal, lubricate its lips with lithium-soap-based grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.



5. Install:
- Oil seal “1”  
(with the fork seal driver “2”)



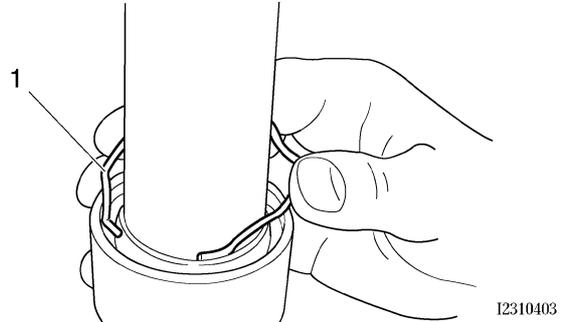
**Fork seal driver**  
**90890-01442**  
**Adjustable fork seal driver (36–46 mm)**  
**YM-01442**



6. Install:
- Oil seal clip “1”

**NOTE:**

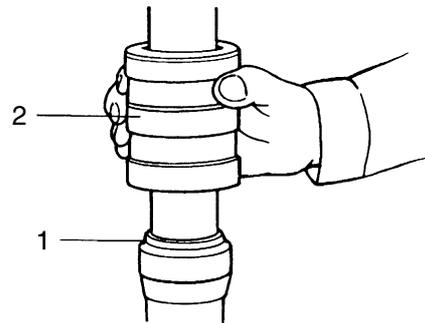
Adjust the oil seal clip so that it fits into the outer tube’s groove.



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



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

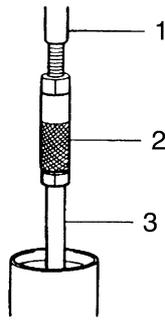


8. Install:
- Rod puller “1”
  - Rod puller attachment (M 10) “2”  
(onto the damper rod “3”)



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

# FRONT FORK



9. Fill:

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



**Quantity**

539.0 cm<sup>3</sup> (18.22 US oz) (19.01 Imp.oz)

**Recommended oil**

Suspension oil 01 or equivalent

ECA14230

**CAUTION:**

- 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.

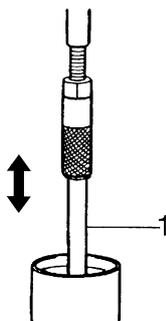
**NOTE:**

Be sure to bleed the front fork.

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

**NOTE:**

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



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

**NOTE:**

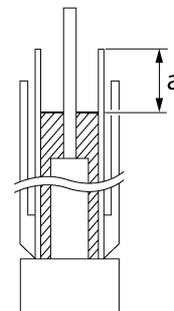
Be sure to bleed the front fork leg of any residual air.

12. Measure:

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

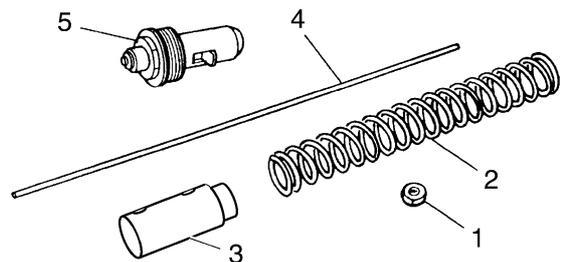


**Front fork leg oil level  
96 mm (3.78 in)**



13. Install:

- Nut "1"
- Fork spring "2"
- Spacer "3"
- Damper adjusting rod "4"
- Cap bolt "5"

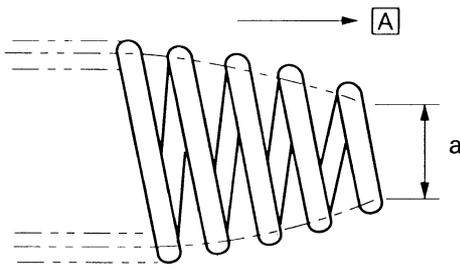


- Remove the rod puller and adapter.
- Install the nut.
- Install the fork spring and spacer.

**NOTE:**

Install the spring with the smaller pitch "a" facing up "A".

# FRONT FORK



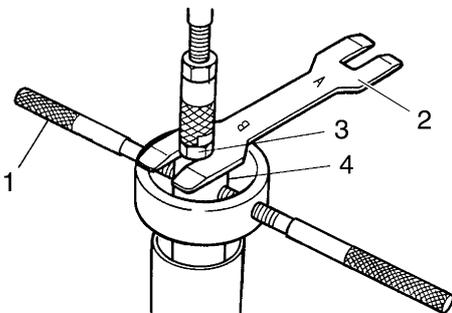
12311702

- d. Press down in the spacer with the fork spring compressor "1"
- e. Pull up the rod puller and install the rod holder "2" between the damper adjusting rod locknut "3" and the spacer "4".

**NOTE:**

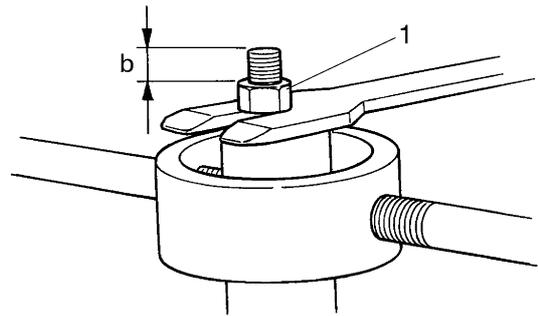
Use the side of the rod holder that is marked "B".

	<b>Fork spring compressor</b> 90890-01441 YM-01441
	<b>Rod holder</b> 90890-01434
	<b>Damper rod holder double ended</b> YM-01434



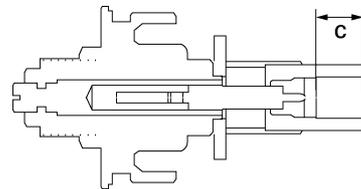
- f. Remove the rod puller and the rod puller attachment.
- g. Install the nut "1" and position it as specified "b".

	<b>Distance "b"</b> 12 mm (0.47 in)
--	--



- h. Set the cap bolt distance "c" to specification.

	<b>Distance "c"</b> 13 mm (0.51 in)
--	--



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

	<b>Damper adjusting rod locknut</b> 15 Nm (1.5 m·kg, 11 ft·lb)
--	---

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

EWA5D01005

**WARNING**

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



EAS23050

**INSTALLING THE FRONT FORK LEGS**

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

**NOTE:**

Each front fork leg is equipped with a spring preload adjusting bolt, the right fork leg is equipped with a rebound damping force adjusting screw and left front fork is equipped with a compression damping force adjusting screw. Pay attention not to mistake the right and left.

1. Install:

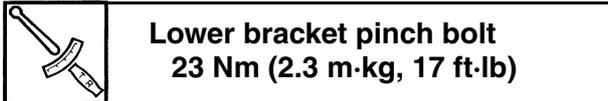
- Front fork leg  
Temporarily tighten the upper and lower bracket pinch bolts.

**NOTE:**

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

2. Tighten:

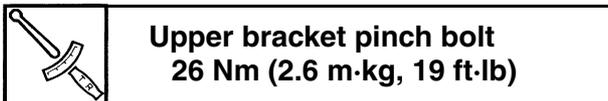
- Lower bracket pinch bolt "1"



- Cap bolt "2"



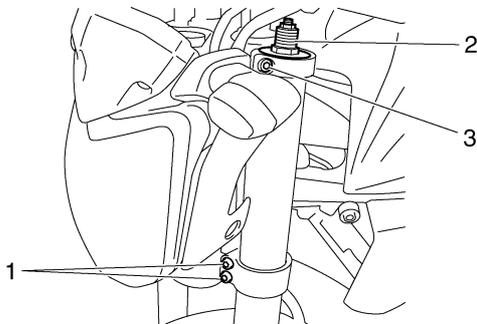
- Upper bracket pinch bolt "3"



EWA13680

**⚠ WARNING**

Make sure the brake hoses are routed properly.



3. Adjust:

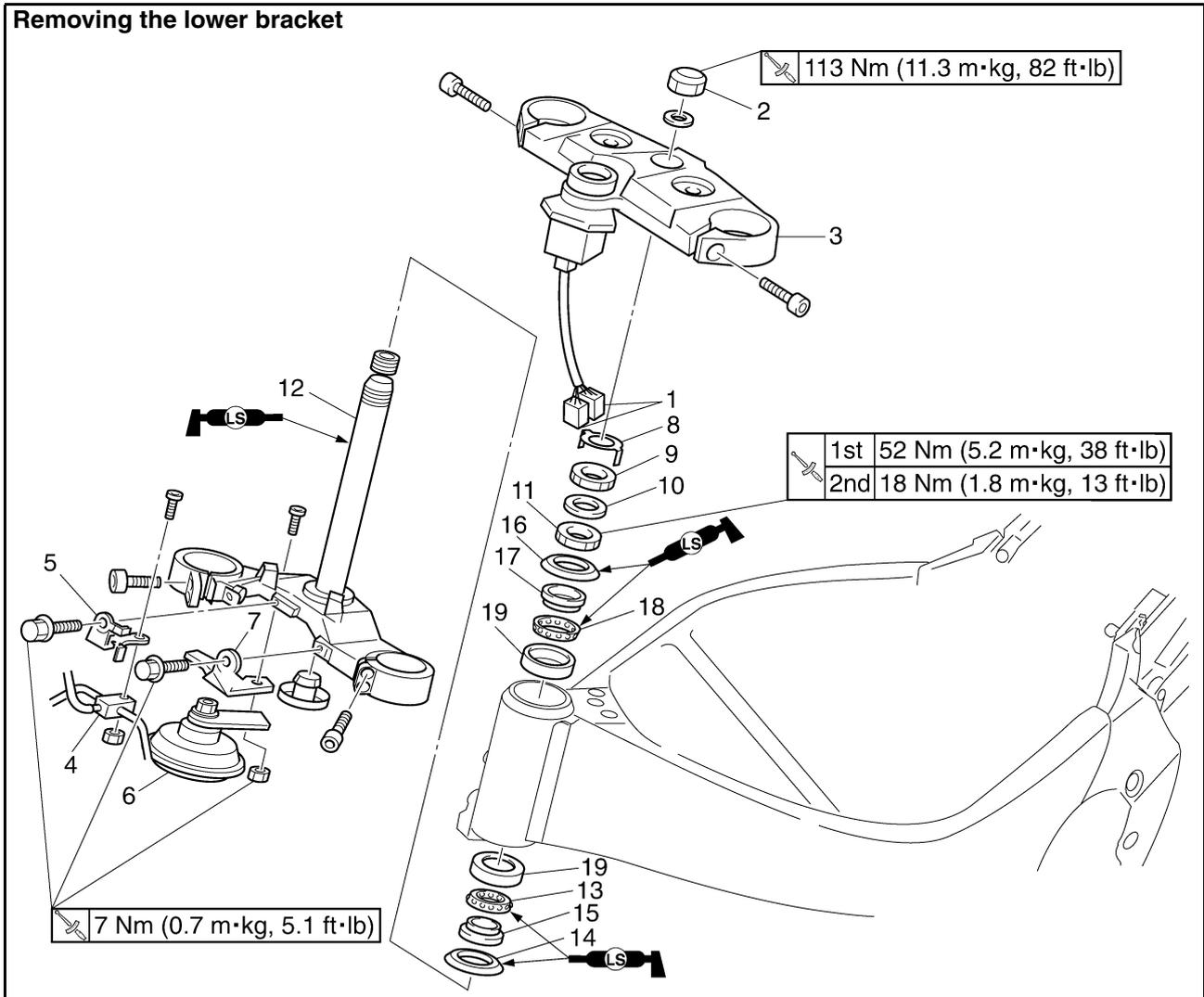
- Spring preload
  - Rebound damping
  - Compression damping
- Refer to "ADJUSTING THE FRONT FORK LEGS" on page 3-30.

# STEERING HEAD

EAS23090

## STEERING HEAD

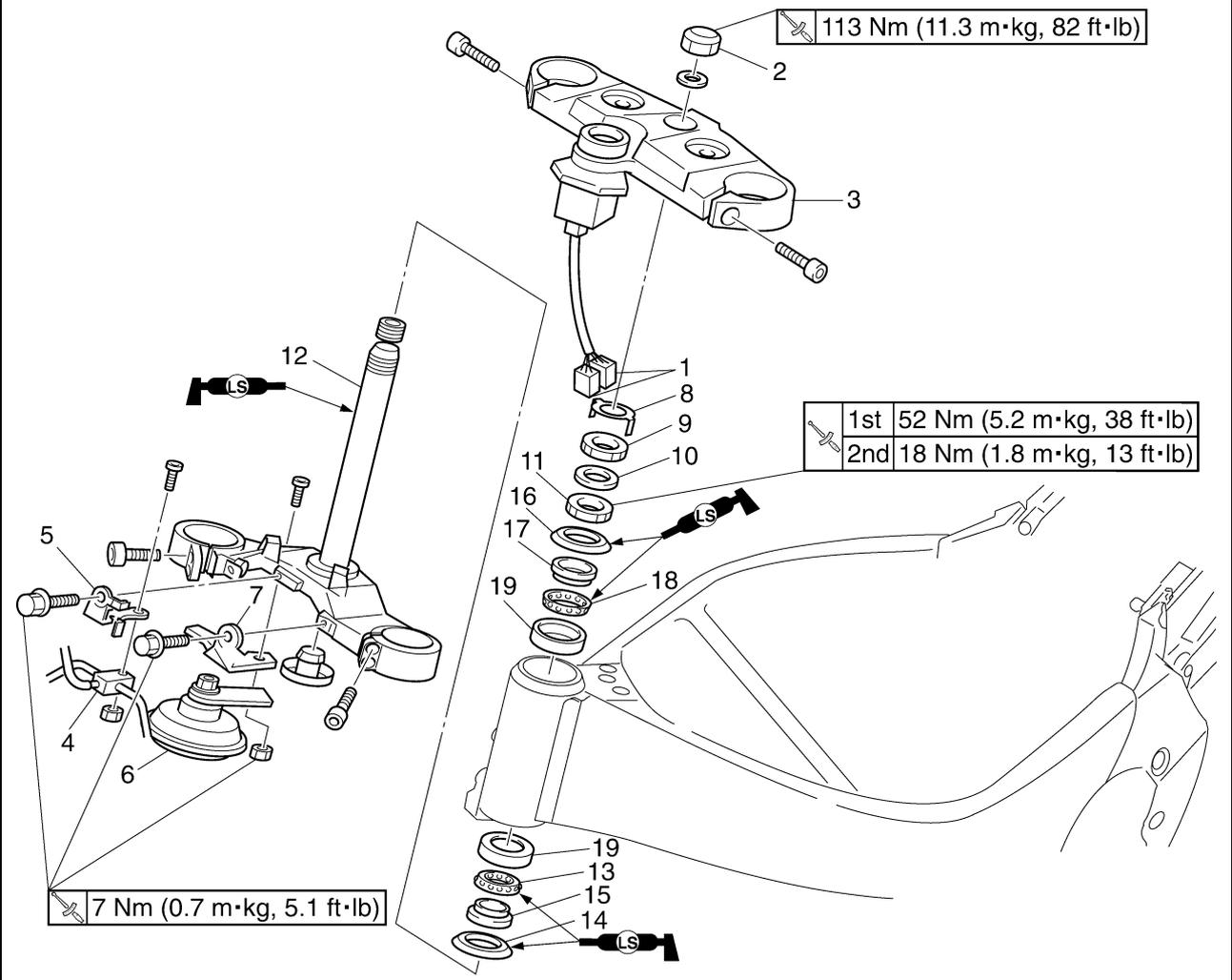
### Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
	Front wheel		Refer to "FRONT WHEEL" on page 4-9.
	Front brake calipers		Refer to "FRONT BRAKE" on page 4-26.
	Front cowling (FZ1-S(X)/FZ1-SA)		Refer to "GENERAL CHASSIS" on page 4-1.
	Headlight and meter assembly (FZ1-N(X)), (FZ1-NA)		Refer to "GENERAL CHASSIS" on page 4-1.
	Handlebar		Refer to "HANDLEBAR" on page 4-58.
	Front fork legs		Refer to "FRONT FORK" on page 4-62.
1	Main switch connector	2	Disconnect.
2	Steering stem nut	1	
3	Upper bracket	1	
4	Front brake hose joint	1	
5	Front brake hose joint bracket	1	
6	Horn	1	
7	Horn bracket	1	
8	Lock washer	1	
9	Upper ring nut	1	
10	Rubber washer	1	
11	Lower ring nut	1	
12	Lower bracket	1	

# STEERING HEAD

## Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
13	Lower bearing	1	
14	Lower bearing dust seal	1	
15	Lower bearing inner race	1	
16	Bearing cover	1	
17	Upper bearing inner race	1	
18	Upper bearing	1	
19	Bearing outer race	2	
			For installation, reverse the removal procedure.



# STEERING HEAD

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

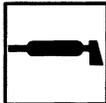


**Steering stem nut**  
**113 Nm (11.3 m·kg, 82 ft·lb)**

EAS23140

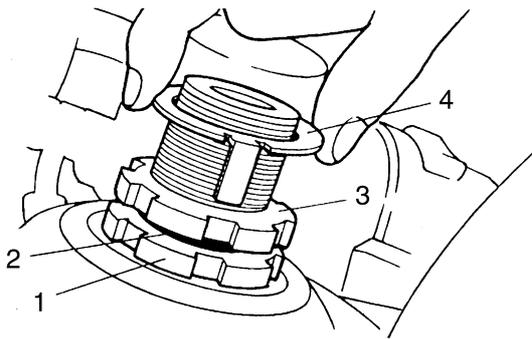
## INSTALLING THE STEERING HEAD

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 “INSTALLING THE STEERING HEAD” on page 4-74.



3. Install:
  - Front brake hose joint bracket
  - Front brake hose joint
4. Install:
  - Upper bracket
  - Steering stem nut

**NOTE:** \_\_\_\_\_  
Temporarily tighten the steering stem nut.

5. Install:
  - Front fork legsRefer to “FRONT FORK” on page 4-62.

**NOTE:** \_\_\_\_\_  
Temporarily tighten the upper and lower bracket pinch bolts.

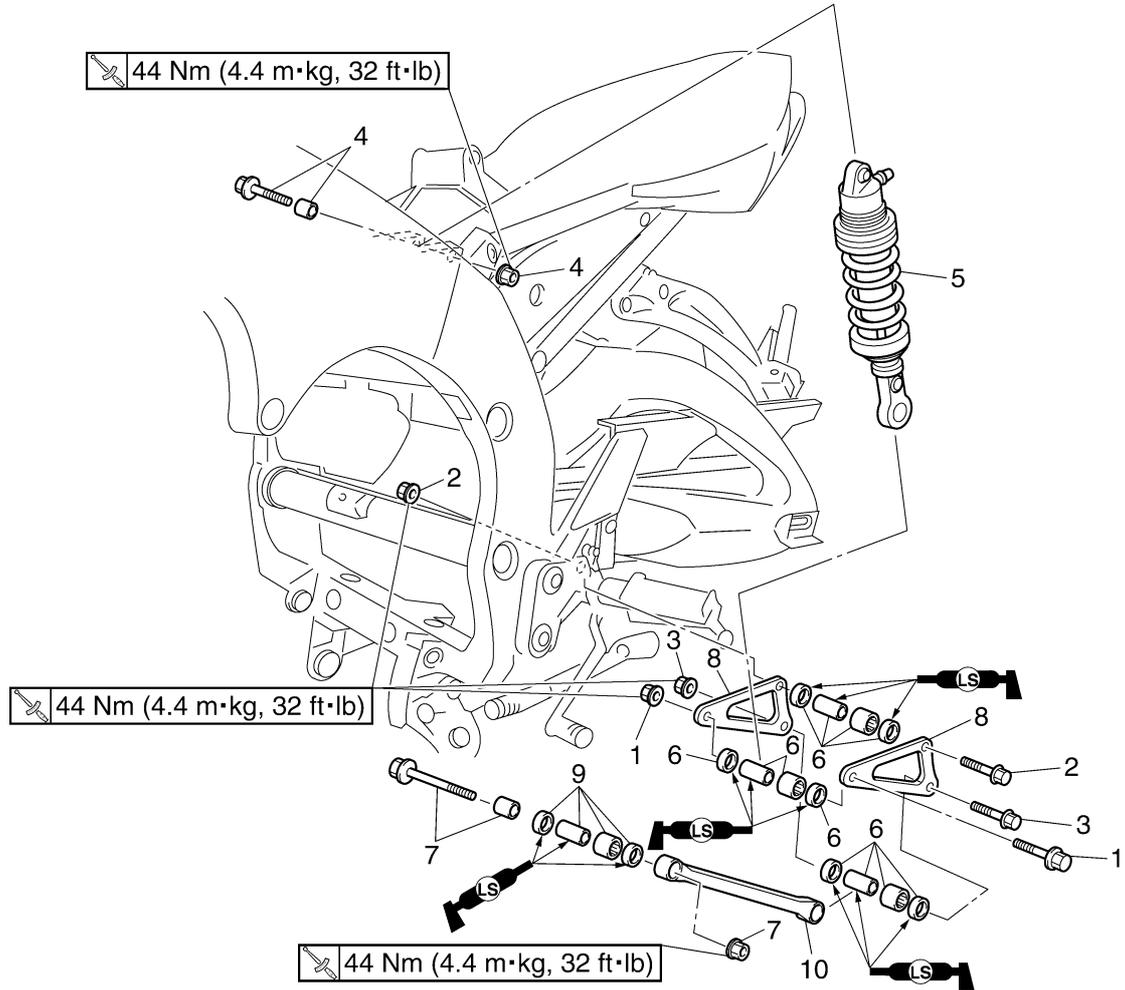
6. Tighten:
  - Steering stem nut

# REAR SHOCK ABSORBER ASSEMBLY

EAS23160

## REAR SHOCK ABSORBER ASSEMBLY

### Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left and right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Brake fluid reservoir tank bolt		Refer to "REAR BRAKE" on page 4-38.
1	Self-locking nut/bolt	1/1	
2	Self-locking nut/bolt	1/1	
3	Self-locking nut/bolt	1/1	
4	Self-locking nut/bolt/collar	1/1/1	
5	Rear shock absorber assembly	1	
6	Oil seal/bearing/collar	6/3/3	
7	Collar/self-locking nut/bolt	1/1/1	
8	Connecting arm	2	
9	Oil seal/bearing/collar	2/1/1	
10	Relay arm	1	
			For installation, reverse the removal procedure.

# 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

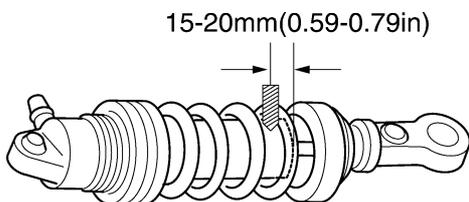
## DISPOSING OF A REAR SHOCK ABSORBER

1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3 mm (0.079–0.118 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.



EAS23210

## REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120

### WARNING

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

### NOTE:

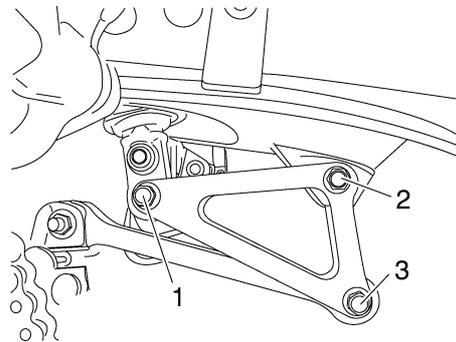
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- Rear shock absorber assembly lower bolt “1”
- Relay arm-to-swingarm bolt “2”
- Connecting arm-to-relay arm bolt “3”

### NOTE:

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

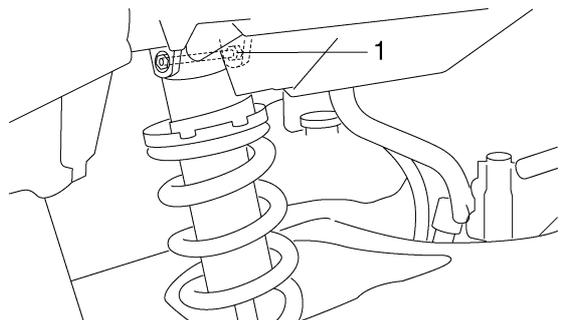


3. Remove:

- Rear shock absorber assembly upper bolt “1”
- Rear shock absorber assembly

### NOTE:

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



EAS23240

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:

- Rear shock absorber rod  
Bends/damage → Replace the rear shock absorber assembly.

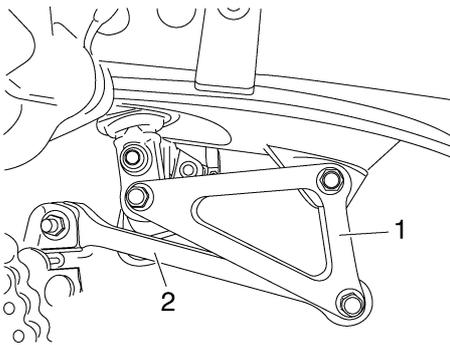
# REAR SHOCK ABSORBER ASSEMBLY

- Rear shock absorber  
Gas leaks/oil leaks → Replace the rear shock absorber assembly.
- Spring  
Damage/wear → Replace the rear shock absorber assembly.
- Bushings  
Damage/wear → Replace.
- Dust seals  
Damage/wear → Replace.
- Bolts  
Bends/damage/wear → Replace.

EAS23260

## CHECKING THE CONNECTING ARM AND RELAY ARM

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

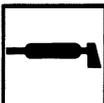


2. Check:
  - Bearings
  - Oil sealsDamage/pitting → Replace.
3. Check:
  - CollarDamage/scratches → Replace.

EAS23300

## INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
  - Spacers
  - Bearings



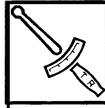
**Recommended lubricant**  
**Lithium-soap-based grease**

2. Install:
  - Rear shock absorber assembly

### NOTE:

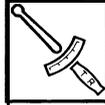
When installing the rear shock absorber assembly, lift up the swingarm.

3. Tighten:
  - Rear shock absorber assembly upper nut



**Rear shock absorber assembly upper nut**  
**44 Nm (4.4 m·kg, 32 ft·lb)**

- Rear shock absorber assembly lower nut



**Rear shock absorber assembly lower nut**  
**44 Nm (4.4 m·kg, 32 ft·lb)**

- Relay-arm-to-swingarm nut

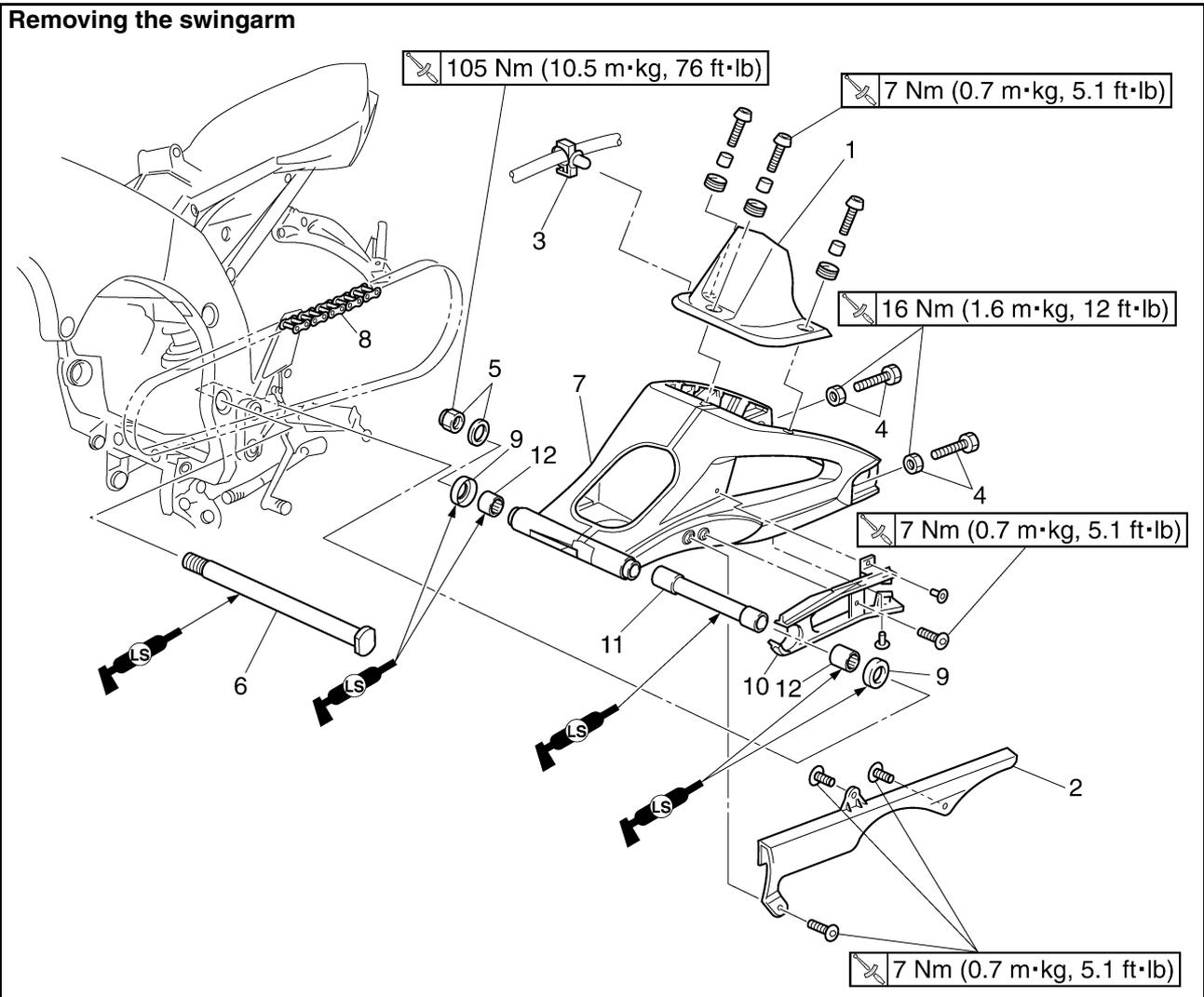


**Relay-arm-to-swingarm nut**  
**44 Nm (4.4 m·kg, 32 ft·lb)**

EAS23330

## SWINGARM

### Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-17.
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-38.
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-75.
	Drive sprocket		Refer to "ENGINE REMOVAL" on page 5-1.
1	Rear fender cover	1	
2	Drive chain guard	1	
3	Brake hose holder	1	
4	Drive chain adjusting bolt/locknut	2/2	
5	Pivot shaft nut/washer	1/1	
6	Pivot shaft	1	
7	Swingarm	1	
8	Drive chain	1	
9	Dust cover	2	
10	Drive chain guide	1	
11	Spacer	1	
12	Bearing	2	
			For installation, reverse the removal procedure.

EAS23350

## REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

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

### NOTE:

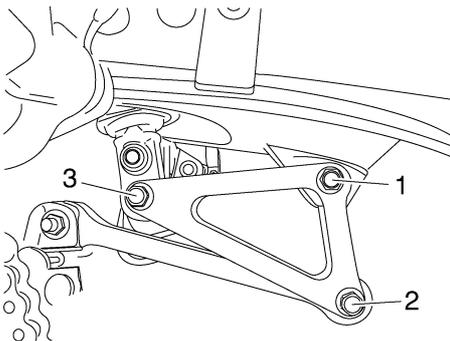
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- Relay arm-to-swingarm bolt "1"
- Connecting arm bolt "2"
- Rear shock absorber assembly lower bolt "3"

### NOTE:

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



3. Measure:

- Swingarm side play
- Swingarm vertical movement

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

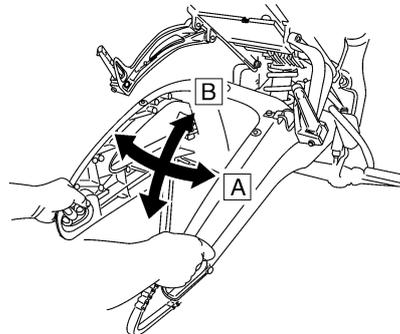
	<b>Pivot shaft nut</b> <b>105 Nm (10.5 m·kg, 76 ft·lb)</b>
---	---

- b. Measure the swingarm side play "A" by moving the swingarm from side to side.
- c. If the swingarm side play is out of specification, check the spacers, bearings, washers, and dust covers.

	<b>Swingarm side play (at the end of the swingarm)</b> <b>1.0 mm (0.04 in)</b>
---	---

d. Check the swingarm vertical movement "B" by moving the swingarm up and down.

If swingarm vertical movement is not smooth or if there is binding, check the spacers, bearings, washers, and dust covers.



EAS23360

## CHECKING THE SWINGARM

1. Check:

- Swingarm  
Bends/cracks/damage → Replace.

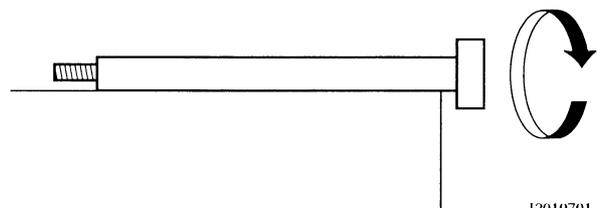
2. Check:

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

EWA13770

### **WARNING**

**Do not attempt to straighten a bent pivot shaft.**



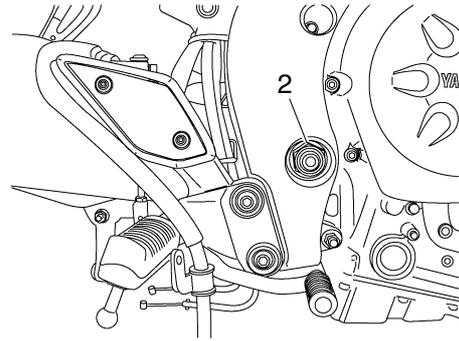
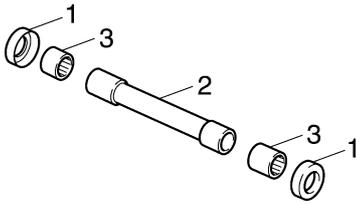
3. Wash:

- Pivot shaft
- Dust covers
- Spacer
- Washers
- Bearings

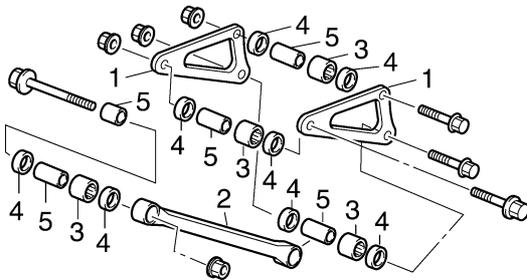
	<b>Recommended cleaning solvent</b> <b>Kerosene</b>
---	--

4. Check:

- Dust covers "1"
- Spacer "2"
- Bearings "3"  
Damage/pitting → Replace.



5. Check:
  - Connecting arms "1"
  - Relay arm "2"
  - Damage/wear → Replace.
6. Check:
  - Bearings "3"
  - Oil seals "4"
  - Damage/pitting → Replace.
7. Check:
  - Collars "5"
  - Damage/scratches → Replace.



3. Install:
  - Rear shock absorber assembly
  - Rear wheel
  - Refer to "INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY" on page 4-77 and "INSTALLING THE REAR WHEEL" on page 4-24.
4. Adjust:
  - Drive chain slack
  - Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-27.

	<p><b>Drive chain slack</b> 25.0–35.0 mm (0.98–1.38 in)</p>
--	---

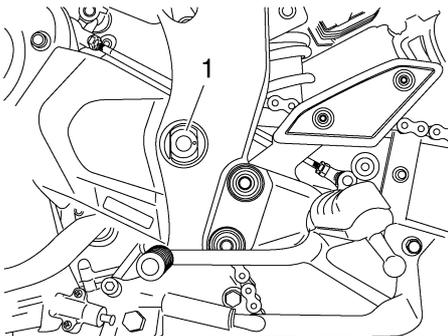
EAS23380

## INSTALLING THE SWINGARM

1. Lubricate:
  - Bearings
  - Spacers
  - Dust covers
  - Pivot shaft

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

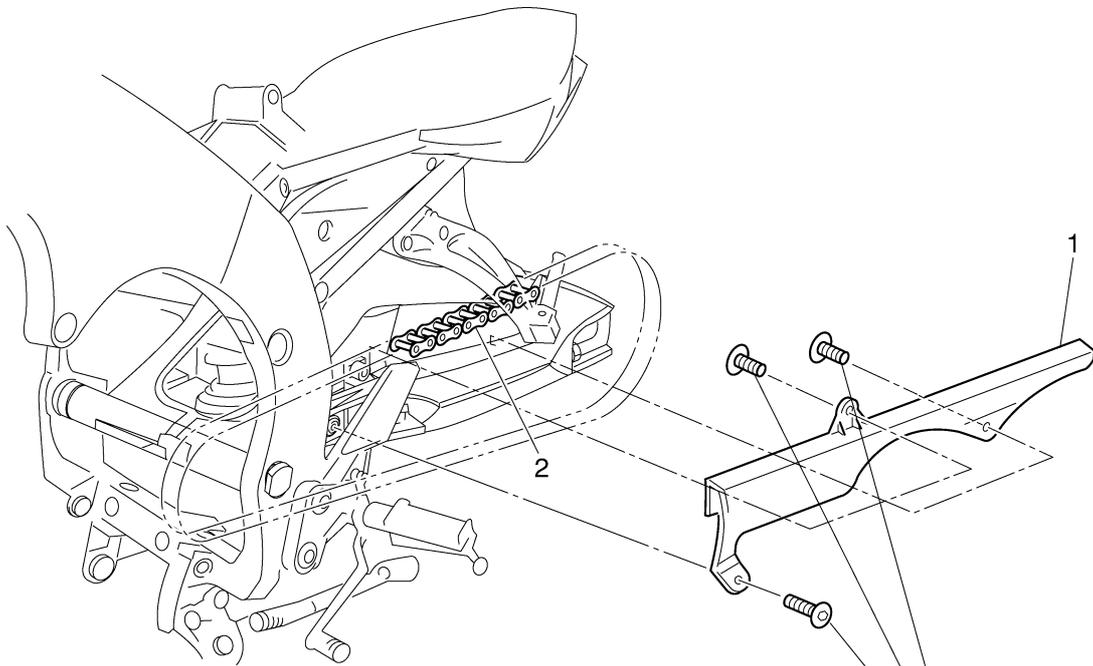
2. Install:
  - Swingarm
  - Pivot shaft "1"
  - Pivot shaft nut "2"



EAS23400

## CHAIN DRIVE

### Removing the drive chain



 7 Nm (0.7 m·kg, 5.1 ft·lb)

Order	Job/Parts to remove	Q'ty	Remarks
	Drive sprocket		Refer to "ENGINE REMOVAL" on page 5-1.
1	Drive chain guard	1	
2	Drive chain	1	
			For installation, reverse the removal procedure.

EAS23410

## REMOVING THE DRIVE CHAIN

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

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

#### NOTE:

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

2. Remove:

- Drive chain  
(with the drive chain cutter)

#### NOTE:

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

EAS23440

## CHECKING THE DRIVE CHAIN

1. Measure:

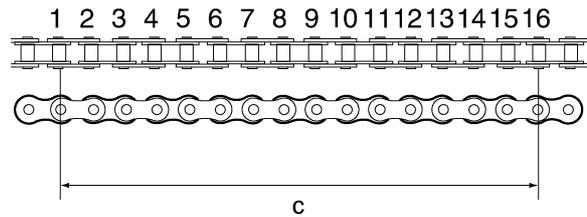
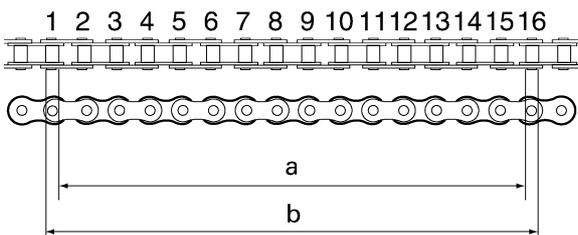
- Measure the dimension between 15-links on the inner side "a" and outer side "b" of the roller and calculate the dimension between pin centers.
- Dimension "c" between pin centers = (Inner dimension "a" + Outer dimension "b")/2
- 15-link section "c" of the drive chain  
Out of specification → Replace the drive chain, front drive sprocket and rear drive sprocket as a set.



**15-link drive chain section limit (maximum)**  
**239.3 mm (9.42 in)**

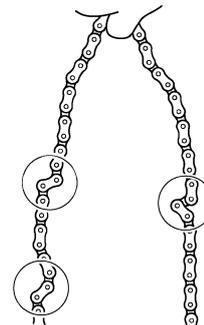
#### NOTE:

- While measuring the 15-link section, push down on the drive chain to increase its tension.
- Perform this measurement at two or three different places.



2. Check:

- Drive chain  
Stiffness → Clean and lubricate or replace.



3. Clean:

- Drive chain

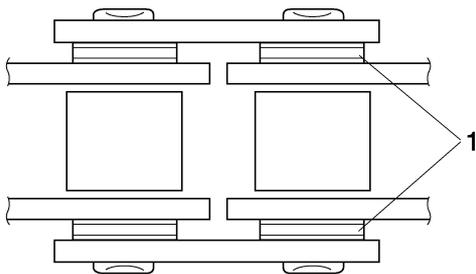
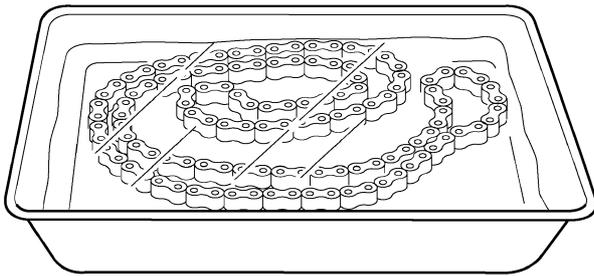


- Wipe the drive chain with a clean cloth.
- Put the drive chain in kerosene and remove any remaining dirt.
- Remove the drive chain from the kerosene and completely dry it.

ECA14290

### **CAUTION:**

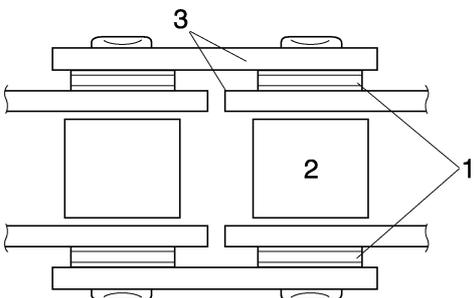
- This vehicle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.
- Do not soak the drive chain in kerosene for more than ten minutes, otherwise the O-rings can be damaged.



I2510201

4. Check:

- O-rings "1"  
Damage → Replace the drive chain.
- Drive chain rollers "2"  
Damage/wear → Replace the drive chain.
- Drive chain side plates "3"  
Damage/wear → Replace the drive chain.  
Cracks → Replace the drive chain and make sure the battery breather hose is properly routed away from the drive chain and below the swingarm.



I2510201

5. Lubricate:

- Drive chain

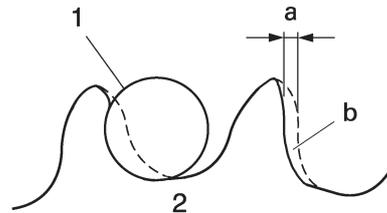
	<p><b>Recommended lubricant</b> Engine oil or chain lubricant suitable for O-ring chains</p>
---	--

EAS23460

## CHECKING THE DRIVE SPROCKET

1. Check:

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



b. Correct

1. Drive chain roller
2. Drive chain sprocket

EAS23470

## CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-22.

EAS23480

## CHECKING THE REAR WHEEL DRIVE HUB

Refer to "CHECKING THE REAR WHEEL DRIVE HUB" on page 4-21.

EAS28800

## INSTALLING THE DRIVE CHAIN

1. Lubricate:

- Drive chain

	<p><b>Recommended lubricant</b> Engine oil or chain lubricant suitable for O-ring chains</p>
---	--

2. Install:

- Drive sprocket
- Lock washer **New**
- Drive sprocket nut  
Refer to "ENGINE REMOVAL" on page 5-1.

	<p><b>Drive sprocket nut</b> 85 Nm (8.5 m.kg, 61 ft-lb)</p>
---	---

---

# ENGINE

<b>ENGINE REMOVAL</b> .....	5-1
INSTALLING THE ENGINE .....	5-7
<b>CAMSHAFTS</b> .....	5-9
REMOVING THE CAMSHAFTS .....	5-11
CHECKING THE CAMSHAFTS .....	5-12
CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET .....	5-13
CHECKING THE TIMING CHAIN GUIDES .....	5-13
CHECKING THE TIMING CHAIN TENSIONER .....	5-13
INSTALLING THE CAMSHAFTS .....	5-15
<b>CYLINDER HEAD</b> .....	5-18
REMOVING THE CYLINDER HEAD .....	5-19
CHECKING THE CYLINDER HEAD .....	5-19
INSTALLING THE CYLINDER HEAD .....	5-19
<b>VALVES AND VALVE SPRINGS</b> .....	5-21
REMOVING THE VALVES .....	5-23
CHECKING THE VALVES AND VALVE GUIDES .....	5-24
CHECKING THE VALVE SEATS .....	5-25
CHECKING THE VALVE SPRINGS.....	5-27
CHECKING THE VALVE LIFTERS .....	5-28
INSTALLING THE VALVES.....	5-28
<b>GENERATOR</b> .....	5-30
REMOVING THE GENERATOR .....	5-32
INSTALLING THE GENERATOR.....	5-32
<b>STARTER CLUTCH</b> .....	5-34
REMOVING THE STARTER CLUTCH .....	5-35
CHECKING THE DAMPER .....	5-35
CHECKING THE STARTER CLUTCH.....	5-35
INSTALLING THE STARTER CLUTCH .....	5-36
<b>CRANKSHAFT POSITION SENSOR</b> .....	5-37
REMOVING THE CRANKSHAFT POSITION SENSOR .....	5-38
INSTALLING THE CRANKSHAFT POSITION SENSOR .....	5-38
<b>ELECTRIC STARTER</b> .....	5-39
CHECKING THE STARTER MOTOR .....	5-41
ASSEMBLING THE STARTER MOTOR.....	5-42
INSTALLING THE STARTER MOTOR.....	5-42
<b>CLUTCH</b> .....	5-43
REMOVING THE CLUTCH.....	5-46
CHECKING THE FRICTION PLATES .....	5-47

---

CHECKING THE CLUTCH PLATES.....	5-47
CHECKING THE CLUTCH SPRINGS.....	5-48
CHECKING THE CLUTCH HOUSING.....	5-48
CHECKING THE CLUTCH BOSS.....	5-48
CHECKING THE PRESSURE PLATE.....	5-48
CHECKING THE PULL LEVER SHAFT AND PULL ROD.....	5-49
INSTALLING THE CLUTCH.....	5-49
<b>SHIFT SHAFT.....</b>	<b>5-52</b>
REMOVING THE SHIFT SHAFT.....	5-53
CHECKING THE SHIFT SHAFT.....	5-53
CHECKING THE STOPPER LEVER.....	5-53
INSTALLING THE SHIFT SHAFT.....	5-53
<b>OIL PUMP.....</b>	<b>5-55</b>
REMOVING THE OIL PAN.....	5-58
CHECKING THE SPROCKET AND CHAIN.....	5-58
CHECKING THE OIL PUMP.....	5-58
CHECKING THE RELIEF VALVE.....	5-59
CHECKING THE OIL DELIVERY PIPES.....	5-59
CHECKING THE OIL STRAINER.....	5-59
CHECKING THE OIL NOZZLES.....	5-59
ASSEMBLING THE OIL PUMP.....	5-59
INSTALLING THE OIL/WATER PUMP ASSEMBLY.....	5-60
INSTALLING THE OIL PAN.....	5-61
<b>CRANKCASE.....</b>	<b>5-62</b>
DISASSEMBLING THE CRANKCASE.....	5-64
CHECKING THE CRANKCASE.....	5-64
CHECKING THE BEARING AND OIL SEALS.....	5-64
ASSEMBLING THE CRANKCASE.....	5-64
<b>CRANKSHAFT.....</b>	<b>5-66</b>
REMOVING THE CONNECTING RODS AND PISTONS.....	5-68
REMOVING THE CRANKSHAFT ASSEMBLY.....	5-68
CHECKING THE CYLINDER AND PISTON.....	5-69
CHECKING THE PISTON RINGS.....	5-69
CHECKING THE PISTON PINS.....	5-70
CHECKING THE BIG END BEARINGS.....	5-71
INSTALLING THE CONNECTING ROD AND PISTON.....	5-74
CHECKING THE CRANKSHAFT.....	5-77
CHECKING THE CRANKSHAFT DRIVE SPROCKET.....	5-77
CHECKING THE CRANKSHAFT JOURNAL BEARINGS.....	5-77
INSTALLING THE CRANKSHAFT.....	5-79
<b>TRANSMISSION.....</b>	<b>5-81</b>
REMOVING THE TRANSMISSION.....	5-86
CHECKING THE SHIFT FORKS.....	5-86
CHECKING THE SHIFT DRUM ASSEMBLY.....	5-87
CHECKING THE TRANSMISSION.....	5-87

---

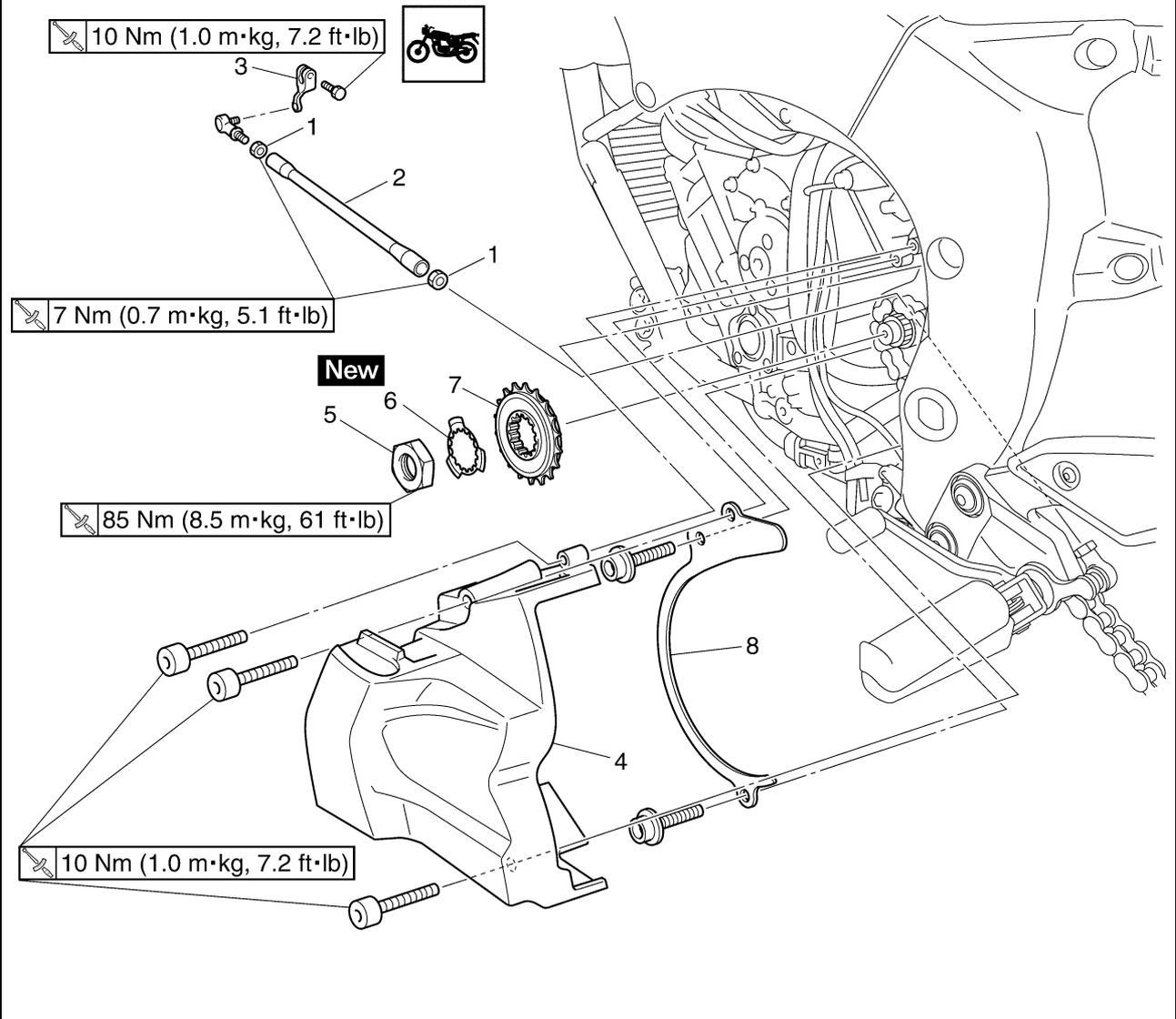
INSTALLING THE TRANSMISSION.....	5-88
----------------------------------	------

# ENGINE REMOVAL

EAS23710

## ENGINE REMOVAL

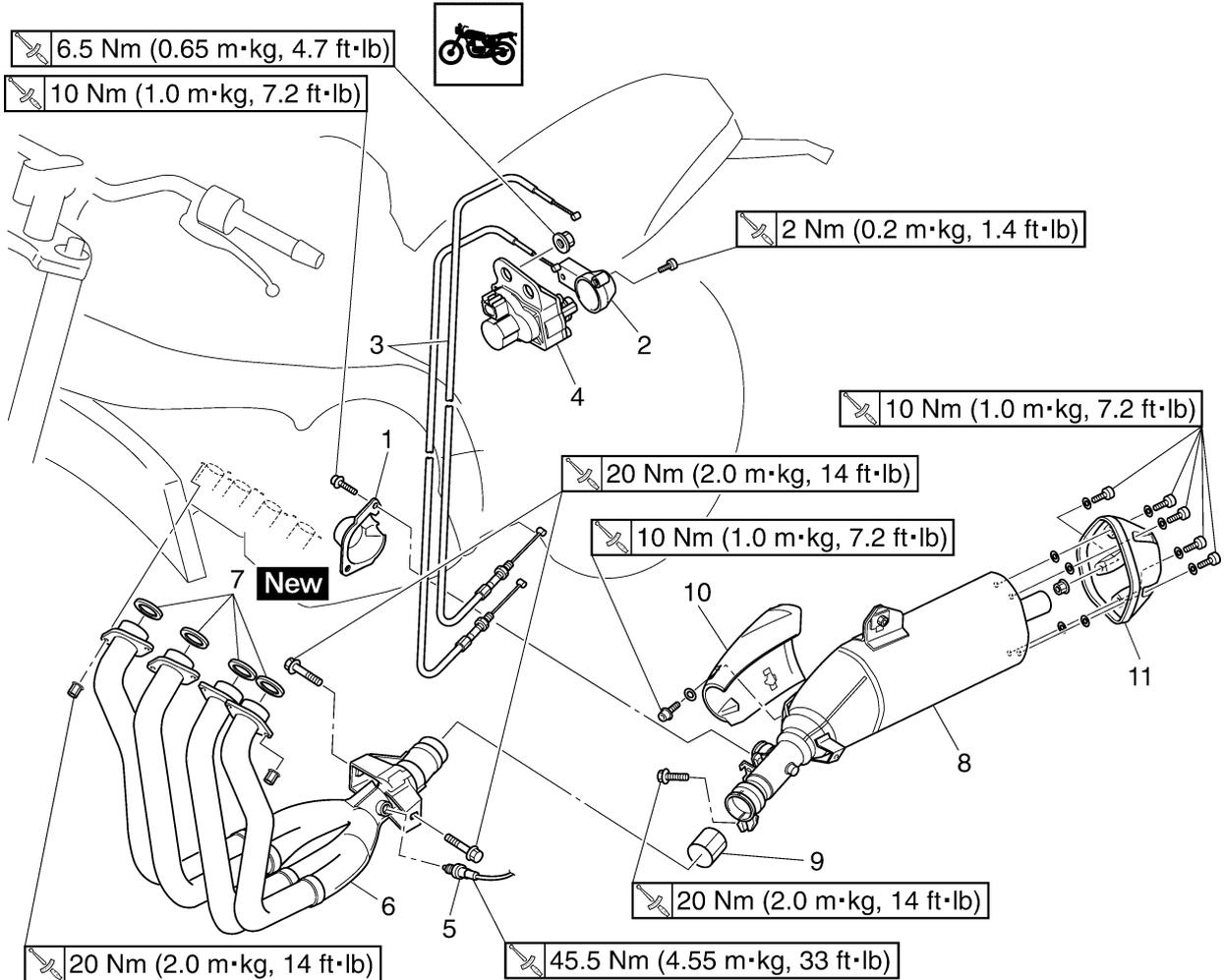
### Removing the drive sprocket



Order	Job/Parts to remove	Q'ty	Remarks
1	Locknut	2	
2	Shift rod	1	
3	Shift arm	1	
4	Drive sprocket cover	1	
5	Drive sprocket nut	1	
6	Lock washer	1	
7	Drive sprocket	1	
8	Plate	1	
			For installation, reverse the removal procedure.

# ENGINE REMOVAL

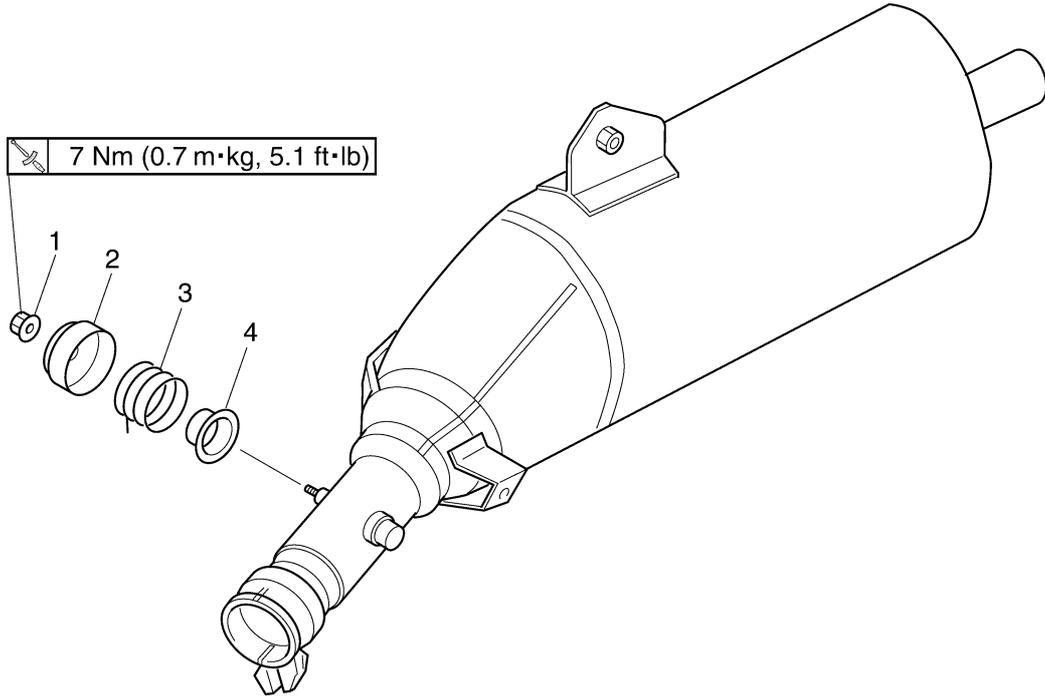
## Removing the exhaust pipe



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	EXUP pulley cover	1	
2	EXUP servo motor cover	1	
3	EXUP cables	2	
4	EXUP servo motor	1	
5	O <sub>2</sub> sensor	1	
6	Exhaust pipe assembly	1	
7	Exhaust pipe gasket	4	
8	Muffler	1	
9	Muffler gasket	1	
10	Muffler cover	1	
11	Muffler end cover	1	
			For installation, reverse the removal procedure.

# ENGINE REMOVAL

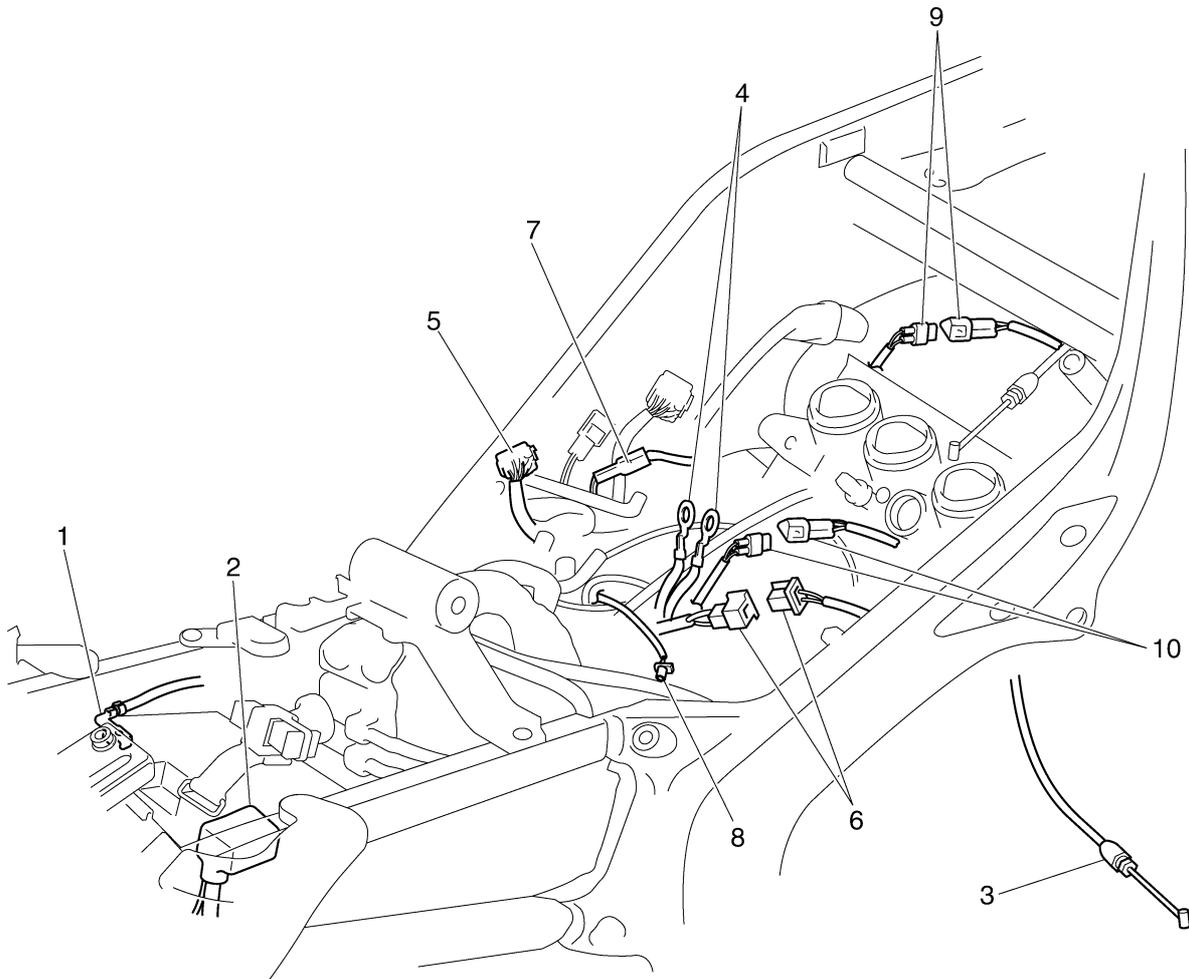
## Disassembling the exhaust valve pipe



Order	Job/Parts to remove	Q'ty	Remarks
1	Nut	1	
2	Pulley	1	
3	Spring	1	
4	Spring seat	1	
			For assembly, reverse the disassembly procedure.

# ENGINE REMOVAL

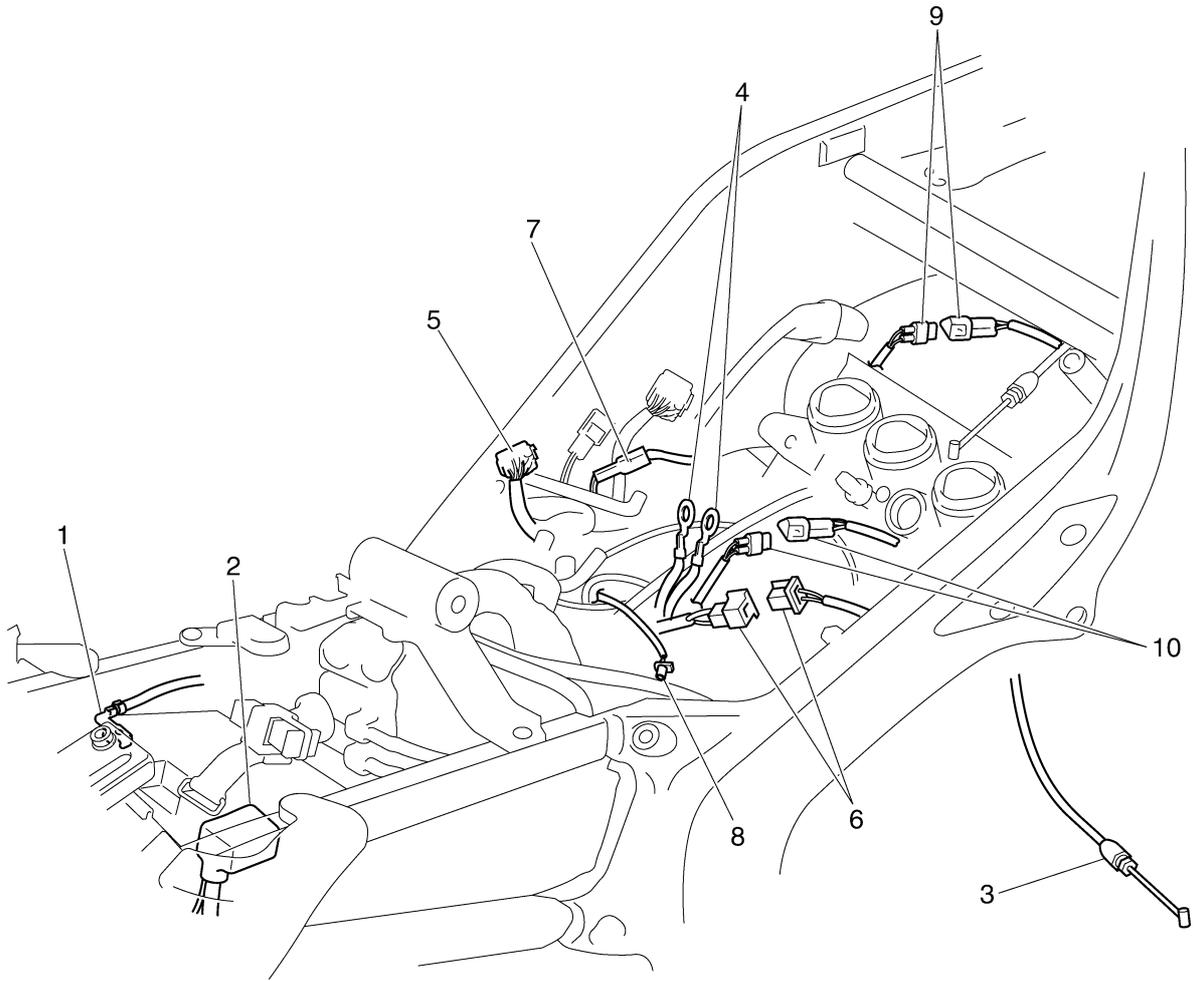
## Disconnecting the leads and hoses



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Throttle body assembly		Refer to "THROTTLE BODIES" on page 7-4.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
	Oil cooler		Refer to "OIL COOLER" on page 6-3.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-12.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-39.
1	Battery negative lead	1	
2	Battery positive lead	1	
3	Clutch cable	1	
4	Ground lead	2	
5	Stator coil assembly coupler	1	Disconnect.
6	Crankshaft position sensor lead coupler	1	Disconnect.
7	Oil level switch connector	1	Disconnect.
8	Neutral switch connector	1	Disconnect.
9	Cylinder identification sensor coupler	1	Disconnect.
10	Speed sensor coupler	1	Disconnect.

# ENGINE REMOVAL

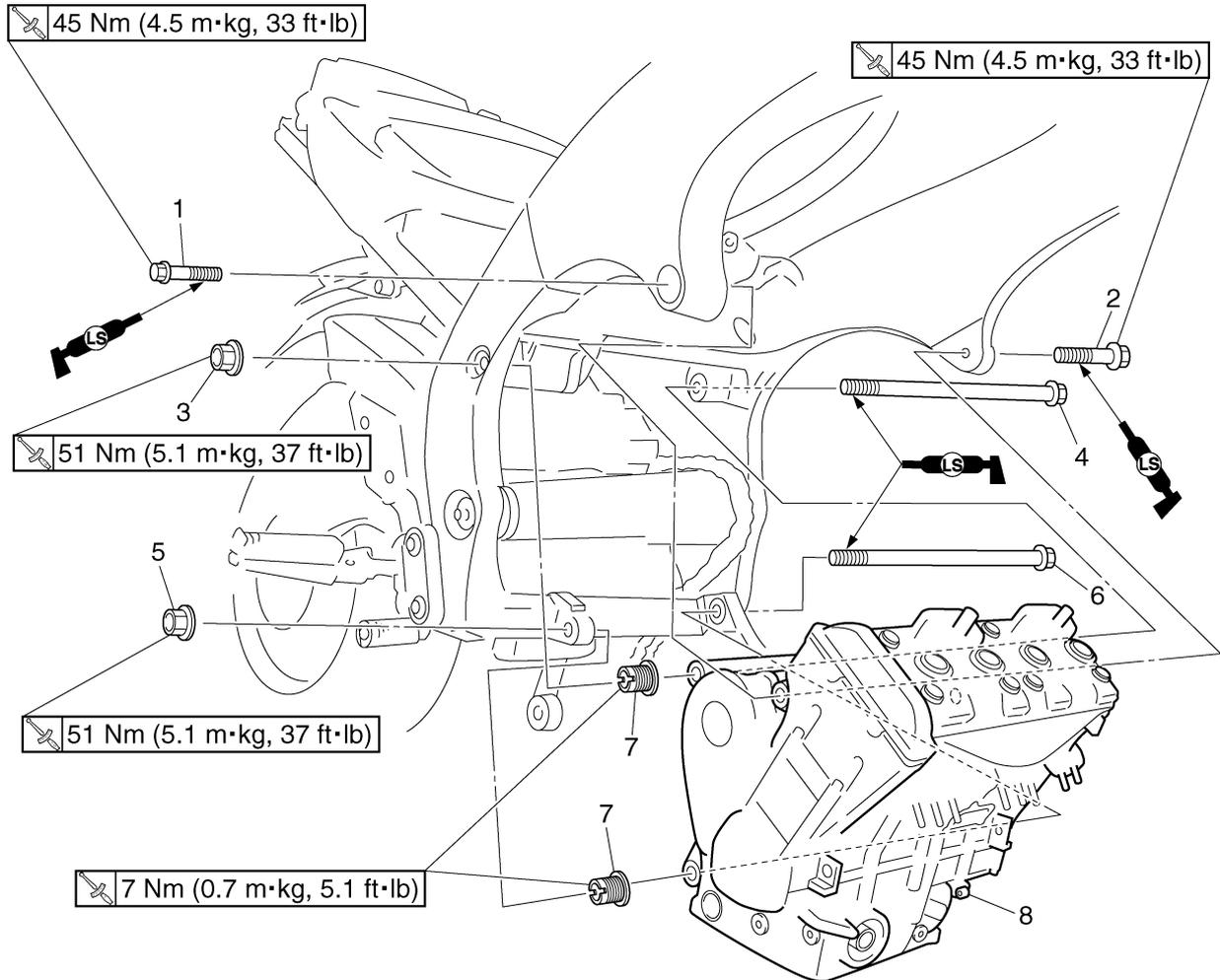
## Disconnecting the leads and hoses



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

# ENGINE REMOVAL

## Removing the engine



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

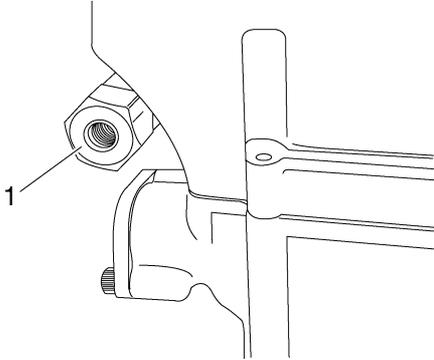
# ENGINE REMOVAL

EAS23720

## INSTALLING THE ENGINE

### 1. Install:

- Right front engine mounting bolt 2 “1”  
Refer to “CYLINDER HEAD” on page 5-18.



### 2. Tighten:

- Right front engine mounting bolt 2

	<b>Right front engine mounting bolt 2</b> <b>50 Nm (5.0 m·kg, 36 ft·lb)</b>
--	--

### 3. Install:

- Engine mounting adjust bolts (temporarily tighten)

### 4. Install:

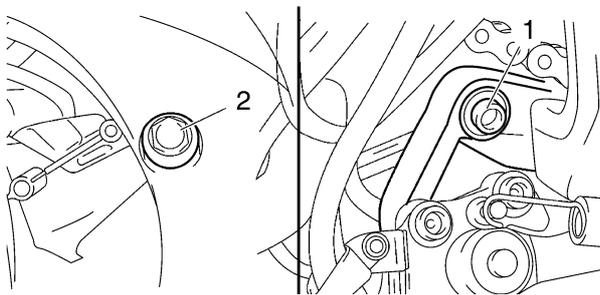
- Engine

### 5. Install:

- Lower engine mounting bolt “1”
- Upper engine mounting bolt “2”
- Self-locking nuts

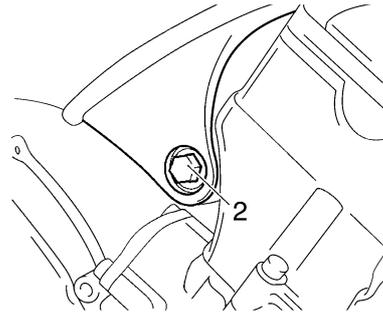
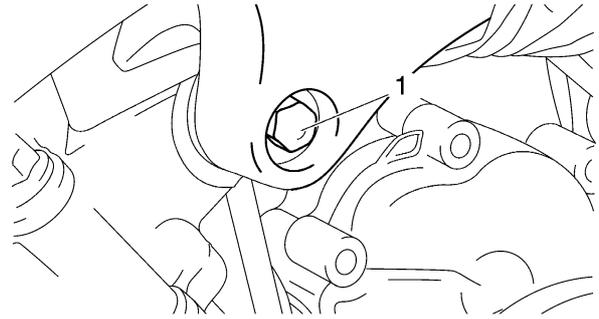
### NOTE:

Do not fully tighten the bolts and nuts.



### 6. Install:

- Left front engine mounting bolt “1” (temporarily tighten)
- Right front engine mounting bolt 1 “2” (temporarily tighten)



### 7. Tighten:

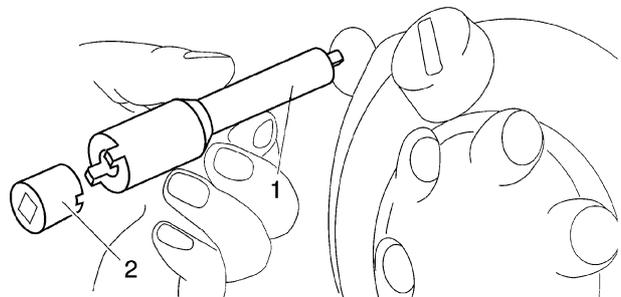
- Engine mounting adjust bolts

	<b>Engine mounting adjust bolt</b> <b>7 Nm (0.7 m·kg, 5.1 ft·lb)</b>
---	---

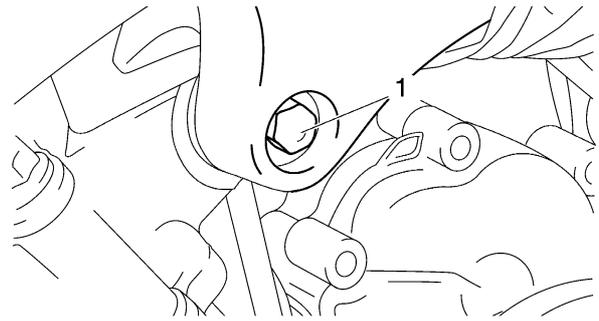
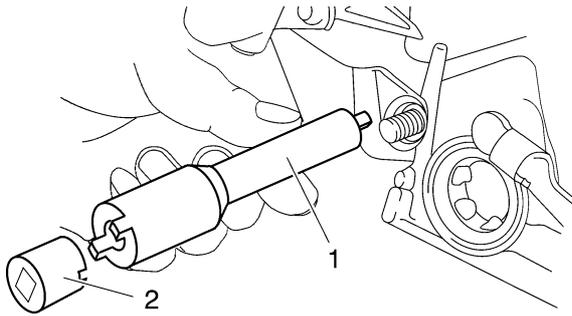
### NOTE:

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

	<b>Pivot shaft wrench</b> <b>90890-01518</b> <b>Frame spanner socket</b> <b>YM-01518</b> <b>Pivot shaft wrench adapter</b> <b>90890-01476</b>
---	--



# ENGINE REMOVAL

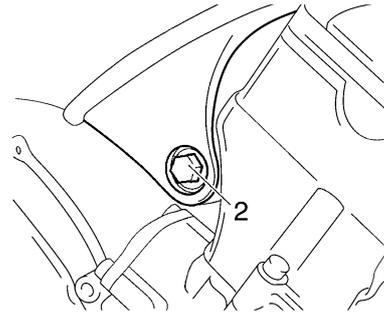


## 8. Tighten:

- Lower self-locking nut "1"
- Upper self-locking nut "2"

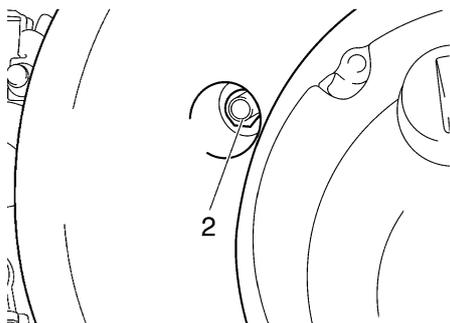
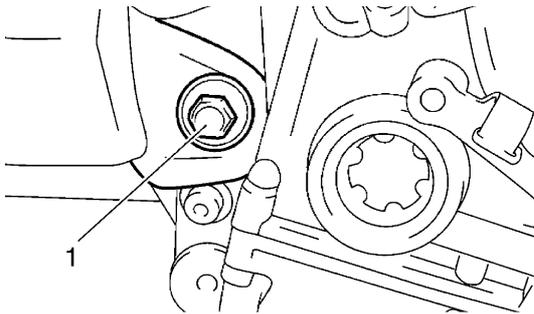


**Upper self-locking nut**  
**51 Nm (5.1 m·kg, 37 ft·lb)**  
**Lower self-locking nut**  
**51 Nm (5.1 m·kg, 37 ft·lb)**



## NOTE:

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



## 9. Tighten:

- Left front engine mounting bolt "1"
- Right front engine mounting bolt 1 "2"

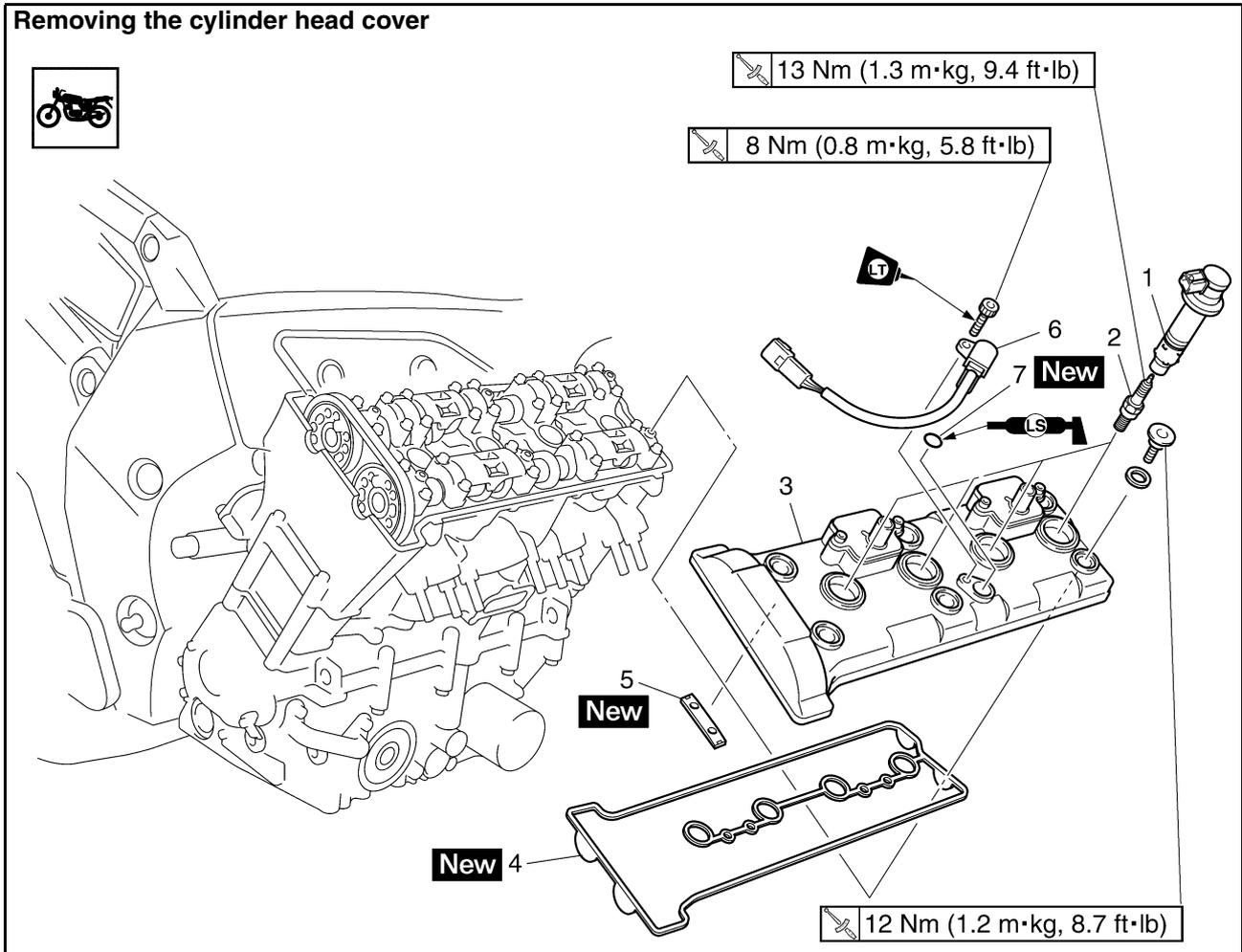


**Left front engine mounting bolt**  
**45 Nm (4.5 m·kg, 33 ft·lb)**  
**Right front engine mounting**  
**bolt 1**  
**45 Nm (4.5 m·kg, 33 ft·lb)**

EAS23760

## CAMSHAFTS

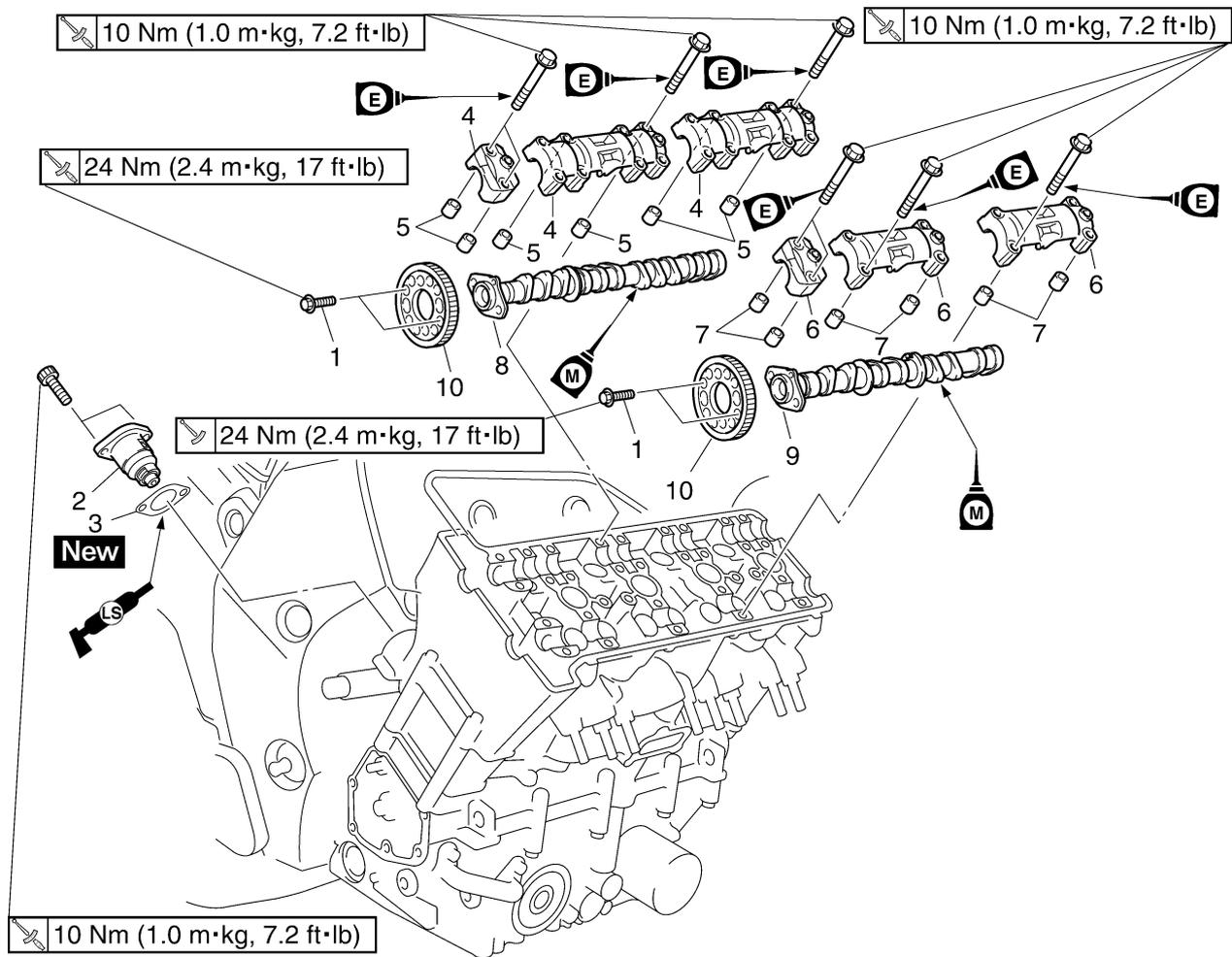
### Removing the cylinder head cover



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Throttle body assembly		Refer to "THROTTLE BODIES" on page 7-4.
	Radiator assembly		Refer to "RADIATOR" on page 6-1.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-12.
1	Ignition coil	4	
2	Spark plug	4	
3	Cylinder head cover	1	
4	Cylinder head cover gasket	1	
5	Timing chain guide (top side)	1	
6	Cylinder identification sensor	1	
7	O-ring	1	
			For assembly, reverse the removal procedure.

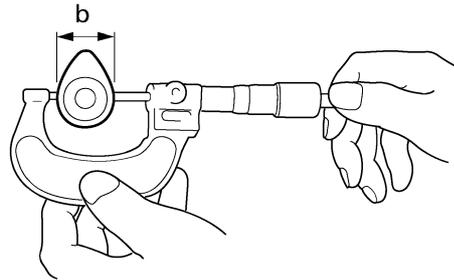
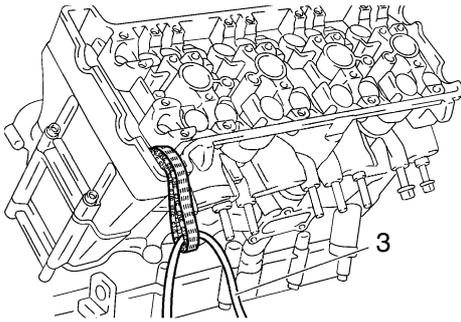
# CAMSHAFTS

## Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
	Pickup rotor cover		Refer to "CRANKSHAFT POSITION SENSOR" on page 5-37.
1	Camshaft sprocket bolt	4	Loosen.
2	Timing chain tensioner	1	
3	Timing chain tensioner gasket	1	
4	Intake camshaft cap	3	
5	Dowel pin	6	Refer to "REMOVING THE CAMSHAFTS" on page 5-11.
6	Exhaust camshaft cap	3	
7	Dowel pin	6	Refer to "REMOVING THE CAMSHAFTS" on page 5-11.
8	Intake camshaft	1	
9	Exhaust camshaft	1	
10	Camshaft sprocket	2	
			For assembly, reverse the removal procedure.





11151002

EAS23850

## CHECKING THE CAMSHAFTS

### 1. Check:

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

### 2. Measure:

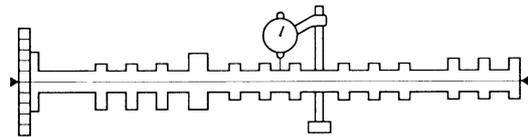
- Camshaft lobe dimensions “a” and “b”  
Out of specification → Replace the camshaft.

### 3. Measure:

- Camshaft runout  
Out of specification → Replace.



**Camshaft runout limit**  
**0.03 mm (0.0012 in)**



### 4. Measure:

- Camshaft-journal-to-camshaft-cap clearance  
Out of specification → Measure the camshaft journal diameter.



**Camshaft-journal-to-camshaft-cap clearance**  
**0.028–0.062 mm (0.0011–0.0024 in)**



### Camshaft lobe dimension limit

**Intake camshaft “a”**  
**32.50–32.60 mm (1.280–1.284 in)**

**Limit**  
**32.40 mm (1.276 in)**

**Intake camshaft “b”**  
**24.95–25.05 mm (0.982–0.986 in)**

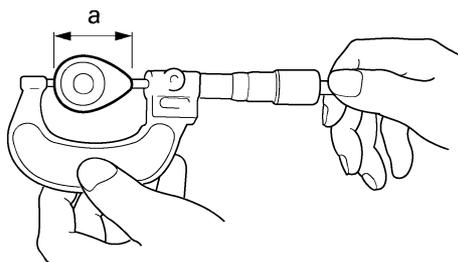
**Limit**  
**24.85 mm (0.978 in)**

**Exhaust camshaft “a”**  
**30.70–30.80 mm (1.209–1.213 in)**

**Limit**  
**30.60 mm (1.205 in)**

**Exhaust camshaft “b”**  
**22.95–23.05 mm (0.904–0.908 in)**

**Limit**  
**22.85 mm (0.900 in)**



11151001



- Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
- Position strip of Plastigauge® “1” onto the camshaft journal as shown.
- Install the dowel pins and camshaft caps.

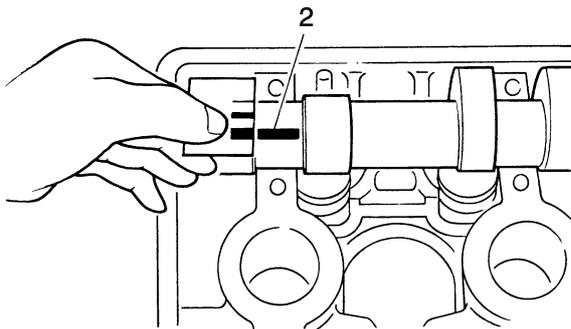
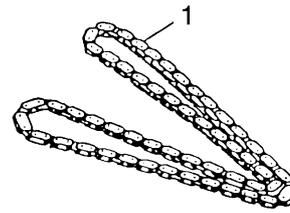
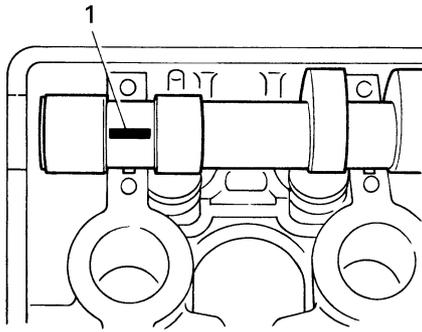
### NOTE:

- 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®.



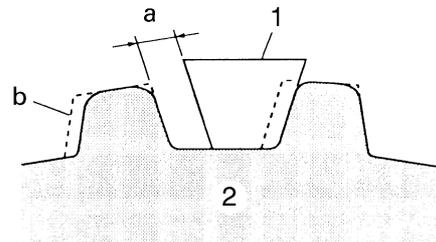
**Camshaft cap bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**

- Remove the camshaft caps and then measure the width of the Plastigauge® “2”.



2. Check:

- Camshaft sprocket  
More than 1/4 tooth wear "a" → Replace the camshaft sprockets and the timing chain as a set.



- a. 1/4 tooth
- b. Correct

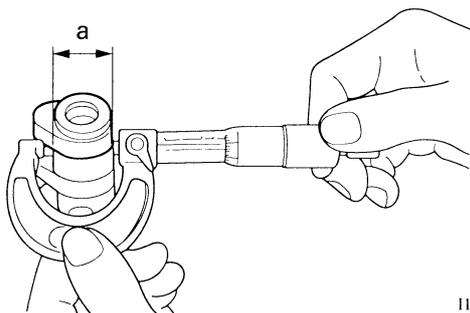
- 1. Timing chain roller
- 2. Camshaft sprocket

5. Measure:

- Camshaft journal diameter "a"  
Out of specification → Replace the camshaft.  
Within specification → Replace the cylinder head and the camshaft caps as a set.



**Camshaft journal diameter**  
22.459–22.472 mm (0.8842–0.8847 in)



11151003

EAS23870

## CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET

1. Check:

- Timing chain "1"  
Damage/stiffness → Replace the timing chain and camshaft and camshaft sprocket as a set.

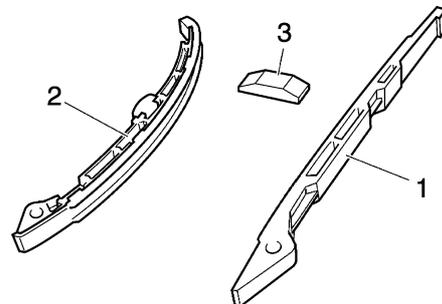
EAS23950

## CHECKING THE TIMING CHAIN GUIDES

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

1. Check:

- Timing chain guide (exhaust side) "1"
  - Timing chain guide (intake side) "2"
  - Timing chain guide (top side) "3"
- Damage/wear → Replace the defective part(s).



EAS23960

## CHECKING THE TIMING CHAIN TENSIONER

1. Remove:

- Timing chain tensioner housing "1"
- Timing chain tensioner rod "2"



EAS24000

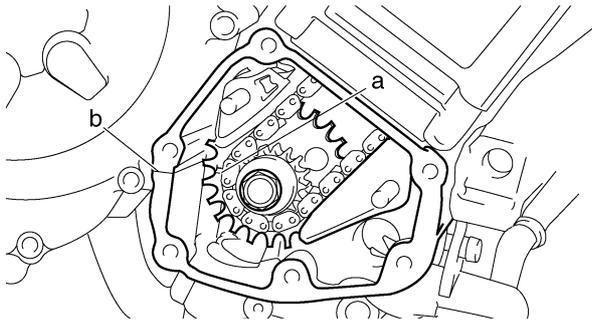
## INSTALLING THE CAMSHAFTS

### 1. Align:

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



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

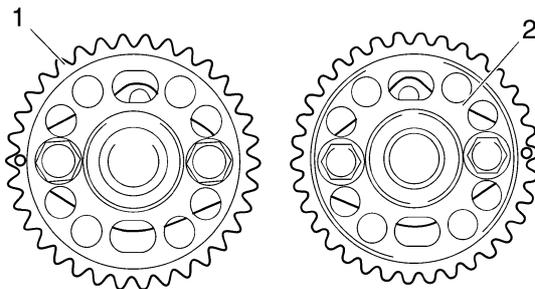


### 2. Install:

- Intake camshaft sprocket “1”
- Exhaust camshaft sprocket “2”  
(with the camshaft sprockets temporarily tightened)

#### NOTE:

Install the camshaft sprockets as a illustration.

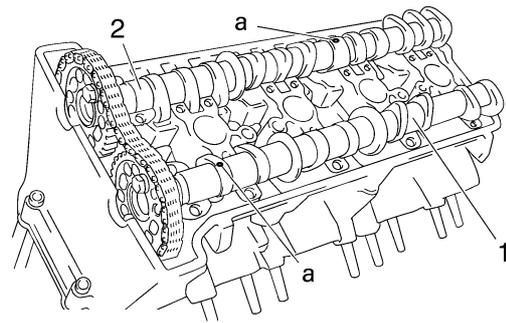


### 3. Install:

- Exhaust camshaft “1”
- Intake camshafts “2”  
(with the camshaft sprockets temporarily tightened)

#### NOTE:

Make sure the punch mark “a” on each camshaft faces up.

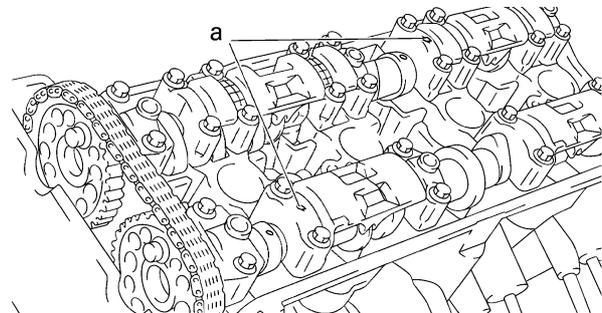


### 4. Install:

- Dowel pins
- Intake camshaft caps
- Exhaust camshaft caps

#### NOTE:

- Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:  
“I”: Intake side camshaft cap mark  
“E”: Exhaust side camshaft cap mark  
“L”: Left side camshaft cap mark  
“R”: Right side camshaft cap mark
- Make sure the arrow mark “a” on each camshaft points towards the right side of the engine.



### 5. Install:

- Camshaft cap bolts



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

#### NOTE:

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

ECA5D01009

#### CAUTION:

- Lubricate the camshaft cap bolts with the engine oil.

# CAMSHAFTS

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

## 6. Tighten:

- Camshaft sprocket bolts "1"



**Camshaft sprocket bolt**  
24 Nm (2.4 m·kg, 17 ft·lb)

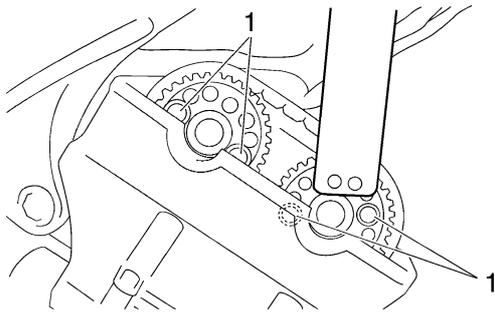


**Camshaft wrench**  
90890-04143  
YM-04143

ECA5D01010

### CAUTION:

Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.

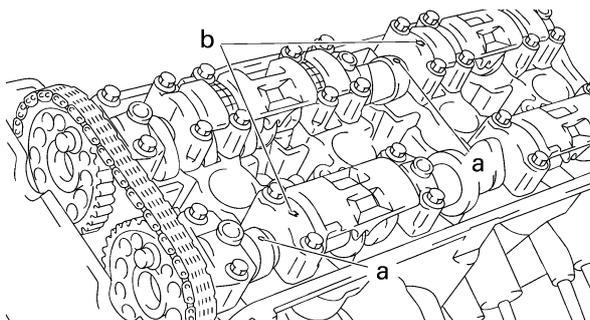


## 7. Align:

- Camshaft punch mark "a"  
Align the camshaft punch mark "a" and the camshaft cap arrow mark "b".



**Camshaft wrench**  
90890-04143  
YM-04143



## 8. Install:

- Gasket **New**
- Timing chain tensioner "1"
- Timing chain tensioner bolts "2"



**Timing chain tensioner bolt**  
10 Nm (1.0 m·kg, 7.2 ft·lb)

ECA5D01011

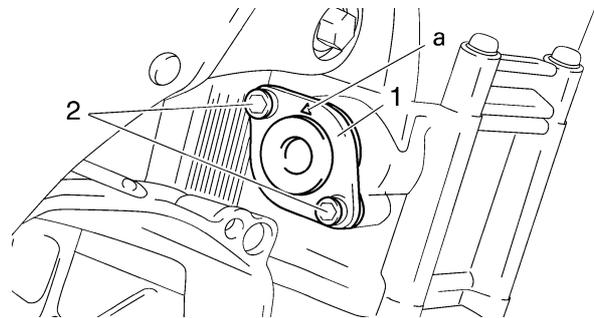
### CAUTION:

The arrow mark "a" on the timing chain tensioner should face up.

EWA5D01008

### WARNING

Always use a new gasket.

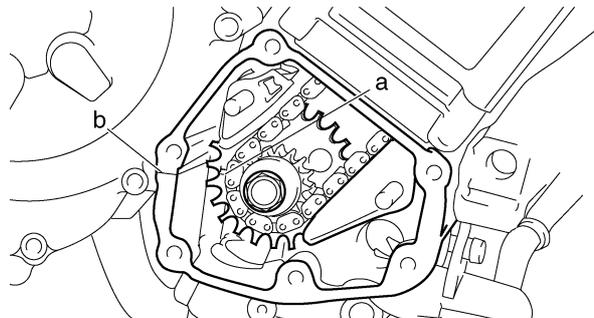


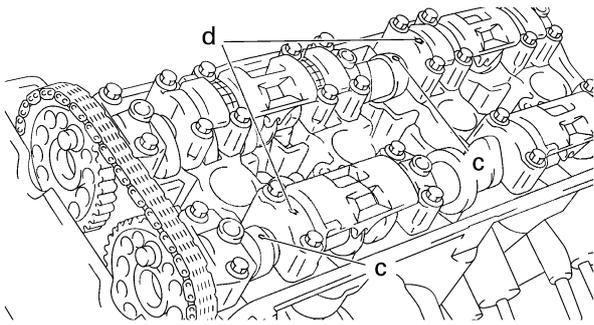
## 9. Turn:

- Crankshaft  
(several turns clockwise)

## 10. Check:

- "T" mark "a"  
Make sure the "T" mark on the pickup rotor is aligned with the crankcase mating surface "b".
- Camshaft punch mark "c"  
Make sure the punch mark "c" on the camshaft is aligned with the camshaft cap arrow mark "d".  
Out of alignment → Adjust.  
Refer to the installation steps above.





11. Measure:

- Valve clearance  
Out of specification → Adjust.  
Refer to “ADJUSTING THE VALVE CLEARANCE” on page 3-4.

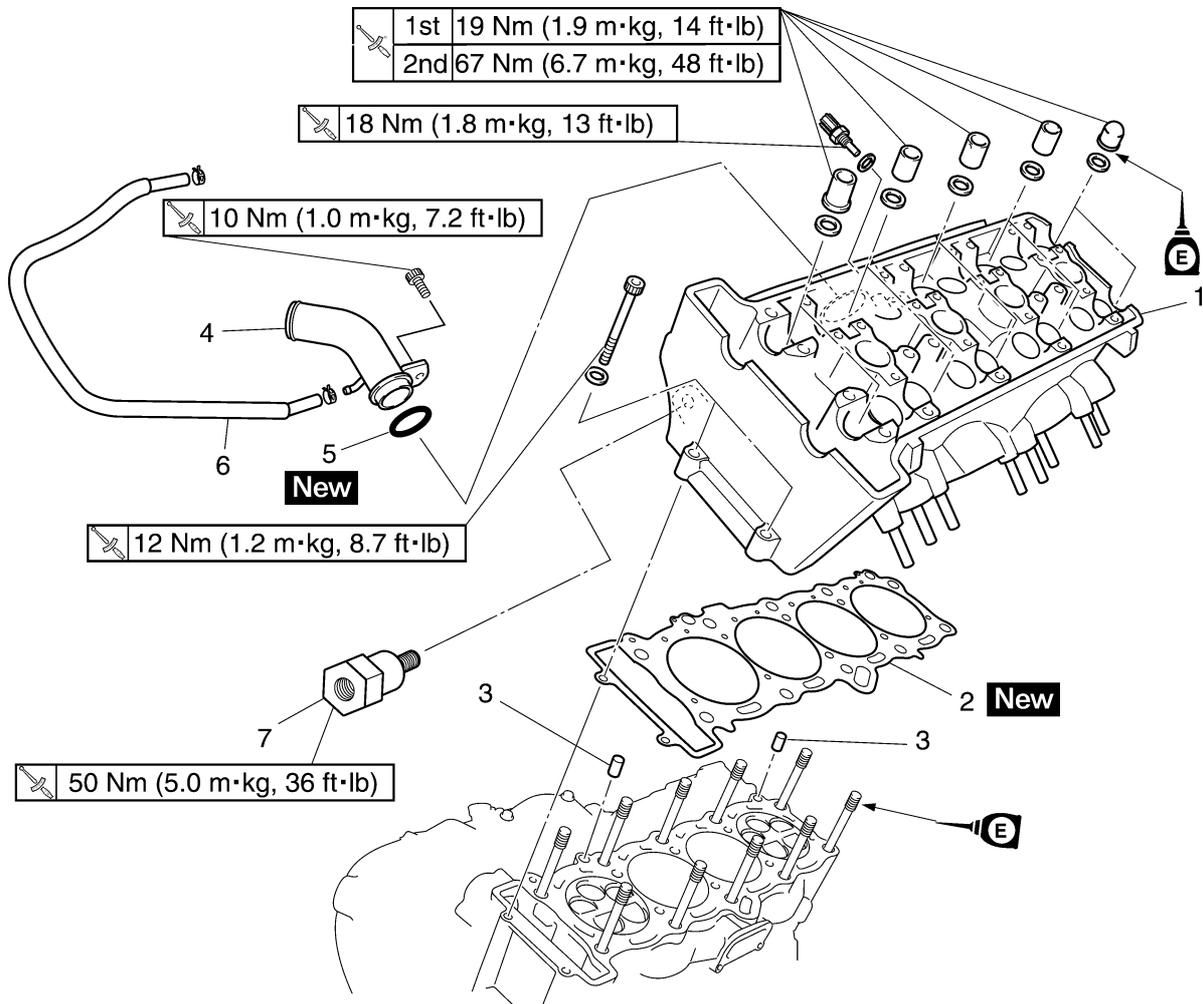
12. Install:

- Pickup coil rotor cover  
“CRANKSHAFT POSITION SENSOR” on page 5-37.

EAS24100

## CYLINDER HEAD

### Removing the cylinder head



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Intake camshaft		Refer to "CAMSHAFTS" on page 5-9.
	Exhaust camshaft		Refer to "CAMSHAFTS" on page 5-9.
1	Cylinder head	1	
2	Cylinder head gasket	1	
3	Dowel pin	2	
4	Coolant pipe	1	
5	O-ring	1	
6	Thermo wax outlet hose	1	
7	Right front engine mounting bolt 2	1	
			For assembly, reverse the removal procedure.

# CYLINDER HEAD

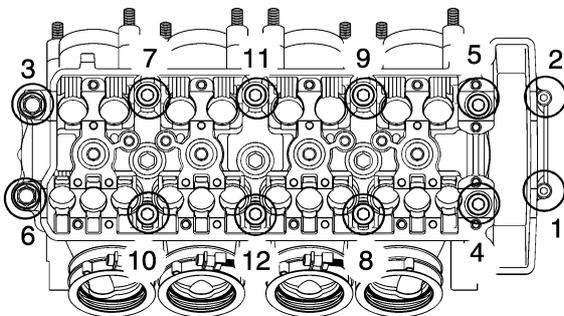
EAS24120

## REMOVING THE CYLINDER HEAD

- Remove:
  - Intake camshaft
  - Exhaust camshaft
 Refer to "REMOVING THE CAM-SHAFTS" on page 5-11.
- Remove:
  - Cylinder head nuts
  - Cylinder head bolts

### NOTE:

- Loosen the nuts in the proper sequence as shown.
- Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.



EAS24160

## CHECKING THE CYLINDER HEAD

- Eliminate:
  - Combustion chamber carbon deposits (with a rounded scraper)

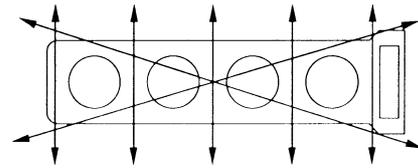
### NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

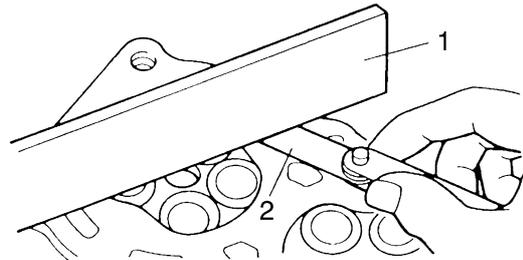
- Spark plug bore threads
- Valve seats

- 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.

	<b>Maximum cylinder head warpage</b> 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.

### NOTE:

To ensure an even surface, rotate the cylinder head several times.

EAS24240

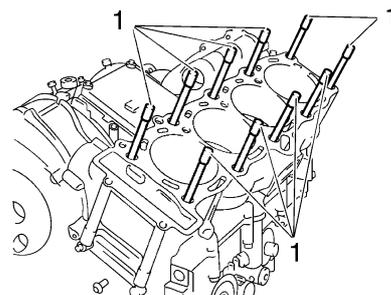
## INSTALLING THE CYLINDER HEAD

- Check:
  - Cylinder head bolts "1"

	<b>Cylinder head bolt</b> 8 Nm (0.8 m·kg, 5.8 ft·lb)
--	---

### NOTE:

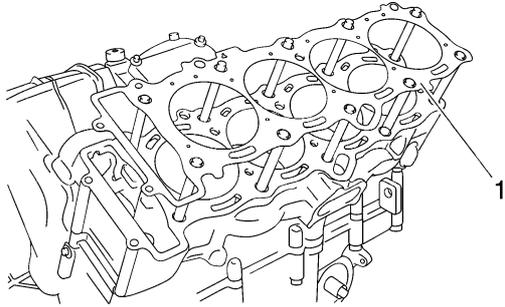
Retighten the cylinder head bolts to specification, before installing the cylinder head.



# CYLINDER HEAD

## 2. Install:

- Gasket "1" **New**
- Dowel pins



## 3. Install:

- Cylinder head

### NOTE:

Pass the timing chain through the timing chain cavity.

## 4. Tighten:

- Cylinder head nuts "1" – "10"



**Cylinder head nut (1st)**  
**19 Nm (1.9 m·kg, 14 ft·lb)**



**Cylinder head nut (2nd)**  
**67 Nm (6.7 m·kg, 48 ft·lb)**

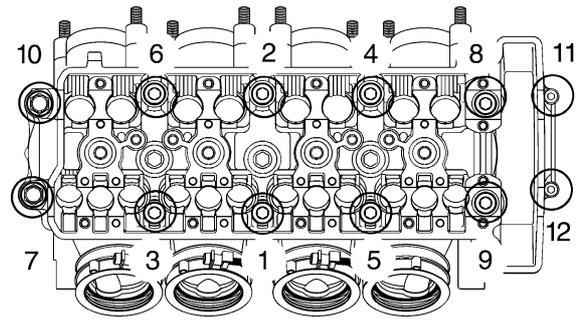
- Cylinder head bolts "11" "12"



**Cylinder head bolt**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**

### NOTE:

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



## 5. Install:

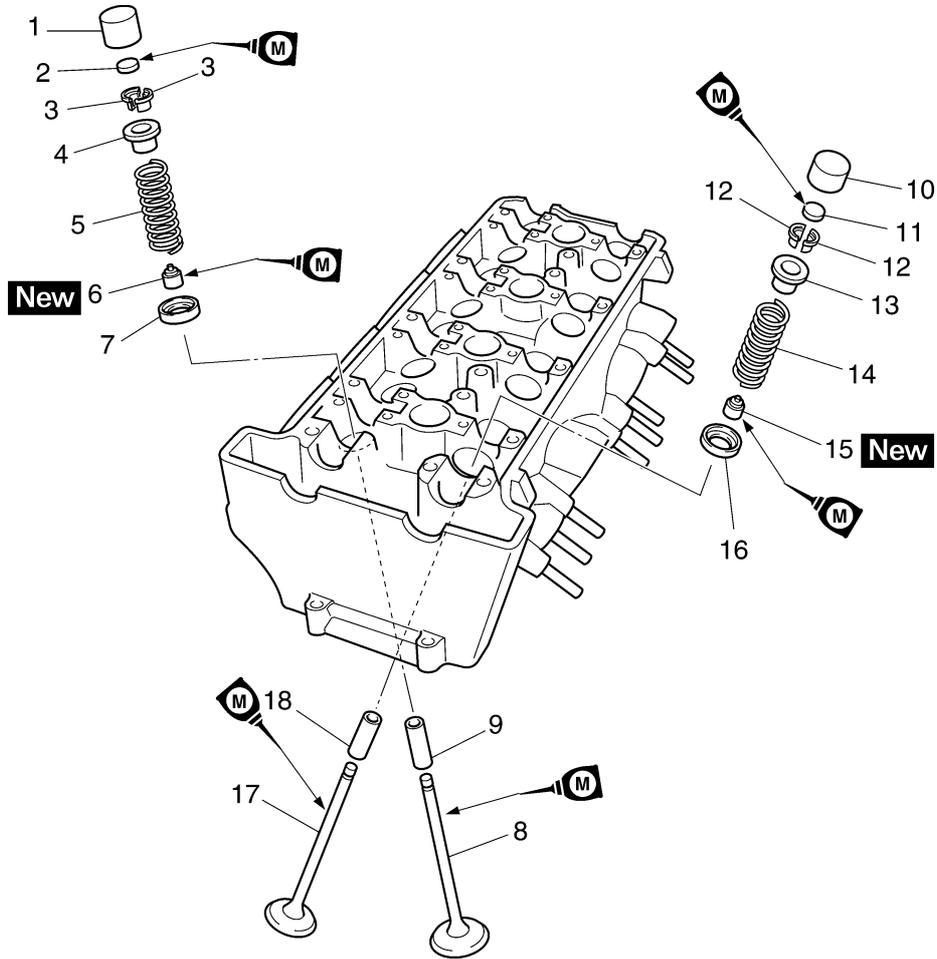
- Exhaust camshaft
  - Intake camshaft
- Refer to "INSTALLING THE CAM-SHAFTS" on page 5-15.

# VALVES AND VALVE SPRINGS

EAS24270

## VALVES AND VALVE SPRINGS

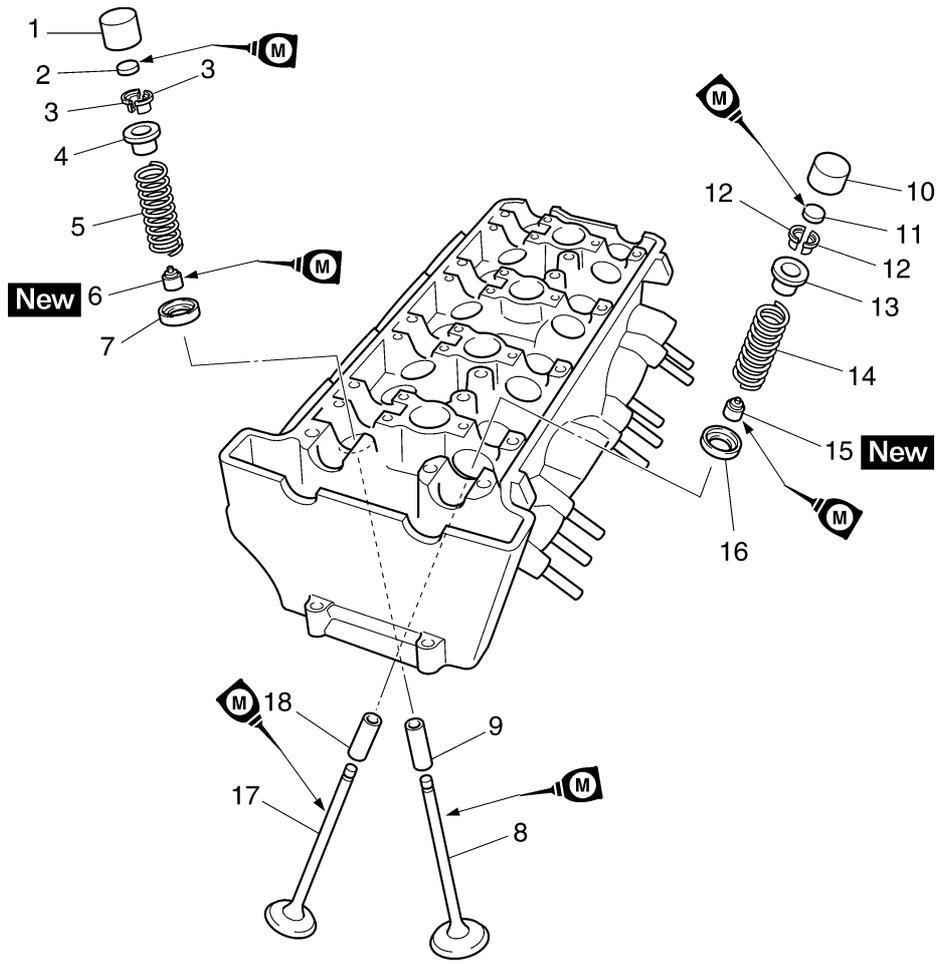
### Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-18.
1	Intake valve lifter	12	
2	Intake valve pad	12	
3	Intake valve cotter	24	
4	Intake valve upper spring seat	12	
5	Intake valve spring	12	
6	Intake valve stem seal	12	
7	Intake valve lower spring seat	12	
8	Intake valve	12	
9	Intake valve guide	12	
10	Exhaust valve lifter	8	
11	Exhaust valve pad	8	
12	Exhaust valve cotter	16	
13	Exhaust valve upper spring seat	8	
14	Exhaust valve spring	8	
15	Exhaust valve stem seal	8	
16	Exhaust valve lower spring seat	8	
17	Exhaust valve	8	
18	Exhaust valve guide	8	

# VALVES AND VALVE SPRINGS

## Removing the valves and valve springs



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



# VALVES AND VALVE SPRINGS

EAS24290

## CHECKING THE VALVES AND VALVE GUIDES

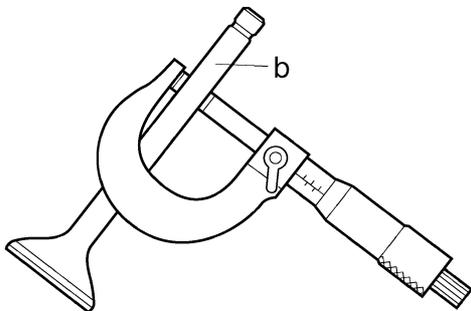
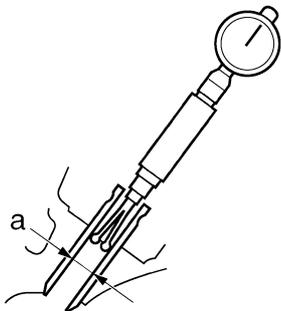
The following procedure applies to all of the valves and valve guides.

### 1. Measure:

- Valve-stem-to-valve-guide clearance  
Out of specification → Replace the valve guide.

<ul style="list-style-type: none"> <li>• Valve-stem-to-valve-guide clearance = Valve guide inside diameter "a" - Valve stem diameter "b"</li> </ul>
---

Valve-stem-to-valve-guide clearance	
<b>Intake</b>	
0.010–0.037 mm (0.0004–0.0015)	
<b>Limit</b>	
0.08 mm (0.0032 in)	
<b>Exhaust</b>	
0.025–0.052 mm (0.0010–0.0020 in)	
<b>Limit</b>	
0.10 mm (0.0039 in)	



### 2. Replace:

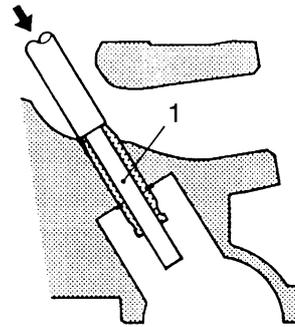
- Valve guide

### NOTE:

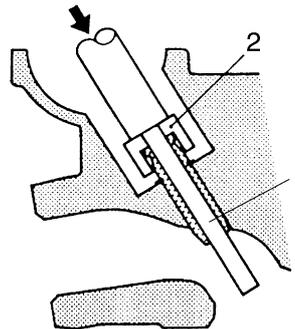
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100°C (212°F) in an oven.



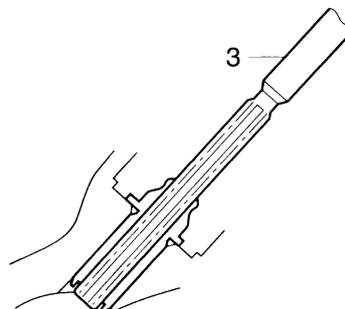
- Remove the valve guide with the valve guide remover "1".



- Install the new valve guide with the valve guide installer "2" and valve guide remover "1".



- After installing the valve guide, bore the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.



11170601

### NOTE:

After replacing the valve guide, reface the valve seat.

# VALVES AND VALVE SPRINGS



**Intake**  
**Valve guide remover (ø4)**  
**90890-04111**  
**YM-04111**

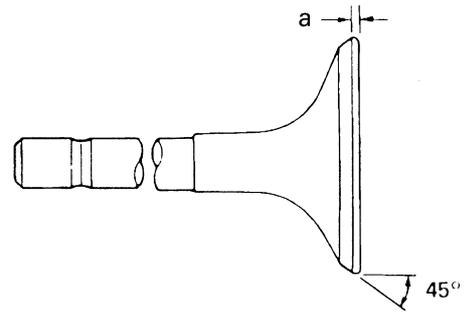
**Exhaust**  
**Valve guide remover (ø4.5)**  
**90890-04116**  
**YM-04116**

**Intake**  
**Valve guide installer (ø4)**  
**90890-04112**  
**YM-04112**

**Exhaust**  
**Valve guide installer (ø4.5)**  
**90890-04117**  
**YM-04117**

**Intake**  
**Valve guide reamer (ø4)**  
**90890-04113**  
**YM-04113**

**Exhaust**  
**Valve guide reamer (ø4.5)**  
**90890-04118**  
**YM-04118**



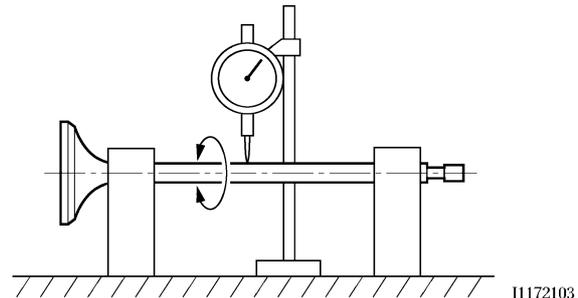
6. Measure:
- Valve stem runout  
 Out of specification → Replace the valve.

**NOTE:**

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



**Valve stem runout**  
**0.010 mm (0.0004 in)**



11172103

EAS24300

**CHECKING THE VALVE SEATS**

The following procedure applies to all of the valves and valve seats.

1. Eliminate:
  - Carbon deposits  
 (from the valve face and valve seat)
2. Check:
  - Valve seat  
 Pitting/wear → Replace the cylinder head.
3. Measure:
  - Valve seat width “a”  
 Out of specification → Replace the cylinder head.



3. Eliminate:
  - Carbon deposits  
 (from the valve face and valve seat)
4. Check:
  - Valve face  
 Pitting/wear → Grind the valve face.
  - Valve stem end  
 Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
  - Valve margin thickness “a”  
 Out of specification → Replace the valve.



**Valve margin thickness**  
**0.5–0.9 mm (0.0197–0.0354 in)**  
**Limit**  
**0.5 mm (0.02 in)**

# VALVES AND VALVE SPRINGS



## Valve seat width

### Intake

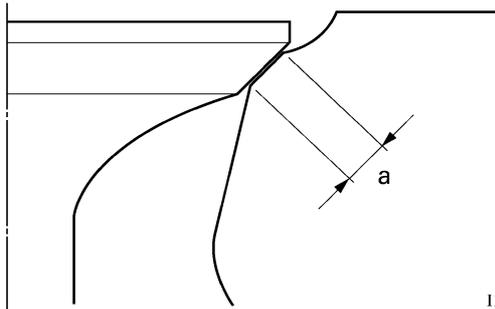
0.90–1.10 mm (0.0354–0.0433 in)

### Exhaust

0.90–1.10 mm (0.0354–0.0433 in)

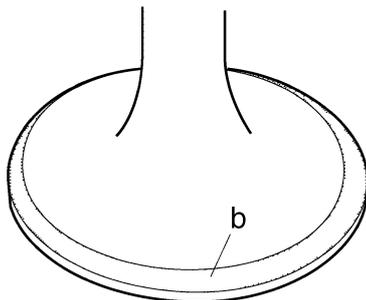
### Limit

1.6 mm (0.063 in)



11171603

- a. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



- b. Install the valve into the cylinder head.
- c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- d. Measure the valve seat width.

### NOTE:

Where the valve seat and valve face contacted one another, the blueing will have been removed.

## 4. Lap:

- Valve face
- Valve seat

### NOTE:

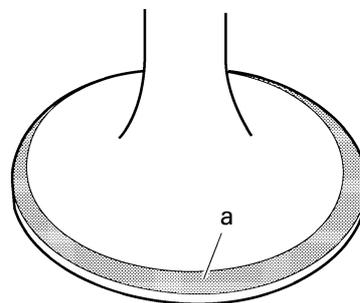
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

- a. Apply a coarse lapping compound "a" to the valve face.

ECA13790

### CAUTION:

Do not let the lapping compound enter the gap between the valve stem and the valve guide.

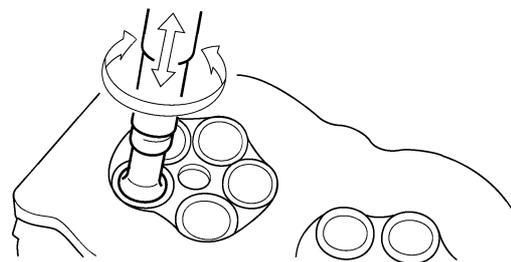


11171601

- 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.

### NOTE:

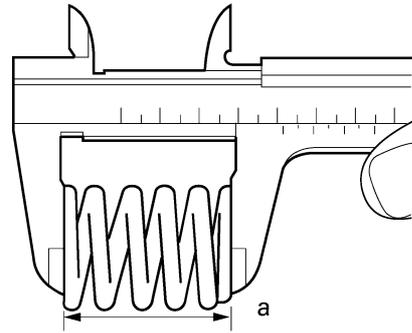
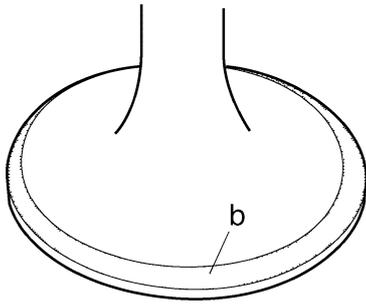
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



11171504

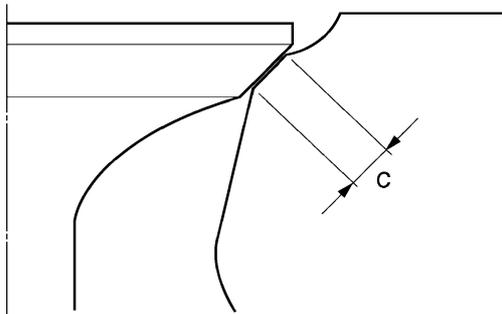
- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.

# VALVES AND VALVE SPRINGS



I1171902

- 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.



2. Measure:
  - Compressed valve spring force "a"  
Out of specification → Replace the valve spring.

**Compressed valve spring force (installed)**

**Intake valve spring**  
127.4–144.6 N (12.99–14.74 kg, 28.64–32.51 lb) at 32.65 mm (1.285 in)

**Exhaust valve spring**  
133.0–153.0 N (13.56–15.60 kg, 29.90–34.39 lb) at 32.82 mm (1.292 in)



EAS24310

## CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:
  - Valve spring free length "a"  
Out of specification → Replace the valve spring.

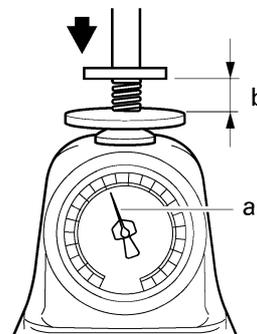
**Valve spring free length**

**Intake valve spring**  
40.5 mm (1.60 in)

**Limit**  
38.5 mm (1.47 in)

**Exhaust valve spring**  
40.5 mm (1.60 in)

**Limit**  
38.5 mm (1.47 in)



I1171904

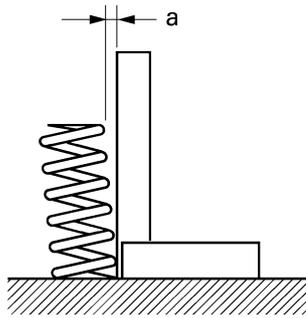
- b. Installed length
3. Measure:
  - Valve spring tilt "a"  
Out of specification → Replace the valve spring.

**Spring tilt limit**

**Intake valve spring**  
1.8 mm (0.07 in)

**Exhaust valve spring**  
1.8 mm (0.07 in)

# VALVES AND VALVE SPRINGS



I1171903

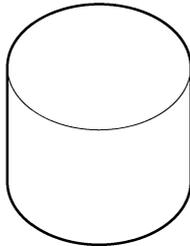
EAS24320

## 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.



I1170701

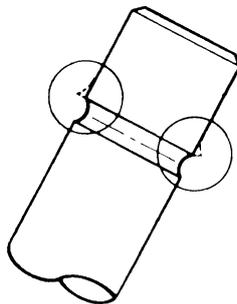
EAS24330

## INSTALLING THE VALVES

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

### 1. Deburr:

- Valve stem end  
(with an oil stone)

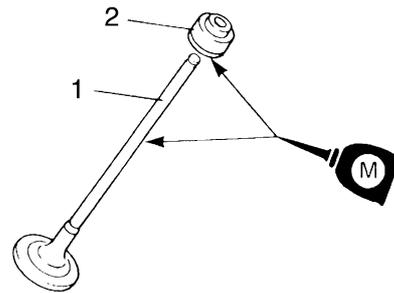


### 2. Lubricate:

- Valve stem "1"
- Valve stem seal "2"  
(with the recommended lubricant)



**Recommended lubricant**  
**Molybdenum disulfide oil**

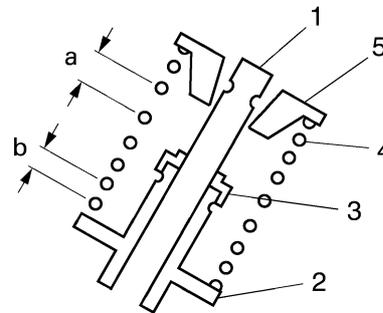


### 3. Install:

- Valve "1"
- Lower spring seat "2"
- Valve stem seal "3"
- Valve spring "4"
- Upper spring seat "5"  
(into the cylinder head)

### NOTE:

- Make sure each valve is installed in its original place. Refer to the following embossed marks.  
Right and left intake valve (-s): "5VY."  
Middle intake valve (-s): "5VY."  
Exhaust valve (-s): "5VY".
- Install the valve springs with the larger pitch "a" facing up.



I1172001

### b. Smaller pitch

### 4. Install:

- Valve cotters "1"

### NOTE:

Install the valve cotters by compressing the valve springs with the valve spring compressor "2" and the valve spring compressor attachment "3".

## VALVES AND VALVE SPRINGS



**Valve spring compressor**  
90890-04019

**YM-04019**

**Valve spring compressor attachment**  
90890-04114

**90890-04114**

**Valve spring compressor adapter**  
YM-04114

**YM-04114**

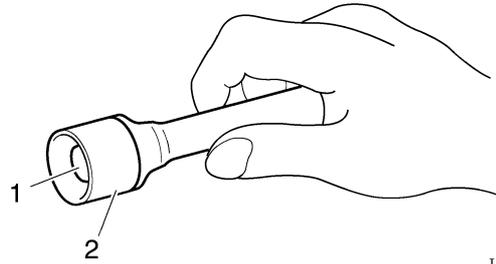
**Valve spring compressor attachment**  
90890-04108

**90890-04108**

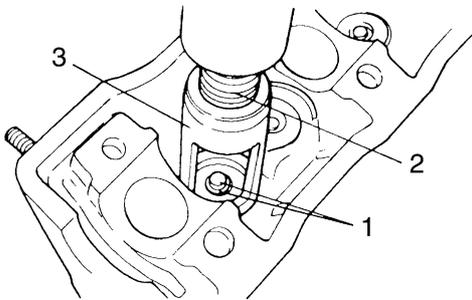
**Valve spring compressor adapter (22 mm)**  
YM-04108

**YM-04108**

- Each valve lifter and valve pad must be reinstalled in its original position.



11171102

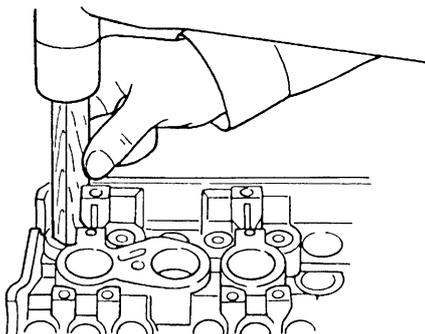


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

**CAUTION:**

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



6. Install:
  - Valve pad "1"
  - Valve lifter "2"

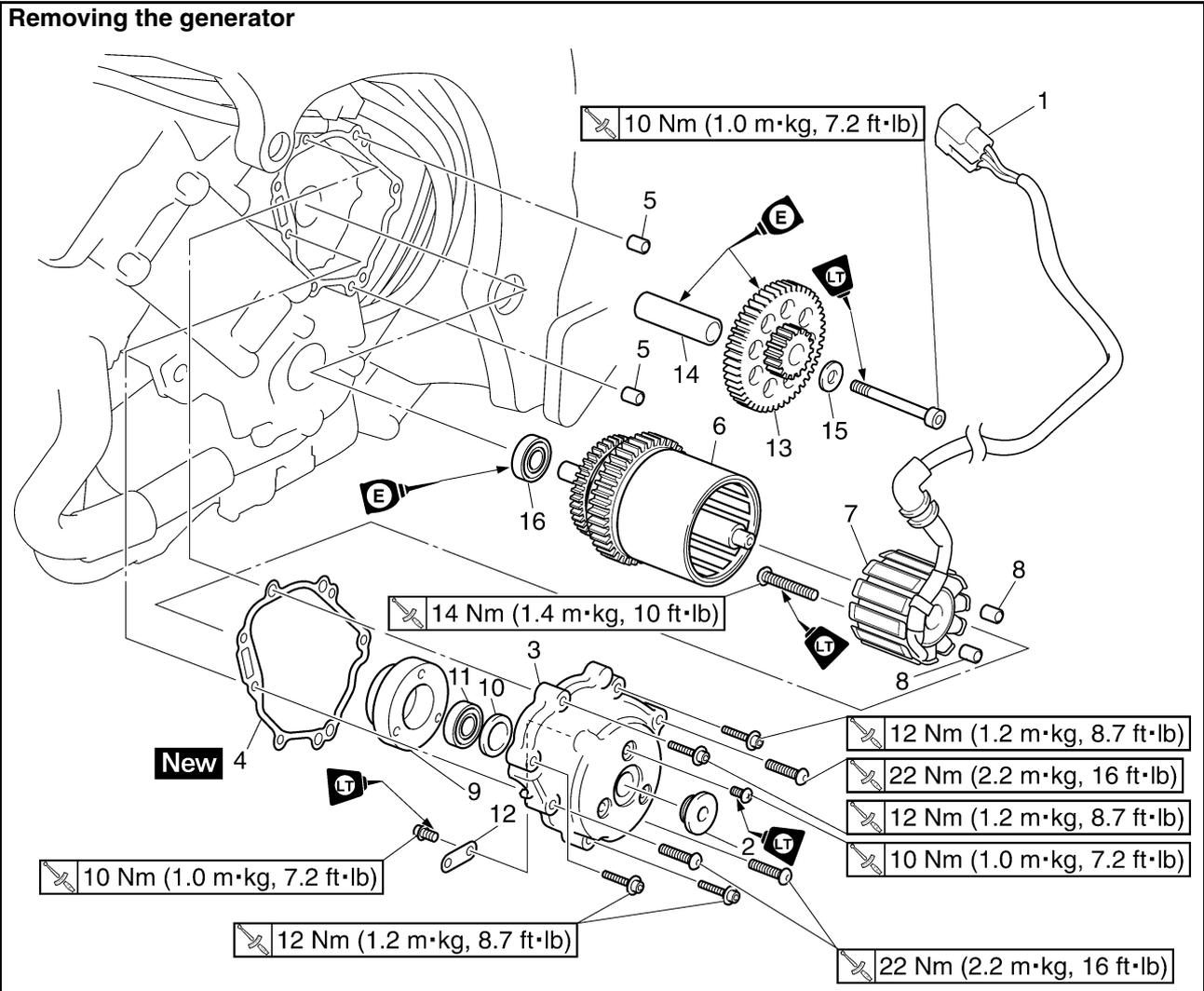
**NOTE:**

- Lubricate the valve lifter and valve pad with molybdenum disulfide oil.
- The valve lifter must move smoothly when rotated with a finger.

EAS24480

## GENERATOR

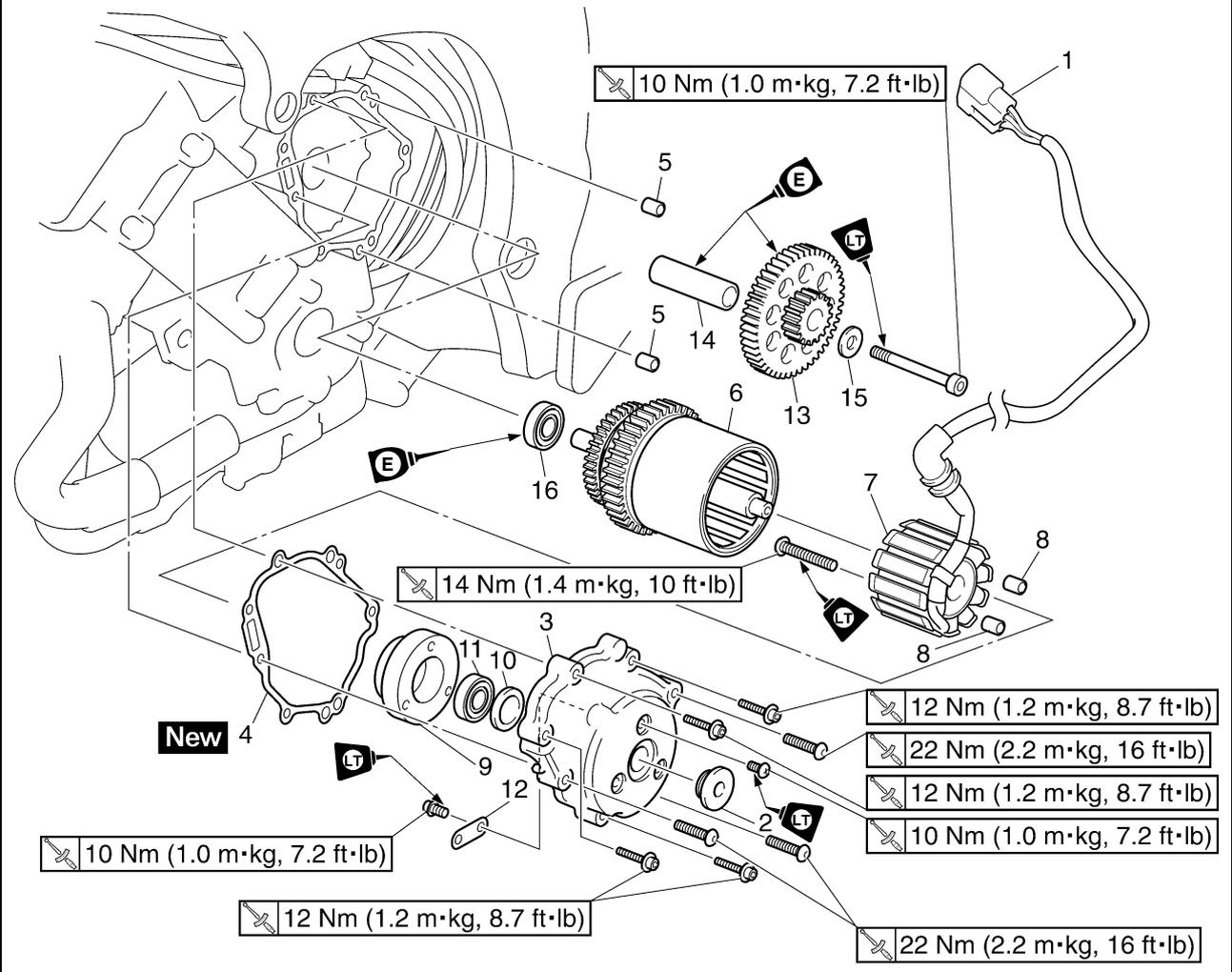
### Removing the generator



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
1	Stator coil assembly lead coupler	1	Disconnect.
2	Plug	1	
3	Generator rotor cover	1	
4	Gasket	1	
5	Dowel pin	2	
6	Generator rotor assembly	1	
7	Stator coil assembly	1	
8	Dowel pin	2	
9	Bearing housing	1	
10	Collar	1	
11	Bearing	1	
12	Stator coil assembly lead holder	1	
13	Idler gear	1	
14	Idler gear shaft	1	

# GENERATOR

## Removing the generator



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

# GENERATOR

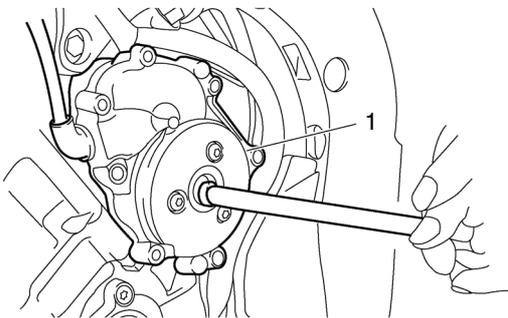
EAS24490

## REMOVING THE GENERATOR

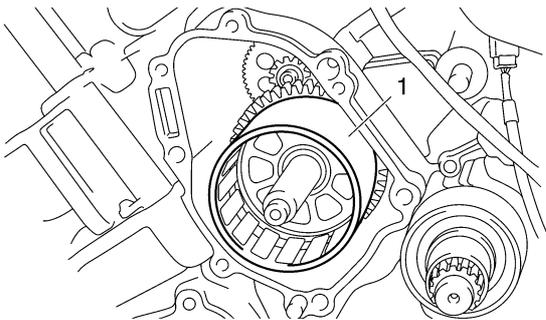
1. Remove:
  - Plug
  - Generator rotor cover "1"

### NOTE:

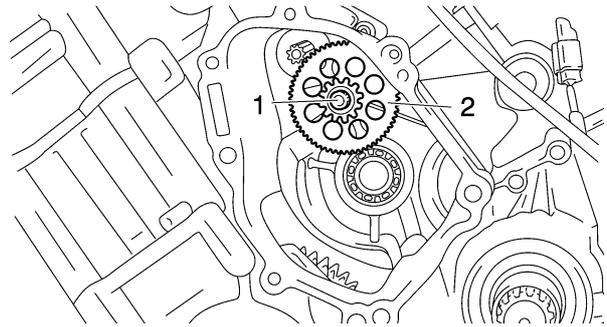
- While pushing generator rotor, remove the generator rotor cover.
- Loosen each bolt 1/4 of a turn a time, in stages and in a crisscross pattern.
- After all of the bolts are fully loosened, remove them.



2. Remove:
  - Generator rotor and starter clutch assembly "1"



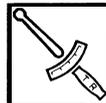
3. Remove:
  - Idle gear shaft bolt "1"
  - Idle shaft
  - Idle gear "2"



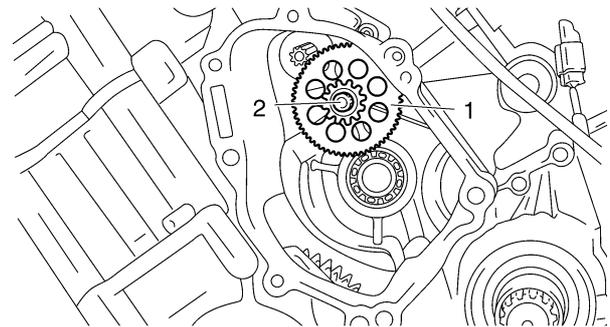
EAS24500

## INSTALLING THE GENERATOR

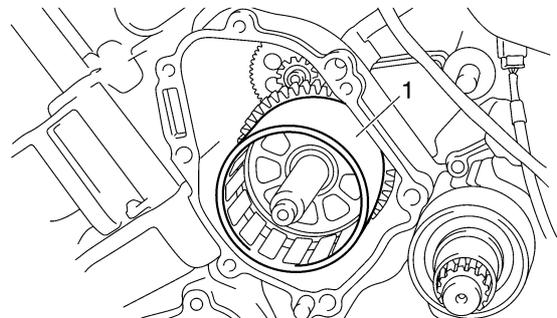
1. Install:
  - Idle gear shaft
  - Idle gear "1"
  - Washer
  - Idle gear shaft bolt "2"



**Idle gear shaft bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**



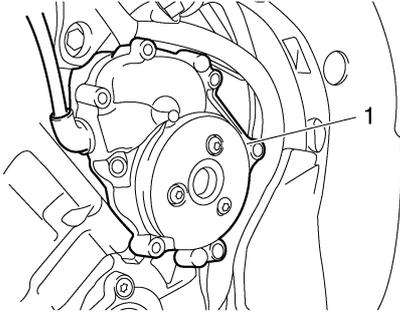
2. Install
  - Generator rotor and starter clutch assembly "1"



3. Install:
  - Generator rotor cover gasket **New**
  - Generator rotor cover "1"



**Generator rotor cover bolt (M6)**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**  
**Generator rotor cover bolt (M8)**  
**22 Nm (2.2 m·kg, 16 ft·lb)**



**NOTE:**

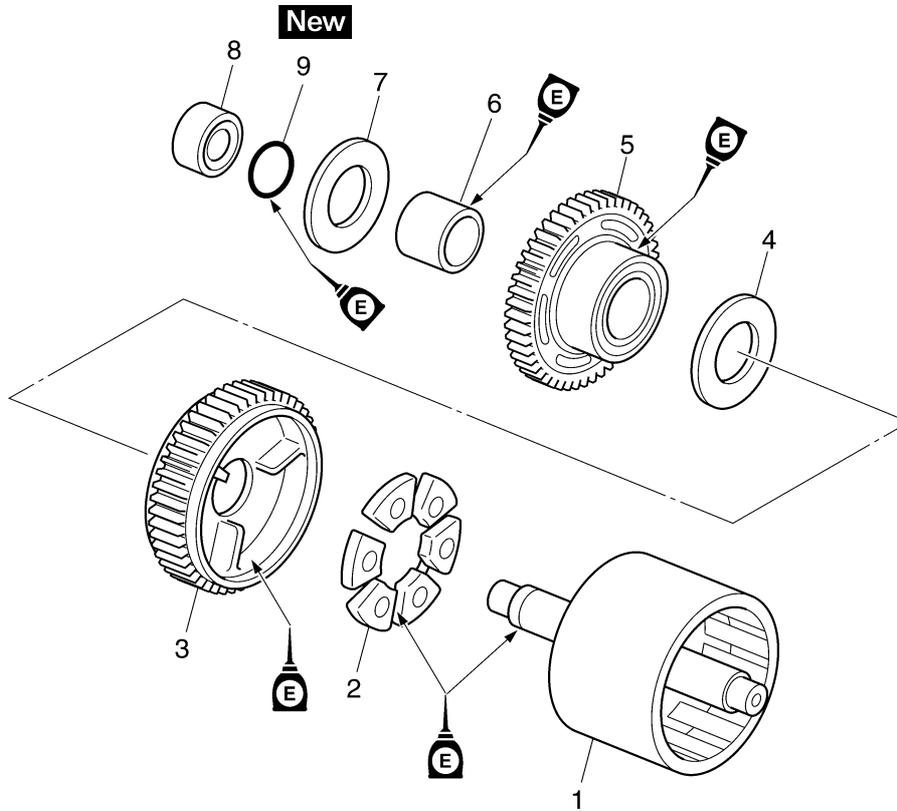
- First tighten the M8 bolts and then tighten the M6 bolts.
  - Tighten the generator rotor cover bolts in stages and in a crisscross pattern.
-

# STARTER CLUTCH

EAS24550

## STARTER CLUTCH

### Removing the starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Generator rotor	1	
2	Damper	3	
3	Driven gear	1	
4	Washer	1	
5	Starter clutch drive gear	1	
6	Collar	1	
7	Washer	1	
8	Spacer	1	
9	O-ring	1	
			For assembly, reverse the removal procedure.



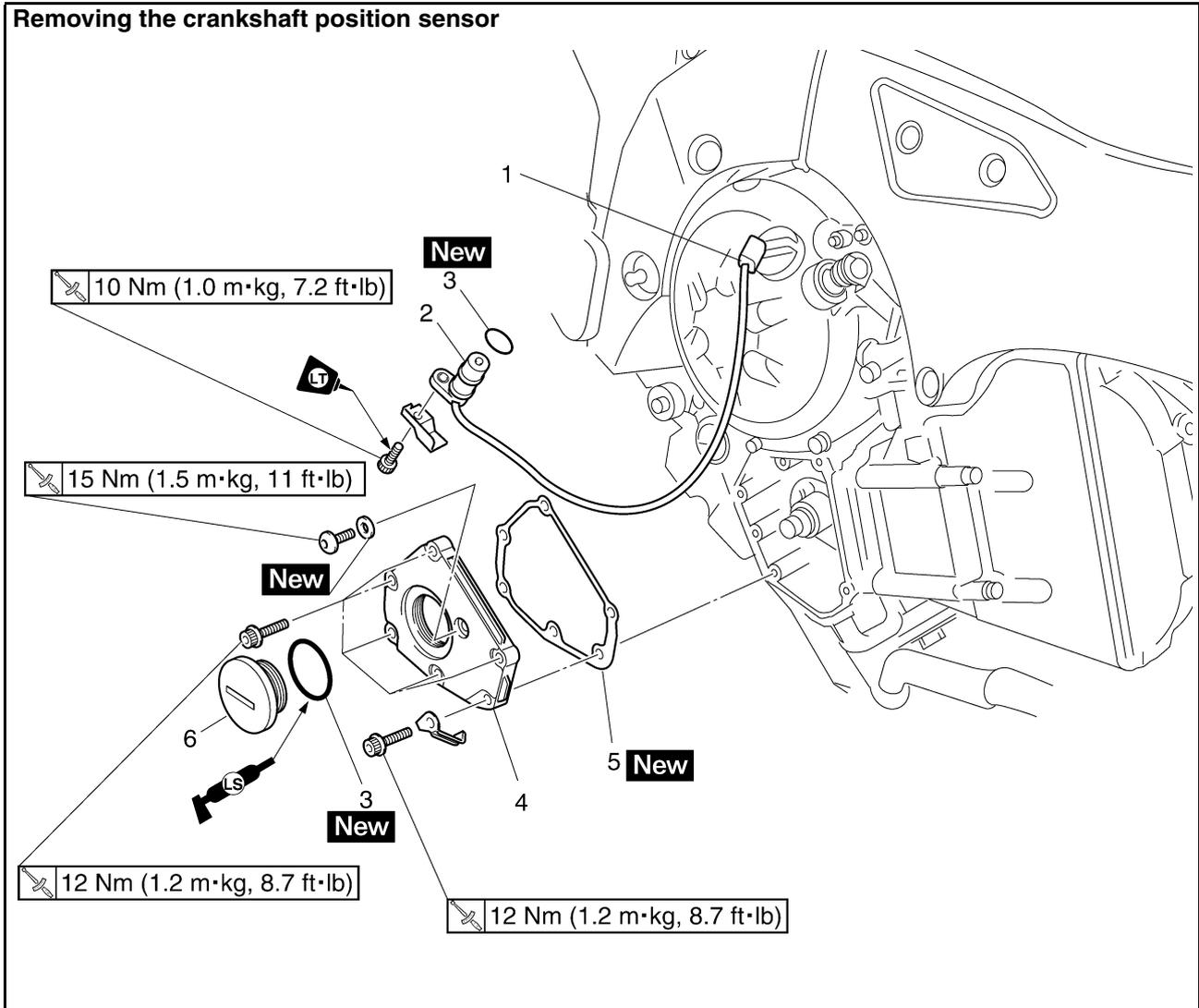


# CRANKSHAFT POSITION SENSOR

EAS24520

## CRANKSHAFT POSITION SENSOR

### Removing the crankshaft position sensor



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
1	Crankshaft position sensor lead coupler	1	Disconnect.
2	Crankshaft position sensor	1	
3	O-ring	1	
4	Pickup rotor cover	1	
5	Gasket	1	
6	Cover	1	
			For assembly, reverse the removal procedure.

# CRANKSHAFT POSITION SENSOR

EAS24530

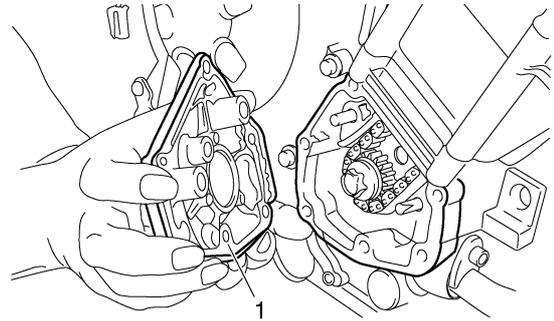
## REMOVING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:
  - Crankshaft position sensor lead coupler
2. Remove:
  - Crankshaft position sensor
  - O-ring
  - Pickup coil rotor cover "1"

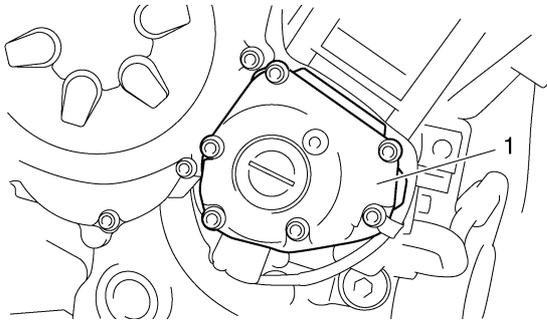
### NOTE:

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

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



2. Connect
  - Crankshaft position sensor lead coupler



EAS24540

## INSTALLING THE CRANKSHAFT POSITION SENSOR

1. Install:
  - Gasket **New**
  - Pickup rotor cover "1"

	<b>Pickup rotor cover</b> <b>12 Nm (1.2 m·kg, 8.7 ft·lb)</b>
---	---

- O-ring **New**
- Crankshaft position sensor

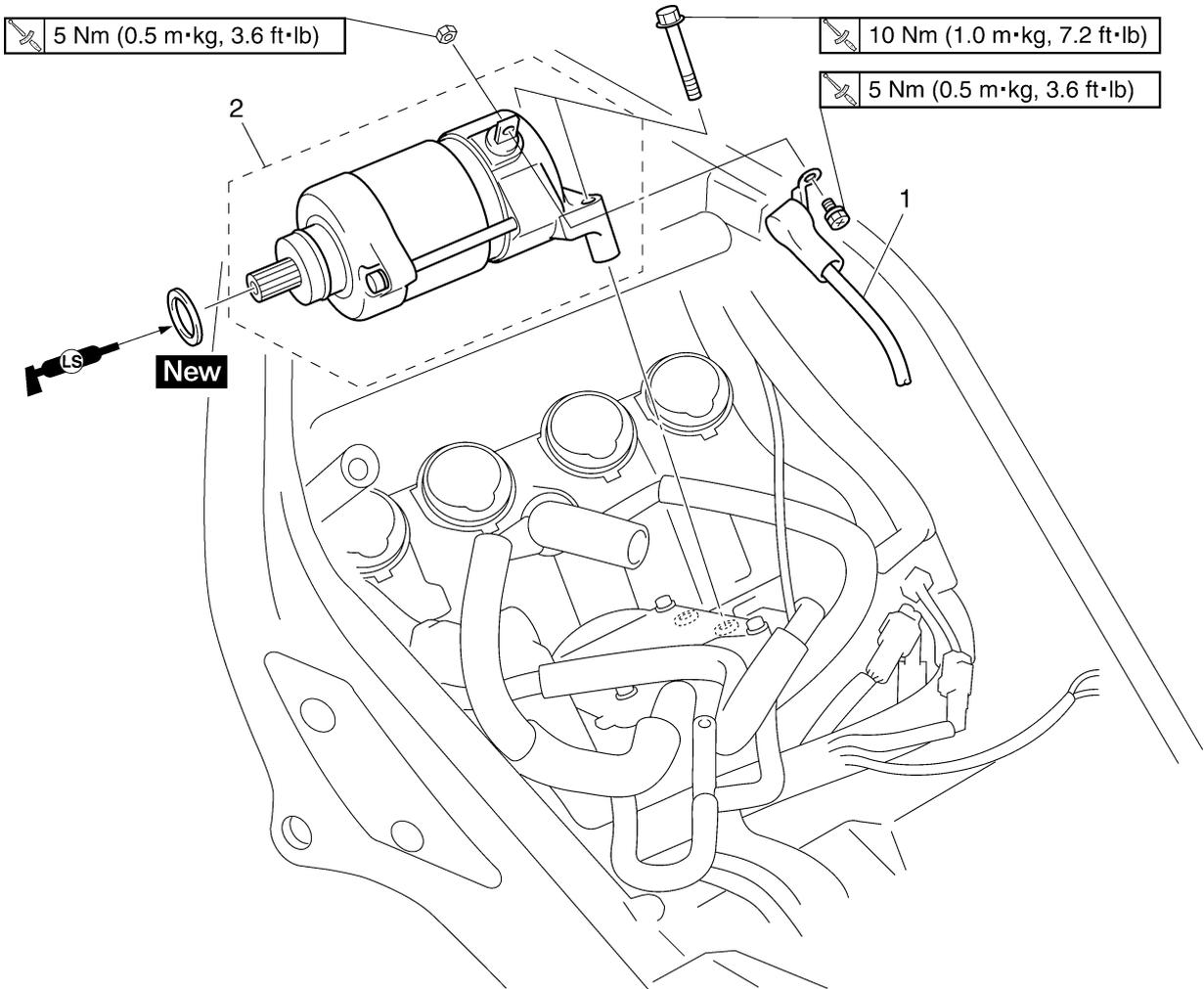
	<b>Crankshaft position sensor bolt</b> <b>10 Nm (1.0 m·kg, 7.2 ft·lb)</b> <b>LOCTITE®</b>
---	---

# ELECTRIC STARTER

EAS24780

## ELECTRIC STARTER

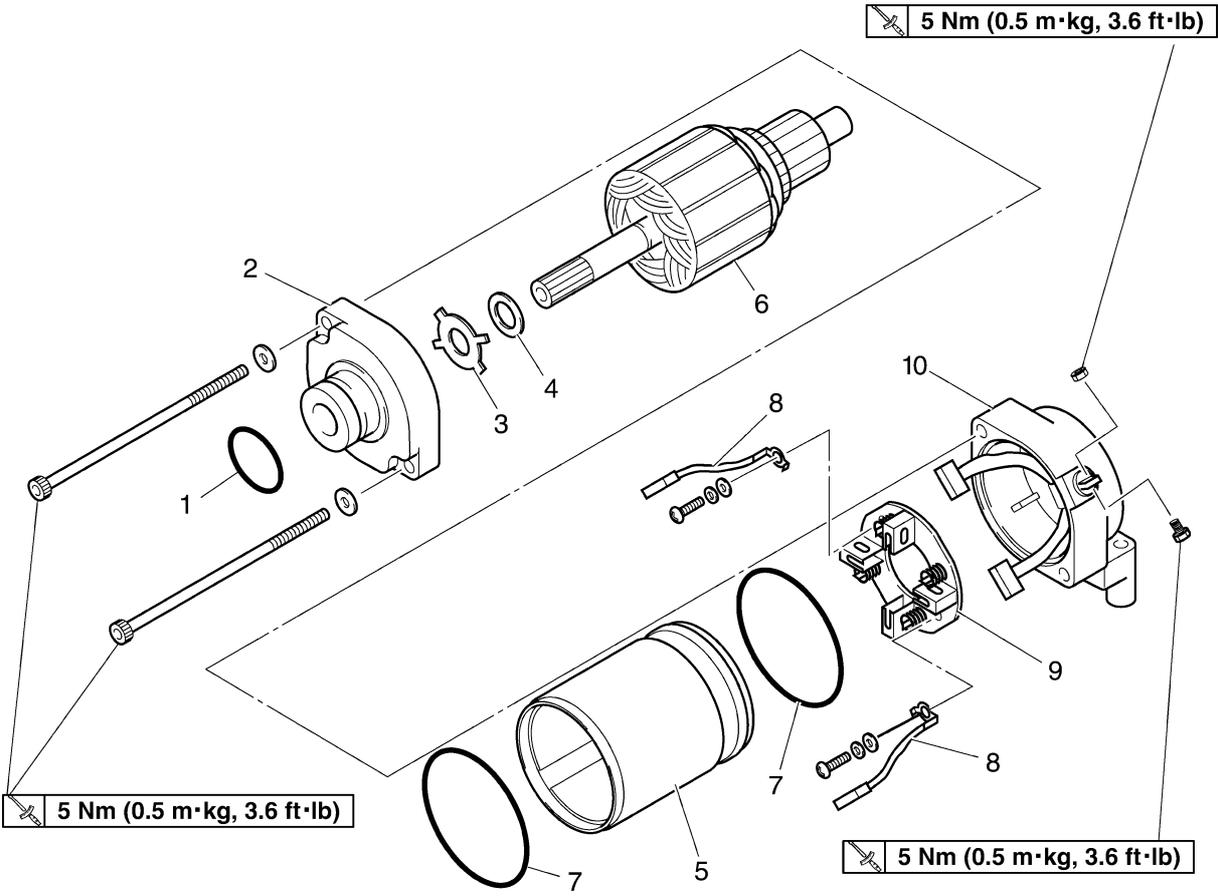
### Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Throttle body assembly		Refer to "THROTTLE BODIES" on page 7-4.
1	Starter motor lead	1	
2	Starter motor	1	
			For assembly, reverse the removal procedure.

# ELECTRIC STARTER

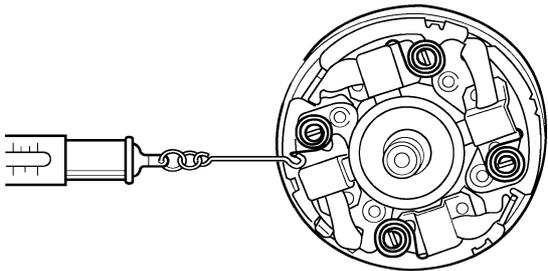
## Disassembling the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Front cover	1	
3	Lock washer	1	
4	Washer	1	
5	Starter motor yoke	1	
6	Armature assembly	1	
7	O-ring	2	
8	Starter motor lead	2	
9	Brush holder	1	
10	Rear cover	1	
			For assembly, reverse the disassembly procedure.



# ELECTRIC STARTER



18210602

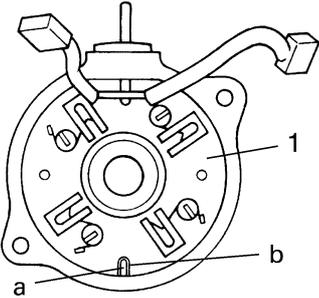
7. Check:
- Gear teeth
- Damage/wear → Replace the gear.

EAS24800

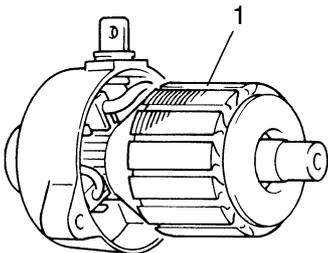
## ASSEMBLING THE STARTER MOTOR

1. Install:
- Brush seat "1"

**NOTE:** \_\_\_\_\_  
Align the tab "a" on the brush seat with the tab "b" in the starter motor rear cover.



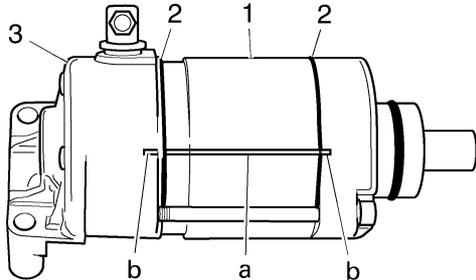
2. Install:
- Armature "1"



3. Install:
- Starter motor yoke "1"
  - O-rings "2" **New**
  - Starter motor rear cover "3"
  - Starter motor assembling bolts

	<b>Starter motor assembling bolt</b> 5 Nm (0.5 m·kg, 3.6 ft·lb)
---	--

**NOTE:** \_\_\_\_\_  
Align the match marks "a" on the starter motor yoke with the match marks "b" on the front and starter motor rear covers.



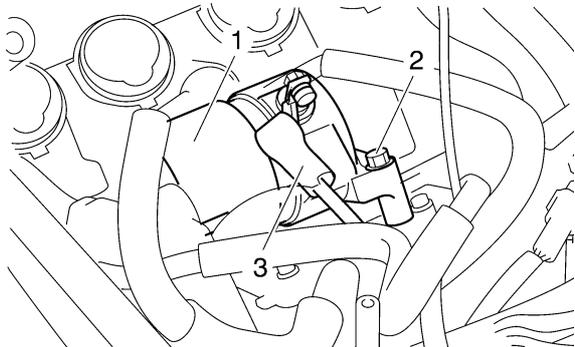
EAS24810

## INSTALLING THE STARTER MOTOR

1. Install:
- Starter motor "1"
  - Starter motor bolts "2"

	<b>Starter motor bolt</b> 10 Nm (1.0 m·kg, 7.2 ft·lb)
--	--

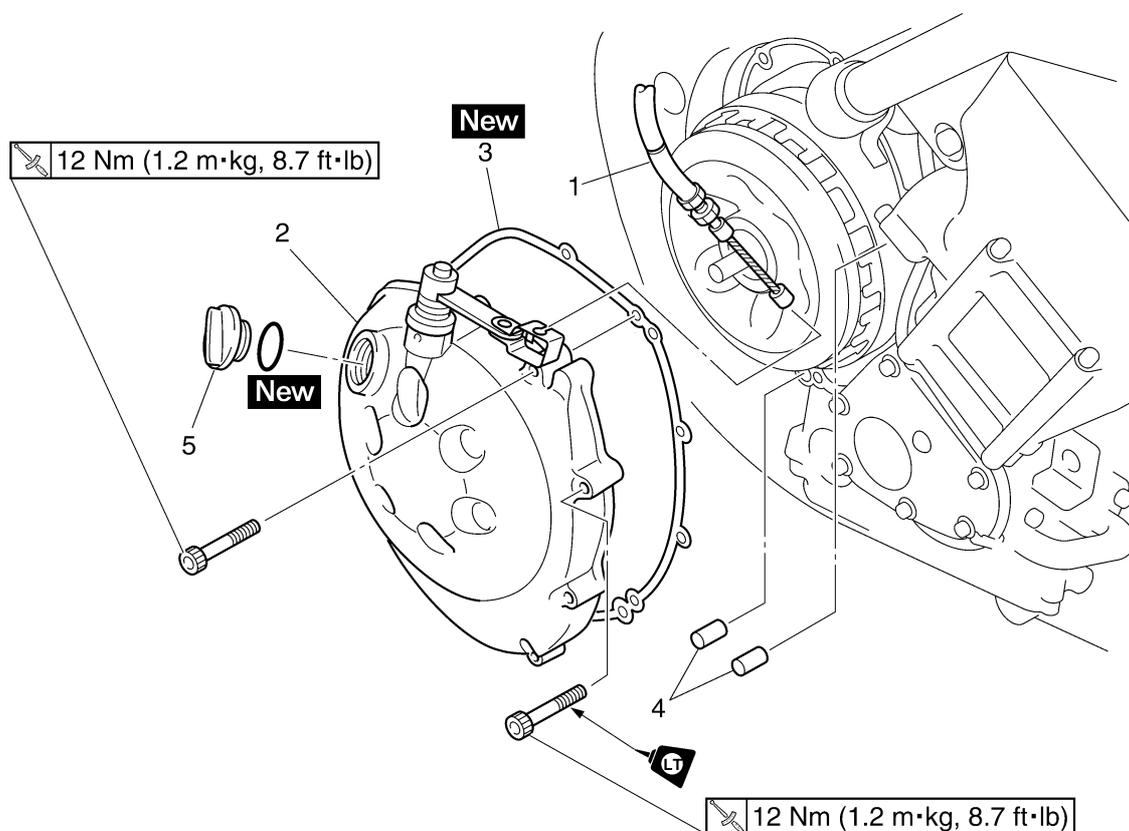
2. Connect:
- Starter motor lead "3"



EAS25060

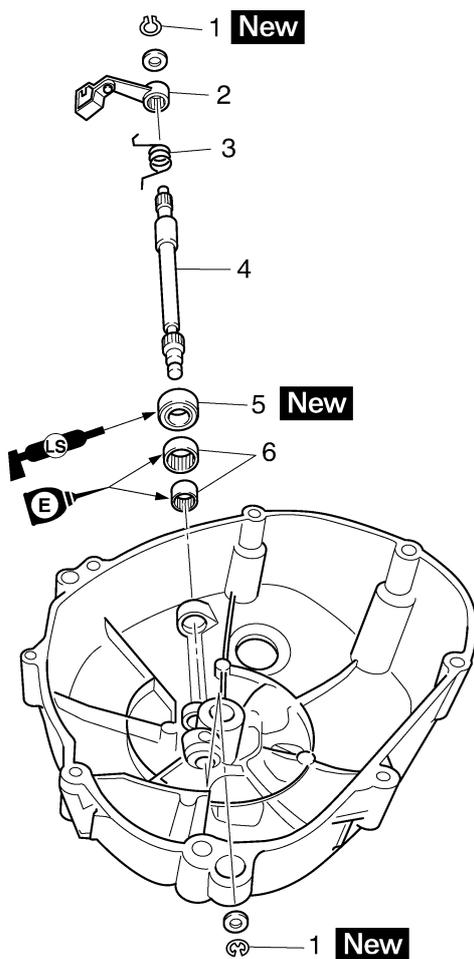
## CLUTCH

### Removing the clutch cover



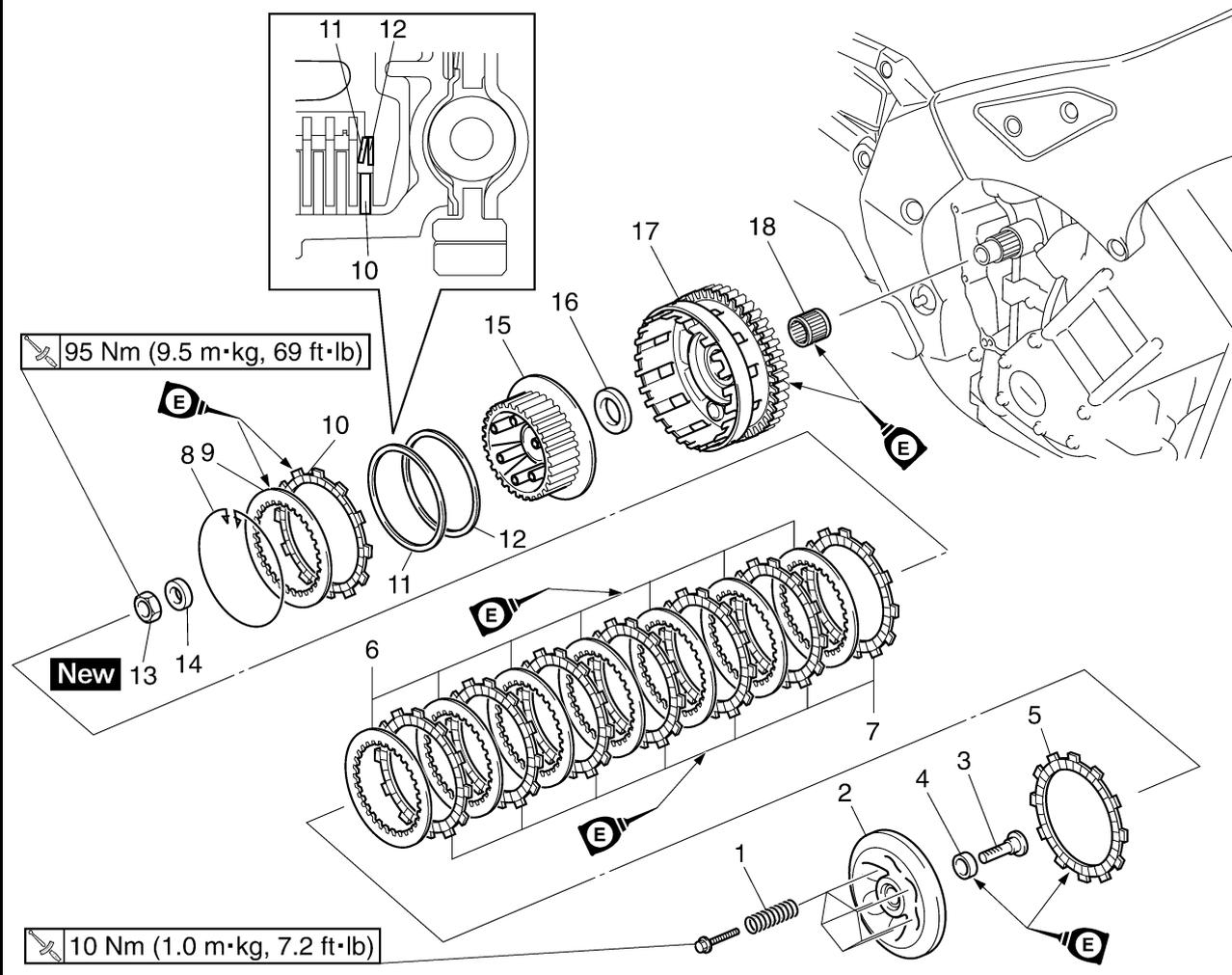
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
1	Clutch cable	1	
2	Clutch cover	1	
3	Clutch cover gasket	1	
4	Dowel pin	2	
5	Oil filler cap	1	
			For installation, reverse the removal procedure.

## Removing the pull lever shaft



Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	2	
2	Pull lever	1	
3	Pull lever spring	1	
4	Pull lever shaft	1	
5	Oil seal	1	
6	Bearing	2	
			For installation, reverse the removal procedure.

## Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Compression spring	6	
2	Pressure plate	1	
3	Pull rod	1	
4	Bearing	1	
5	Friction plate 1	1	
6	Clutch plate 1	7	
7	Friction plate 2	7	
8	Wire circlip	1	
9	Clutch plate 2	1	
10	Friction plate 3	1	
11	Clutch damper spring	1	
12	Clutch damper spring seat	1	
13	Clutch boss nut	1	
14	Washer	1	
15	Clutch boss assembly	1	
16	Thrust plate	1	
17	Clutch housing	1	
18	Bearing	1	
			For assembly, reverse the removal procedure.

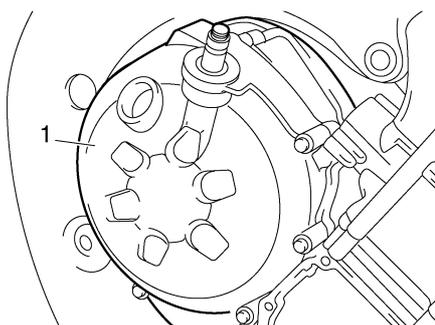
EAS25080

## REMOVING THE CLUTCH

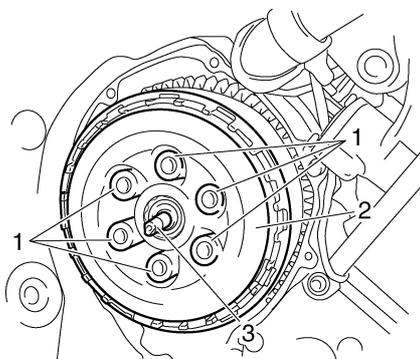
1. Remove:
  - Clutch cover "1"
  - Gasket

### NOTE:

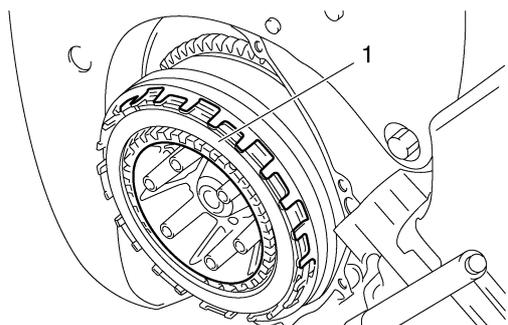
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



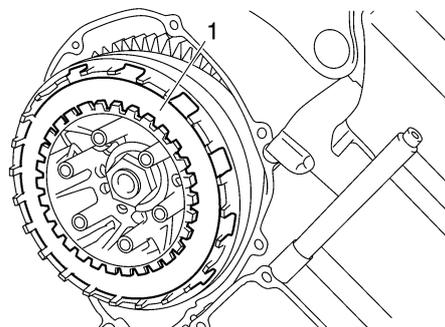
2. Remove:
  - Compression spring bolts "1"
  - Compression springs
  - Pressure plate "2"
  - Pull rod "3"



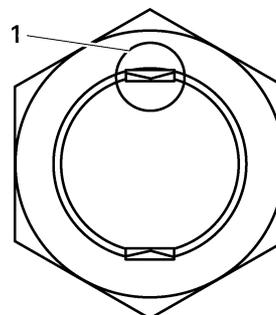
3. Remove:
  - Friction plate 1 "1"



4. Remove:
  - Clutch plate 1 "1"
  - Friction plate 2



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



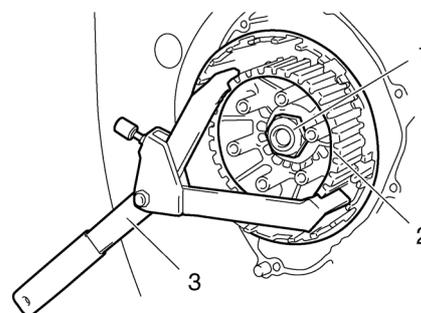
6. Loosen:
  - Clutch boss nut "1"

### NOTE:

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



**Universal clutch holder**  
**90890-04086**  
**YM-91042**

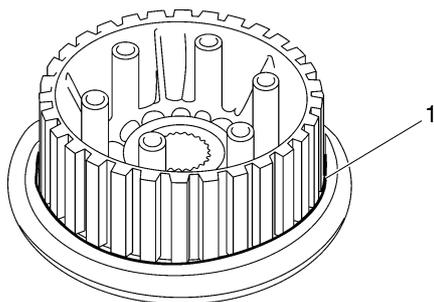


7. Remove:
  - Clutch boss nut
  - Washer
  - Clutch boss assembly

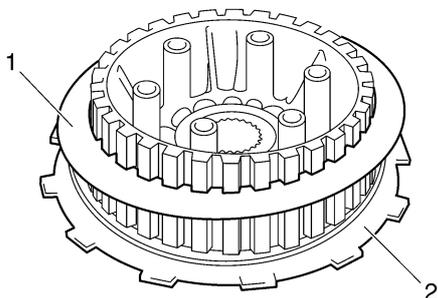
- Thrust plate
8. Remove:
- Wire circlip "1"

**NOTE:**

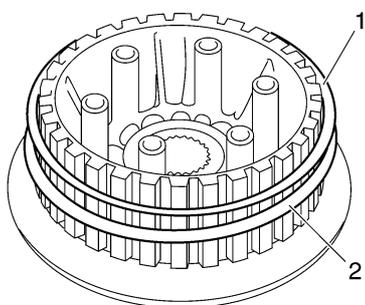
There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip "1" and disassemble the built-in damper unless there is serious clutch chattering.



9. Remove:
- Clutch plate 2 "1"
  - Friction plate 3 "2"



10. Remove:
- Clutch damper spring "1"
  - Clutch damper spring seat "2"



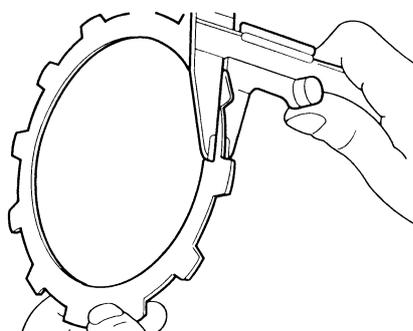
1. Check:
- Friction plate  
Damage/wear → Replace the friction plates as a set.
2. Measure:
- Friction plate thickness  
Out of specification → Replace the friction plates as a set.

**NOTE:**

Measure the friction plate at four places.



**Friction plate thickness**  
2.90–3.10 mm (0.114–0.122 in)  
**Limit**  
2.8 mm (0.110 in)



1411101

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.

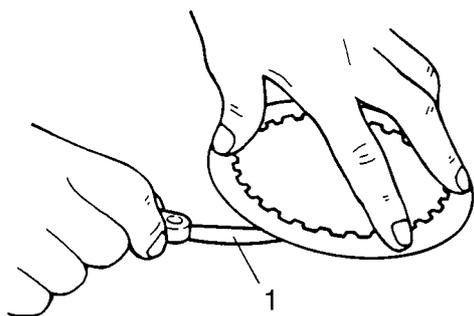


**Clutch plate warpage limit**  
0.1 mm (0.0039 in)

EAS25100

**CHECKING THE FRICTION PLATES**

The following procedure applies to all of the friction plates.



EAS25140

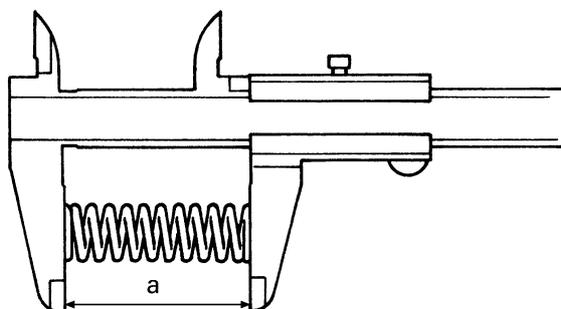
## CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

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



**Clutch spring free length**  
52.50 mm (2.07 in)  
**Limit**  
49.9 mm (1.96 in)



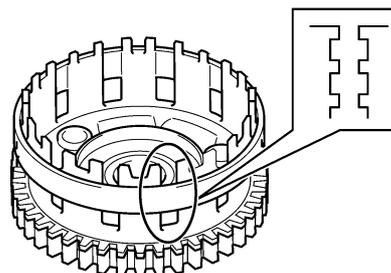
EAS25150

## CHECKING THE CLUTCH HOUSING

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

**NOTE:** \_\_\_\_\_

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



2. Check:
  - Bearing  
Damage/wear → Replace the bearing and clutch housing.

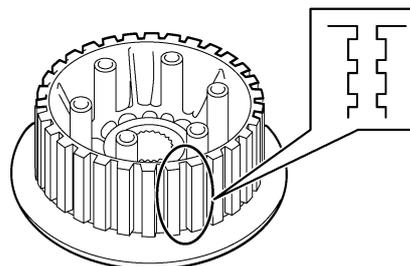
EAS25160

## CHECKING THE CLUTCH BOSS

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

**NOTE:** \_\_\_\_\_

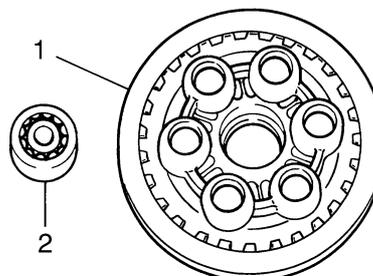
Pitting on the clutch boss splines will cause erratic clutch operation.



EAS25170

## CHECKING THE PRESSURE PLATE

1. Check:
  - Pressure plate “1”  
Cracks/damage → Replace.
  - Bearing “2”  
Damage/wear → Replace.

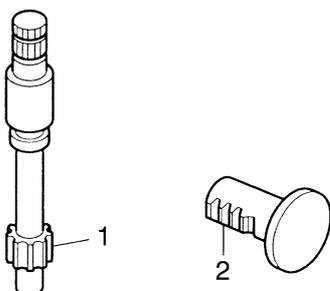


EAS25220

## CHECKING THE PULL LEVER SHAFT AND PULL ROD

### 1. Check:

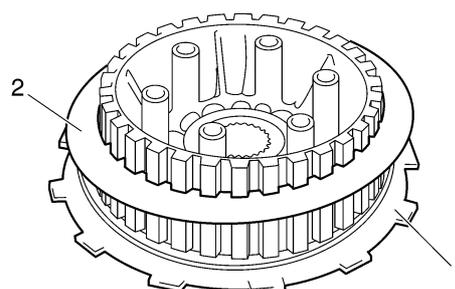
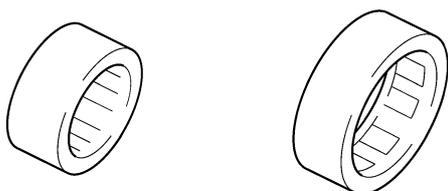
- Pull lever shaft pinion gear teeth "1"
  - Pull rod teeth "2"
- Damage/wear → Replace the pull rod and pull lever shaft pinion gear as a set.



11-112102

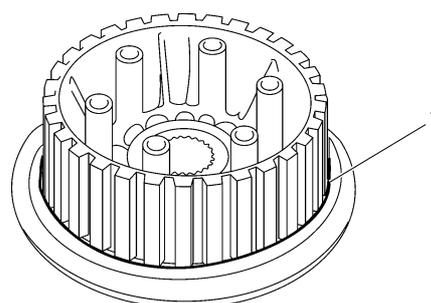
### 2. Check:

- Pull rod bearing
- Damage/wear → Replace.



### 3. Install:

- Wire circlip "1"



### 4. Install:

- Clutch housing "1"

#### NOTE:

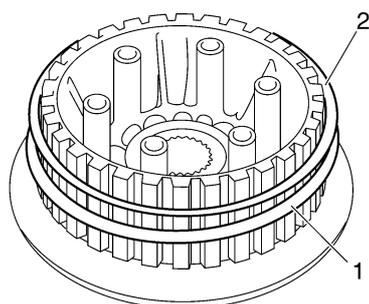
Align the projection of clutch housing "a" and hollow of the oil pump drive gear "b".

EAS25240

## INSTALLING THE CLUTCH

### 1. Install:

- Clutch damper spring seat "1"
- Clutch damper spring "2"

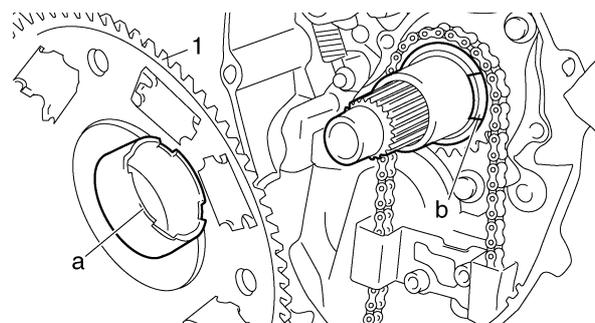


### 2. Install:

- Friction plate 3 "1"
- Clutch plate 2 "2"

#### NOTE:

Lubricate the engine oil.



### 5. Install:

- Thrust plate
- Clutch boss assembly "1"
- Washer
- Clutch boss nut "2" **New**



**Clutch boss nut**  
95 Nm (9.5 m·kg, 69 ft·lb)

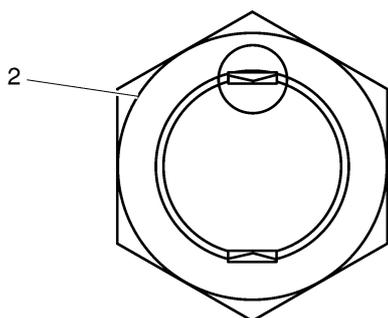
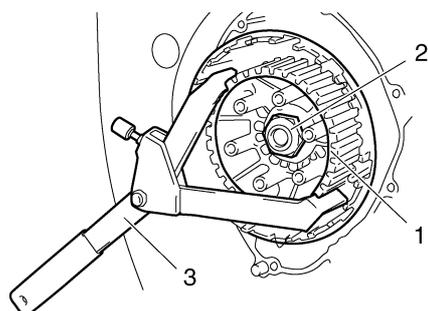
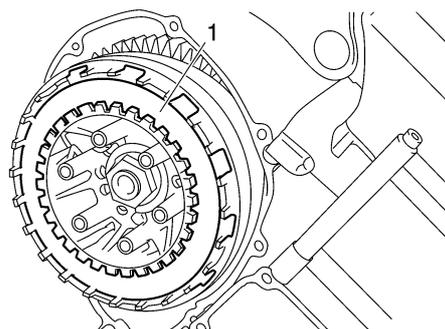
#### NOTE:

- Install the washer on the main axle with the "OUT" mark facing away from the vehicle.

- Lock the threads on the clutch boss nut by staking them with a drift punch at the point aligned with the groove in the axle.
- While holding the clutch boss assembly "1" with the clutch holding tool "3", tighten the clutch boss nut.



**Universal clutch holder**  
**90890-04086**  
**YM-91042**



6. Lubricate
- Friction plates
  - Clutch plates  
(with the recommended lubricant)

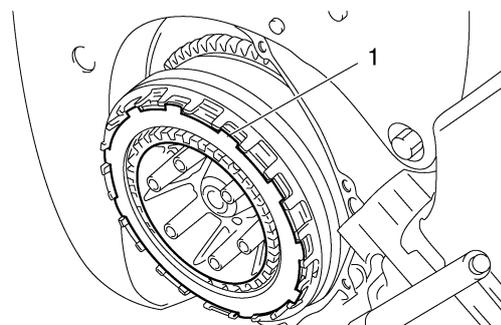


**Recommended lubricant**  
**Engine oil**

7. Install:
- Friction plate 2
  - Clutch plate 1 "1"

8. Install:
- Friction plate 1 "1"

**NOTE:**  
 Install the last friction plate shifting half phase.

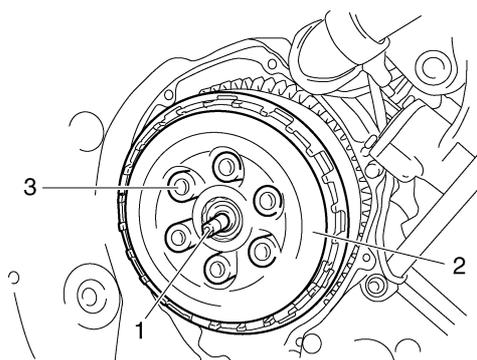


9. Install:
- Bearing
  - Pull rod "1"
  - Pressure plate "2"
  - Clutch springs
  - Clutch spring bolts "3"



**Clutch spring bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**

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

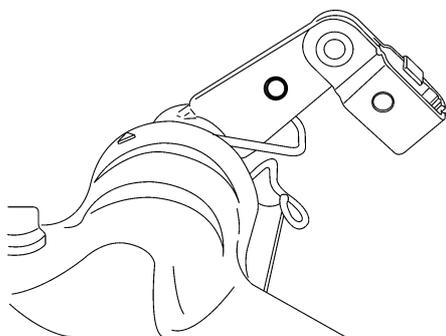


## 10. Install:

- Pull lever

### NOTE:

Install the pull lever with the “O” mark facing toward lower side.

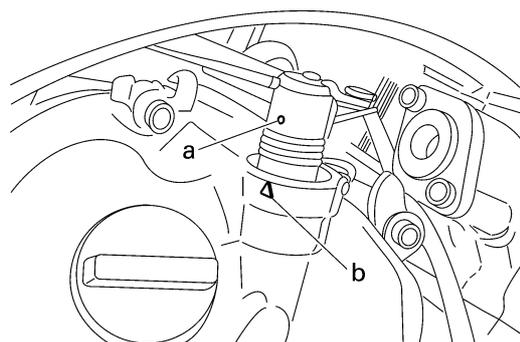


## 11. Install:

- Clutch cover
- Clutch cover gasket **New**

### NOTE:

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



## 12. Tighten

- Clutch cover bolts “1”



**Clutch cover bolt**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**

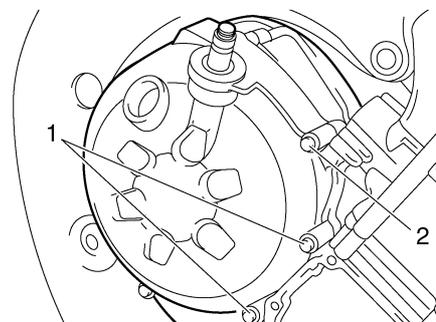
- Clutch cover bolt “2”



**Clutch cover bolt**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**  
**LOCTITE®**

### NOTE:

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



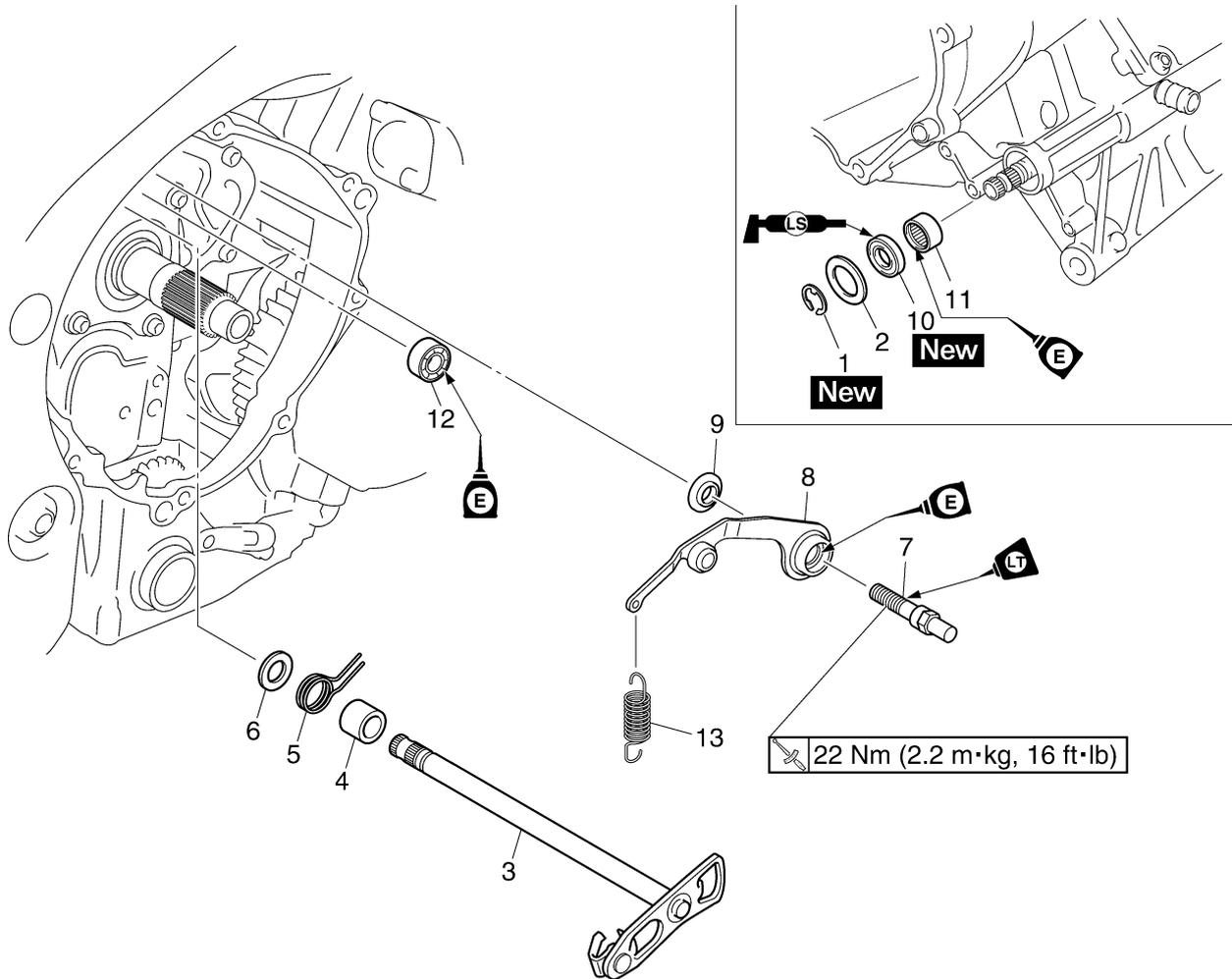
## 13. Adjust:

- Clutch cable free play  
Refer to “ADJUSTING THE CLUTCH CABLE FREE PLAY” on page 3-14.

EAS25410

## SHIFT SHAFT

### Removing the shift shaft and stopper lever

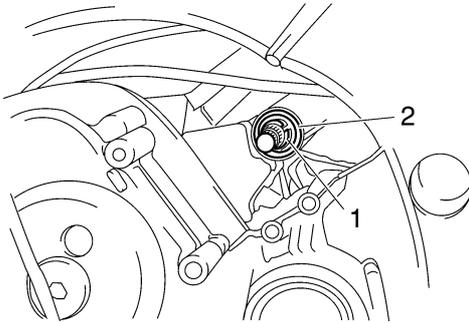


Order	Job/Parts to remove	Q'ty	Remarks
	Clutch assembly		Refer to "CLUTCH" on page 5-43.
	Shift arm and shift rod		Refer to "ENGINE REMOVAL" on page 5-1.
1	Circlip	1	
2	Washer	1	
3	Shift shaft	1	
4	Collar	1	
5	Shift shaft spring	1	
6	Washer	1	
7	Stopper screw	1	
8	Stopper lever	1	
9	Washer	1	
10	Oil seal	1	
11	Bearing	1	
12	Bearing	1	
13	Stopper lever spring	1	
			For installation, reverse the removal procedure.

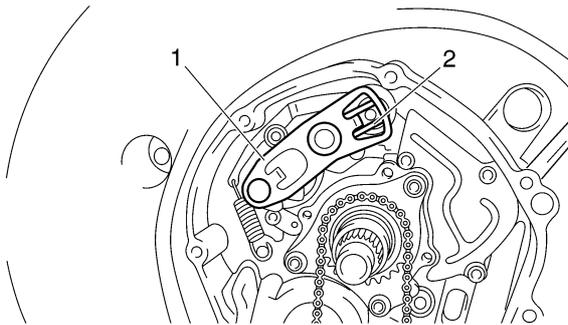
EAS5D01019

## REMOVING THE SHIFT SHAFT

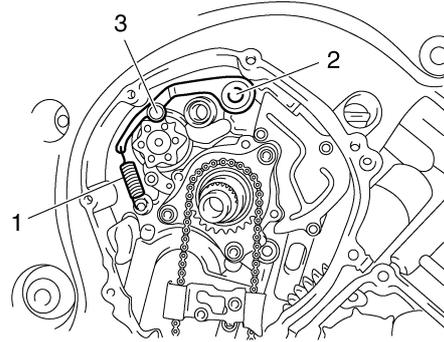
1. Remove:
  - Clutch assembly  
Refer to "CLUTCH" on page 5-43
2. Remove:
  - Shift arm
  - Shift rod  
Refer to "ENGINE REMOVAL" on page 5-1
3. Remove:
  - Circlip "1"
  - Washer "2"  
(left side of the engine)



4. Remove:
  - Shift shaft "1"
  - Shift shaft spring "2"
  - Collar
  - Washer



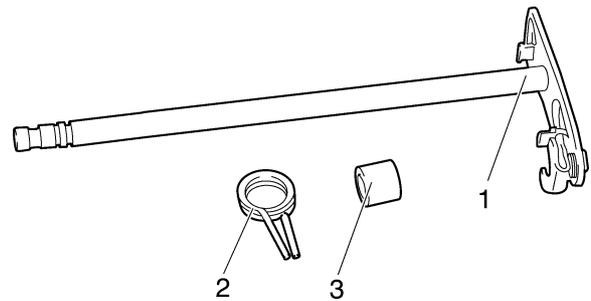
5. Remove:
  - Stopper lever spring "1"
  - Stopper screw "2"
  - Stopper lever "3"
  - Washer



EAS25420

## CHECKING THE SHIFT SHAFT

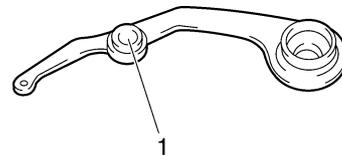
1. Check:
  - Shift shaft "1"  
Bends/damage/wear → Replace.
  - Shift shaft spring "2"
  - Collar "3"  
Damage/wear → Replace.



EAS25430

## CHECKING THE STOPPER LEVER

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



EAS25450

## INSTALLING THE SHIFT SHAFT

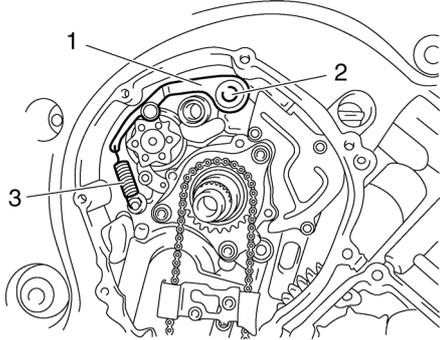
1. Install:
  - Washer
  - Stopper lever "1"
  - Stopper screw "2"



**Stopper screw**  
22 Nm (2.2 m·kg, 16 ft·lb)  
LOCTITE®

# SHIFT SHAFT

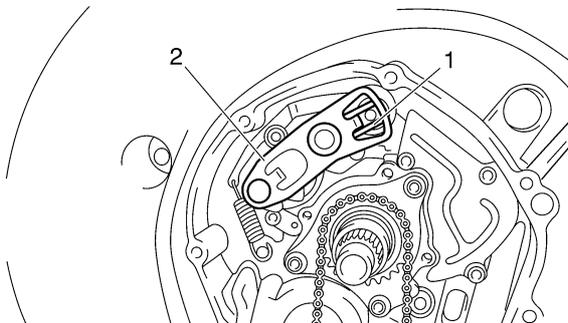
- Stopper lever spring “3”



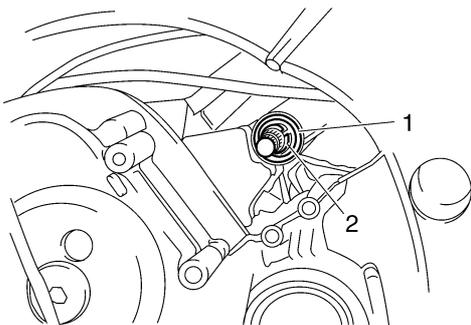
2. Install:
  - Washer
  - Collar
  - Shift shaft spring “1”
  - Shift shaft “2”

**NOTE:**

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



3. Install:
  - Washer “1”
  - Circlip “2” **New**

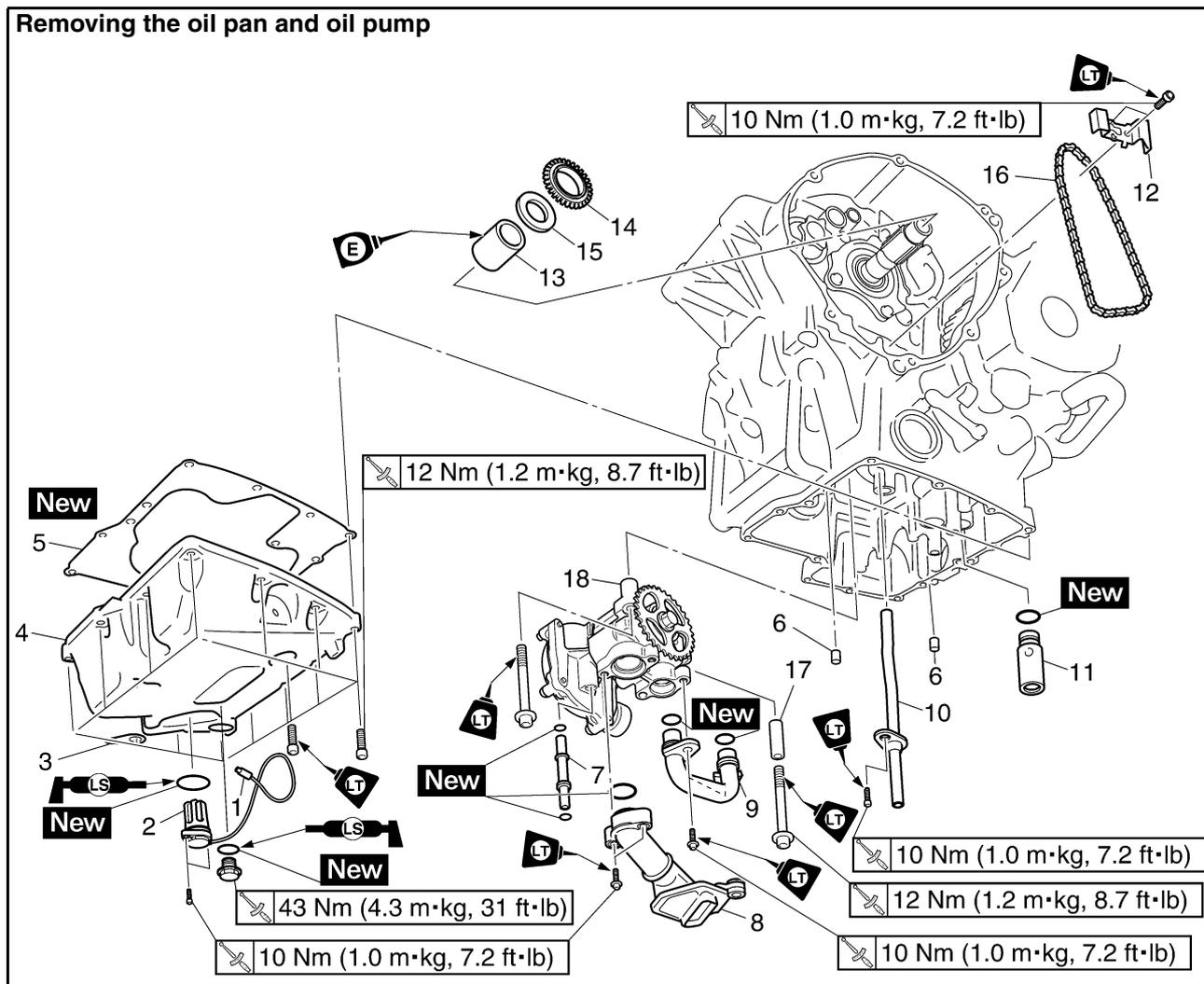


4. Install:
  - Shift rod
  - Shift armRefer to “ENGINE REMOVAL” on page 5-1.
5. Install:
  - Clutch assemblyRefer to “CLUTCH” on page 5-43.

EAS24920

## OIL PUMP

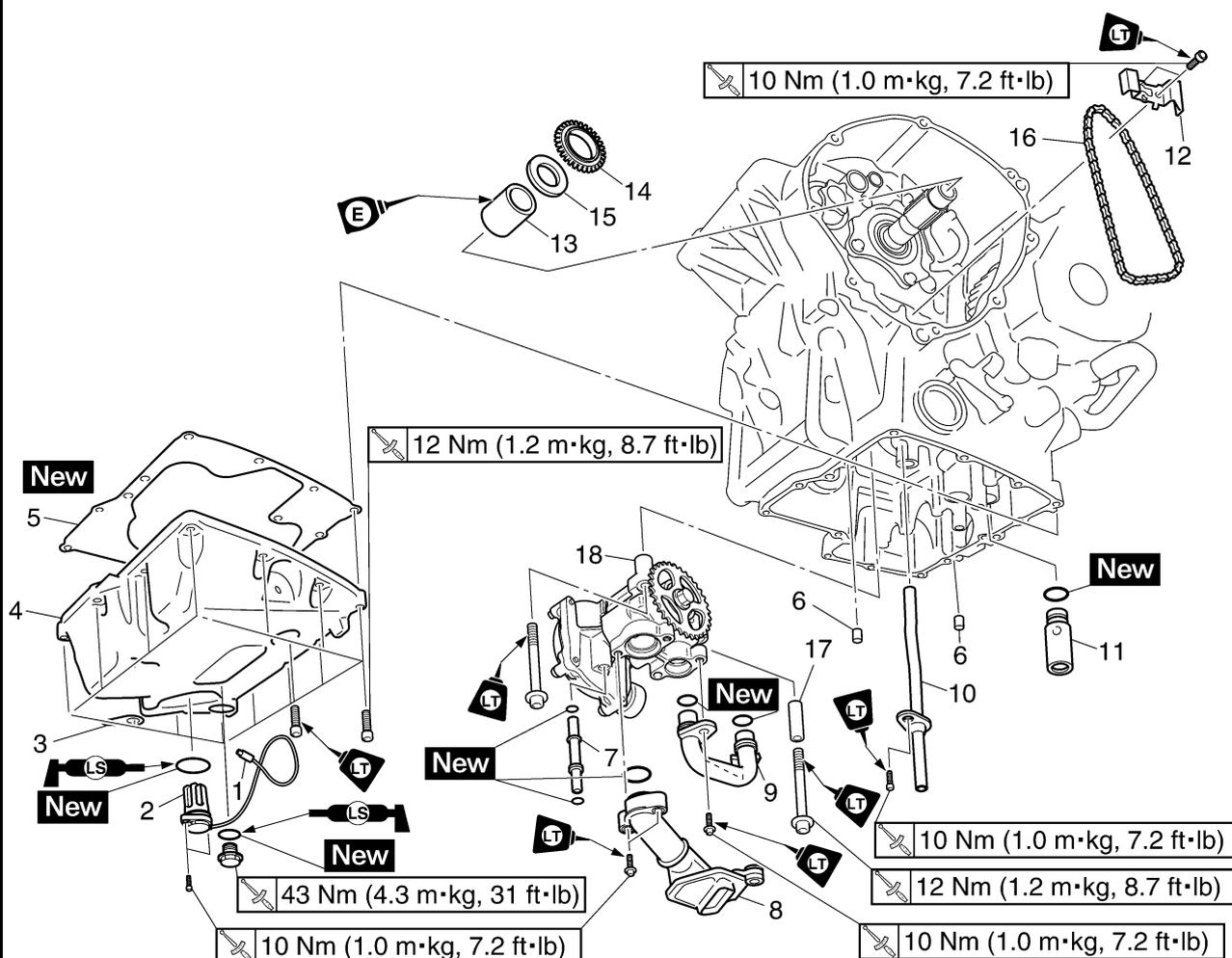
### Removing the oil pan and oil pump



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
	EXUP cables		Refer to "ENGINE REMOVAL" on page 5-1.
	O <sub>2</sub> sensor		Refer to "ENGINE REMOVAL" on page 5-1.
	Muffler		Refer to "ENGINE REMOVAL" on page 5-1.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-1.
	Clutch assembly		Refer to "CLUTCH" on page 5-43.
	Water pump inlet pipe		Refer to "OIL COOLER" on page 6-3.
	Water pump outlet pipe		Refer to "OIL COOLER" on page 6-3.
1	Oil level switch lead coupler	1	Disconnect.
2	Oil level switch	1	
3	Oil level switch lead holder	1	
4	Oil pan	1	
5	Oil pan gasket	1	
6	Dowel pin	2	
7	Drain pipe	1	
8	Oil strainer	1	
9	Oil pipe	1	

# OIL PUMP

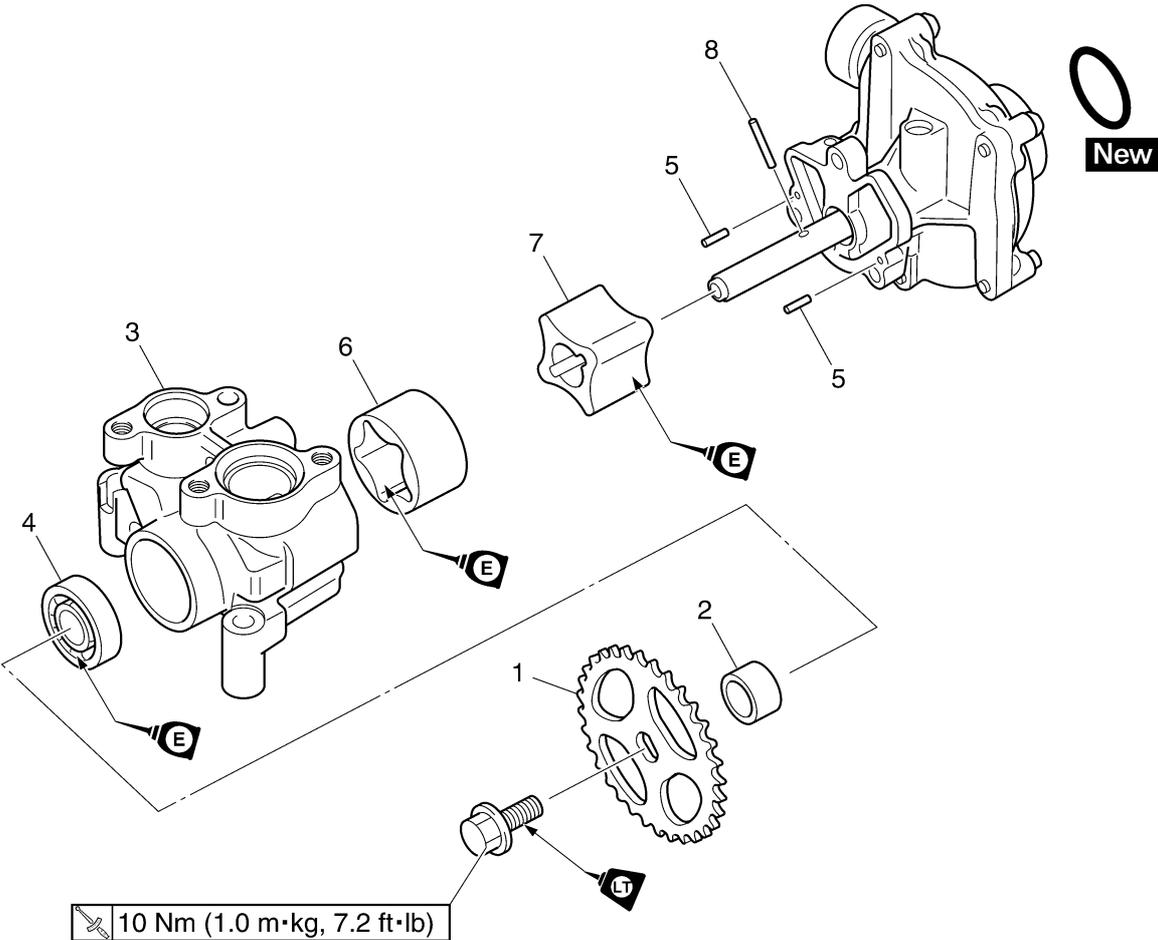
## Removing the oil pan and oil pump



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

# OIL PUMP

## Disassembling the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil/water pump driven sprocket	1	
2	Collar	1	
3	Oil pump housing	1	
4	Bearing	1	
5	Pin	2	
6	Oil pump outer rotor	1	
7	Oil pump inner rotor	1	
8	Pin	1	
			For assembly, reverse the disassembly procedure.

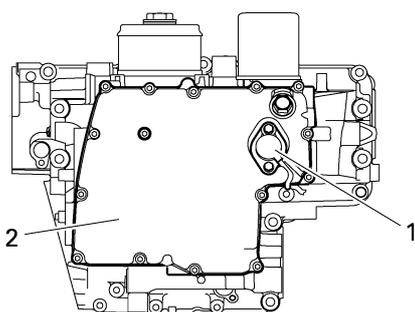
EAS24930

## REMOVING THE OIL PAN

- Remove:
  - Oil level switch "1"
  - Oil pan "2"
  - Oil pan gasket
  - Dowel pins

### NOTE:

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

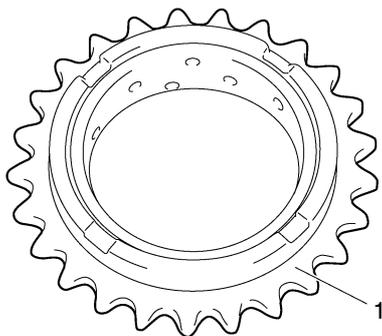


EAS25620

## CHECKING THE SPROCKET AND CHAIN

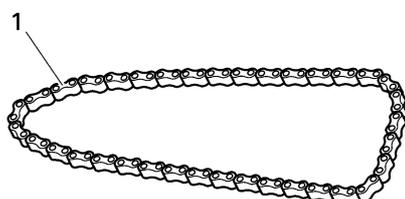
- Check:
  - Oil/water pump assembly drive sprocket "1"

Cracks/damage/wear → Replace the defective part(-s).



- Check:
  - Oil/water pump assembly drive chain "1"

Damage/stiffness → Replace the oil/water pump assembly drive chain and oil/water pump assembly drive sprocket as a set.

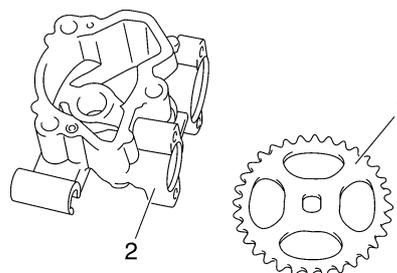


EAS24960

## CHECKING THE OIL PUMP

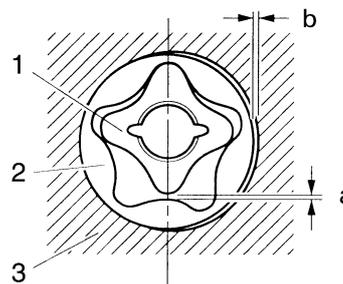
- Check:
  - Oil pump driven gear "1"
  - Oil pump rotor housing "2"
  - Oil pump cover

Cracks/damage/wear → Replace the defective part(s).



- Measure:
  - Inner-rotor-to-outer-rotor-tip clearance "a"
  - Outer-rotor-to-oil-pump-housing clearance "b"

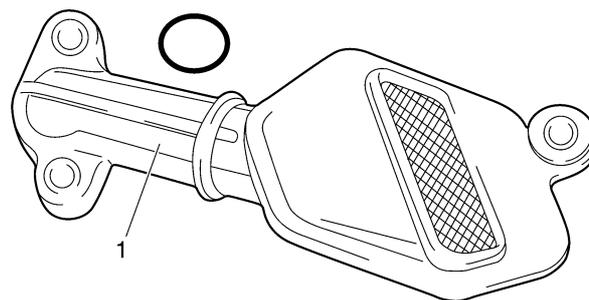
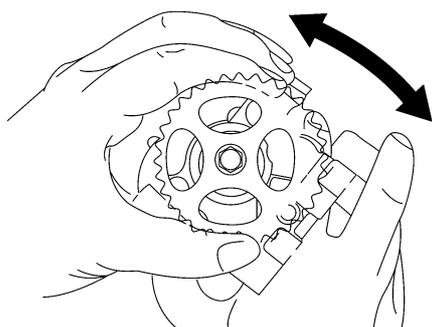
	<b>Inner-rotor-to-outer-rotor-tip clearance</b>		
		0.010–0.100 mm	(0.0004–0.0039 in)
	<b>Limit</b>	0.18 mm (0.0071 in)	
	<b>Outer-rotor-to-oil-pump-housing clearance</b>		
	0.090–0.150 mm	(0.0035–0.0059 in)	
	<b>Limit</b>	0.22 mm (0.0087 in)	



- Oil pump inner rotor
- Oil pump outer rotor
- Oil pump housing

- Check:
  - Oil pump operation

Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



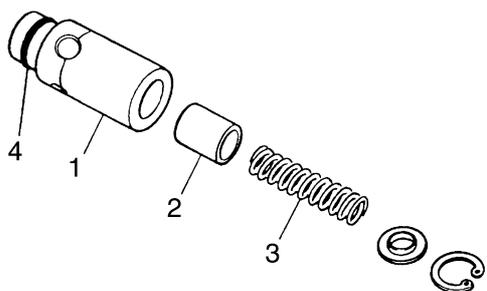
EAS24970

## CHECKING THE RELIEF VALVE

### 1. Check:

- Relief valve body "1"
- Relief valve "2"
- Spring "3"
- O-ring "4"

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



EAS24980

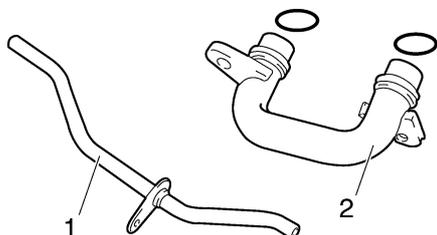
## CHECKING THE OIL DELIVERY PIPES

### 1. Check:

- Oil delivery pipe "1"
- Oil pipe "2"

Damage → Replace.

Obstruction → Wash and blow out with compressed air.



EAS24990

## CHECKING THE OIL STRAINER

### 1. Check:

- Oil strainer "1"

Damage → Replace.

Contaminants → Clean with solvent.

EAS25600

## CHECKING THE OIL NOZZLES

The following procedure applies to all of the oil nozzles.

### 1. Check:

- Oil nozzle "1"

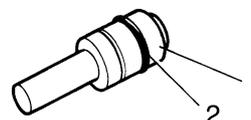
Damage/wear → Replace the oil nozzles.

- O-ring "2"

Damage/wear → Replace.

- Oil nozzle passage

Obstruction → Blow out with compressed air.



EAS25010

## ASSEMBLING THE OIL PUMP

### 1. Lubricate:

- Inner rotor
- Outer rotor
- Oil pump shaft

(with the recommended lubricant)

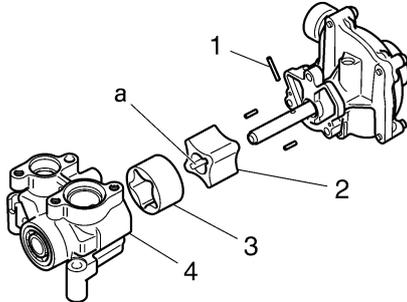


### 2. Install:

- Pin "1"
- Inner rotor "2"
- Outer rotor "3"
- Oil pump housing "4"

**NOTE:**

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



3. Install:

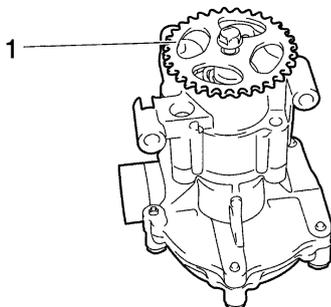
- Oil/water pump driven sprocket “1”



**Oil/water pump driven sprocket bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**  
**LOCTITE®**

**NOTE:**

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



4. Check:

- Oil pump operation  
Refer to “CHECKING THE OIL PUMP” on page 5-58.

EAS25030

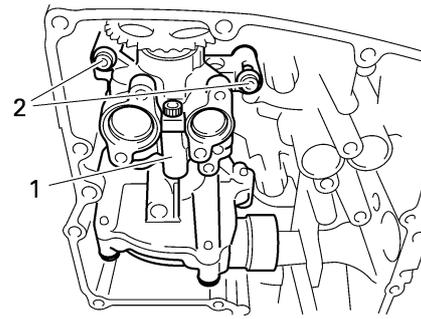
**INSTALLING THE OIL/WATER PUMP ASSEMBLY**

1. Install:

- Oil ring **New**
- Oil/water pump assembly “1”
- Dowel pin
- Bolts “2”



**Oil/water pump assembly bolt**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**  
**LOCTITE®**



2. Install:

- Washer
- Oil/water pump assembly drive chain “1”
- Oil/water pump assembly drive sprocket “2”
- Collar

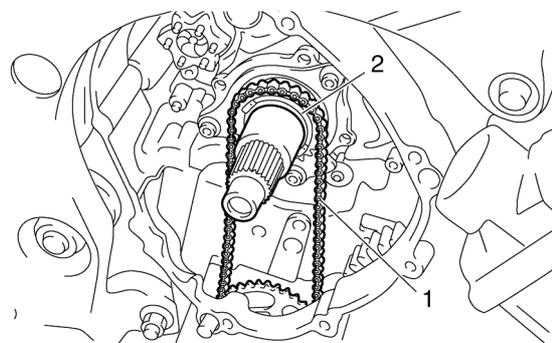
**NOTE:**

Install the oil/water pump assembly drive chain “1” onto the oil/water pump assembly drive sprocket “2”.

ECA5D01016

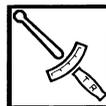
**CAUTION:**

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



3. Install:

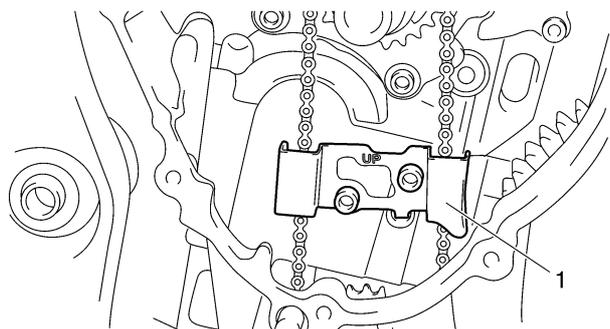
- Oil/water pump assembly drive chain guide “1”



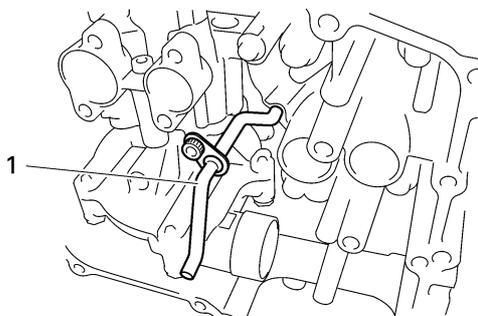
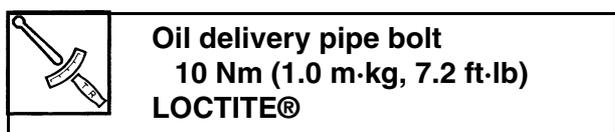
**Oil/water pump assembly drive chain guide bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**  
**LOCTITE®**

**NOTE:**

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



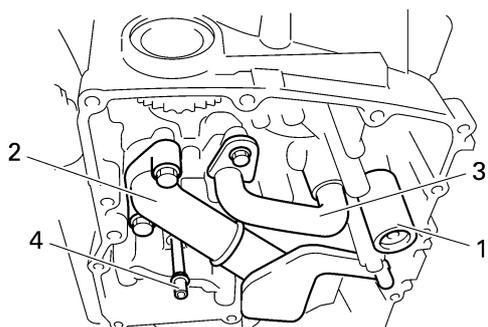
4. Install:
- Oil delivery pipe "1"



5. Install:
- Relief valve "1"
  - O-ring **New**
  - Oil strainer "2"



- O-ring **New**
- Oil pipe "3"
- O-ring **New**
- Drain pipe "4"
- O-ring **New**



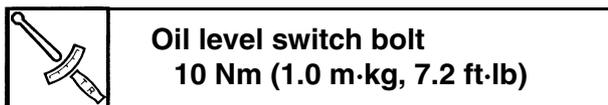
EAS25050

## INSTALLING THE OIL PAN

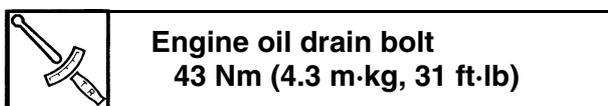
1. Install:
- Dowel pins
  - Gasket **New**
  - Oil pan "1"



- Oil level switch "2"



- Engine oil drain bolt "3"



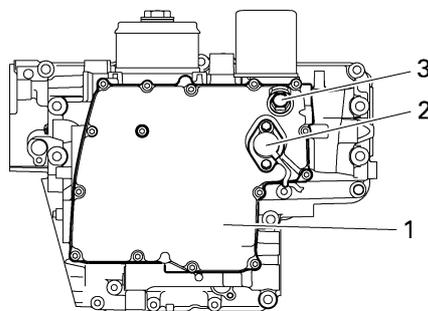
EWA12820

### **WARNING**

**Always use new copper washers.**

### **NOTE:**

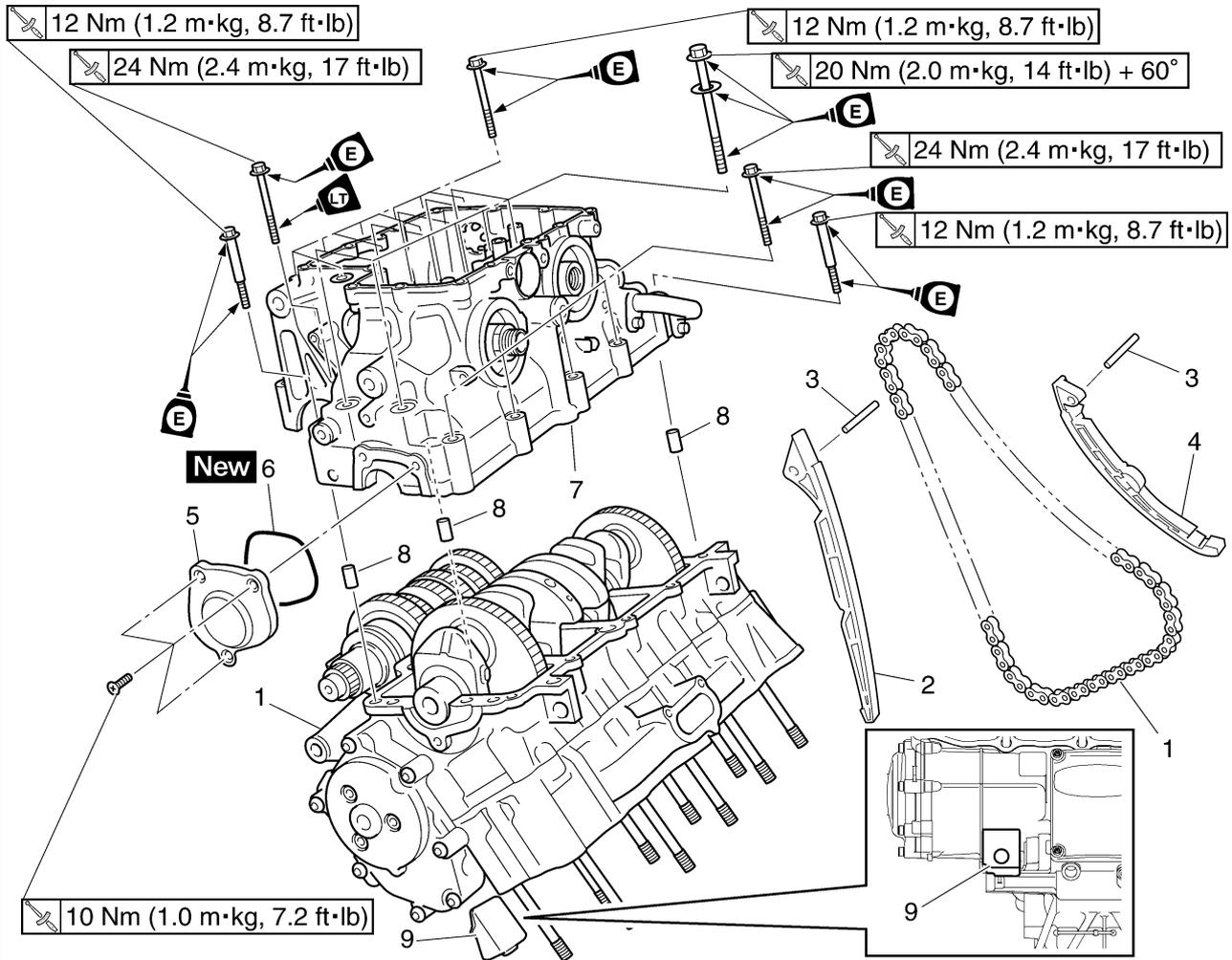
- Tighten the oil pan bolts in stages and in a crisscross pattern.
- Lubricate the oil level switch O-ring with engine oil.



EAS25540

## CRANKCASE

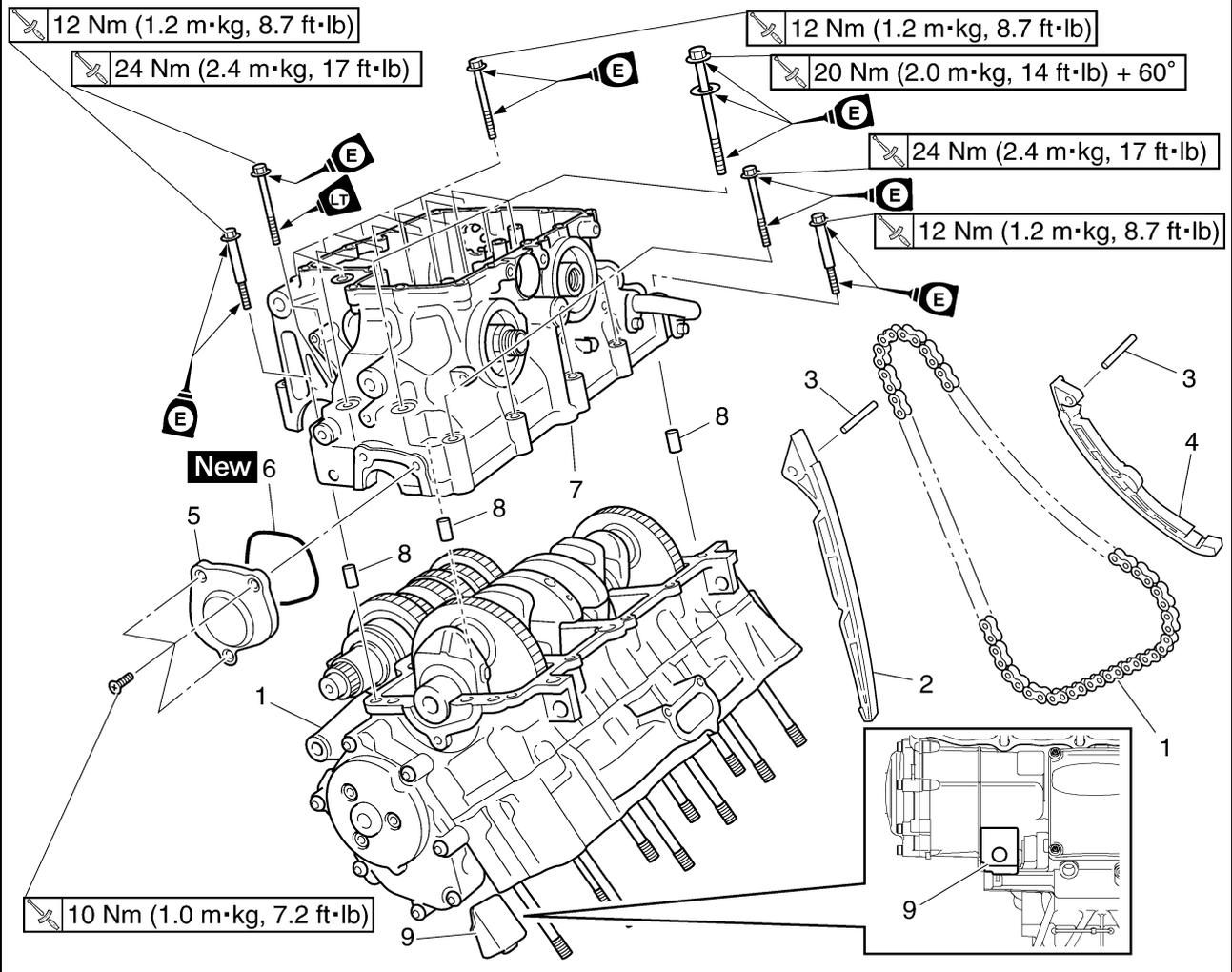
### Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Throttle body assembly		Refer to "THROTTLE BODIES" on page 7-4.
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-18.
	Generator		Refer to "GENERATOR" on page 5-30.
	Starter clutch		Refer to "STARTER CLUTCH" on page 5-34.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-52.
	Crankshaft position sensor		Refer to "CRANKSHAFT POSITION SENSOR" on page 5-37.
	Clutch		Refer to "CLUTCH" on page 5-43.
	Oil pump		Refer to "OIL PUMP" on page 5-55.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-39.
1	Timing chain	1	
2	Timing chain guide (intake side)	1	
3	Pin	2	
4	Timing chain guide (exhaust side)	1	
5	Left side cover	1	
6	O-ring	1	

# CRANKCASE

## Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
7	Lower crankcase	1	
8	Dowel pin	3	
9	Damper	1	
			For assembly, reverse the removal procedure.

EAS25550

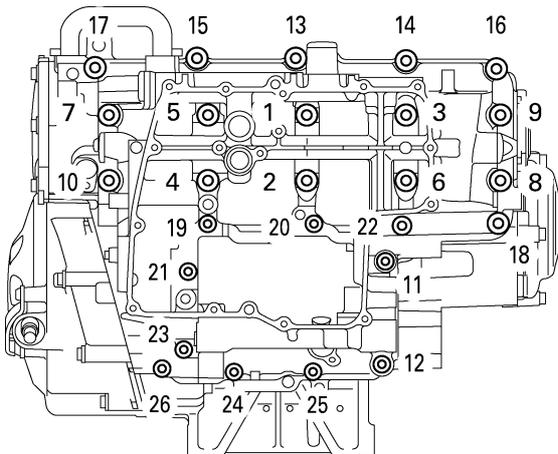
## DISASSEMBLING THE CRANKCASE

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

### NOTE:

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

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



3. Remove:
  - Lower crankcase

ECA13900

### CAUTION:

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

4. Remove:
  - Dowel pins
5. Remove:
  - Crankshaft journal lower bearing (from the lower crankcase)

### NOTE:

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

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.

EAS5D01020

## CHECKING THE BEARING AND OIL SEALS

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

EAS25650

## ASSEMBLING THE CRANKCASE

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

	<b>Recommended lubricant Engine oil</b>
---	---

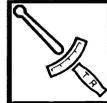
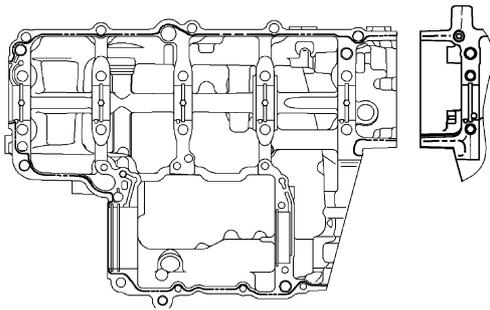
2. Apply:
  - Sealant

	<b>Yamaha bond No. 1215 (Three Bond No.1215®) 90890-85505</b>
---	---

### NOTE:

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

# CRANKCASE



## Crankcase bolt

### Bolt "1" – "10"

1st: 20 Nm (2.0 m·kg, 14 ft·lb)

2nd\*: 20 Nm (2.0 m·kg, 14 ft·lb)

3rd: +60°

### Bolt "11" – "16"

24 Nm (2.4 m·kg, 17 ft·lb)

### Bolt "17" – "26"

12 Nm (1.2 m·kg, 8.7 ft·lb)

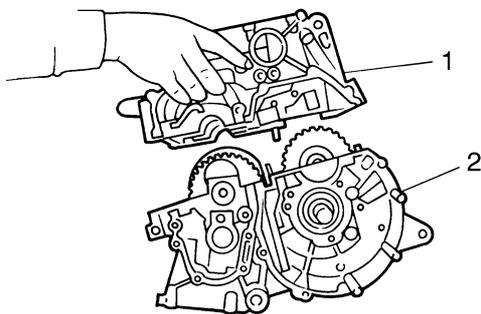
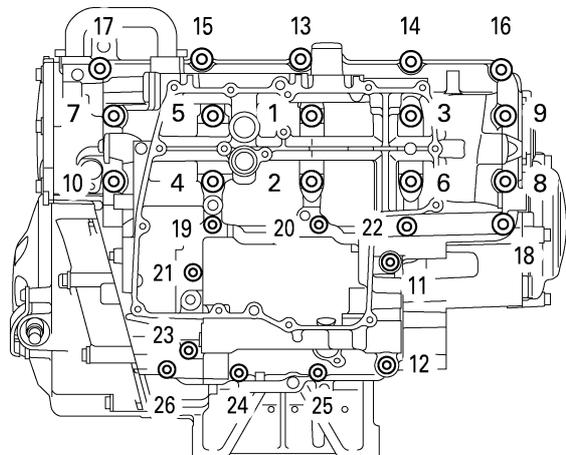
3. Install:
  - Dowel pin
4. Set the shift drum assembly and transmission gears in the neutral position.
5. Install:
  - Lower crankcase "1" (onto the upper crankcase "2")

ECA13980

### CAUTION:

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

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



6. Install:
  - Crankcase bolts

### NOTE:

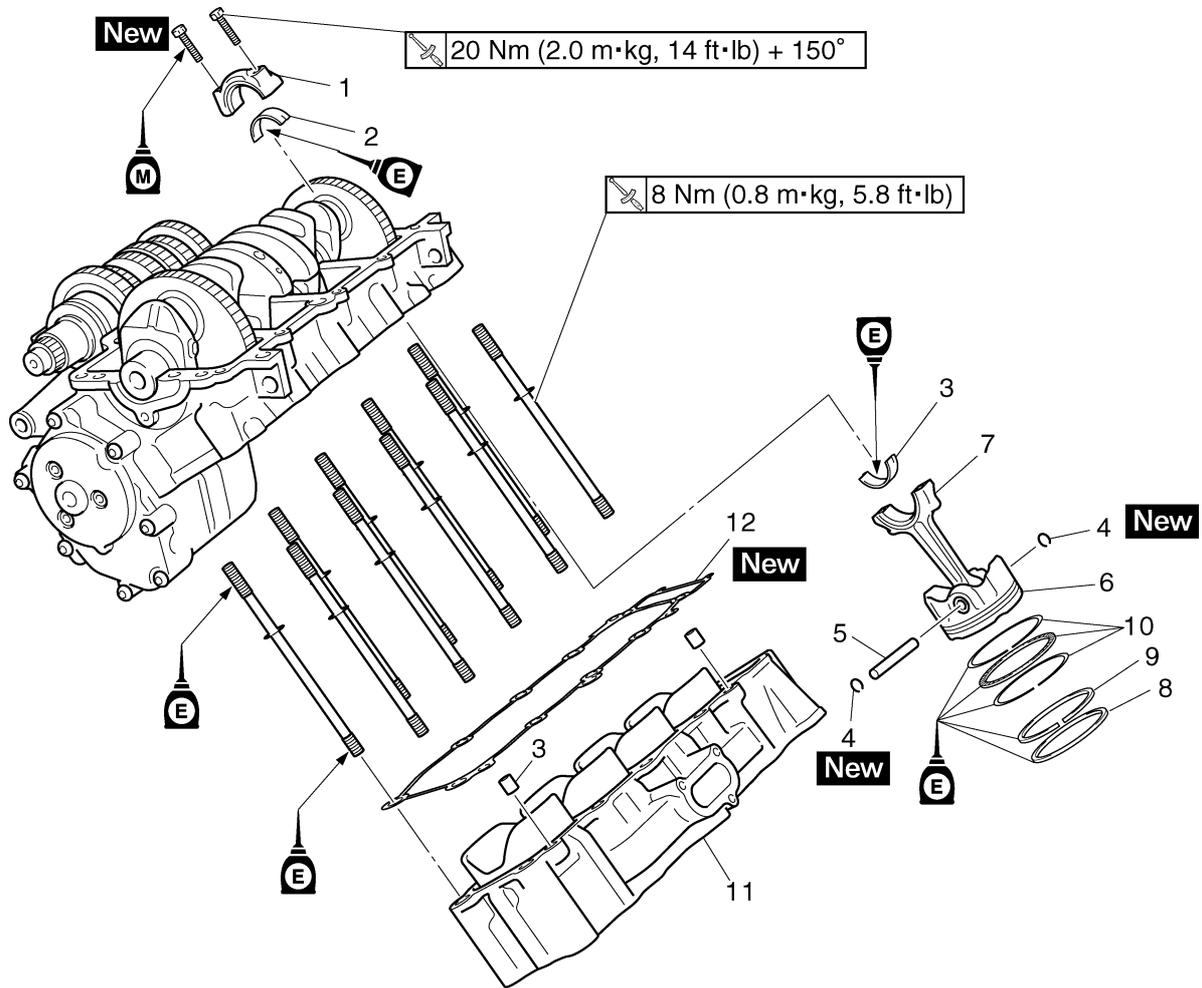
- Lubricate the bolt threads with engine oil.
- Install a washer on bolts "1" – "10" and "22".
- Seal bolt "18"
- Tighten the bolts in the tightening sequence cast on the crankcase.

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

EAS25950

## CRANKSHAFT

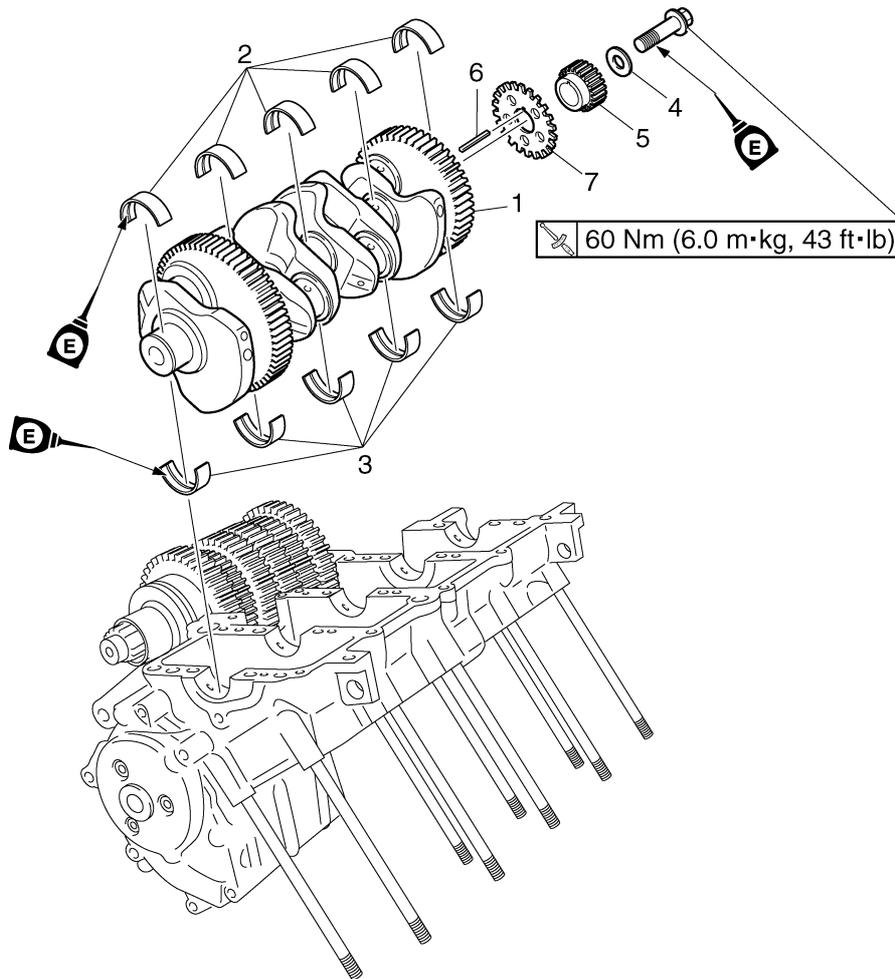
### Removing the connecting rods and pistons



Order	Job/Parts to remove	Q'ty	Remarks
	Lower crankcase		Refer to "CRANKCASE" on page 5-62.
1	Connecting rod cap	4	
2	Big end lower bearing	4	
3	Big end upper bearing	4	
4	Piston pin clip	8	
5	Piston pin	4	
6	Piston	4	
7	Connecting rod	4	
8	Top ring	4	
9	2nd ring	4	
10	Oil ring	4	
11	Cylinder	1	
12	Cylinder gasket	1	
			For installation, reverse the removal procedure.

# CRANKSHAFT

## Removing the crankshaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-62.
	Connecting rod and connecting rod caps		Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-68.
1	Crankshaft	1	
2	Crankshaft journal lower bearing	5	
3	Crankshaft journal upper bearing	5	
4	Washer	1	
5	Crankshaft drive gear	1	
6	Pin	1	
7	Pickup rotor	1	
			For assembly, reverse the disassembly procedure.

# CRANKSHAFT

EAS26030

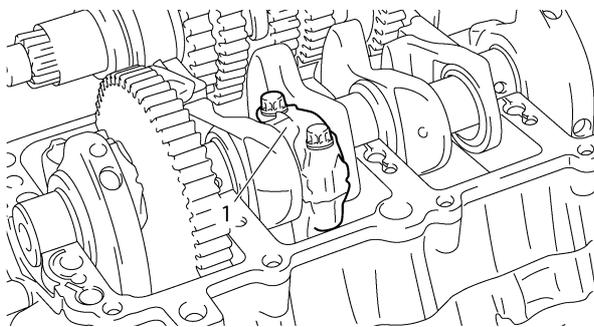
## REMOVING THE CONNECTING RODS AND PISTONS

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

1. Remove:
  - Connecting rod cap "1"
  - Big end bearings

### NOTE:

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



2. Remove:
  - Cylinder
  - Cylinder gasket
  - Cylinder stud bolts
3. Remove:
  - Piston pin clips "1"
  - Piston pin "2"
  - Piston "3"

ECA5D01020

### CAUTION:

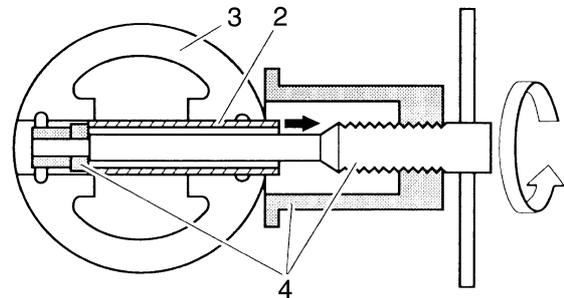
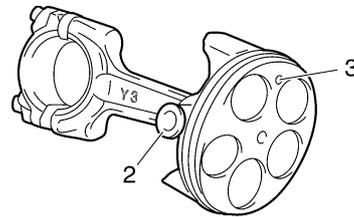
**Do not use a hammer to drive the piston pin out.**

### NOTE:

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



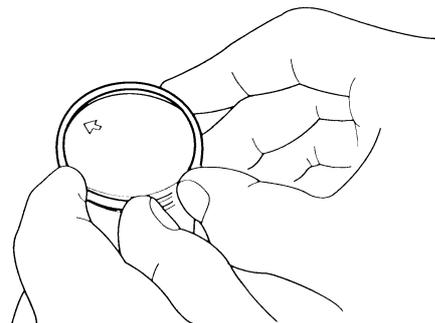
**Piston pin puller set**  
**90890-01304**  
**Piston pin puller**  
**YU-01304**



4. Remove:
  - Top ring
  - 2nd ring
  - Oil ring

### NOTE:

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EAS25980

## REMOVING THE CRANKSHAFT ASSEMBLY

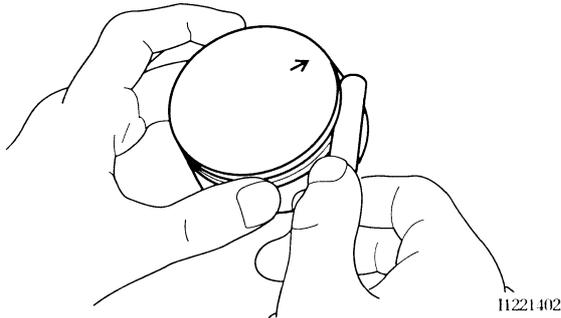
1. Remove:
  - Crankshaft assembly
  - Crankshaft journal upper bearings (from the upper crankcase)

Refer to "CRANKSHAFT" on page 5-66.



	<b>Piston ring side clearance</b>		
	<b>Top ring</b>		
	0.030–0.065	mm	(0.0012–0.0026 in)
	<b>Limit</b>		
	0.115	mm	(0.0045 in)
	<b>2nd ring</b>		
0.020–0.055	mm	(0.0008–0.0022 in)	
<b>Limit</b>			
0.115 mm (0.0045 in)			

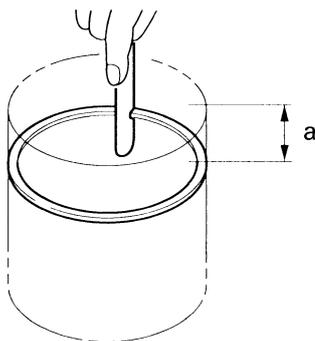
	<b>Piston ring end gap</b>		
	<b>Top ring</b>		
	0.15–0.25	mm	(0.0059–0.0098 in)
	<b>Limit</b>		
	0.50	mm	(0.0197 in)
	<b>2nd ring</b>		
	0.30–0.45	mm	(0.0118–0.0177 in)
<b>Limit</b>			
0.80 mm (0.0315 in)			
<b>Oil ring</b>			
0.10–0.40	mm	(0.0039–0.0157 in)	



2. Install:
  - Piston ring (into the cylinder)

**NOTE:**  
Level the piston ring into the cylinder with the piston crown.

5 mm (0.20 in) "a"



3. Measure:
  - Piston ring end gap  
Out of specification → Replace the piston ring.

**NOTE:**  
The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

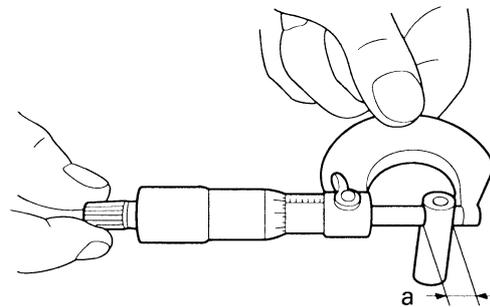
EAS24440

## CHECKING THE PISTON PINS

The following procedure applies to all of the piston pins.

1. Check:
  - Piston pin  
Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
  - Piston pin outside diameter "a"  
Out of specification → Replace the piston pin.

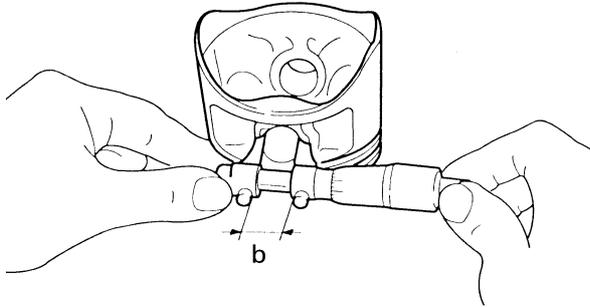
	<b>Piston pin bore outside diameter</b>		
	16.991–17.000	mm	(0.6689–0.6693 in)
	<b>Limit</b>		
	16.971	mm	(0.6682 in)



3. Measure:
  - Piston pin bore inside diameter "b"  
Out of specification → Replace the piston.



**Piston pin bore inside diameter**  
 17.002–17.013 mm (0.6694–0.6698 in)  
**Limit**  
 17.043 mm (0.6710 in)



4. Calculate:

- Piston-pin-to-position clearance  
 Out of specification → Replace the position pin and piston as a set.



**Piston-pin-to-piston clearance =**  
**Piston pin bore size - Piston pin outside diameter**  
**Piston-pin-to-piston clearance**  
 0.002–0.022 mm (0.0001–0.009 in)  
**Limit**  
 0.072 mm (0.0028 in)

EAS5D01021

## CHECKING THE BIG END BEARINGS

1. Measure:

- Crankshaft-pin-to-big-end-bearing clearance  
 Out of specification → Replace the big end bearings.



**Crankshaft-pin-to-big-end-bearing clearance**  
 0.034–0.058 mm (0.0013–0.0023 in)  
**Limit**  
 0.09 mm (0.0035 in)



The following procedure applies to all of the connecting rods.

ECA14900

**CAUTION:**

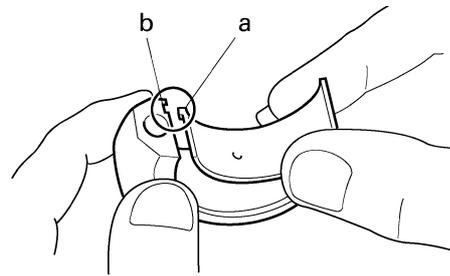
**Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big**

**end bearings must be installed in their original positions.**

- Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
- Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

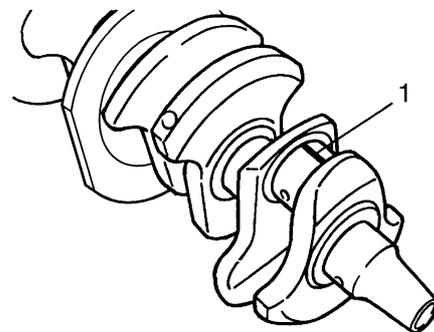
**NOTE:**

Align the projections “a” on the big end bearings with the notches “b” in the connecting rod and connecting rod cap.



11630301

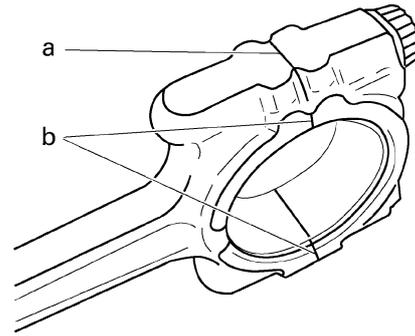
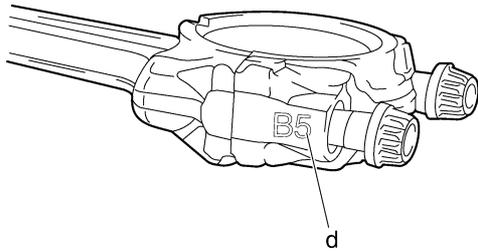
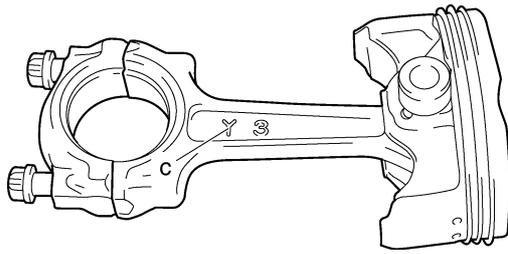
- Put a piece of Plastigauge® “1” on the crankshaft pin.



- Assemble the connecting rod halves.

**NOTE:**

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads with molybdenum disulfide grease.
- Make sure that the “Y” mark “c” on the connecting rod faces towards the left side of the crankshaft.
- Make sure that the characters “d” on both the connecting rod and connecting rod cap are aligned.



e. Tighten the connecting rod bolts.

**NOTE:**  
Install by carrying out the following procedures in order to assemble in the most suitable condition.

	<b>Connecting rod bolt</b> <b>29.4 Nm (3.0 m·kg, 21 ft·lb)</b>
---	---

**NOTE:**

- First, tighten the bolts to 15 Nm (1.5 m·kg, 11 ft·lb).
- Retighten the bolts to 29.4 Nm (3.0 m·kg, 21 ft·lb).

- f. Replace the connecting rod bolts with new ones.
- g. Clean the connecting rod bolts.
- h. After installing big end bearing, assemble the connecting rod and connecting rod cap once using a single unit of the connecting rod.
- i. Tighten the connecting rod bolt while checking that the sections shown "a" and "b" are flush with each other by touching the surface.
- Side machined face "a"
  - Thrusting faces (4 places at front and rear) "b"

**NOTE:**  
To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

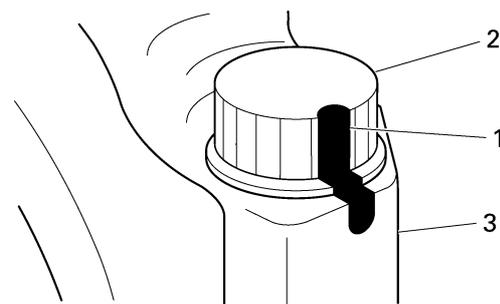
- j. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.
- k. Tighten the connecting rod bolts.

	<b>Connecting rod bolt</b> <b>20 Nm (2.0 m·kg, 14 ft·lb)</b> <b>+150°</b>
---	---

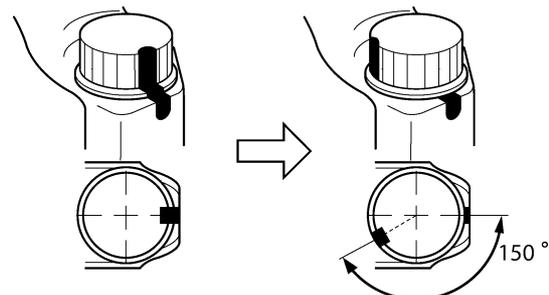
ECA5D01028

**CAUTION:**  
**Tighten the connecting rod bolts using the plastic-region tightening angle method.**

- l. Clean the connecting rod bolts.
- m. Tighten the connecting rod bolts.
- n. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod "3".



- o. Tighten the bolt further to reach the specified angle (150°).



# CRANKSHAFT

- p. After the installation, check that the section shown “a” is flush with each other by touching the surface.

- Side machined face “a”

EWA5D01010

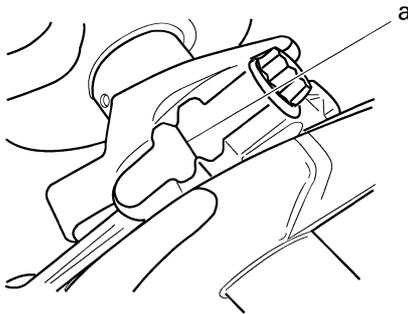
**WARNING**

- **When the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Replace the bolt with a new one and perform the procedure again.**
- **If they are not flush with each other, remove the connecting rod bolt and big end bearing and restart from step “e”. In this case, make sure to replace the connecting rod bolt.**

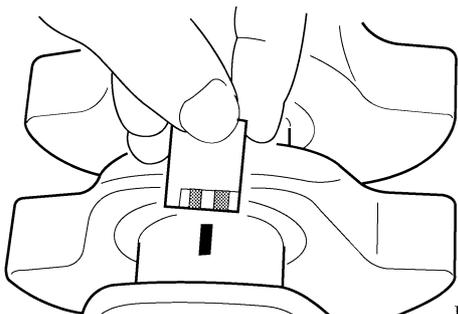
ECA5D01022

**CAUTION:**

- **Do not use a torque wrench to tighten the nut to the specified angle.**
- **Tighten the bolt until it is at the specified angles.**



- q. Remove the connecting rod and big end bearings.  
Refer to “REMOVING THE CONNECTING RODS AND PISTONS” on page 5-68.
- r. Measure the compressed Plastigauge® width on the crankshaft pin.  
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



11630702



2. Select:
- Big end bearings (P1 – P4)

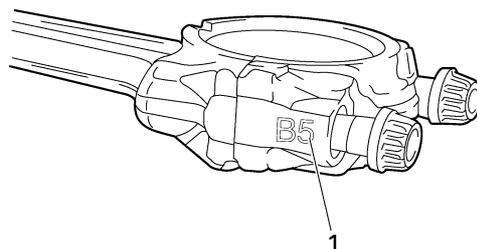
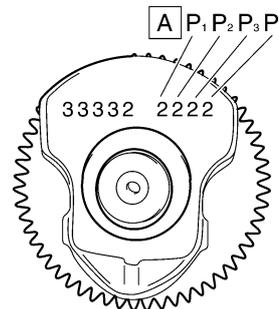
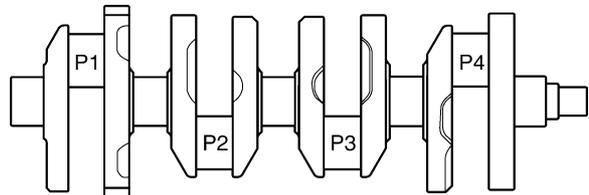
**NOTE:**

- The numbers “A” stamped into the crankshaft web and the numbers “1” on the connecting rods are used to determine the replacement big end bearings sizes.
- “P1” - “P4” refer to the bearings shown in the crankshaft illustration.

For example, if the connecting rod “P<sub>1</sub>” and the crankshaft web “P<sub>1</sub>” numbers are “5” and “2” respectively, then the bearing size for “P<sub>1</sub>” is:

“P <sub>1</sub> ” (connecting rod) – “P <sub>1</sub> ” (crankshaft) = 5 – 2 = 3 (brown)
---

BIG END BEARING COLOR CODE	
1	Blue
2	Black
3	Brown
4	Green



# CRANKSHAFT

EAS26190

## INSTALLING THE CONNECTING ROD AND PISTON

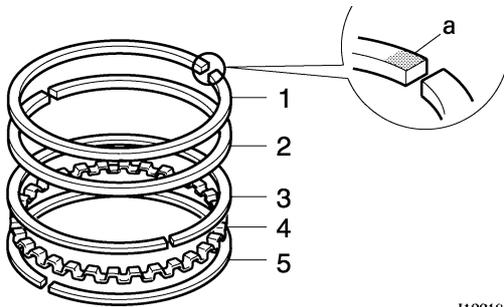
The following procedure applies to all of the connecting rods and pistons.

### 1. Install:

- Top ring "1"
- 2nd ring "2"
- Upper oil ring rail "3"
- Oil ring expander "4"
- Lower oil ring rail "5"

### NOTE:

Be sure to install the piston rings so that the manufacturer's marks or numbers "a" face up.



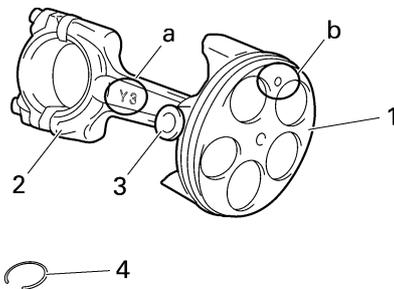
11221301

### 2. Install:

- Piston "1"  
(onto the respective connecting rod "2")
- Piston pin "3"
- Piston pin clip "4" **New**

### NOTE:

- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark "a" on the connecting rod faces left when the arrow mark "b" on the piston is pointing up as shown.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).



### 3. Lubricate:

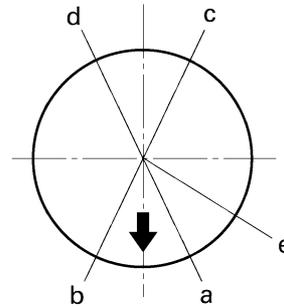
- Piston
- Piston rings
- Cylinder

(with the recommended lubricant)



### 4. Offset:

- Piston ring end gaps



11221202

- a. Top ring
- b. Lower oil ring rail
- c. Upper oil ring rail
- d. 2nd ring
- e. Oil ring expander

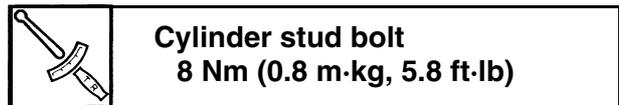
### 5. Lubricate:

- Crankshaft pins
- Big end bearings
- Connecting rod big end inner surface  
(with the recommended lubricant)



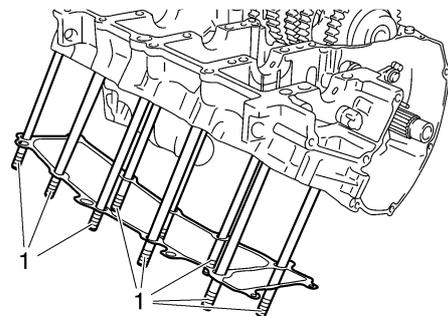
### 6. Check:

- Cylinder stud bolts "1"



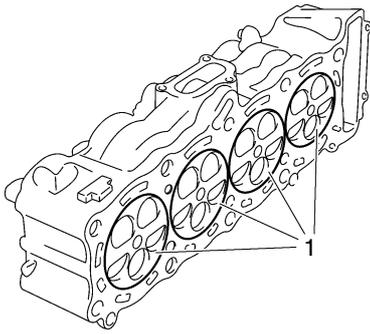
### 7. Install:

- Cylinder gasket "2" **New**





# CRANKSHAFT

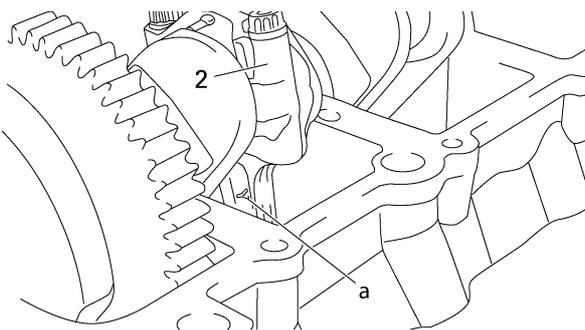
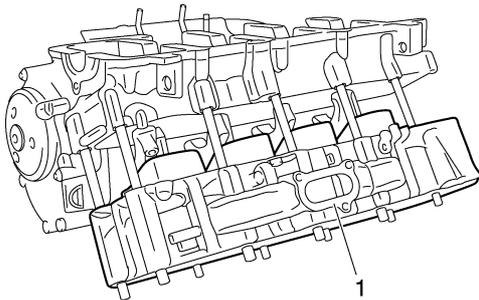


## 11. Install:

- Cylinder assembly "1"
- Connecting rod caps "2"

### NOTE:

- Make sure that the "Y" marks "a" on the connecting rods face towards the left side of the crankshaft.
- Make sure that the characters on both the connecting rod and connecting rod cap are aligned.



## 12. Tighten:

- Connecting rod bolts

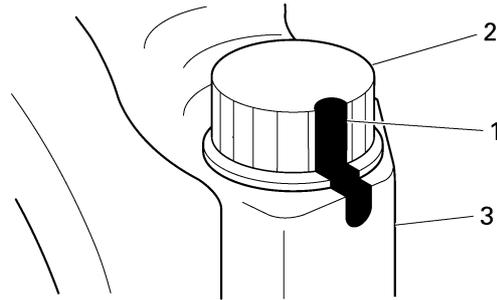
	<p><b>Connecting rod bolt</b>  <b>20 Nm (2.0 m·kg, 14 ft·lb)+150°</b></p>
---	---

ECA14980

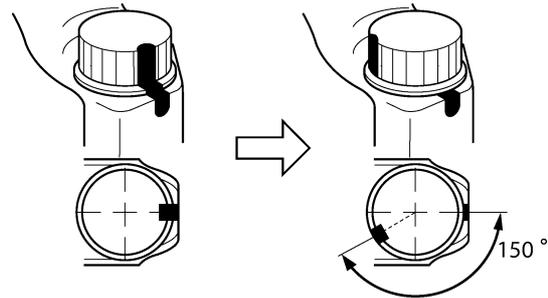
### CAUTION:

**Tighten the connecting rod bolts using the plastic-region tightening angle method.**

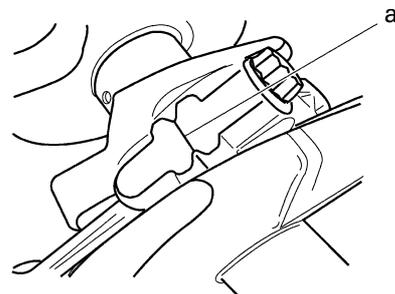
- Clean the connecting rod bolts.
- Tighten the connecting rod bolts.
- Put a mark "1" on the connecting rod bolt "2" and the connecting rod cap "3".



- Tighten the bolt further to reach the specified angle (150°).



- After the installation, check that the section shown "a" is flush with each other by touching the surface.



- Side machined face

EWA13990

### WARNING

- When the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Replace the bolt with a new one and perform the procedure again.

- If they are not flush with each other, remove the connecting rod bolt and big end bearing and restart from step “9”. In this case, make sure to replace the connecting rod bolt.

ECA14680

**CAUTION:**

- Do not use a torque wrench to tighten the bolt to the specified angle.
- Tighten the bolt until it is at the specified angles.



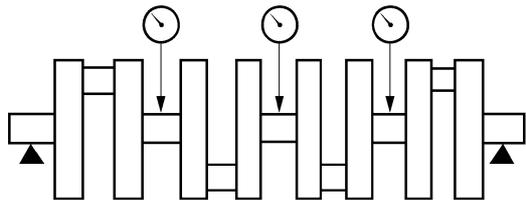
EAS26070

**CHECKING THE CRANKSHAFT**

1. Measure:
  - Crankshaft runout  
Out of specification → Replace the crankshaft.



**Crankshaft runout**  
Less than 0.03 mm (0.0012 in)



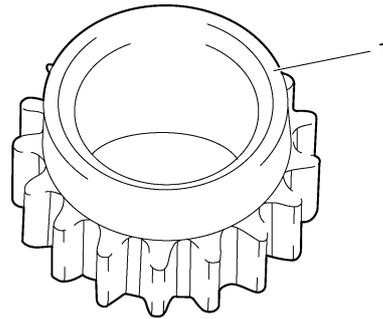
11631006

2. Check:
  - Crankshaft journal surfaces
  - Crankshaft pin surfaces
  - Bearing surfaces  
Scratches/wear → Replace the crankshaft.

EAS5D01022

**CHECKING THE CRANKSHAFT DRIVE SPROCKET**

1. Check:
  - Crankshaft drive sprocket “1”  
Cracks/damage/wear → Replace the defective part(s).



EAS5D01023

**CHECKING THE CRANKSHAFT JOURNAL BEARINGS**

1. Measure:
  - Crankshaft-journal-to-crankshaft-journal bearing clearance  
Out of specification → Replace the crankshaft journal bearings.



**Crankshaft-journal-to-crankshaft-journal bearing clearance**  
0.014-0.037 mm (0.0006-0.0015 in)  
**Limit**  
0.10 mm (0.0039 in)

ECA5D01021

**CAUTION:**

**Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.**

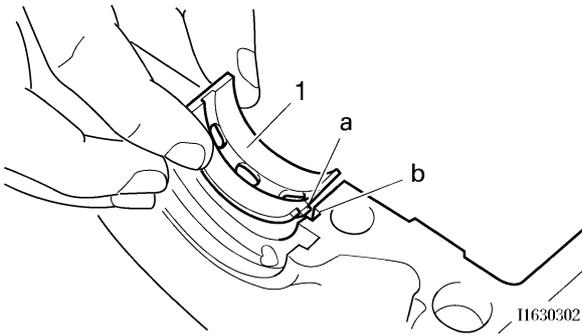


- a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
- b. Place the upper crankcase upside down on a bench.
- c. Install the crankshaft journal upper bearings “1” and the crankshaft into the upper crankcase.

**NOTE:**

Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the upper crankcase.

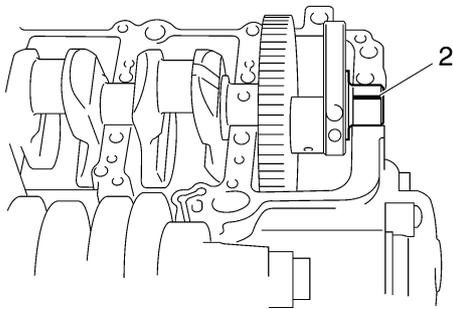
# CRANKSHAFT



- d. Put a piece of Plastigauge® “2” on each crankshaft journal.

**NOTE:**

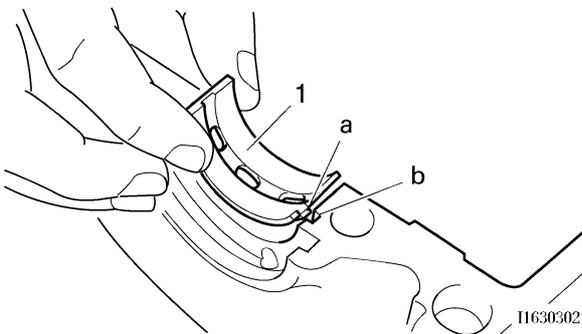
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



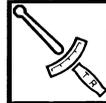
- e. Install the crankshaft journal lower bearings “1” into the lower crankcase and assemble the crankcase halves.

**NOTE:**

- Align the projections “a” of the crankshaft journal lower bearings with the notches “b” in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



- f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.



**Crankcase bolt**

**Bolt “1”–“10”**

**1st: 20 Nm (2.0 m·kg, 14 ft·lb)**

**2nd: 20 Nm (2.0 m·kg, 14 ft·lb)**

**3rd: +60°**

**Bolt “11”–“16”**

**24 Nm (2.4 m·kg, 17 ft·lb)**

**Bolt “17”–“26”**

**12 Nm (1.2 m·kg, 8.7 ft·lb)**

M9 x 105 mm (4.1 in) bolts: “1”–“10”

M8 x 60 mm (2.4 in) bolt: “11” LOCTITE®

M8 x 60 mm (2.4 in) bolts: “12”, “16”

M6 x 70 mm (2.8 in) bolts: “19”, “21”, “23”

M6 x 65 mm (2.5 in) bolts: “17”, “18”

M6 x 60 mm (2.4 in) bolt and washer: “22”

M6 x 60 mm (2.4 in) bolts: “24”, “25”

M6 x 50 mm (2.0 in) bolts: “20”, “26”

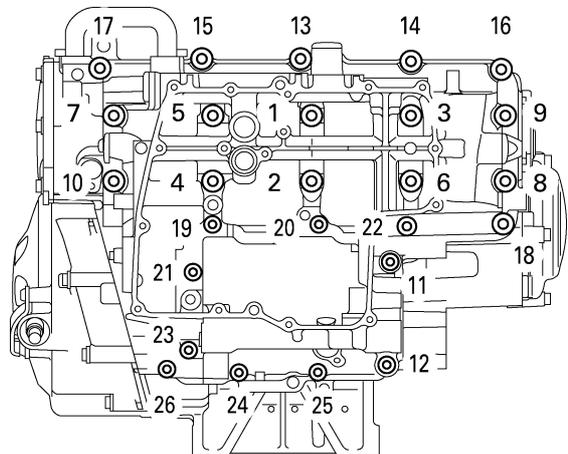
M8 x 50 mm (2.0 in) bolts: “13”–“15”

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

**NOTE:**

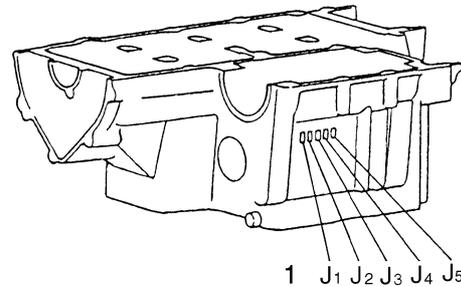
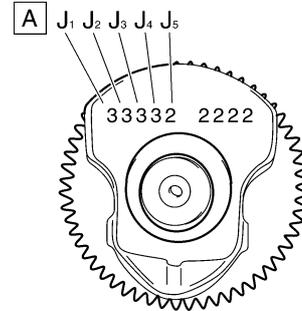
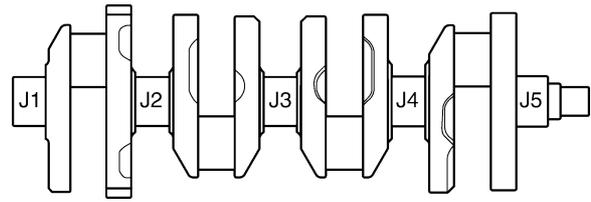
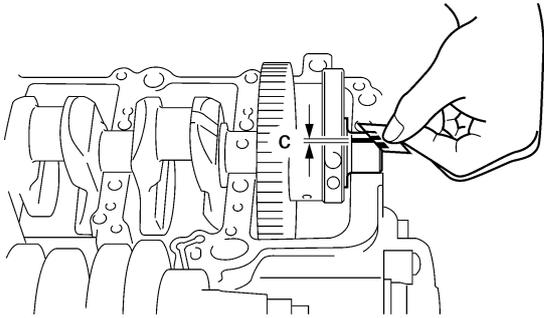
Lubricate the crankcase bolt threads with engine oil.

Refer to “CRANKCASE” on page 5-62.



- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- h. Measure the compressed Plastigauge® width “c” on each crankshaft journal. If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.

# CRANKSHAFT



2. Select:
- Crankshaft journal bearings (J1–J5)

**NOTE:**

- The numbers “A” stamped into the crankshaft web and the numbers “1” stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- “J1–J5” refer to the bearings shown in the crankshaft illustration.
- If “J1–J5” are the same, use the same size for all of the bearings.
- If the size is the same for all “J<sub>1</sub> to J<sub>5</sub>” one digit for that size is indicated. (Crankcase side only)

For example, if the crankcase “J<sub>1</sub>” and crankshaft web “J<sub>1</sub>” numbers are “6” and “2” respectively, then the bearing size for “J<sub>1</sub>” is:

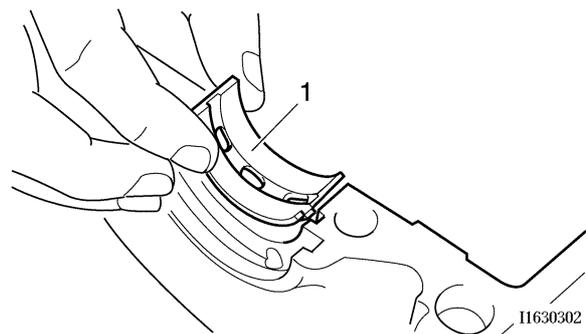
$\begin{aligned} & \text{“J}_1\text{” (crankcase) – “J}_1\text{”} \\ & \text{(crankshaft web) – 1 =} \\ & 6 - 2 - 1 = 3 \text{ (brown)} \end{aligned}$
--

CRANKSHAFT JOURNAL BEARING COLOR CODE	
0	White
1	Blue
2	Black
3	Brown
4	Green

EAS26200

**INSTALLING THE CRANKSHAFT**

1. Install:
- Crankshaft journal upper bearings “1” (into the upper crankcase)

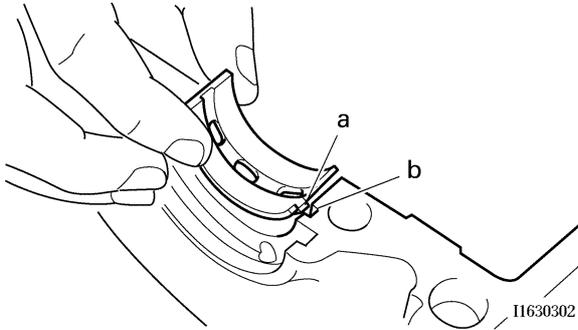


2. Lubricate:
- Crankshaft journal upper bearings (with the recommended lubricant)

	<b>Recommended lubricant</b> <b>Engine oil</b>
--	---

**NOTE:**

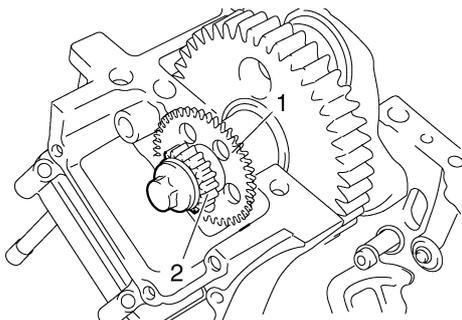
- Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the upper crankcase.
- Be sure to install each crankshaft journal upper bearing in its original place.



3. Install:
  - Crankshaft
4. Install:
  - Crankcase (lower)  
Refer to “CRANKCASE” on page 5-62.
5. Install:
  - Pin
  - Pickup rotor “1”
  - Drive sprocket “2”



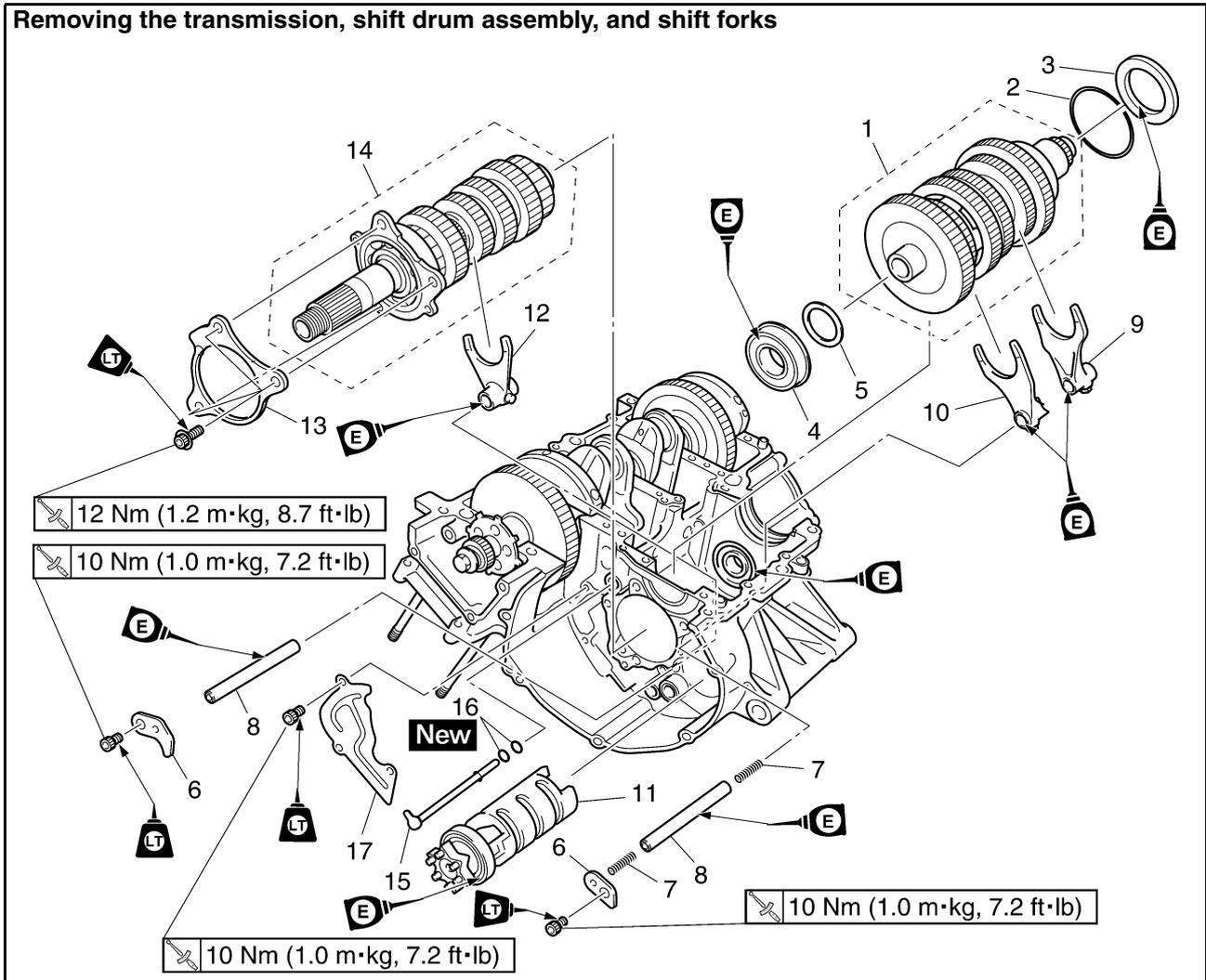
**Drive sprocket bolt**  
**60 Nm (6.0 m·kg, 43 ft·lb)**



EAS26240

## TRANSMISSION

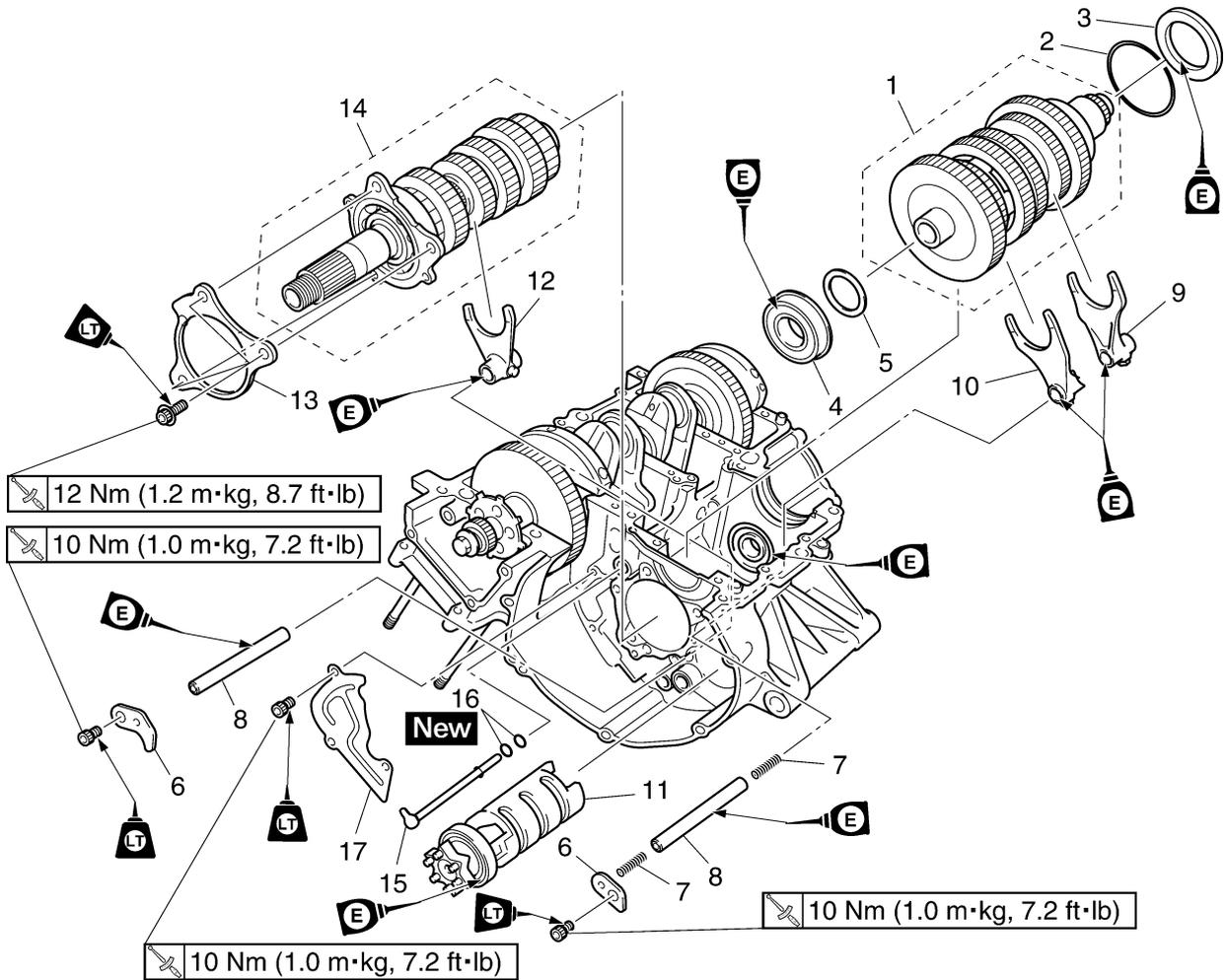
### Removing the transmission, shift drum assembly, and shift forks



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase lower		Separate. Refer to "CRANKCASE" on page 5-62.
1	Drive axle assembly	1	
2	Circlip	1	
3	Oil seal	1	
4	Bearing	1	
5	Washer	1	
6	Shift fork guide bar retainer	2	
7	Spring	2	
8	Shift fork guide bar	2	
9	Shift fork "L"	1	
10	Shift fork "R"	1	
11	Shift drum assembly	1	
12	Shift fork "C"	1	
13	Main axle retainer	1	
14	Main axle assembly	1	
15	Oil pipe	1	
16	O-ring	2	
17	Oil baffle plate	1	

# TRANSMISSION

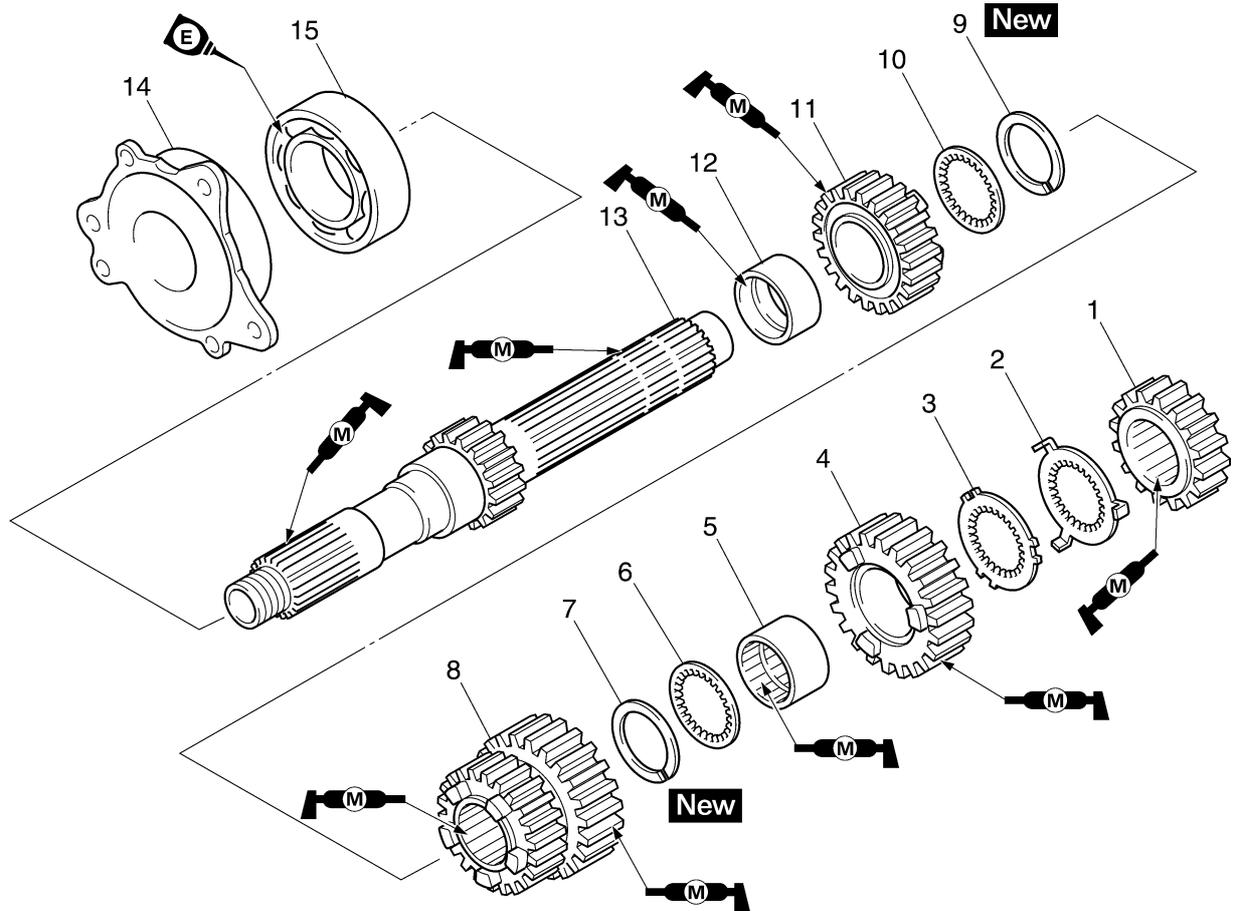
## Removing the transmission, shift drum assembly, and shift forks



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

# TRANSMISSION

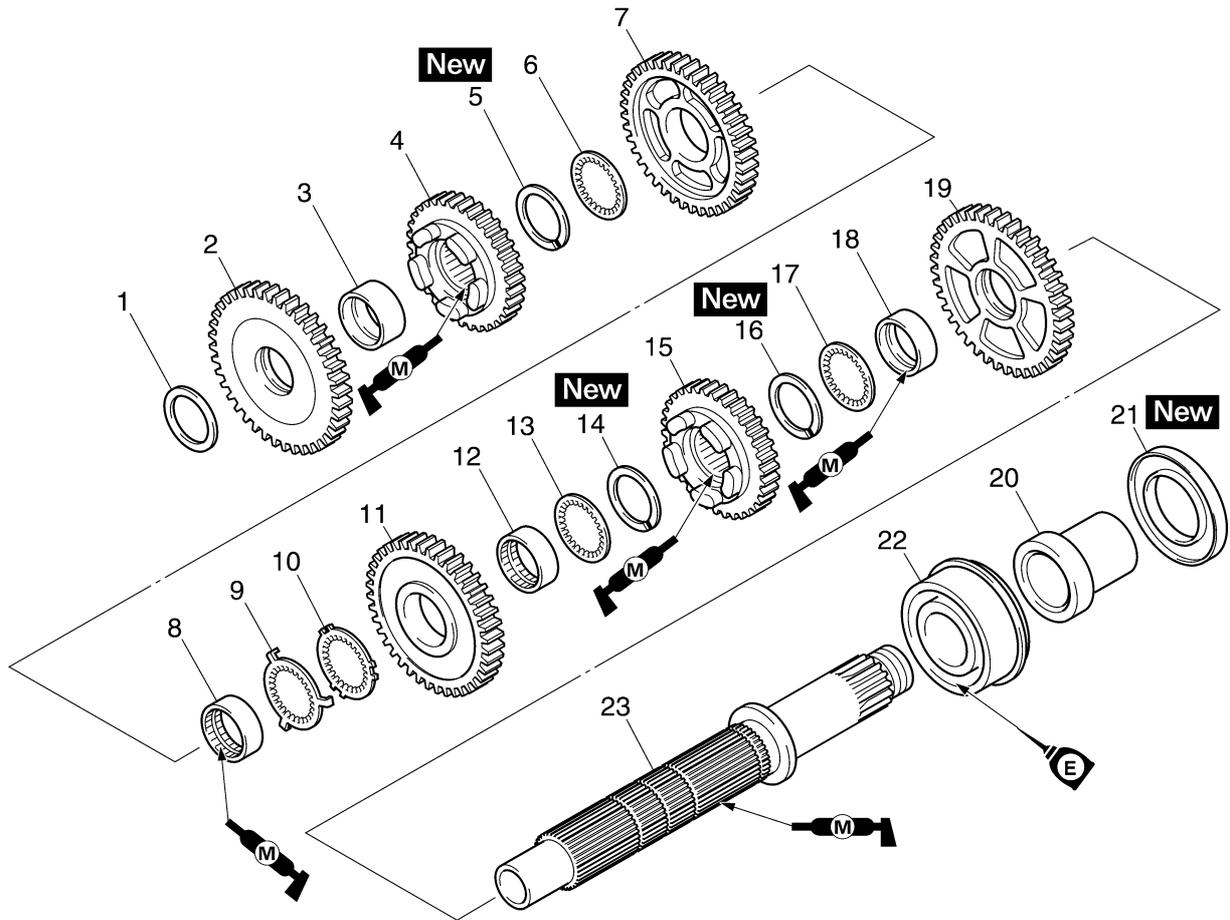
## Disassembling the main axle assembly



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	6th pinion gear	1	
5	Collar	1	
6	Washer	1	
7	Circlip	1	
8	3rd pinion gear	1	
9	Circlip	1	
10	Washer	1	
11	5th pinion gear	1	
12	Collar	1	
13	Main axle	1	
14	Bearing housing	1	
15	Bearing	1	
			For assembly, reverse the disassembly procedure.

# TRANSMISSION

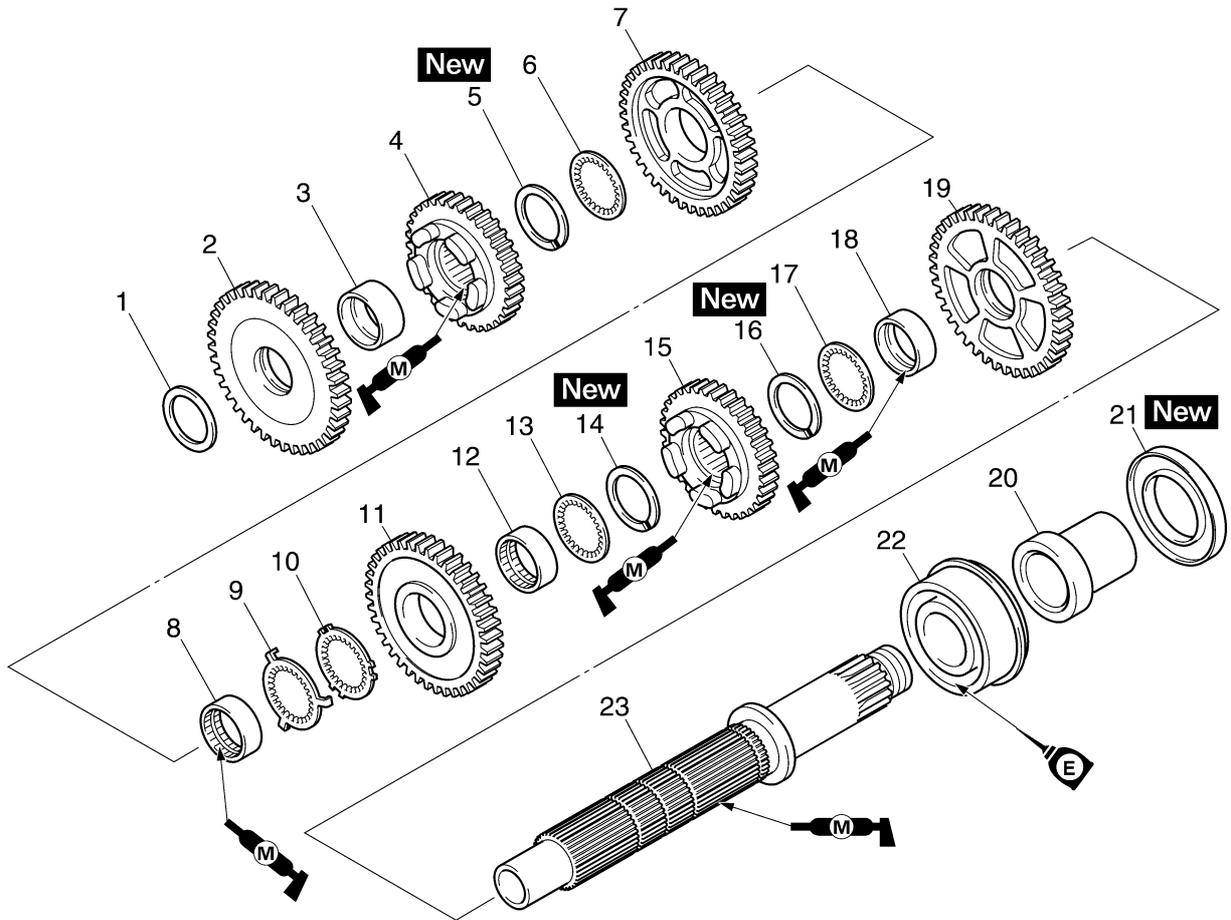
## Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Washer	1	
2	1st wheel gear	1	
3	Collar	1	
4	5th wheel gear	1	
5	Circlip	1	
6	Washer	1	
7	3rd wheel gear	1	
8	Collar	1	
9	Toothed lock washer	1	
10	Toothed lock washer retainer	1	
11	4th wheel gear	1	
12	Collar	1	
13	Washer	1	
14	Circlip	1	
15	6th wheel gear	1	
16	Circlip	1	
17	Washer	1	
18	Collar	1	
19	2nd wheel gear	1	
20	Collar	1	
21	Oil seal	1	
22	Bearing	1	
23	Drive axle	1	

# TRANSMISSION

## Disassembling the drive axle assembly

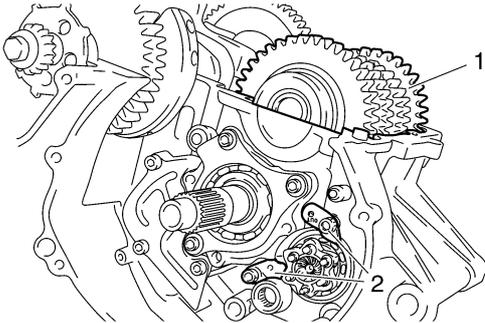
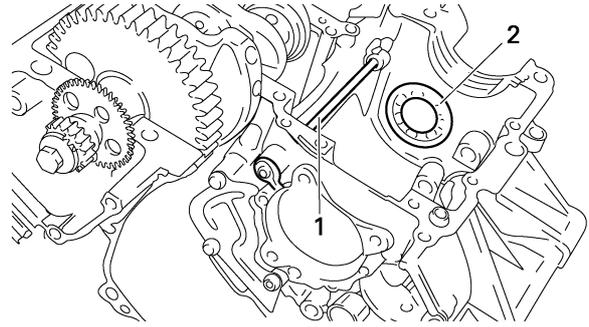


Order	Job/Parts to remove	Q'ty	Remarks
			For assembly, reverse the disassembly procedure.

EAS26250

## REMOVING THE TRANSMISSION

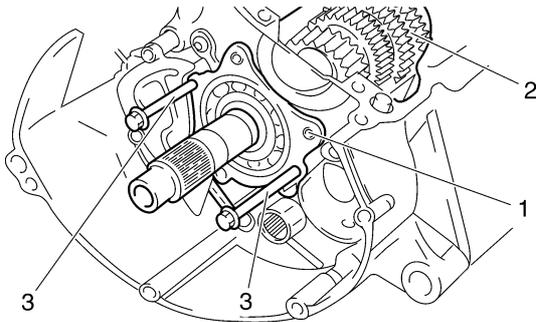
1. Remove:
  - Drive axle assembly "1"
  - Shift drum retainers "2"
  - Shift fork guide bars
  - Shift fork "L" and "R"
  - Shift drum assembly
  - Shift fork "C"



2. Remove:
  - Bearing housing "1"
  - Main axle assembly "2"



- a. Insert two bolts "3" of the proper size, as shown in the illustration, into the main axle assembly bearing housing.



- b. Tighten the bolts until they contact the crankcase surface.
- c. Continue tightening the bolts until the main axle assembly comes free from the upper crankcase.



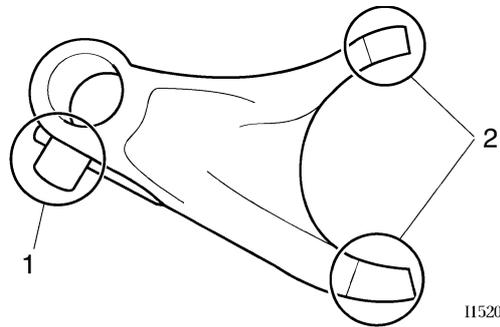
3. Remove:
  - Oil pipe "1"
  - Bearing "2"

EAS26260

## CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

1. Check:
  - Shift fork cam follower "1"
  - Shift fork pawl "2"
 Bends/damage/scoring/wear → Replace the shift fork.



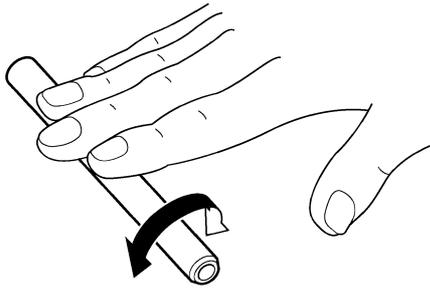
I1520202

2. Check:
  - Shift fork guide bar
 Roll the shift fork guide bar on a flat surface.  
 Bends → Replace.

EWA12840



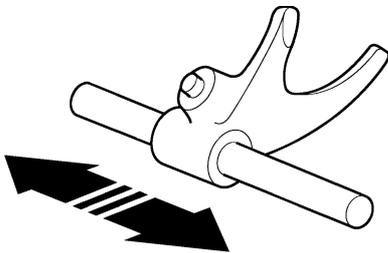
**Do not attempt to straighten a bent shift fork guide bar.**



I1520401

3. Check:

- Shift fork movement (along the shift fork guide bar)  
Rough movement → Replace the shift forks and shift fork guide bar as a set.



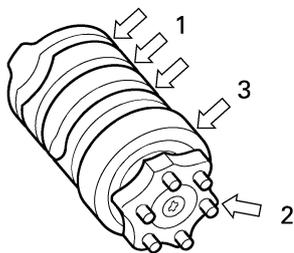
I1520101

EAS26270

## CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:

- Shift drum grooves "1"  
Damage/scratches/wear → Replace the shift drum assembly.
- Shift drum segment "2"  
Damage/wear → Replace the shift drum assembly.
- Shift drum bearing "3"  
Damage/pitting → Replace the shift drum assembly.



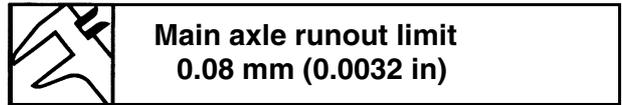
EAS26280

## CHECKING THE TRANSMISSION

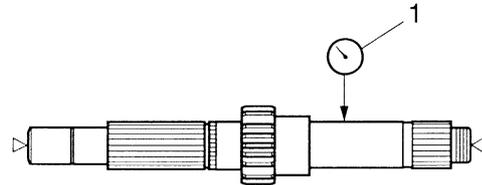
1. Measure:

- Main axle runout (with a centering device and dial gauge "1")

Out of specification → Replace the main axle.



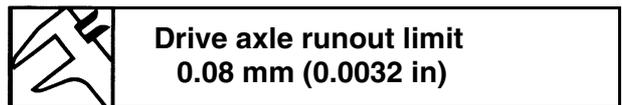
**Main axle runout limit  
0.08 mm (0.0032 in)**



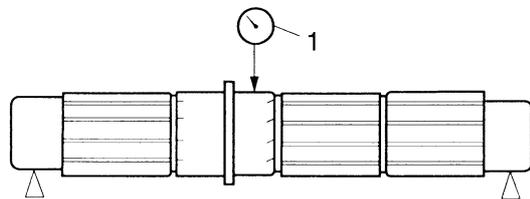
I1650702

2. Measure:

- Drive axle runout (with a centering device and dial gauge "1")  
Out of specification → Replace the drive axle.



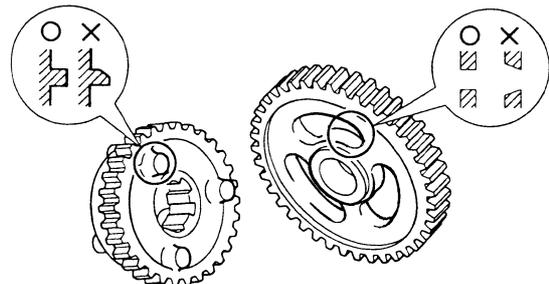
**Drive axle runout limit  
0.08 mm (0.0032 in)**



I1650701

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).



EAS26350

## INSTALLING THE TRANSMISSION

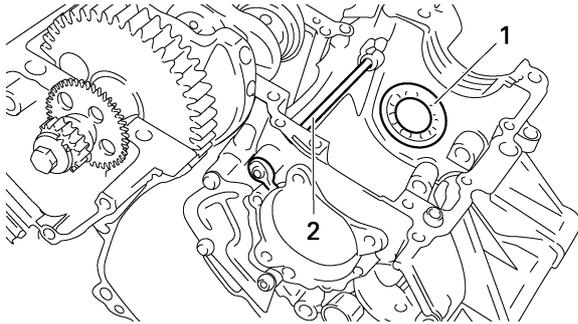
### 1. Install:

- Bearing "1"

#### NOTE:

Make the seal side of bearing face to the outside and install it close to the right end face of the crankcase.

- Oil pipe "2"



### 2. Install:

- Main axle assembly "1"
- Bearing housing "2"



**Bearing housing bolt**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**  
**LOCTITE®**

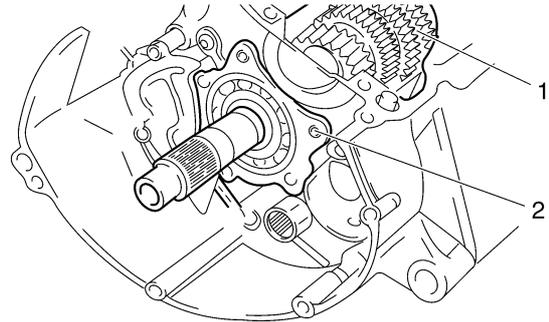
- Shift fork "C"
- Shift drum assembly
- Shift fork guide bar
- Shift fork guide bar retainer



**Shift fork guide bar retainer bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**  
**LOCTITE®**

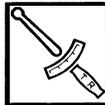
#### NOTE:

- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: "R", "C", "L".
- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork "C" into the groove in the 3rd and 4th pinion gear on the main axle.



### 3. Install:

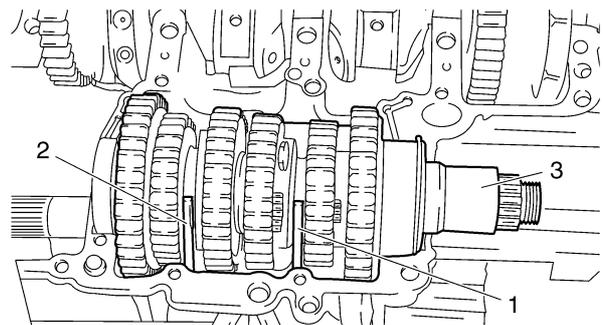
- Shift fork "L" "1" and "R" "2"
- Drive axle assembly "3"
- Shift fork guide bar
- Shift fork guide bar retainer "4"

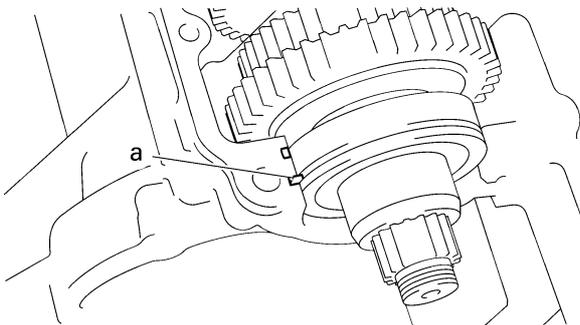
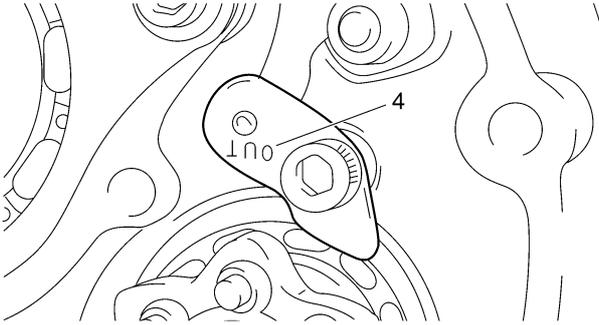


**Shift fork guide bar retainer bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**  
**LOCTITE®**

#### NOTE:

- Install shift fork "L" into the groove in the 6th wheel gear and shift fork "R" into the groove in the 5th wheel gear on the drive axle.
- Make sure that the drive axle bearing circlip "a" is inserted into the grooves in the upper crankcase.





4. Check:

- Transmission  
Rough movement → Repair.

**NOTE:** \_\_\_\_\_  
Oil each gear, shaft, and bearing thoroughly.

---

---

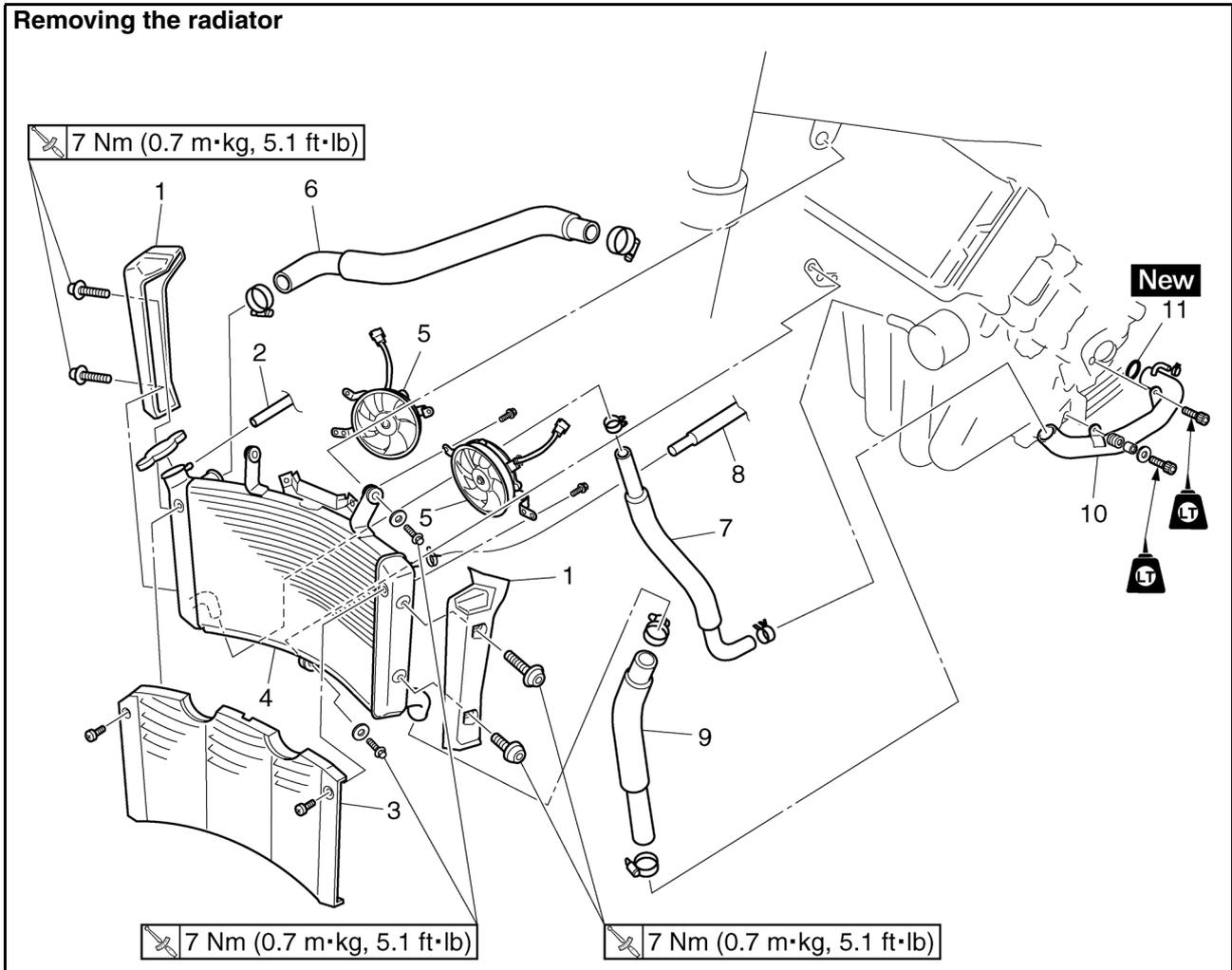
## COOLING SYSTEM

<b>RADIATOR</b> .....	6-1
CHECKING THE RADIATOR.....	6-2
INSTALLING THE RADIATOR.....	6-2
<b>OIL COOLER</b> .....	6-3
CHECKING THE OIL COOLER.....	6-4
INSTALLING THE OIL COOLER.....	6-4
<b>THERMOSTAT</b> .....	6-5
CHECKING THE THERMOSTAT.....	6-7
ASSEMBLING THE THERMOSTAT ASSEMBLY.....	6-7
INSTALLING THE THERMOSTAT ASSEMBLY.....	6-7
<b>WATER PUMP</b> .....	6-9
DISASSEMBLING THE WATER PUMP.....	6-10
CHECKING THE WATER PUMP.....	6-10
ASSEMBLING THE WATER PUMP.....	6-10

EAS26380

## RADIATOR

### Removing the radiator



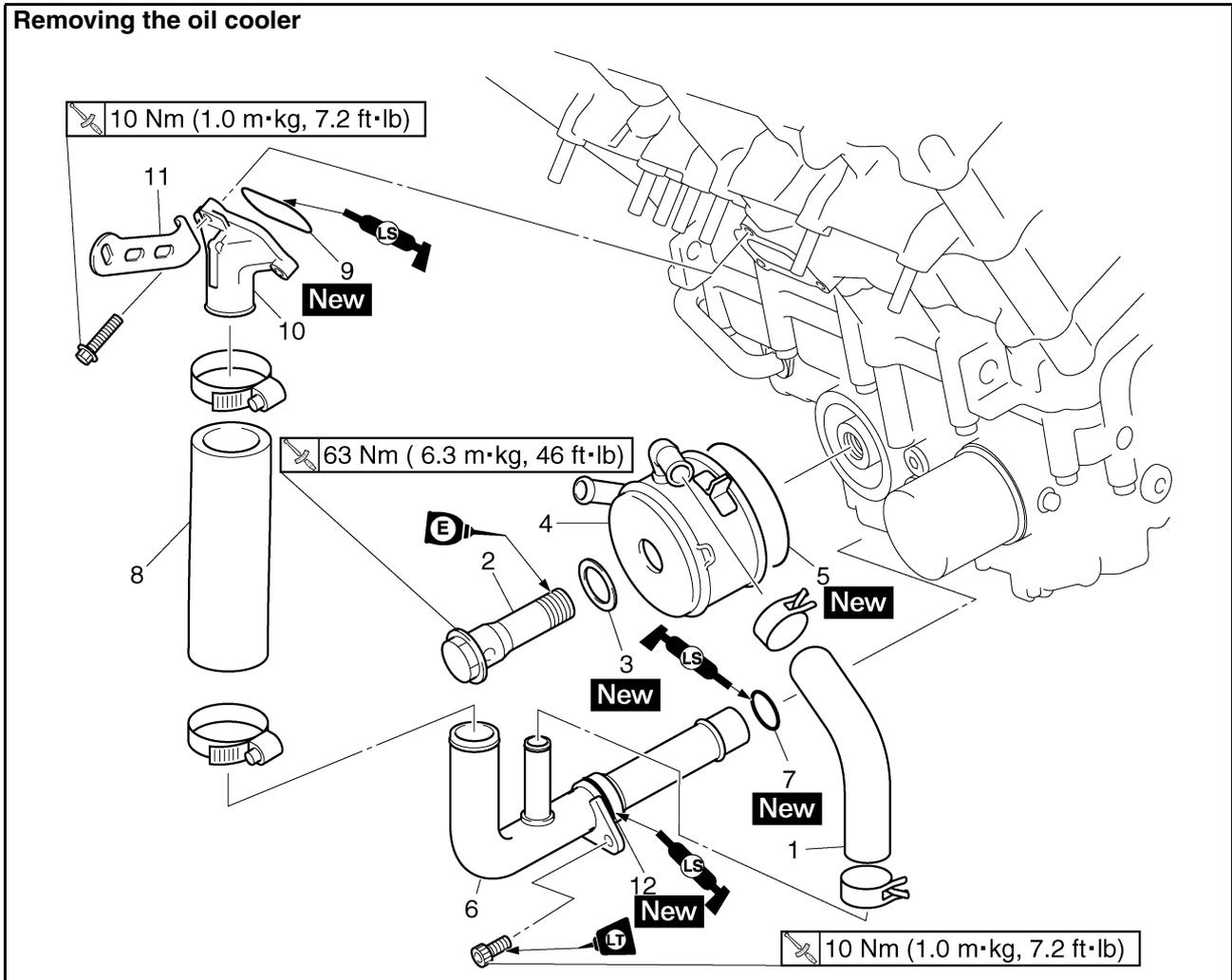
Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
1	Radiator side covers	2	
2	Coolant reservoir hose	1	
3	Radiator front cover	1	
4	Radiator	1	
5	Radiator fan motor	2	
6	Radiator inlet hose	1	
7	Oil cooler outlet hose	1	
8	Water pump breather hose	1	
9	Radiator outlet hose	1	
10	Water pump inlet pipe	1	
11	O-ring	1	
			For installation, reverse the removal procedure.



EAS26410

## OIL COOLER

### Removing the oil cooler

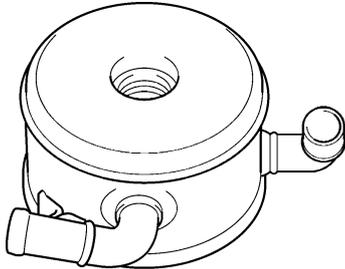


Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
1	Oil cooler inlet hose	1	
2	Oil cooler bolt	1	
3	Washer	1	
4	Oil cooler	1	
5	O-ring	1	
6	Water pump outlet pipe	1	
7	O-ring	1	
8	Water jacket joint inlet hose	1	
9	O-ring	1	
10	Water jacket joint	1	
11	Stay	1	
12	O-ring	1	
			For assembly, reverse the removal procedure.

EAS26420

## CHECKING THE OIL COOLER

1. Check:
  - Oil cooler
  - Cracks/damage → Replace.



2. Check:
  - Oil cooler inlet hose
  - Oil cooler outlet hose
  - Cracks/damage/wear → Replace.

EAS26430

## INSTALLING THE OIL COOLER

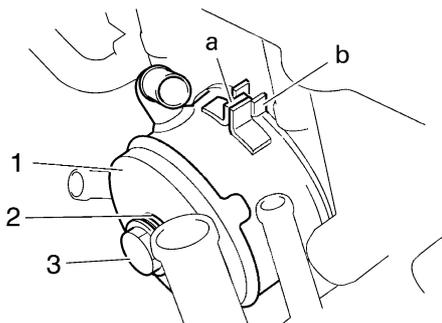
1. Clean:
  - Mating surfaces of the oil cooler and the crankcase  
(with a cloth dampened with lacquer thinner)
2. Install:
  - O-ring **New**
  - Oil cooler "1"
  - Washer "2" **New**
  - Oil cooler bolt "3"



**Oil cooler bolt**  
**63 Nm (6.3 m·kg, 46 ft·lb)**

### NOTE:

- Before installing the oil cooler, lubricate the oil cooler bolt and O-ring with a thin coat of engine oil.
- Make sure the O-ring is positioned properly.
- Align the projection "a" on the oil cooler with the slot "b" in the crankcase.

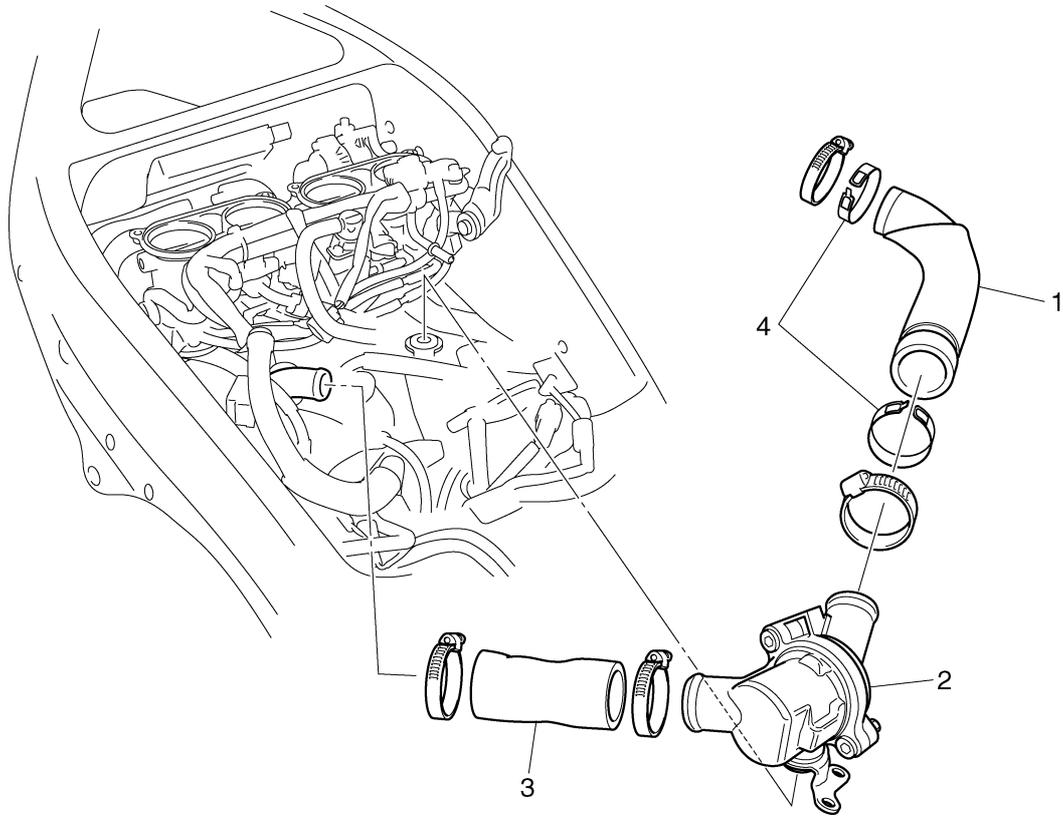


3. Fill:
  - Cooling system  
(with the specified amount of the recommended coolant)
  - Refer to "CHANGING THE COOLANT" on page 3-19.
  - Crankcase  
(with the specified amount of the recommended engine oil)
  - Refer to "CHANGING THE ENGINE OIL" on page 3-12.
4. Check:
  - Cooling system
  - Leaks → 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 6-2.

EAS26440

## THERMOSTAT

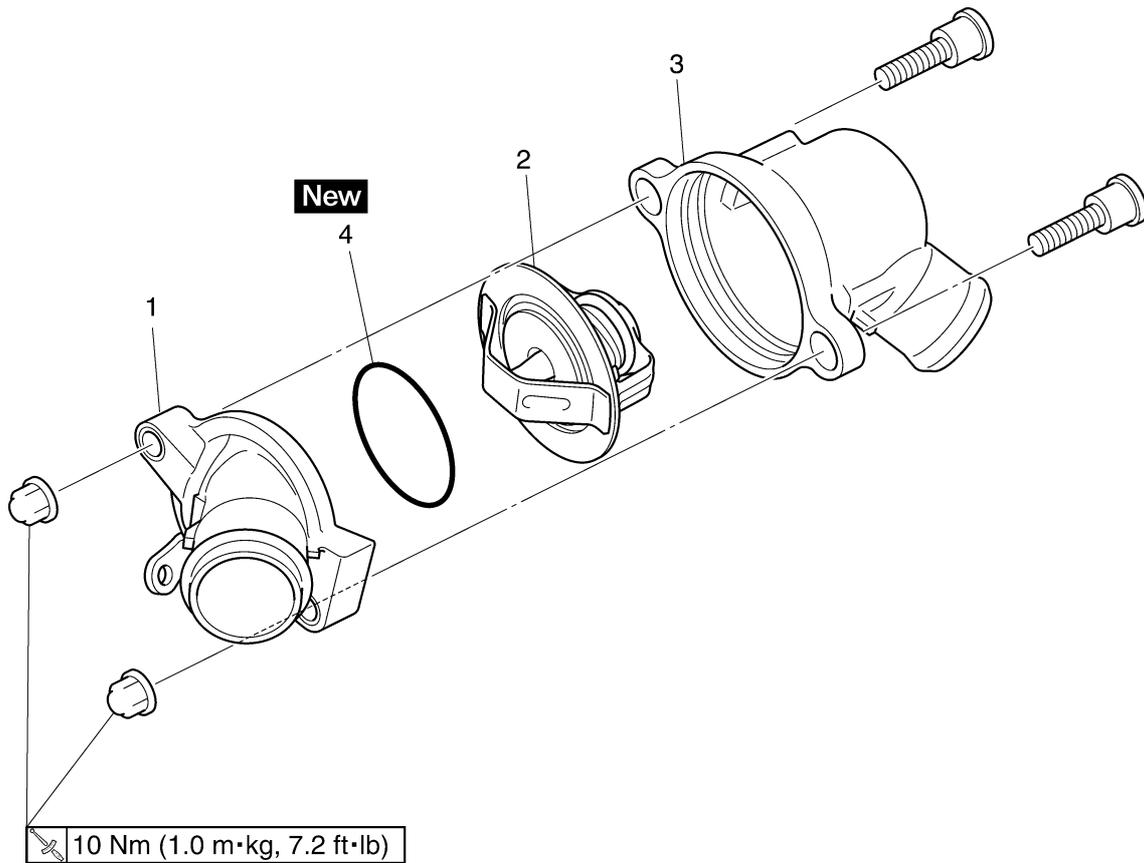
### Removing the thermostat assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
1	Thermostat assembly outlet hose	1	
2	Thermostat assembly	1	
3	Thermostat assembly inlet hose	1	
4	Band	2	
			For installation, reverse the removal procedure.

# THERMOSTAT

## Disassembling the thermostat assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Thermostat housing cover	1	
2	Thermostat	1	
3	Thermostat housing	1	
4	O-ring	1	
			For assembly, reverse the disassembly procedure.

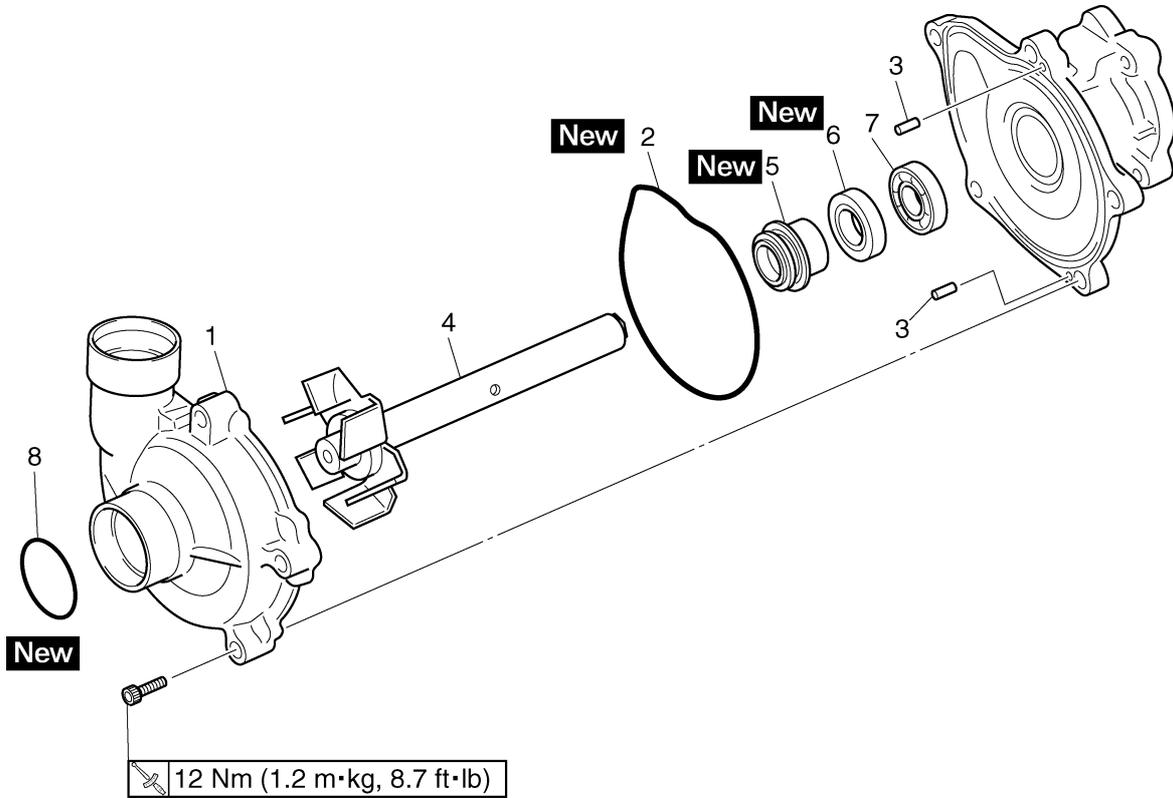


3. Measure:
  - Radiator cap opening pressure  
Below the specified pressure → Replace  
the radiator cap.  
Refer to “CHECKING THE RADIATOR”  
on page 6-2.

EAS26500

## WATER PUMP

### Removing the impeller shaft



Order	Job/Parts to remove	Q'ty	Remarks
	Oil/water pump assembly		Refer to "OIL PUMP" on page 5-55.
	Oil pump rotor		Refer to "OIL PUMP" on page 5-55.
1	Water pump cover	1	
2	O-ring	1	
3	Pin	2	
4	Impeller shaft (along with the impeller)	1	
5	Water pump seal	1	
6	Oil seal	1	
7	Bearing	1	
8	O-ring	1	
			For installation, reverse the removal procedure.

# WATER PUMP

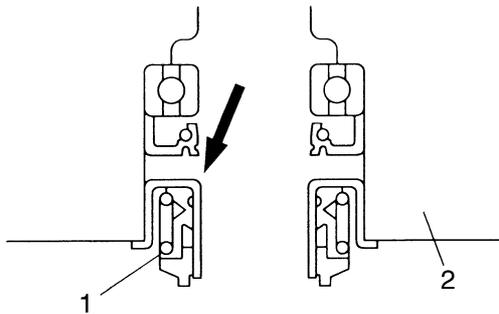
EAS26520

## DISASSEMBLING THE WATER PUMP

1. Remove:
  - Water pump seal "1"
  - Water pump housing "2"

**NOTE:** \_\_\_\_\_

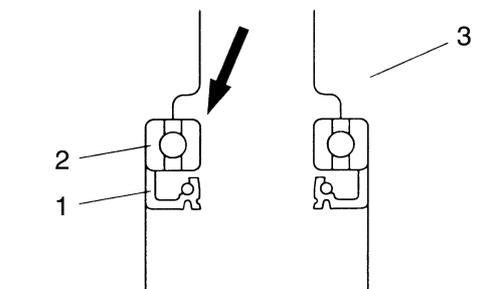
Tap out the water pump seal from the inside of the water pump housing.



2. Remove:
  - Oil seal "1"
  - Bearing "2"
  - Water pump housing "3"

**NOTE:** \_\_\_\_\_

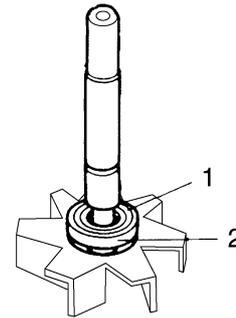
Tap out the bearing and oil seal from the outside of the water pump housing.



3. Remove:
  - Rubber damper holder "1"
  - Rubber damper "2"  
(from the impeller, with a thin, flat-head screwdriver)

**NOTE:** \_\_\_\_\_

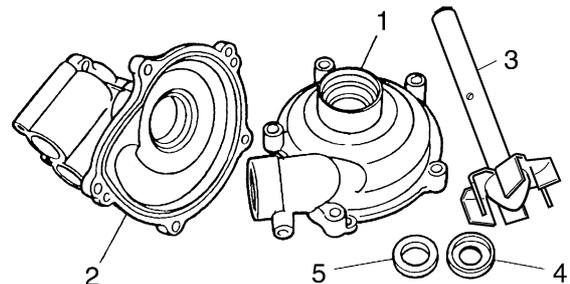
Do not scratch the impeller shaft.



EAS26540

## CHECKING THE WATER PUMP

1. Check:
  - Water pump housing cover "1"
  - Water pump housing "2"
  - Impeller "3"
  - Rubber damper "4"
  - Rubber damper holder "5"
  - Water pump seals
  - Oil sealCracks/damage/wear → Replace.



2. Check:
  - BearingRough movement → Replace.
3. Check:
  - Water pump outlet pipeCracks/damage/wear → Replace.

EAS26560

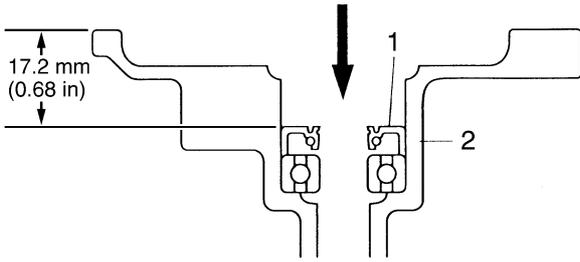
## ASSEMBLING THE WATER PUMP

1. Install:
  - Oil seal "1" **New**  
(into the water pump housing "2")

**NOTE:** \_\_\_\_\_

- Before installing the oil seal, apply tap water or coolant onto its out surface.
- Install the oil seal with a socket that matches its outside diameter.

# WATER PUMP



2. Install:

- Water pump seal “1” **New**

ECA14080

**CAUTION:**

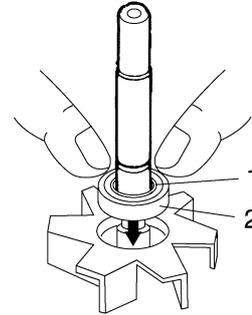
**Never lubricate the water pump seal surface with oil or grease.**

**NOTE:**

- Install the water pump seal with the special tools.
- Before installing the water pump seal, apply Yamaha bond No.1215 (Three Bond No.1215®) “2” to the water pump housing “3”.

**NOTE:**

Before installing the rubber damper, apply tap water or coolant onto its outer surface.



4. Measure:

- Impeller shaft tilt  
Out of specification → Repeat steps (3) and (4).

ECA14090

**CAUTION:**

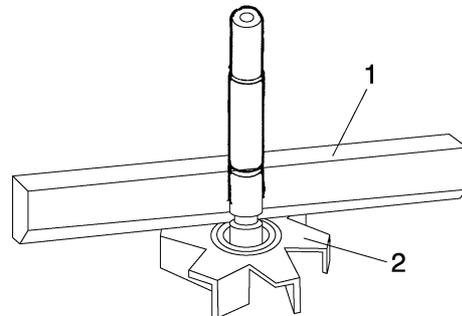
**Make sure the rubber damper and rubber damper holder are flush with the impeller.**



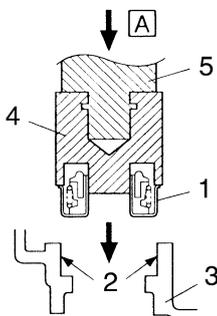
**Mechanical seal installer “4”**  
90890-04078  
**Water pump seal installer**  
YM-33221-A  
**Middle driven shaft bearing driver “5”**  
90890-04058  
**Bearing driver 40 mm**  
YM-04058  
**Yamaha bond No. 1215**  
**(Three Bond No.1215®)**  
90890-85505



**Impeller shaft tilt limit**  
0.15 mm (0.006 in)



1. Straightedge
2. Impeller



14150501

A. Push down.

3. Install:

- Rubber damper holder “1” **New**
- Rubber damper “2” **New**

---

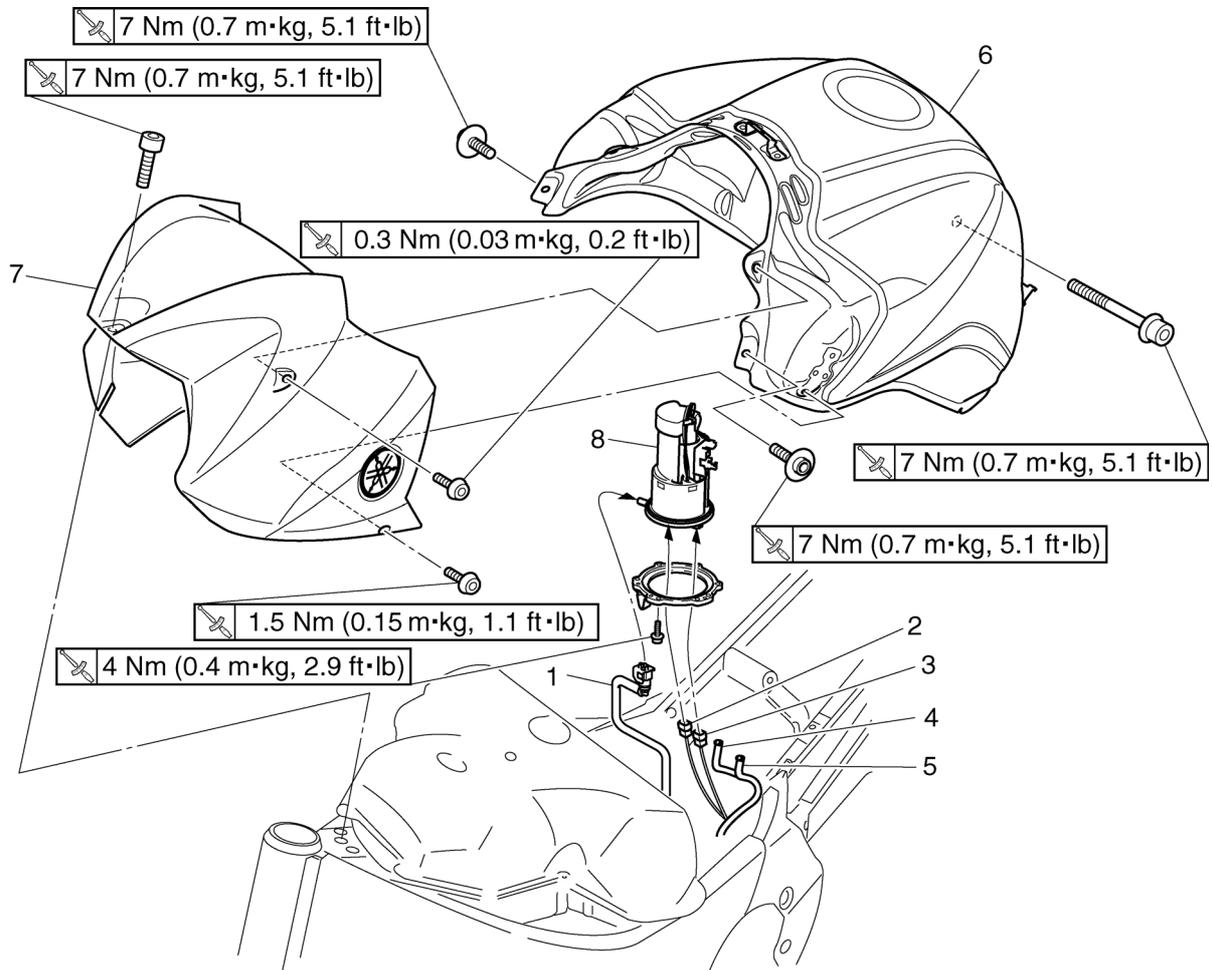
## FUEL SYSTEM

<b>FUEL TANK</b> .....	7-1
REMOVING THE FUEL TANK .....	7-2
REMOVING THE FUEL PUMP .....	7-2
CHECKING THE FUEL PUMP BODY .....	7-2
CHECKING THE FUEL PUMP OPERATION .....	7-2
INSTALLING THE FUEL PUMP .....	7-2
INSTALLING THE FUEL TANK .....	7-3
<b>THROTTLE BODIES</b> .....	7-4
CHECKING THE INJECTORS .....	7-7
CHECKING THE THROTTLE BODIES .....	7-7
CHECKING THE FUEL PRESSURE .....	7-7
ADJUSTING THE THROTTLE POSITION SENSOR .....	7-7
ADJUSTING THE SUB-THROTTLE POSITION SENSOR .....	7-8
CHECKING THE SUB-THROTTLE SERVO MOTOR .....	7-10
CHECKING THE THERMO WAX .....	7-10
ADJUSTING THE THERMO WAX .....	7-10
<b>AIR INDUCTION SYSTEM</b> .....	7-12
CHECKING THE AIR INDUCTION SYSTEM .....	7-13
INSTALLING THE AIR INDUCTION SYSTEM .....	7-14

EAS26620

## FUEL TANK

### Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Fuel hose	1	Disconnect.
2	Fuel sender coupler	1	Disconnect.
3	Fuel pump coupler	1	Disconnect.
4	Fuel tank drain hose	1	Disconnect.
5	Fuel tank breather hose	1	Disconnect.
6	Fuel tank	1	
7	Fuel tank cover	1	
8	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 connector cover
  - Fuel hose
  - Fuel sender coupler
  - Fuel pump coupler
  - Fuel tank breather hose
  - Fuel tank drain hose

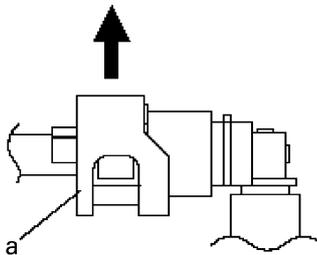
ECA5D01017

### CAUTION:

- **Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.**
- **Although the fuel has been removed from the fuel tank be careful when removing the fuel hoses, since there may be fuel remaining in it.**

### NOTE:

- To remove the fuel hose from the fuel injection pipe, slide the cover "a" on the end of the hose in the direction of the arrow shown and then remove the hose.
- Before removing the hoses, place a few rags in the area under where it will be removed.



3. Remove:
  - Fuel tank

### NOTE:

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

EAS26640

## REMOVING THE FUEL PUMP

1. Remove:
  - Fuel pump

ECA14720

### CAUTION:

- **Do not drop the fuel pump or give it a strong shock.**

- **Do not touch the base section of the fuel sender.**

EAS26670

## CHECKING THE FUEL PUMP BODY

1. Check:
  - Fuel pump body  
Obstruction → Clean.  
Cracks/damage → Replace fuel pump assembly.
2. Check:
  - Diaphragms and gaskets  
Turn/fatigue/cracks → Replace fuel pump assembly.
3. Check:
  - Valves  
Cracks/damage → Replace fuel pump assembly.

EAS26690

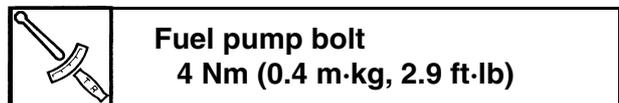
## CHECKING THE FUEL PUMP OPERATION

1. Check:
  - Fuel pump operation  
Refer to "CHECKING THE FUEL PRESSURE" on page 7-7.

EAS26710

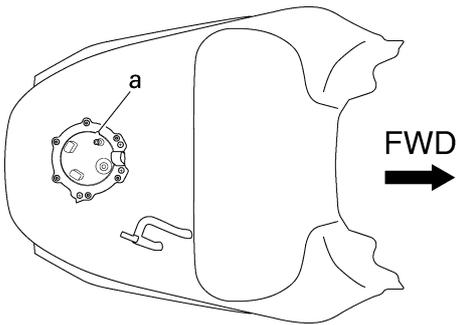
## INSTALLING THE FUEL PUMP

1. Install:
  - Fuel pump



### NOTE:

- Do not damage the installation surface 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 stages in a crisscross pattern and to the specified torque.



EAS5D01024

## INSTALLING THE FUEL TANK

### 1. Install:

- Fuel hose
- Fuel hose connector cover

ECA14740

### CAUTION:

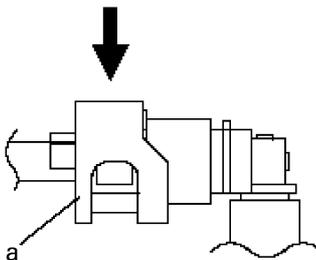
**When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holders are in the correct position, otherwise the fuel hose will not be properly installed.**

---

### NOTE:

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. To install the fuel hose from the fuel injection hose, slide the cover “a” on the end of the hose in the direction of arrow shown.

---



### 2. Install:

- Fuel sender coupler
- Fuel pump coupler
- Fuel tank breather hose
- Fuel tank drain hose

### NOTE:

There is white paint mark on the fuel tank breather hose. Refer to “CABLE ROUTING” on page 2-41.

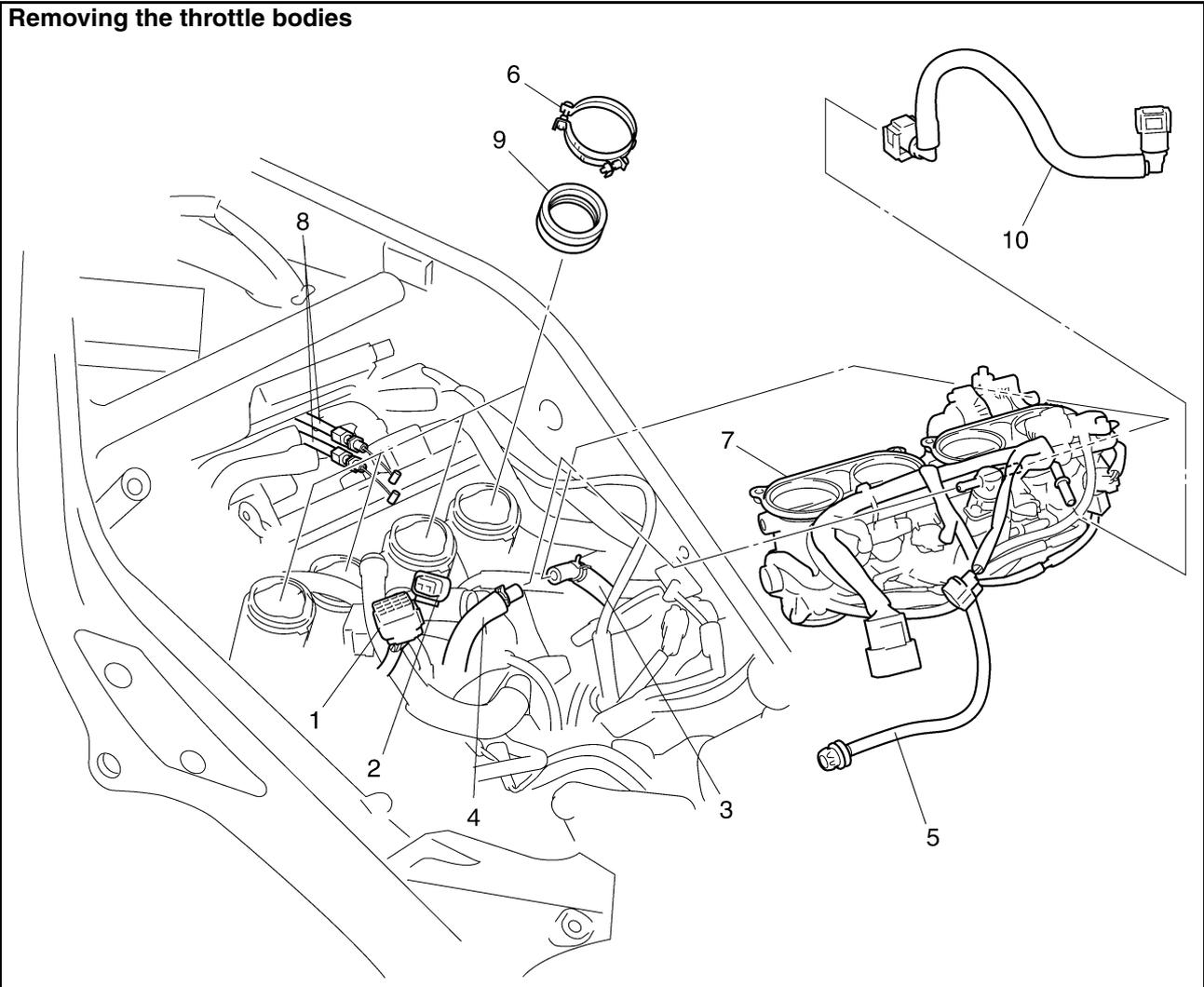
---

# THROTTLE BODIES

EAS26970

## THROTTLE BODIES

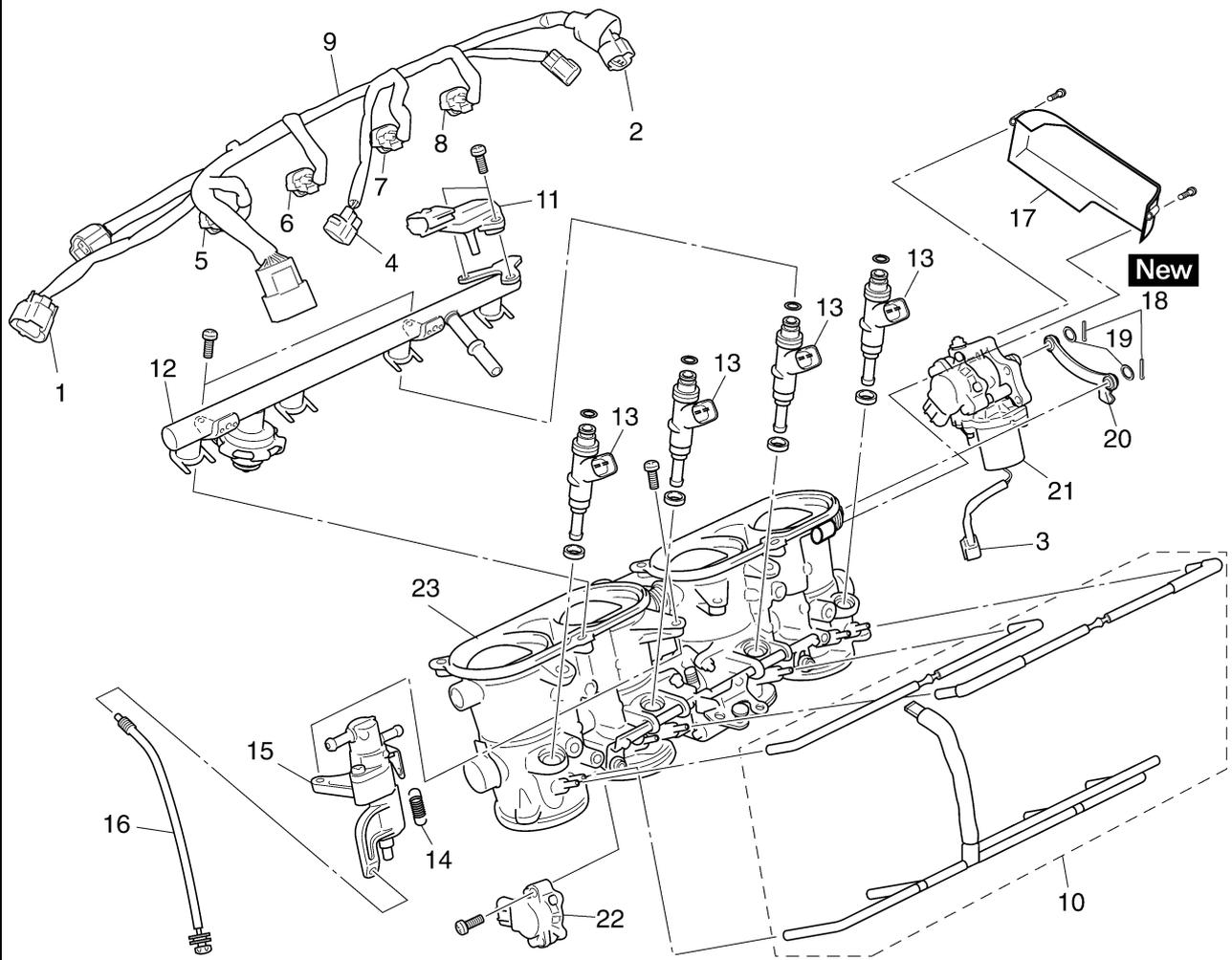
### Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
1	Sub-wire harness coupler	2	Disconnect.
2	Coolant temperature sensor coupler	1	Disconnect.
3	Thermo wax inlet hose	1	Disconnect.
4	Thermo wax outlet hose	1	Disconnect.
5	Idle adjust screw wire	1	
6	Throttle body joint clamp	4	Loosen.
7	Throttle bodies	1	
8	Throttle cables	2	Disconnect.
9	Throttle body joint	4	
10	Fuel hose	1	Disconnect.
			For installation, reverse the removal procedure.

# THROTTLE BODIES

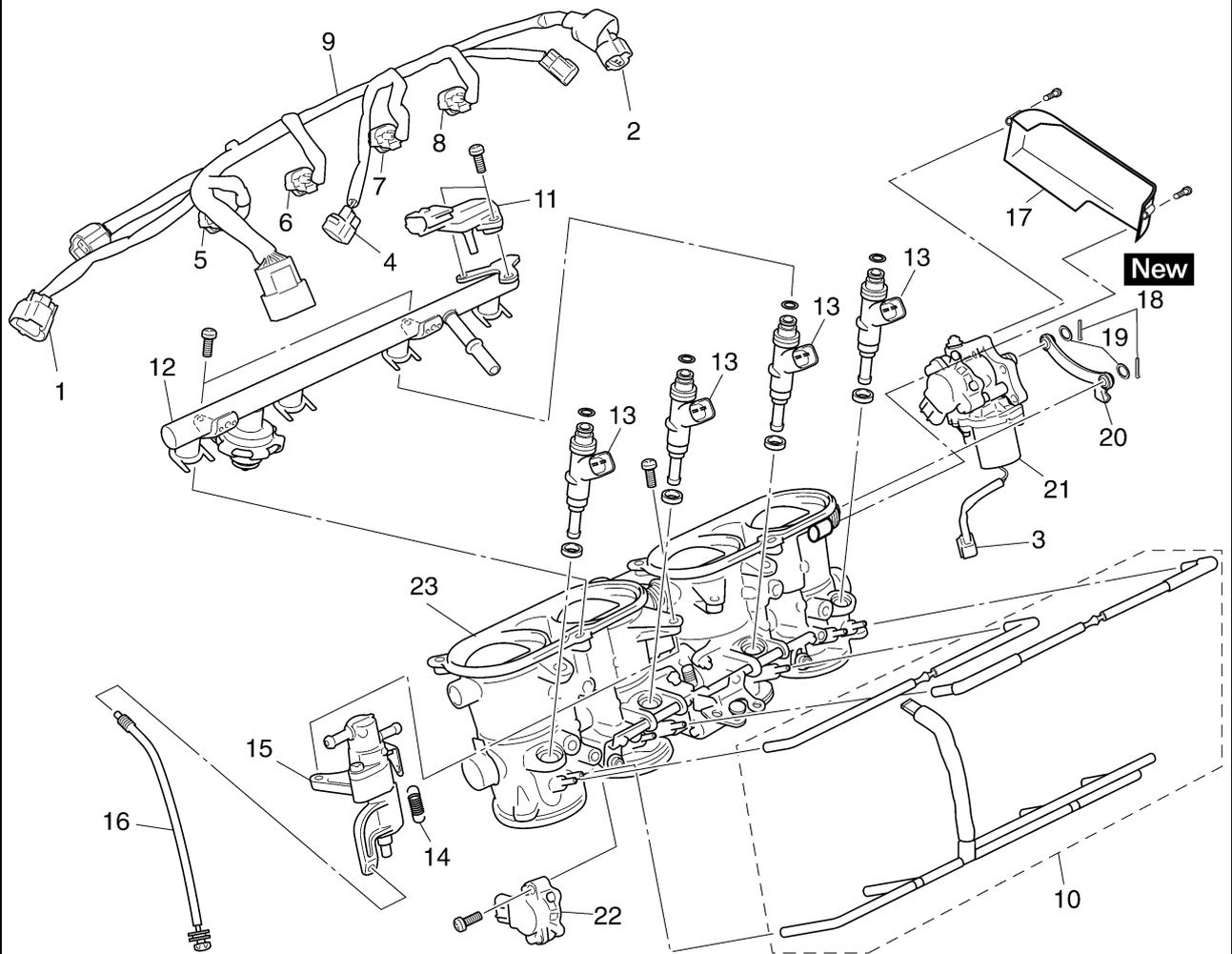
## Removing the injectors



Order	Job/Parts to remove	Q'ty	Remarks
1	Throttle position sensor coupler	1	Disconnect.
2	Sub-throttle position sensor coupler	1	Disconnect.
3	Sub-throttle motor assembly coupler	1	Disconnect.
4	Intake air pressure sensor coupler	1	Disconnect.
5	Cylinder #1-injector coupler	1	Disconnect.
6	Cylinder #2-injector coupler	1	Disconnect.
7	Cylinder #3-injector coupler	1	Disconnect.
8	Cylinder #4-injector coupler	1	Disconnect.
9	Sub-wire harness	1	
10	Negative pressure hose	1	Disconnect.
11	Intake air pressure sensor	1	
12	Fuel distributor	1	
13	Injector	4	
14	Spring	1	
15	Thermo wax assembly	1	
16	Idle adjust screw wire	1	
17	Link cover	1	Loosen.
18	Cotter pin	2	
19	Washer	2	
20	Link	1	
21	Sub-throttle servo motor assembly	1	

# THROTTLE BODIES

## Removing the injectors



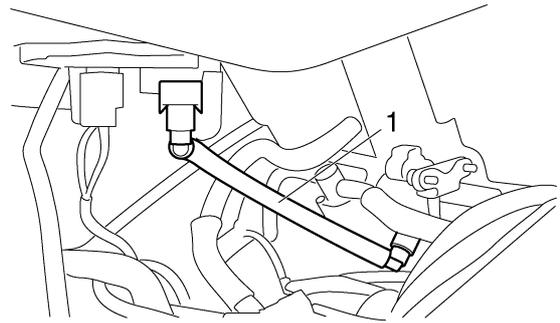
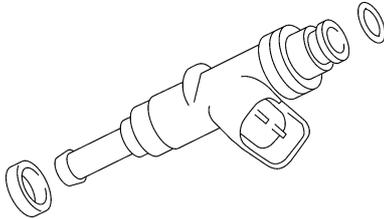
Order	Job/Parts to remove	Q'ty	Remarks
22	Throttle position sensor	1	
23	Throttle body assembly	1	
			For installation, reverse the removal procedure.

# THROTTLE BODIES

EAS26980

## CHECKING THE INJECTORS

1. Check:
  - Injectors
  - Damage → Replace.



- c. Connect the pressure gauge "2" and adapter "3" to the fuel hose (fuel tank to primary injector fuel rail).

EAS26990

## CHECKING THE THROTTLE BODIES

1. Check:
  - Throttle bodies
  - Cracks/damage → Replace the throttle bodies as a set.
2. Check:
  - Fuel passages
  - Obstructions → Clean.



- a. Wash the throttle bodies in a petroleum-based solvent.  
Do not use any caustic carburetor cleaning solution.
- b. Blow out all of the passages with compressed air.



EAS5D01029

## CHECKING THE FUEL PRESSURE

1. Check:
  - Fuel pressure



- a. Remove the rider and passenger seat.  
Refer to "GENERAL CHASSIS" on page 4-1.
- b. Disconnect the fuel hose (fuel tank to primary injector fuel rail) "1" from the primary injector fuel rail.

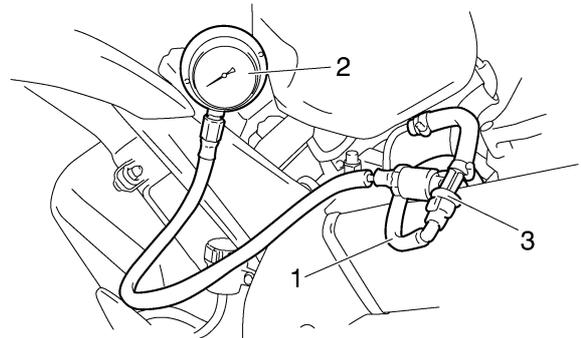
EWA5D01002

**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.



**Vacuum/pressure pump gauge set**  
**90890-06756**  
**Pressure gauge**  
**90890-03153**  
**YU-03153**  
**Fuel pressure adapter**  
**90890-03176**  
**YM-03176**



- d. Start the engine.
- e. Measure the fuel pressure.



**Fuel pressure**  
**324 kPa (46.1 psi) (3.24 kg/cm<sup>2</sup>)**

Faulty → Replace the fuel pump.



EAS27020

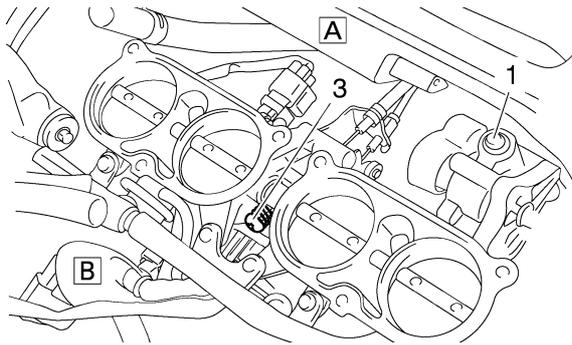
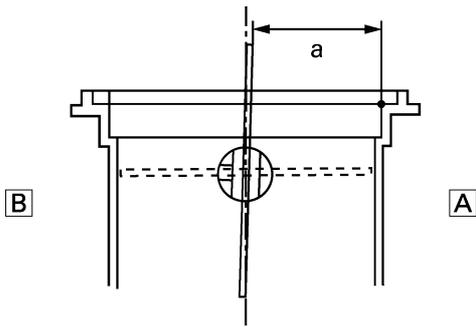
## ADJUSTING THE THROTTLE POSITION SENSOR

**NOTE:**

Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.



# THROTTLE BODIES



- A. Front side
- B. Rear side

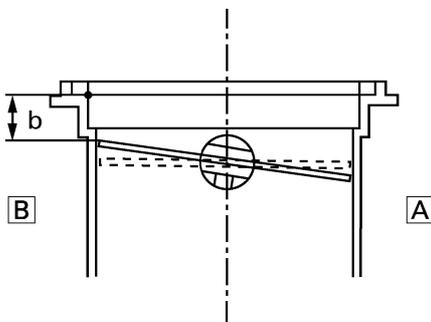
### 3. Adjust:

- Primary opening

- a. After performing the full open angle of the sub-throttle position sensor, turn the nut of the worm shaft clockwise, measure the dimension of "b" section with a micrometer caliper or other device and adjust so that the dimension is in a range from 8.1 to 8.5 mm (0.32 to 0.33 in).



**Sub-throttle dimension "b"**  
8.1–8.5 mm (0.32–0.33 in)



- A. Front side
- B. Rear side

### 4. Adjust:

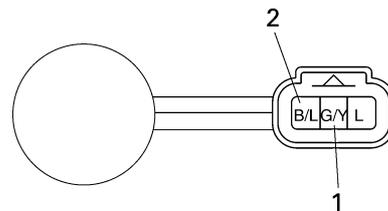
- Sub-throttle position sensor voltage

- a. Connect the sub-throttle position sensor coupler to the wire harness.
- b. Connect the digital circuit tester to the sub-throttle position sensor.

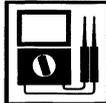
- Positive tester probe  
Green/Yellow terminal "1"
- Negative tester probe  
Black/Blue terminal "2"



**Digital circuit tester**  
90890-03174  
**Model 88 Multimeter with tachometer**  
YU-A1927



- c. Move the sub-throttle position sensor to adjust to be in the specified range.



**Sub-throttle position sensor voltage**  
0.97–1.07 V

- d. After adjusting the sub-throttle position sensor voltage, tighten the sub-throttle position sensor screws.

### NOTE:

- After setting up the sub-throttle position sensor, check that the sub-throttle position sensor output voltage is 0.4 V or more with the nut of worm shaft turned to the full close side until it stops.
- When the sub-throttle position sensor output voltage is 0.4 V or more, check that the sub-throttle position sensor output voltage is 4.6 V or less with the nut of worm shaft turned to the full open side until it stops.

### 5. Connect

- Sub-throttle motor assembly coupler

# THROTTLE BODIES

EAS2D1011

## CHECKING THE SUB-THROTTLE SERVO MOTOR

### 1. Check:

- Sub-throttle servo motor operation  
Out of specification → Replace.

### a. Check whether or not the sub-throttle valve is seized.

1. Turn the nut of worm shaft of the sub-throttle servo motor by hand to check that the sub-throttle valve is moved smoothly by hand.
2. If it is not moved smoothly, disconnect the link between the sub-throttle servo motor and sub-throttle valve, and then check whether or not the sub-throttle valve is moved smoothly by hand. Refer to "THROTTLE BODIES" on page 7-4.
3. When the sub-throttle valve is not moved smoothly, repair or replace it since the cause is the seizure of sub-throttle valve body itself. When it moved smoothly at Step (1) and (2), replace the sub-throttle servo motor.

### b. Perform the self-diagnosis mode and check the operation of sub-throttle valve by visual inspection (Code No: 56).

The operation should be carried out as 5-second drive in the full open direction, 2-second stop and 5-second drive in the full close direction.

EAS5D01026

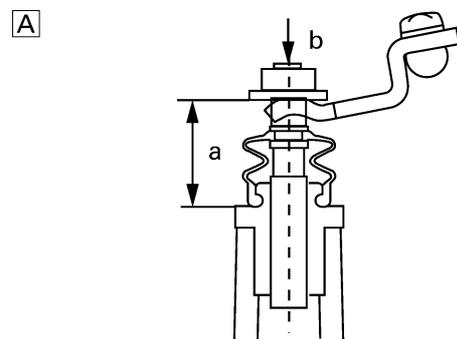
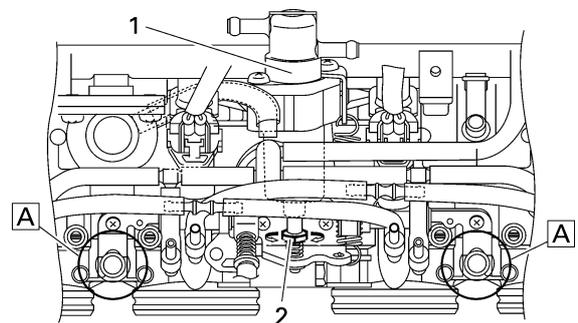
## ADJUSTING THE THERMO WAX

### 1. Adjust:

- Thermo wax the end face distance "a"

a. Before adjusting the distance, push the rod "b" in order to be fitted in several times by hand.

b. Measure the outside air temperature, and adjust the distance "a" by turning the adjusting screw "2". Refer to the thermo wax tolerance table based on the measured outside air temperature for correct adjustment.

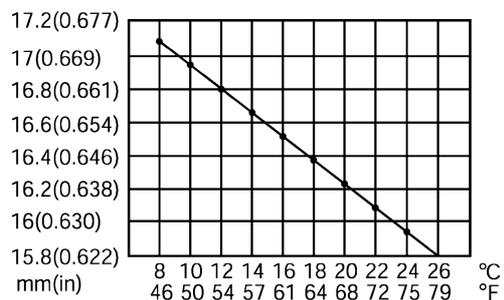
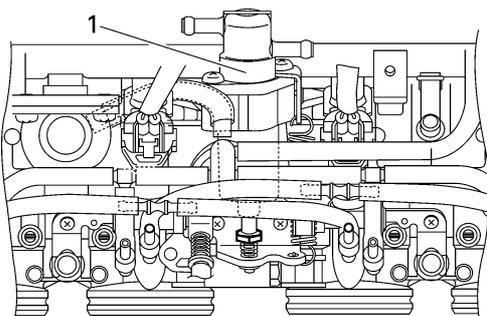


EAS5D01012

## CHECKING THE THERMO WAX

### 1. Check:

- Thermo wax "1"  
Damage → Replace the thermo wax assembly.



**NOTE:**

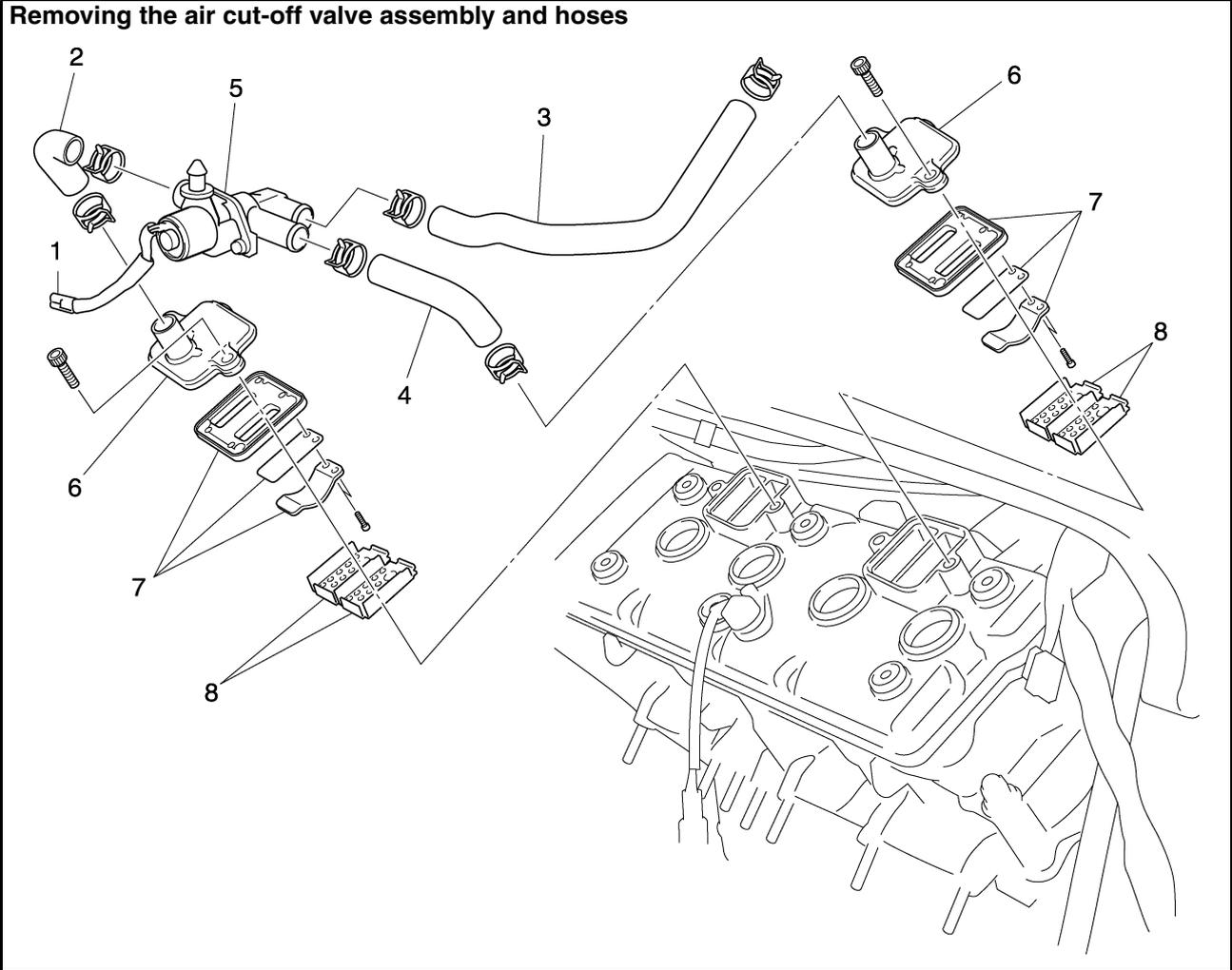
- Setup tolerance of the longitudinal axis should be  $\pm 0.2$  mm ( $\pm 0.008$  in).
  - After adjusting the thermo wax, check that the first idling is released at the coolant temperature around  $60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ ) by idling.
  - If the first idling is not released around  $60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ ), make sure to set it again. (When the coolant temperature is low, adjust the distance between the end faces longer or adjust it shorter when the coolant temperature is high.)
  - In case of turning the adjusting bolt two-third turn, the temperature varies about  $10^{\circ}\text{C}$  ( $50^{\circ}\text{F}$ ).
-

# AIR INDUCTION SYSTEM

EAS27040

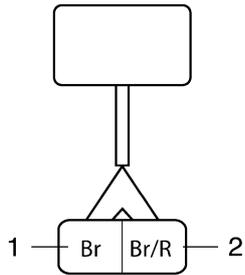
## AIR INDUCTION SYSTEM

### Removing the air cut-off valve assembly and hoses



Order	Job/Parts to remove	Q'ty	Remarks
1	Air cut-off valve coupler	1	Disconnect.
2	Air cut-off valve hose 1	1	Disconnect.
3	Air cut-off valve hose 2	1	Disconnect.
4	Air cut-off valve hose 3	1	Disconnect.
5	Air cut-off valve	1	
6	Reed valve cap	2	
7	Reed valve assembly	2	
8	Plate	4	
			For assembly, reverse the removal procedure.





c. Measure the air induction system solenoid resistance.

	<b>Air induction system solenoid resistance</b> <b>18–22Ω at 20°C (68°F)</b>
---	---

d. Out of specification → Replace.



EAS27070

## INSTALLING THE AIR INDUCTION SYSTEM

1. Install:
  - Plate
  - Reed valve assembly
  - Reed valve cap
2. Install:
  - Air cut-off valve
  - Air cut-off valve hose 1
  - Air cut-off valve hose 2
  - Air cut-off valve hose 3
  - Air cut-off valve coupler



---

## ELECTRICAL SYSTEM

<b>IGNITION SYSTEM</b> .....	8-1
CIRCUIT DIAGRAM.....	8-1
TROUBLESHOOTING.....	8-3
<b>ELECTRIC STARTING SYSTEM</b> .....	8-5
CIRCUIT DIAGRAM.....	8-5
STARTING CIRCUIT CUT-OFF SYSTEM OPERATION.....	8-7
TROUBLESHOOTING.....	8-9
<b>CHARGING SYSTEM</b> .....	8-11
CIRCUIT DIAGRAM.....	8-11
TROUBLESHOOTING.....	8-13
<b>LIGHTING SYSTEM</b> .....	8-15
CIRCUIT DIAGRAM (FZ1-N(X)).....	8-15
CIRCUIT DIAGRAM (FZ1-S(X)).....	8-17
TROUBLESHOOTING.....	8-19
<b>SIGNALING SYSTEM</b> .....	8-21
CIRCUIT DIAGRAM.....	8-21
TROUBLESHOOTING.....	8-23
<b>COOLING SYSTEM</b> .....	8-27
CIRCUIT DIAGRAM.....	8-27
TROUBLESHOOTING.....	8-29
<b>FUEL INJECTION SYSTEM</b> .....	8-31
CIRCUIT DIAGRAM.....	8-31
TROUBLESHOOTING.....	8-33
ECU SELF-DIAGNOSTIC FUNCTION.....	8-37
SELF-DIAGNOSTIC FUNCTION TABLE.....	8-38
TROUBLESHOOTING METHOD.....	8-41
DIAGNOSTIC MODE.....	8-42
TROUBLESHOOTING DETAILS.....	8-50
<b>FUEL PUMP SYSTEM</b> .....	8-75
CIRCUIT DIAGRAM.....	8-75
TROUBLESHOOTING.....	8-77
<b>IMMOBILIZER SYSTEM</b> .....	8-79
CIRCUIT DIAGRAM.....	8-79
GENERAL INFORMATION.....	8-81
PART REPLACEMENT AND KEY CODE REGISTRATION REQUIREMENTS.....	8-81
TROUBLESHOOTING.....	8-85
SELF-DIAGNOSIS FAULT CODE INDICATION.....	8-86

---

<b>ABS (ANTI-LOCK BRAKE SYSTEM)</b> .....	8-89
CIRCUIT DIAGRAM (FZ1-SA) .....	8-89
CIRCUIT DIAGRAM (FZ1-NA) .....	8-91
ABS COMPONENTS CHART .....	8-93
ABS CONNECTOR LOCATION CHART .....	8-97
ABS ECU AND ABS MOTOR RELAY .....	8-101
[D-1] MAINTENANCE OF THE ABS ECU .....	8-103
[D-2] MAINTENANCE OF THE ABS MOTOR RELAY .....	8-104
ABS TROUBLESHOOTING OUTLINE .....	8-105
BASIC INSTRUCTION FOR TROUBLESHOOTING .....	8-106
BASIC PROCESS FOR TROUBLESHOOTING .....	8-107
[A] ABS MALFUNCTION CHECK USING THE ABS WARNING LIGHT .....	8-108
[B] DETAILED ABS MALFUNCTION CHECK .....	8-108
[B-1] THE ABS WARNING LIGHT DOES NOT COME ON .....	8-108
[B-2] THE ABS WARNING LIGHT REMAINS ON .....	8-108
[B-3] THE ABS WARNING LIGHT FLASHES .....	8-109
[B-4] MALFUNCTION CHECK BY THE ABS SELF DIAGNOSIS (PAST MALFUNCTION) .....	8-109
[B-5] MALFUNCTION CHECK BY THE ABS SELF DIAGNOSIS (PRESENT MALFUNCTION) .....	8-110
[C-5] DIAGNOSIS BY THE MALFUNCTION CODE .....	8-114
[D-6-4] DELETING THE MALFUNCTION CODE .....	8-128
[D-6-6] DELETE FUNCTION TEST .....	8-129
[D-6] FINAL CHECK .....	8-130
 <b>ELECTRICAL COMPONENTS</b> .....	 8-131
CHECKING THE SWITCHES .....	8-135
CHECKING THE BULBS AND BULB SOCKETS .....	8-138
CHECKING THE FUSES .....	8-139
CHECKING AND CHARGING THE BATTERY .....	8-140
CHECKING THE RELAYS .....	8-142
CHECKING THE ABS MOTOR RELAY .....	8-144
CHECKING THE SOLENOID VALVES AND MOTOR .....	8-145
CHECKING THE TURN SIGNAL/HAZARD RELAY .....	8-146
CHECKING THE RELAY UNIT (DIODE) .....	8-146
CHECKING THE IGNITION COILS .....	8-147
CHECKING THE CRANKSHAFT POSITION SENSOR .....	8-148
CHECKING THE LEAN ANGLE SENSOR .....	8-149
CHECKING THE WHEEL SENSOR .....	8-149
CHECKING THE STARTER MOTOR OPERATION .....	8-150
CHECKING THE STATOR COIL .....	8-150
CHECKING THE RECTIFIER/REGULATOR .....	8-150
CHECKING THE HORN .....	8-151
CHECKING THE FUEL SENDER .....	8-151
CHECKING THE SPEED SENSOR .....	8-152
CHECKING THE RADIATOR FAN MOTOR .....	8-152
CHECKING THE COOLANT TEMPERATURE SENSOR .....	8-152
CHECKING THE THROTTLE POSITION SENSOR .....	8-153
CHECKING THE SUB-THROTTLE POSITION SENSOR .....	8-154
CHECKING THE AIR INDUCTION SYSTEM SOLENOID .....	8-155
CHECKING THE ATMOSPHERIC PRESSURE SENSOR .....	8-155
CHECKING THE CYLINDER IDENTIFICATION SENSOR .....	8-156

---

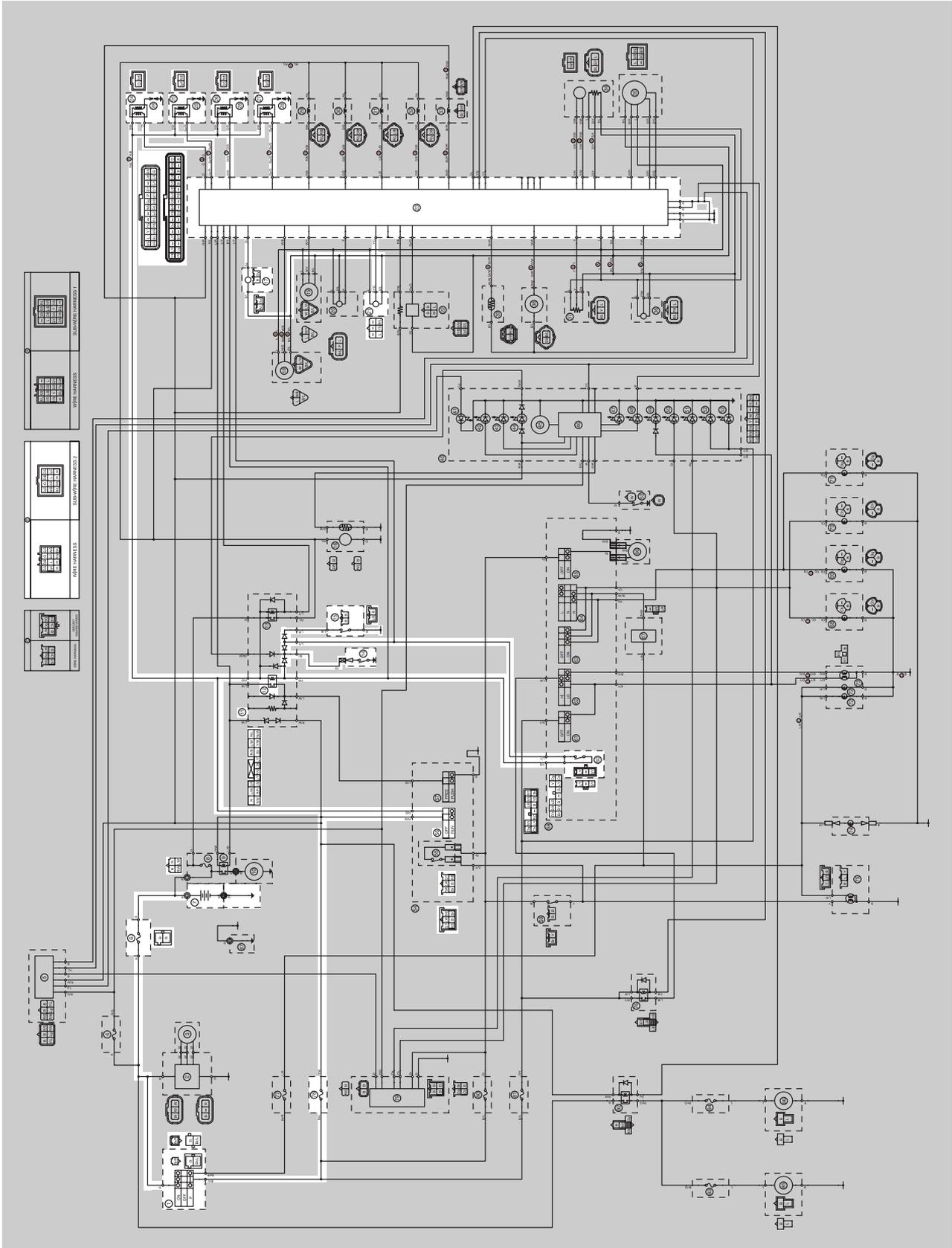
CHECKING THE INTAKE AIR PRESSURE SENSOR .....	8-156
CHECKING THE INTAKE AIR TEMPERATURE SENSOR .....	8-156

EAS27090

## IGNITION SYSTEM

EAS27110

## CIRCUIT DIAGRAM



# IGNITION SYSTEM

---

1. Main switch
6. Main fuse
7. Battery
11. Relay unit
12. Starting circuit cut-off relay
14. Neutral switch
15. Sidestand switch
17. Crankshaft position sensor
21. Lean angle sensor
23. ECU (engine control unit)
24. Ignition coil #1
25. Ignition coil #2
26. Ignition coil #3
27. Ignition coil #4
28. Spark plug
56. Engine stop switch
60. Clutch switch
78. Ignition fuse

# IGNITION SYSTEM

EAS27150

## TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

### NOTE:

• Before troubleshooting, remove the following part(s):

1. Rider and passenger seat
2. Fuel tank

1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 8-139.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-140.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3. Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-10.	NG→	Re-gap or replace the spark plugs.
OK↓		
4. Check the ignition spark gap. Refer to "CHECKING THE IGNI- TION COILS" on page 8-147.	OK→	Ignition system is OK.
NG↓		
5. Check the ignition coils. Refer to "CHECKING THE IGNI- TION COILS" on page 8-147.	NG→	Replace the ignition coils.
NG↓		
6. Check the crankshaft position sen- sor. Refer to "CHECKING THE CRANKSHAFT POSITION SEN- SOR" on page 8-148.	NG→	Replace the crankshaft position sen- sor
OK↓		
7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the immobilizer kit.
OK↓		

## IGNITION SYSTEM

8. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the right handlebar switch.
OK↓		
9. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the neutral switch.
OK↓		
10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the sidestand switch.
OK↓		
11. Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the clutch switch.
OK↓		
12. Check the starting circuit cut-off relay. Refer to "CHECKING THE RELAYS" on page 8-142.	NG→	Replace the relay unit.
OK↓		
13. Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-149.	NG→	Replace the lean angle sensor.
OK↓		
14. Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-1.	NG→	Properly connect or repair the ignition system's wiring
OK↓		
Replace the ECU		

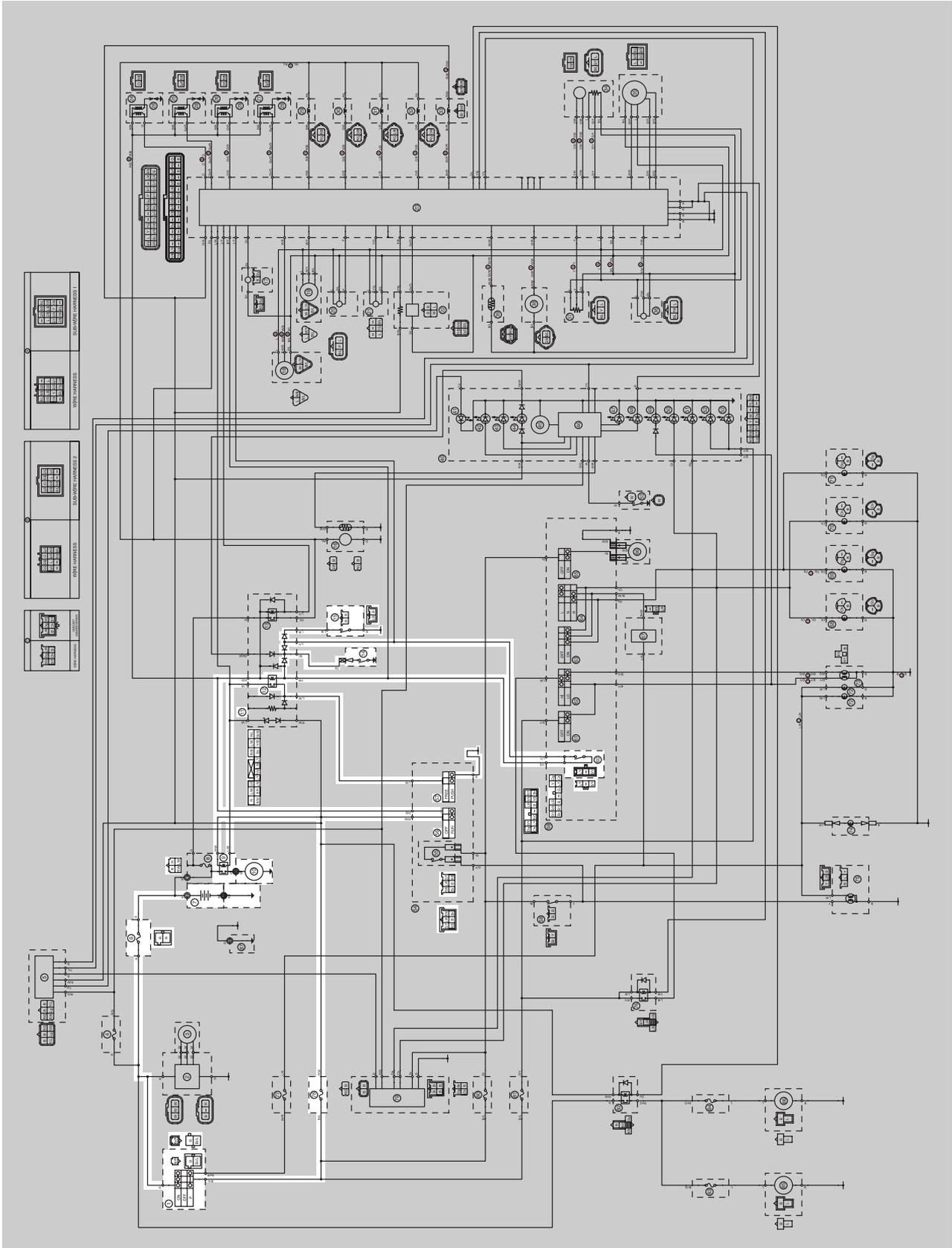
# ELECTRIC STARTING SYSTEM

EAS27160

## ELECTRIC STARTING SYSTEM

EAS27170

## CIRCUIT DIAGRAM



# ELECTRIC STARTING SYSTEM

---

- 1. Main switch
- 6. Main fuse
- 7. Battery
- 9. Starter relay
- 10. Starter motor
- 11. Relay unit
- 12. Starting circuit cut-off relay
- 14. Neutral switch
- 15. Sidestand switch
- 56. Engine stop switch
- 57. Start switch
- 60. Clutch switch
- 78. Ignition fuse

# ELECTRIC STARTING SYSTEM

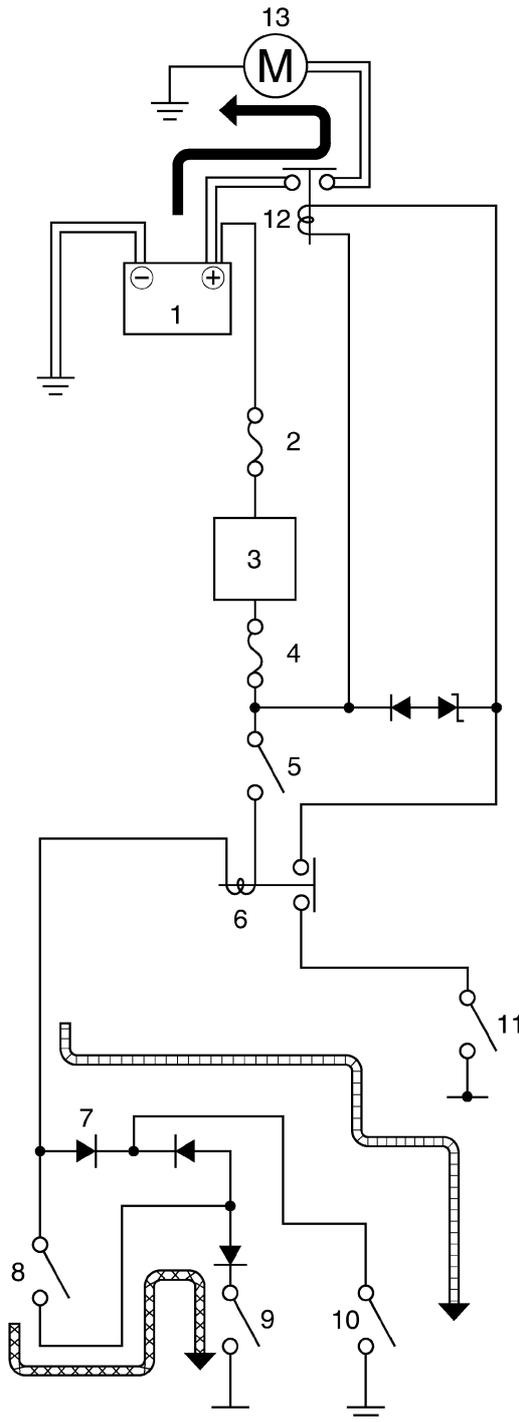
EAS27180

## STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the engine stop switch is set to “○” and the main switch is set to “ON” (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cut-off relay is closed and the engine can be started by pressing the starter switch.



# ELECTRIC STARTING SYSTEM

---

- a. WHEN THE TRANSMISSION IS IN NEUTRAL
- b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR

- 1. Battery
- 2. Main fuse
- 3. Main switch
- 4. Ignition fuse
- 5. Engine stop switch
- 6. Starting circuit cut-off relay
- 7. Diode
- 8. Clutch switch
- 9. Sidestand switch
- 10. Neutral switch
- 11. Start switch
- 12. Starter relay
- 13. Starter motor

# ELECTRIC STARTING SYSTEM

EAS27190

## TROUBLESHOOTING

The starter motor fails to turn.

### NOTE:

• Before troubleshooting, remove the following part(s):

1. Rider and passenger seat
2. Fuel tank
3. Air filter case

1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 8-139.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-140.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3. Check the starter motor operation. Refer to "CHECKING THE STARTER MOTOR OPERATION" on page 8-150.	NG→	Replace the starter motor.
OK↓		
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 8-142.	NG→	Replace the relay unit.
OK↓		
6. Check the relay unit (diode). Refer to "CHECKING THE RELAYS" on page 8-142.	NG→	Replace the relay unit.
OK↓		
7. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 8-142.	NG→	Replace the starter relay.
OK↓		

## ELECTRIC STARTING SYSTEM

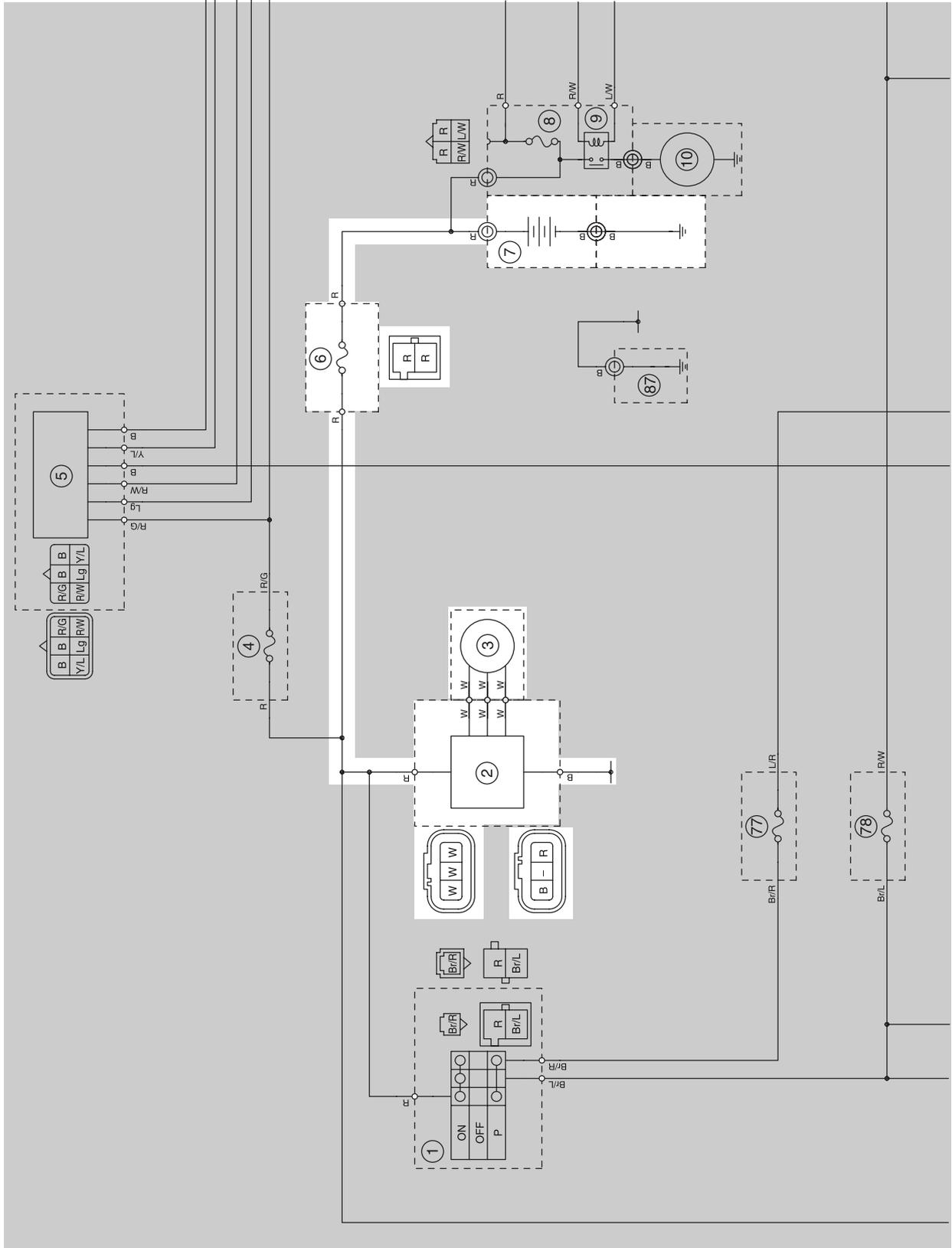
8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the immobilizer kit.
OK↓		
9. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the right handlebar switch.
OK↓		
10. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the neutral switch.
OK↓		
11. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the sidestand switch.
OK↓		
12. Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the clutch switch.
OK↓		
13. Check the start switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the right handlebar switch.
OK↓		
14. Check the entire starting system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-5.	NG→	Properly connect or repair the starting system's wiring
OK↓		
The starting system circuit is OK.		

EAS27200

## CHARGING SYSTEM

EAS27210

## CIRCUIT DIAGRAM



## CHARGING SYSTEM

---

2. Rectifier/regulator
3. AC magneto
6. Main fuse
7. Battery

# CHARGING SYSTEM

EAS27230

## TROUBLESHOOTING

The battery is not being charged.

### NOTE:

- Before troubleshooting, remove the following part(s):
  1. Rider and passenger seat

1. Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 8-139.	NG→	Replace the fuse.
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-140.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-150.	NG→	<ul style="list-style-type: none"><li>• Replace the stator assembly.</li></ul>
OK↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTI- FIER/REGULATOR" on page 8- 150.	NG→	Replace the rectifier/regulator.
OK↓		
5. Check the entire charging system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-11.	NG→	Properly connect or repair the charg- ing system's wiring.
OK↓		
This circuit is OK.		

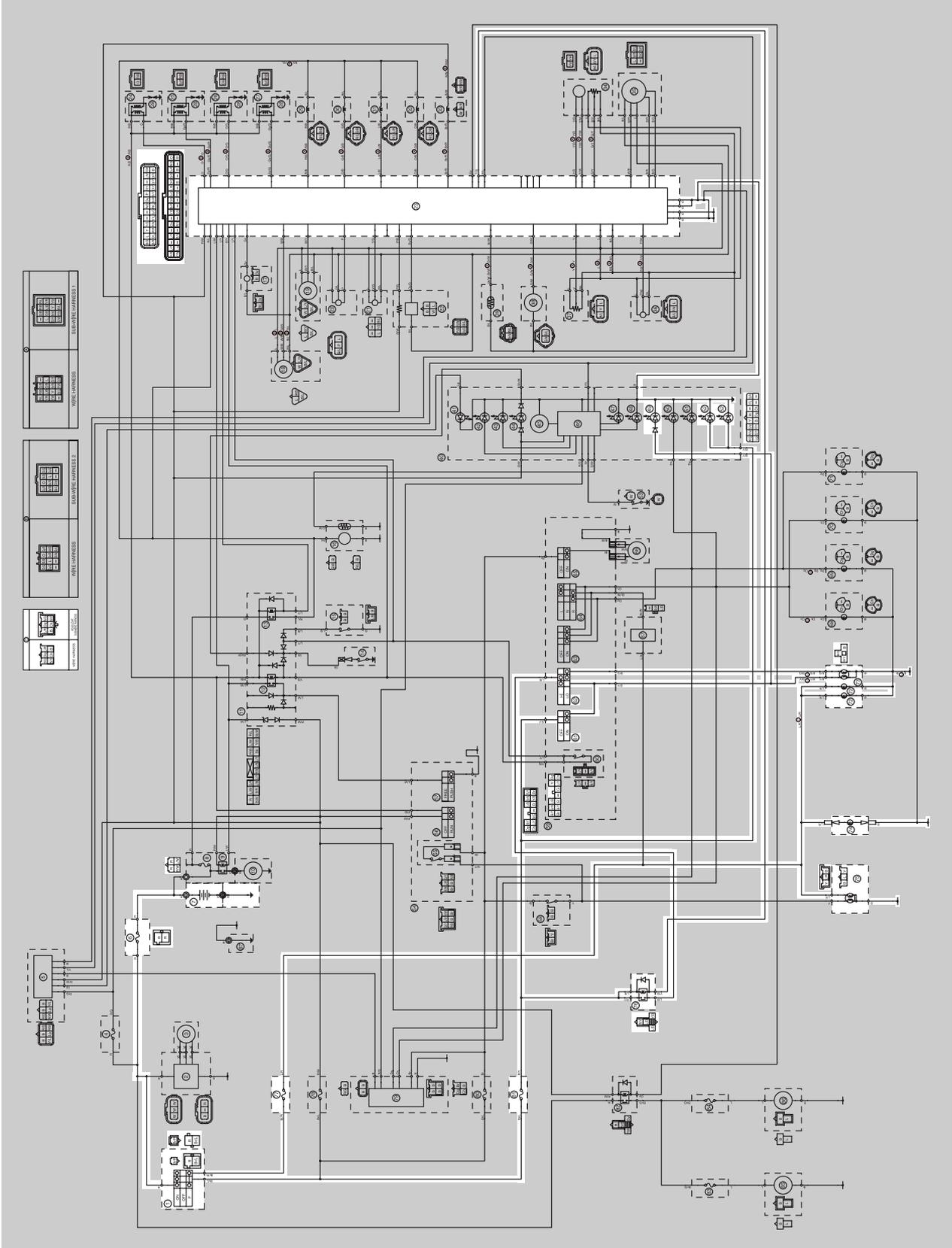


EAS27240

## LIGHTING SYSTEM

EAS27250

## CIRCUIT DIAGRAM (FZ1-N(X))

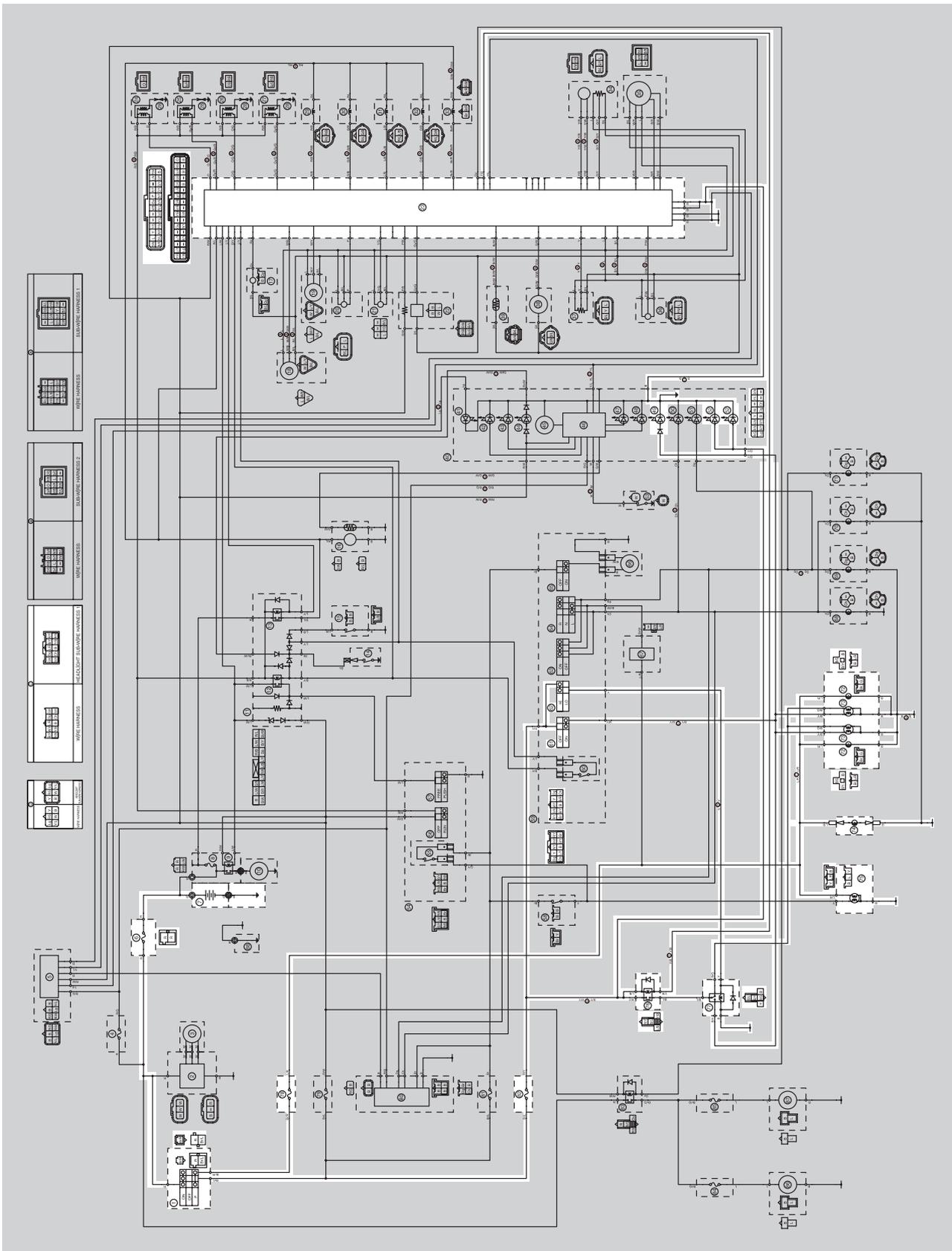


# LIGHTING SYSTEM

---

- 1. Main switch
- 6. Main fuse
- 7. Battery
- 23. ECU (engine control unit)
- 49. High beam indicator light
- 52. Meter light
- 61. Pass switch
- 62. Dimmer switch
- 72. Auxiliary light
- 73. Headlight
- 74. License plate light
- 75. Tail/brake light
- 76. Headlight relay (on/off)
- 77. Taillight fuse
- 81. Headlight fuse

EAS5D01027  
**CIRCUIT DIAGRAM (FZ1-S(X))**



# LIGHTING SYSTEM

---

- 1. Main switch
- 6. Main fuse
- 7. Battery
- 23. ECU (engine control unit)
- 49. High beam indicator light
- 52. Meter light
- 61. Pass switch
- 62. Dimmer switch
- 72. Auxiliary light
- 73. Headlight
- 74. License plate light
- 75. Tail/brake light
- 76. Headlight relay (on/off)
- 77. Headlight relay (dimmer)
- 78. Taillight fuse
- 82. Headlight fuse

# LIGHTING SYSTEM

EAS27260

## TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, license light or meter light.

### NOTE:

- Before troubleshooting, remove the following part(s):
  1. Rider and passenger seat
  2. Fuel tank
  3. Air filter case

1. Check the each bulbs and bulb sockets condition. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-138.	NG→	Replace the bulb(s) and bulb socket(s).
OK↓		
2. Check the fuses. (Main, headlight and tail/brake light) Refer to "CHECKING THE FUSES" on page 8-139.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-140.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the immobilizer kit.
OK↓		
5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	The dimmer switch is faulty. Replace the left handlebar switch.
OK↓		
6. Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	The pass switch is faulty. Replace the left handlebar switch.
OK↓		
7. Check the rear brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	The rear brake light switch is faulty. Replace the rear brake light switch.
OK↓		

## LIGHTING SYSTEM

8. Check the headlight relay (on/off).  
Refer to "CHECKING THE RELAYS" on page 8-142.

NG→

Replace the headlight relay.

OK↓

9. Check the headlight relay (dimmer)  
(FZ1-S(W)/FZ1-SA).  
Refer to "CHECKING THE RELAYS" on page 8-142.

NG→

Replace the headlight relay.

OK↓

10. Check the entire lighting system's  
wiring.  
Refer to "CIRCUIT DIAGRAM  
(FZ1-N(X))" on page 8-15.

NG→

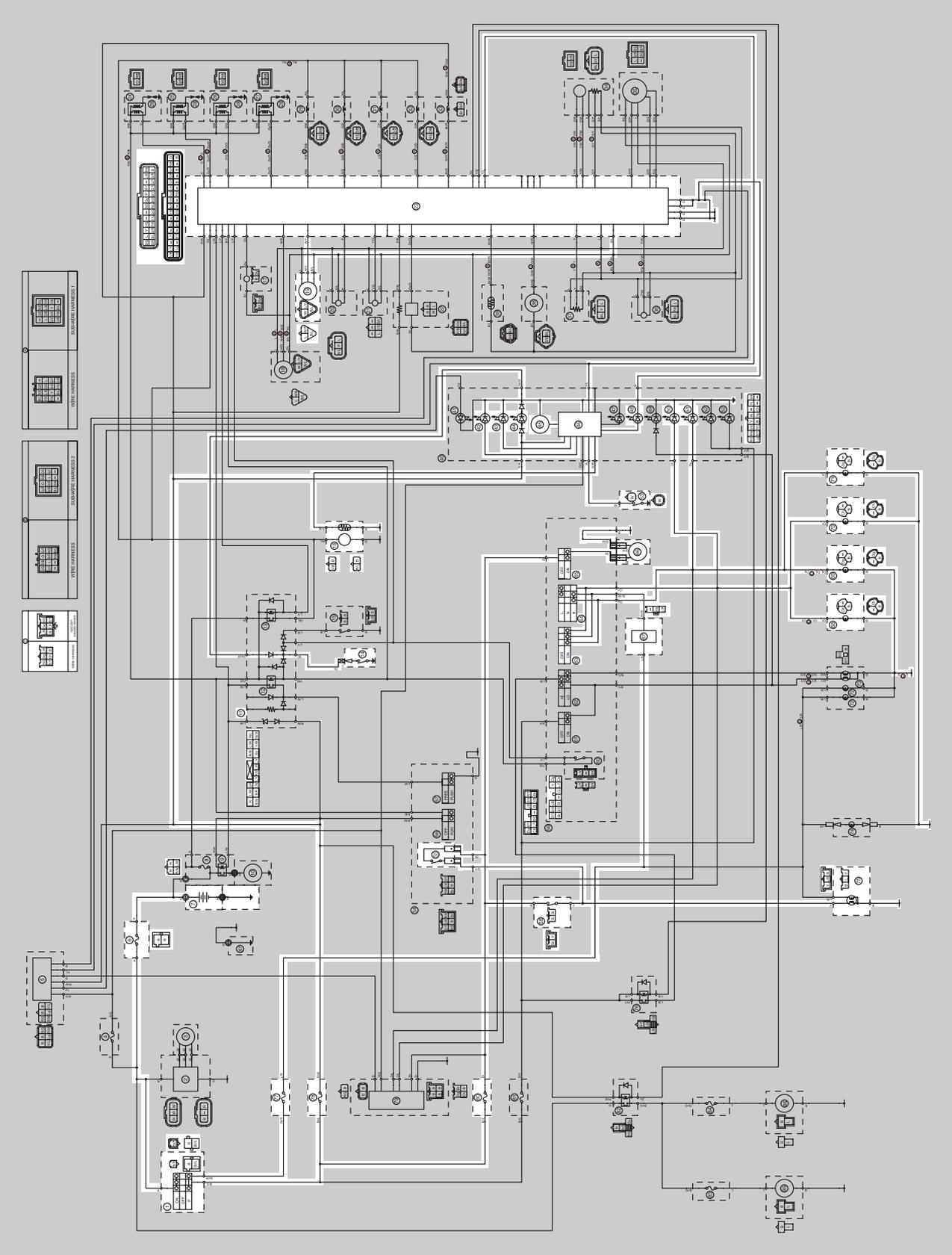
Properly connect or repair the lighting  
system's wiring.

OK↓

This circuit is OK.

EAS27270  
**SIGNALING SYSTEM**

EAS27280  
**CIRCUIT DIAGRAM**



# SIGNALING SYSTEM

---

1. Main switch
6. Main fuse
7. Battery
11. Relay unit
14. Neutral switch
16. Fuel pump
19. Speed sensor
23. ECU (engine control unit)
42. Fuel level warning light
43. Oil level warning light
44. Neutral indicator light
45. Tachometer
46. Multi-function meter
48. Coolant temperature indicator light
50. Left turn signal indicator light
51. Right turn signal indicator light
53. Oil level switch
55. Front brake light switch
58. Rear brake light switch
63. Hazard switch
64. Turn signal switch
65. Horn switch
66. Horn
67. Turn signal/hazard relay
68. Front left turn signal light
69. Front right turn signal light
70. Rear left turn signal light
71. Rear right turn signal light
75. Tail/brake light
77. Taillight fuse
78. Ignition fuse
80. Signal fuse

EAS27290

## TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.

### NOTE:

- Before troubleshooting, remove the following part(s):
1. Rider and passenger seat
  2. Fuel tank
  3. Air filter case

<p>1. Check the fuses. (Main, ignition, signal and tail/brake light) Refer to "CHECKING THE FUSES" on page 8-139.</p>	NG→	<p>Replace the fuse(s).</p>
OK↓		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-140.</p>	NG→	<ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul>
OK↓		
<p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-135.</p>	NG→	<p>Replace the immobilizer kit.</p>
OK↓		
<p>4. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.</p>	NG→	<p>Properly connect or repair the signaling system's wiring.</p>
OK↓		
<p>This circuit is OK.</p>		

### Check the signaling system

The horn fails to sound.

<p>1. Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 8-135.</p>	NG→	<p>Replace the left handlebar switch.</p>
OK↓		
<p>2. Check the horn. Refer to "CHECKING THE HORN" on page 8-151.</p>	NG→	<p>Replace the horn.</p>
OK↓		

# SIGNALING SYSTEM

3. Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG→

Properly connect or repair the signaling system wiring.

OK↓

This circuit is OK.

The tail/brake light fails to come on.

1. Check the tail/brake light bulb and socket.  
Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-138.

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 8-135.

NG→

Replace the front brake light switch.

OK↓

3. Check the rear brake light switch.  
Refer to "CHECKING THE SWITCHES" on page 8-135.

NG→

Replace the rear brake light switch.

OK↓

4. Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG→

Properly connect or repair the signaling system's wiring.

OK↓

This circuit is OK.

The turn signal light, turn signal indicator light or both fail to blink.

1. Check the turn signal bulb.  
Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-138.

NG→

Replace the turn signal bulb.

OK↓

2. Check the turn signal switch.  
Refer to "CHECKING THE SWITCHES" on page 8-135.

NG→

Replace the left handlebar switch.

OK↓

## SIGNALING SYSTEM

3. Check the hazard switch.  
Refer to "CHECKING THE SWITCHES" on page 8-135.

NG→

Replace the left handlebar switch.

OK↓

4. Check the turn signal/hazard relay.  
Refer to "CHECKING THE RELAYS" on page 8-142.

NG→

Replace the turn signal/hazard relay.

OK↓

5. Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG→

Properly connect or repair the signaling system's wiring.

OK↓

This circuit is OK.

The neutral indicator light fails to come on.

1. Check the neutral switch.  
Refer to "CHECKING THE SWITCHES" on page 8-135.

NG→

Replace the neutral switch.

OK↓

2. Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG→

Properly connect or repair the signaling system's wiring.

OK↓

This circuit is OK.

The oil level warning light fails to come on.

1. Check the oil level switch.  
Refer to "CHECKING THE SWITCHES" on page 8-135.

NG→

Replace the oil level switch.

OK↓

## SIGNALING SYSTEM

2. Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG→

Properly connect or repair the signaling system's wiring.

OK↓

This circuit is OK.

The fuel level warning light fails to come on.

1. Check the fuel sender.  
Refer to "CHECKING THE FUEL SENDER" on page 8-151.

NG→

Replace the fuel pump assembly.

OK↓

2. Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG→

Properly connect or repair the signaling system's wiring.

OK↓

This circuit is OK.

The speedometer fails to operate.

1. Check the speed sensor.  
Refer to "CHECKING THE SPEED SENSOR" on page 8-152.

NG→

Replace the speed sensor.

OK↓

2. Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG→

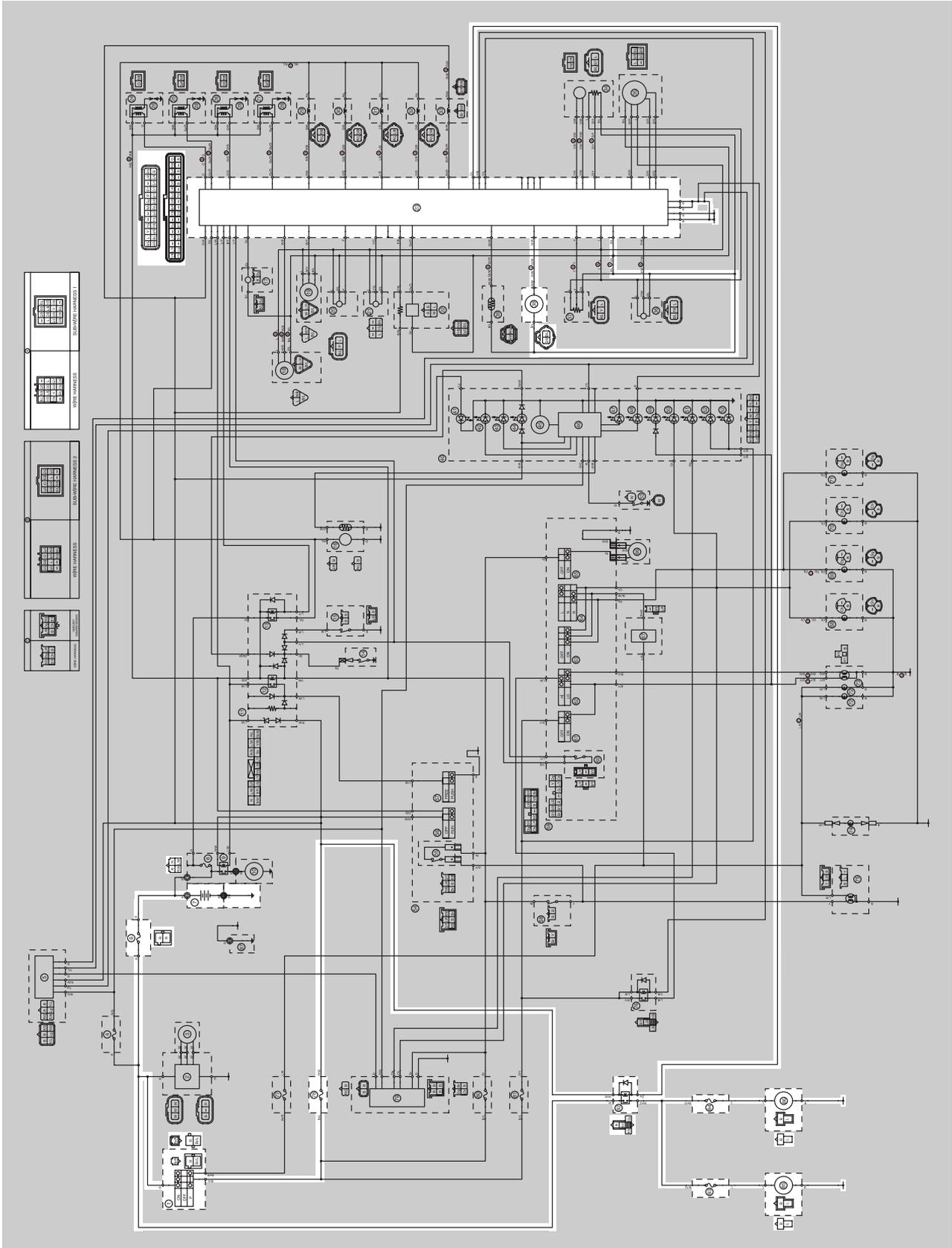
Properly connect or repair the signaling system's wiring.

OK↓

Replace the meter assembly.

EAS27300  
**COOLING SYSTEM**

EAS27310  
**CIRCUIT DIAGRAM**



# COOLING SYSTEM

---

- 1. Main switch
- 6. Main fuse
- 7. Battery
- 23. ECU (engine control unit)
- 38. Coolant temperature sensor
- 78. Ignition fuse
- 82. Radiator fan motor relay
- 83. Left radiator fan motor fuse
- 84. Right radiator fan motor fuse
- 85. Left radiator fan motor
- 86. Right radiator fan motor

# COOLING SYSTEM

EAS27320

## TROUBLESHOOTING

### NOTE:

- Before troubleshooting, remove the following part(s):
  1. Rider and passenger seat
  2. Fuel tank
  3. Air filter case

1. Check the fuses. (Main, ignition and radiator fan motor) Refer to "CHECKING THE FUSES" on page 8-139.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-140.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the immobilizer kit.
OK↓		
4. Check the radiator fan motor (left and right). Refer to "CHECKING THE RADIATOR FAN MOTOR" on page 8-152.	NG→	The radiator fan motor is faulty and must be replaced.
OK↓		
5. Check the radiator fan motor relay. Refer to "CHECKING THE RELAYS" on page 8-142.	NG→	Replace the radiator fan motor relay.
OK↓		
6. Check the coolant temperature. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-152.	NG→	Replace the coolant temperature sensor.
OK↓		
7. Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-27.	NG→	Properly connect or repair the cooling system's wiring.
OK↓		
This circuit is OK.		

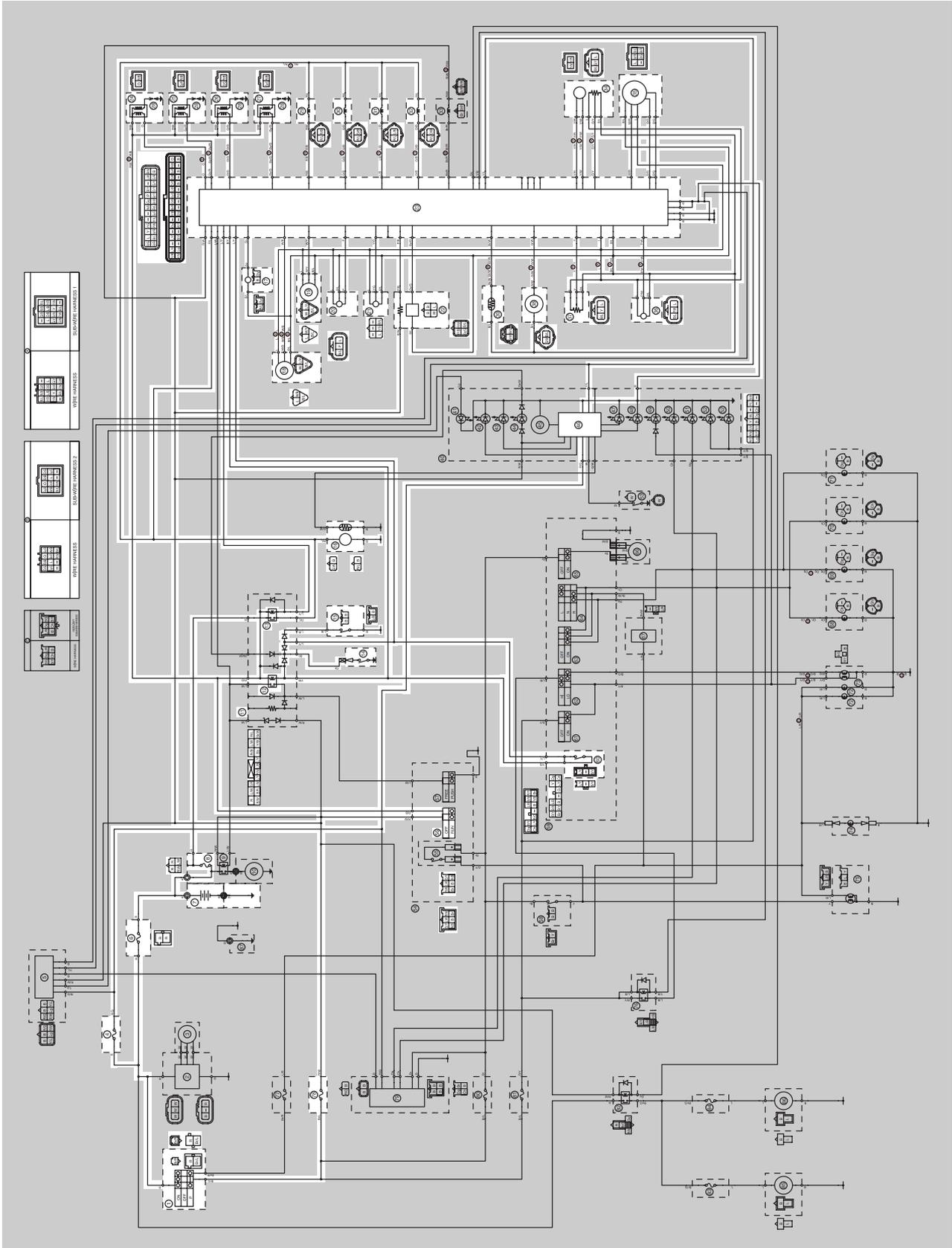


EAS27330

## FUEL INJECTION SYSTEM

EAS27340

## CIRCUIT DIAGRAM



# FUEL INJECTION SYSTEM

---

1. Main switch
4. Backup fuse
6. Main fuse
7. Battery
8. Fuel injection system fuse
11. Relay unit
12. Starting circuit cut-off relay
13. Fuel pump relay
14. Neutral switch
15. Sidestand switch
16. Fuel pump
17. Crankshaft position sensor
18. Cylinder identification sensor
19. Speed sensor
20. Atmospheric pressure sensor
21. Lean angle sensor
22. O<sub>2</sub> sensor
23. ECU (engine control unit)
24. Ignition coil #1
25. Ignition coil #2
26. Ignition coil #3
27. Ignition coil #4
28. Spark plug
29. Injector #1
30. Injector #2
31. Injector #3
32. Injector #4
34. Sub-throttle position sensor
35. EXUP servo motor
36. Intake air pressure sensor
37. Throttle position sensor
38. Coolant temperature sensor
39. Air temperature sensor
46. Multi-function meter
56. Engine stop switch
78. Ignition fuse

# FUEL INJECTION SYSTEM

EAS27370

## TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

### NOTE:

• Before troubleshooting, remove the following part(s):

1. Rider and passenger seat
2. Fuel tank
3. Air filter case

1. Check the fuses. (Main, backup, fuel injection and ignition) Refer to "CHECKING THE FUSES" on page 8-139.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-140.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3. Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-10.	NG→	Re-gap or replace the spark plugs.
OK↓		
4. Check the ignition coils. Refer to "CHECKING THE IGNITION COILS" on page 8-147.	NG→	Replace the ignition coils.
OK↓		
5. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-148.	NG→	Replace the crankshaft position sensor.
OK↓		
6. Check the relay unit (fuel pump relay). Refer to "CHECKING THE RELAYS" on page 8-142.	NG→	Replace the relay unit.
OK↓		
7. Check the fuel pump. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the fuel pump.
OK↓		

## FUEL INJECTION SYSTEM

8. Check the main switch.  
Refer to "CHECKING THE SWITCHES" on page 8-135.

NG→

Replace the immobilizer kit.

OK↓

9. Check the engine stop switch.  
Refer to "CHECKING THE SWITCHES" on page 8-135.

NG→

Replace the right handlebar switch.

OK↓

10. Check the neutral switch.  
Refer to "CHECKING THE SWITCHES" on page 8-135.

NG→

Replace the neutral switch.

OK↓

11. Check the sidestand switch.  
Refer to "CHECKING THE SWITCHES" on page 8-135.

NG→

Replace the sidestand switch.

OK↓

12. Check the clutch switch.  
Refer to "CHECKING THE SWITCHES" on page 8-135.

NG→

Replace the clutch switch.

OK↓

13. Check the relay unit (starting circuit cut-off relay).  
Refer to "CHECKING THE RELAYS" on page 8-142.

NG→

Replace the relay unit.

OK↓

14. Check the lean angle sensor.  
Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-149.

NG→

Replace the lean angle sensor.

OK↓

15. Check the cylinder identification sensor.  
Refer to "CHECKING THE CYLINDER IDENTIFICATION SENSOR" on page 8-156.

NG→

Replace the cylinder identification sensor.

OK↓

16. Check the speed sensor.  
Refer to "CHECKING THE SPEED SENSOR" on page 8-152.

NG→

Replace the speed sensor.

OK↓

# FUEL INJECTION SYSTEM

17. Checking the atmospheric pressure sensor.  
Refer to "CHECKING THE ATMOSPHERIC PRESSURE SENSOR" on page 8-155.

OK↓

NG→

Replace the atmospheric pressure sensor.

18. Check the injector.  
Refer to "CHECKING THE INJECTORS" on page 7-7.

OK↓

NG→

Replace the injector.

19. Check the throttle position sensor.  
Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-153.

OK↓

NG→

Replace the throttle position sensor.

20. Check the sub-throttle position sensor.  
Refer to "CHECKING THE SUBTHROTTLE POSITION SENSOR" on page 8-154.

OK↓

NG→

Replace the sub-throttle position sensor.

21. Check the intake air pressure sensor.  
Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-156.

OK↓

NG→

Replace the intake air pressure sensor

22. Check the coolant temperature sensor.  
Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-152.

OK↓

NG→

Replace the coolant temperature sensor.

23. Check the intake air temperature sensor.  
Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-156.

OK↓

NG→

Replace the intake air temperature sensor.

## FUEL INJECTION SYSTEM

---

24. Check the entire ignition system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-1.

OK↓

Replace the ECU.

NG→

Properly connect or repair the ignition system's wiring

# FUEL INJECTION SYSTEM

EAS27350

## ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, the ECU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the odometer/tripmeter/fuel reserve tripmeter LCD. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

### Engine trouble warning light indication and FI system operation

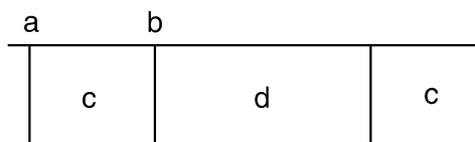
Warning light indication	ECU operation	FI operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Can or cannot be operated depending on the fault code

\* The warning light flashes when any one of the conditions listed below is present and the start switch is pushed:

11: Cylinder identification sensor	30: Lean angle sensor (latch up detected)
12: Crankshaft position sensor	41: Lean angle sensor (open or short-circuit)
19: Sidestand switch (open circuit in the wire to the ECU)	50: ECU internal malfunction (faulty ECU memory)

### Checking the engine trouble warning light

The engine trouble warning light comes on for 1.4 seconds after the main switch has been turned to "ON" and it comes on while the start switch is being pushed. If the warning light does not come on under these conditions, the warning light (LED) may be defective.



# FUEL INJECTION SYSTEM

- a. Main switch "OFF"
- b. Main switch "ON"
- c. Engine trouble warning light off
- d. Engine trouble warning light on for 1.4 seconds

EAS27362

## SELF-DIAGNOSTIC FUNCTION TABLE

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue to operate or stop operating, depending on the conditions.

### Self-Diagnostic Function table

Fault code No.	Item	Symptom	Able/unable to start	Able/unable to drive
11	Cylinder identification sensor	No normal signals are received from the cylinder identification sensor when the engine is started or while the vehicle is being driven.	Unable	Able
12	Crankshaft position sensor	No normal signals are received from the crankshaft position sensor.	Unable	Unable
13	Intake air pressure sensor (open or short circuit)	Intake air pressure sensor: open or short circuit detected.	Able	Able
14	Intake air pressure sensor hose line (piping system)	Intake air pressure sensor: faulty intake air pressure sensor system.	Able	Able
15	Throttle position sensor (open or short circuit)	Throttle position sensor: open or short circuit detected.	Able	Able
16	Throttle position sensor (stuck)	Throttle position sensor is stuck.	Able	Able
17	EXUP servo motor potention circuit (open or short circuit)	EXUP servo motor potention circuit: open or short circuit detected.	Able	Able
18	EXUP servo motor (stuck)	EXUP servo motor is stuck.	Able	Able
19	Sidestand switch (open circuit in the wire to the ECU)	Open circuit in the input line of ECU No.24 terminal is detected when start switch is pressed from the sidestand switch to the ECU.	Unable	Unable
20	Intake air pressure sensor or atmospheric pressure sensor	When the main switch is turned to "ON", the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly.	Able	Able

## FUEL INJECTION SYSTEM

Fault code No.	Item	Symptom	Able/ unable to start	Able/ unable to drive
21	Coolant temperature sensor (open or short circuit)	Coolant temperature sensor: open or short circuit detected.	Able	Able
22	Intake air temperature sensor (open or short circuit)	Intake air temperature sensor: open or short circuit detected.	Able	Able
23	Atmospheric pressure sensor (open or short circuit)	Atmospheric pressure sensor: open or short circuit detected.	Able	Able
24	O <sub>2</sub> sensor	No normal signal is received from the O <sub>2</sub> sensor.	Able	Able
30	Lean angle sensor (latch up detected)	No normal signal is received from the lean angle sensor.	Unable	Unable
33	Cylinder-#1 ignition coil (open circuit)	Primary lead of the cylinder-#1 ignition coil: open circuit detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
34	Cylinder-#2 ignition coil (open circuit)	Primary lead of the cylinder-#2 ignition coil: open circuit detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
35	Cylinder-#3 ignition coil (open circuit)	Primary lead of the cylinder-#3 ignition coil: open circuit detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
36	Cylinder-#4 ignition coil (open circuit)	Primary lead of the cylinder-#4 ignition coil: open circuit detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)

## FUEL INJECTION SYSTEM

Fault code No.	Item	Symptom	Able/ unable to start	Able/ unable to drive
39	Injector (open circuit)	Injector: open circuit detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
41	Lean angle sensor (open or short-circuit)	Lean angle sensor: open or short circuit detected.	Unable	Unable
42	Speed sensor	No normal signals are received from the speed sensor.	Able	Able
	Neutral switch	Neutral switch: open or short circuit detected.		
43	Fuel system voltage (monitoring voltage)	Power supply to the injectors and the fuel pump is not normal.	Able	Able
44	Error in writing the amount of CO adjustment on EEPROM	An error is detected while reading or writing on EEPROM (CO adjustment value).	Able	Able
46	Vehicle system power supply (monitoring voltage)	Power supply to the fuel injection system is not normal.	Able	Able
47	Sub-throttle servo motor potention (open or short circuit)	sub-throttle servo motor potention: open or short circuit detected.	Able	Able
48	Sub-throttle servo motor (lock)	A lock of the sub-throttle servo motor is detected.	Able	Able
50	ECU internal malfunction (memory check error)	ECU memory is faulty. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	Unable	Unable
-	Start unable warning	Relay is not turned ON even if the crank signal is input while the start switch is turned ON. When the start switch is turned ON while an error is detected with the fault code of No.11, 12, 19, 30, 41 or 50.	Unable	Unable

### Communication error with the meter

Fault code No.	Item	Symptom	Able/ unable to start	Able/ unable to drive
Er-1	ECU internal malfunction (output signal error)	No signals are received from the ECU.	Unable	Unable

# FUEL INJECTION SYSTEM

Fault code No.	Item	Symptom	Able/ unable to start	Able/ unable to drive
Er-2	ECU internal malfunction (output signal error)	No signals are received from the ECU within the specified duration.	Unable	Unable
Er-3	ECU internal malfunction (output signal error)	Data from the ECU cannot be received correctly.	Unable	Unable
Er-4	ECU internal malfunction (input signal error)	Non-registered data has been received from the meter.	Unable	Unable

EAS27400

## TROUBLESHOOTING METHOD

**The engine operation is not normal and the engine trouble warning light comes on.**

- Check:
  - Fault code number



- Check the fault code number displayed on the meter.
- Identify the faulty system with the fault code. Refer to "Self-Diagnostic Function table".
- Identify the probable cause of malfunction. Refer to "Diagnostic code table".



- Checking and repair the probable cause of malfunction.

Fault code No.	Fault code No.
Check and repair. Refer to "TROUBLESHOOTING DETAILS" on page 8-50. Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to "Sensor operation table" and "Actuator operation table".	Check and repair. Refer to Self-Diagnostic Function table.

- Perform ECU reinstatement action. Refer to "Reinstatement method" of table in "TROUBLESHOOTING DETAILS".
- Turn the main switch to "OFF" and back to "ON", then check that no fault code number is displayed.

**NOTE:** \_\_\_\_\_

If fault codes are displayed, repeat steps (1) to (4) until no fault code number is displayed.

- Erase the malfunction history in the diagnostic mode. Refer to "Sensor operation table (Diagnostic code No.62)".

**NOTE:** \_\_\_\_\_

Turning the main switch to "OFF" will not erase the malfunction history.

**The engine operation is not normal but the engine trouble warning light does not come on.**

- Check the operation of following sensors and actuators in the Diagnostic mode. Refer to "Sensor operation table" and "Actuator operation table".

01: Throttle position sensor (throttle angle)
02: Atmospheric pressure sensor
05: Intake air pressure sensor
06: Coolant temperature sensor
07: Vehicle speed pulse
09: Fuel system voltage (battery bolt)
21: Neutral switch
30: Ignition coil #1
31: Ignition coil #2
32: Ignition coil #3
33: Ignition coil #4
36: Injector #1
37: Injector #2
38: Injector #3
39: Injector #4
48: AI system solenoid
53: EXUP servo motor
56: Sub-throttle servo motor

# FUEL INJECTION SYSTEM

If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.

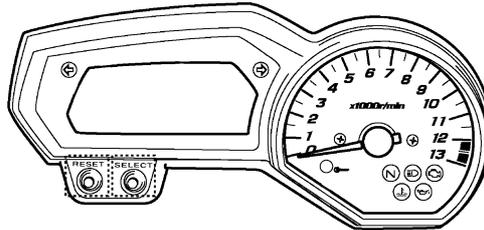
If no malfunction is detected in the sensors and actuators, check and repair inner parts of the engine.

EAS27420

## DIAGNOSTIC MODE

Setting the diagnostic mode

1. Turn the main switch to “OFF” and set the engine stop switch to “○”.
2. Disconnect the wire harness coupler from the fuel pump.
3. Press and hold the “SELECT” and “RESET” buttons, turn the main switch to “ON”, and continue to press the buttons for 8 seconds or more.



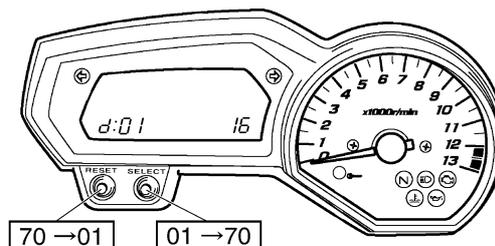
### NOTE:

- All displays on the meter disappear except the odometer/tripmeter/fuel reserve tripmeter display.
- “dl” appears on the odometer/tripmeter/fuel reserve tripmeter LCD.

4. Press the “SELECT” button to select the diagnostic mode “dl”.
5. After selecting “dl”, simultaneously press the “SELECT” and “RESET” buttons for 2 seconds or more to activate the diagnostic mode. The diagnostic code number “d01” appears on the clock LCD.
6. Set the engine stop switch to “⊗”.
7. Select the diagnostic code number corresponding to the fault code number by pressing the “SELECT” and “RESET” buttons.

### NOTE:

- The diagnostic code number appears on the LCD meter (d01–70).
- To decrease the selected diagnostic code number, press the “RESET” button. Press the “RESET” button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the “SELECT” button. Press the “SELECT” button for 1 second or longer to automatically increase the diagnostic code numbers.



8. Verify the operation of the sensor or actuator.
  - Sensor operation

# FUEL INJECTION SYSTEM

The data representing the operating conditions of the sensor appears on the odometer/ tripmeter/fuel reserve tripmeter LCD.

- Actuator operation

Set the engine stop switch to “○” to operate the actuator.

**NOTE:**

If the engine stop switch is set to “○”, set it to “⊗”, and then set it to “○” again.

9. Turn the main switch to “OFF” to cancel the diagnostic mode.

**Fault code table**

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
11	<ul style="list-style-type: none"> <li>• No normal signals are received from the cylinder identification sensor when the engine is started or while the vehicle is being driven.</li> </ul>	<ul style="list-style-type: none"> <li>• Open or short circuit in sub wire harness.</li> <li>• Open or short circuit in wire harness.</li> <li>• Defective cylinder identification sensor.</li> <li>• Improperly installed sensor.</li> <li>• Malfunction in ECU.</li> </ul>	—
12	No normal signals are received from the crankshaft position sensor.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective crankshaft position sensor.</li> <li>• Malfunction in pickup rotor.</li> <li>• Improperly installed sensor.</li> <li>• Malfunction in ECU.</li> </ul>	—
13	Intake air pressure sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Open or short circuit in sub wire harness.</li> <li>• Defective intake air pressure sensor.</li> <li>• Malfunction in ECU.</li> </ul>	03
14	Intake air pressure sensor: faulty intake air pressure sensor system.	<ul style="list-style-type: none"> <li>• Intake air pressure sensor hose is detached, clogged, kinked, or pinched.</li> <li>• Malfunction in ECU.</li> </ul>	03
15	Throttle position sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Open or short circuit in sub wire harness.</li> <li>• Defective throttle position sensor.</li> <li>• Improperly installed throttle position sensor.</li> <li>• Malfunction in ECU.</li> </ul>	01
16	Throttle position sensor: stuck	<ul style="list-style-type: none"> <li>• Stuck throttle position sensor.</li> <li>• Malfunction in ECU.</li> </ul>	01
17	EXUP servo motor potentiation circuit: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in sub wire harness.</li> <li>• Defective EXUP servo motor (potentiation circuit).</li> </ul>	53
18	EXUP servo motor is stuck.	<ul style="list-style-type: none"> <li>• Open or short circuit in sub wire harness.</li> <li>• Stuck EXUP servo motor (mechanism).</li> <li>• Stuck EXUP servo motor (motor).</li> </ul>	53
19	Open circuit is detected in the input line of ECU No.24 terminal is detected when the start switch is pressed.	<ul style="list-style-type: none"> <li>• Open circuit in wire harness (ECU Coupler).</li> <li>• Malfunction in ECU.</li> </ul>	20

## FUEL INJECTION SYSTEM

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
20	When the main switch is turned to "ON", the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly.	<ul style="list-style-type: none"> <li>• Atmospheric pressure sensor hose is clogged.</li> <li>• Intake air pressure sensor hose is clogged, kinked, or pinched.</li> <li>• Malfunction of the atmospheric pressure sensor in the intermediate electrical potential.</li> <li>• Malfunction of the intake air pressure sensor in the intermediate electrical potential.</li> <li>• Malfunction in ECU.</li> </ul>	02 03
21	Coolant temperature sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective coolant temperature sensor.</li> <li>• Improperly installed coolant temperature sensor.</li> <li>• Malfunction in ECU.</li> </ul>	06
22	Intake air temperature sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective intake air temperature sensor.</li> <li>• Improperly installed intake air temperature sensor.</li> <li>• Malfunction in ECU.</li> </ul>	05
23	Atmospheric pressure sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in sub wire harness.</li> <li>• Defective atmospheric pressure sensor.</li> <li>• Improperly installed atmospheric pressure sensor.</li> <li>• Malfunction in ECU.</li> </ul>	02
24	No normal signal is received from the O <sub>2</sub> sensor.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective O<sub>2</sub> sensor.</li> <li>• Improperly installed O<sub>2</sub> sensor.</li> <li>• Malfunction in ECU.</li> </ul>	—
30	No normal signal is received from the lean angle sensor.	<ul style="list-style-type: none"> <li>• Vehicle has overturned.</li> <li>• Defective lean angle sensor.</li> <li>• Improperly installed lean angle sensor.</li> <li>• Malfunction in ECU.</li> </ul>	08
33	Open circuit detected in the primary lead of the cylinder-#1 ignition coil.	<ul style="list-style-type: none"> <li>• Open circuit in wire harness.</li> <li>• Malfunction in ignition coil.</li> <li>• Malfunction in a component of ignition cut-off circuit system.</li> <li>• Malfunction in ECU.</li> </ul>	30
34	Open circuit detected in the primary lead of the cylinder-#2 ignition coil.	<ul style="list-style-type: none"> <li>• Open circuit in wire harness.</li> <li>• Malfunction in ignition coil.</li> <li>• Malfunction in a component of ignition cut-off circuit system.</li> <li>• Malfunction in ECU.</li> </ul>	31
35	Open circuit detected in the primary lead of the cylinder-#3 ignition coil.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Malfunction in ignition coil.</li> <li>• Malfunction in a component of ignition cut-off circuit system.</li> <li>• Malfunction in ECU.</li> </ul>	32

## FUEL INJECTION SYSTEM

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
36	Open circuit detected in the primary lead of the cylinder-#4 ignition coil.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Malfunction in ignition coil.</li> <li>• Malfunction in a component of ignition cut-off circuit system.</li> <li>• Malfunction in ECU.</li> </ul>	33
39	Open circuit detected in a injector.	<ul style="list-style-type: none"> <li>• Open or short circuit sub-wire- harness.</li> <li>• Open or short circuit in wire harness.</li> <li>• Improperly installed injector.</li> <li>• Defective injector.</li> </ul>	36 37 38 39
41	Lean angle sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective lean angle sensor.</li> <li>• Malfunction in ECU.</li> </ul>	08
42	No normal signals are received from the speed sensor.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Malfunction in speed sensor.</li> <li>• Malfunction in ECU.</li> </ul>	07
	Neutral switch: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Malfunction in neutral switch.</li> <li>• Malfunction in ECU.</li> </ul>	21
43	Power supply to the injectors and the fuel pump is not normal.	<ul style="list-style-type: none"> <li>• Open circuit in wire harness.</li> <li>• Malfunction in ECU.</li> </ul>	09
44	An error is detected while reading or writing on EEPROM (CO adjustment value).	<ul style="list-style-type: none"> <li>• Malfunction in ECU. (The CO adjustment value is not properly written on or read from the internal memory).</li> </ul>	60
46	Power supply to the fuel injection system relay is not normal.	<ul style="list-style-type: none"> <li>• Malfunction in the charging system. Refer to "CHARGING SYSTEM" on page 8-11.</li> </ul>	—
47	Sub-throttle servo motor potentiation circuit: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective Sub-throttle servo motor (potentiation circuit).</li> </ul>	56
48	Sub-throttle servo motor is stuck.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Stuck Sub-throttle servo motor (mechanism).</li> <li>• Stuck Sub-throttle servo motor (motor).</li> </ul>	56
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	<ul style="list-style-type: none"> <li>• Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.)</li> </ul>	—
Er-1	No signals are received from the ECU.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Malfunction in meter.</li> <li>• Defective wire connection of the ECU coupler.</li> <li>• Malfunction in ECU.</li> </ul>	—

## FUEL INJECTION SYSTEM

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
Er-2	No signals are received from the ECU within the specified duration.	<ul style="list-style-type: none"> <li>• Improper connection in wire harness.</li> <li>• Malfunction in meter.</li> <li>• Malfunction in ECU.</li> </ul>	—
Er-3	Data from the ECU cannot be received correctly.	<ul style="list-style-type: none"> <li>• Improper connection in wire harness.</li> <li>• Malfunction in meter.</li> <li>• Malfunction in ECU.</li> </ul>	—
Er-4	Non-registered data has been received from the meter.	<ul style="list-style-type: none"> <li>• Improper connection in wire harness.</li> <li>• Malfunction in meter.</li> <li>• Malfunction in ECU.</li> </ul>	—

**Sensor operation table**

Diagnostic code No.	Item	Meter display	Checking method
01	Throttle position sensor signal <ul style="list-style-type: none"> <li>• Fully closed position</li> <li>• Fully opened position</li> </ul>	15–18  95–100	Check with throttle valve fully closed.  Check with throttle valve fully opened.
02	Atmospheric pressure	Displays the atmospheric pressure.	Compare the actually measured atmospheric pressure with the meter display value.
03	Intake air pressure	Displays the cylinder-#1 intake air pressure.	Set the engine stop switch to “○” then operate the throttle while pushing the start switch “⊗”. (If the display value changes, the performance is OK.)
05	Intake air temperature	Displays the intake air temperature.	Compare the actually measured air temperature with the meter display value.
06	Coolant temperature	Displays the coolant temperature.	Compare the actually measured coolant temperature with the meter display value.
07	Vehicle 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 <ul style="list-style-type: none"> <li>• Upright</li> <li>• Overturned</li> </ul>	0.4–1.4 3.7–4.4	Remove the lean angle sensor and incline it more than 65 degrees.

## FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Meter display	Checking method
09	Fuel system voltage (battery voltage)	Approximately 12.0	Set the engine stop switch to “○” and then compare with the actually measured battery voltage. (If the battery voltage is lower, recharge the battery.)
20	Sidestand switch <ul style="list-style-type: none"> <li>• Stand retracted</li> <li>• Stand extended</li> </ul>	ON OFF	Set ON/OFF the sidestand switch (with the transmission in gear).
21	Neutral switch <ul style="list-style-type: none"> <li>• Neutral</li> <li>• In gear</li> </ul>	ON OFF	Set ON/OFF the neutral switch (shift the transmission).
60	EEPROM fault cylinder No <ul style="list-style-type: none"> <li>• No fault</li> <li>• Fault detected</li> </ul>	00 01–04 (fault cylinder No.) <ul style="list-style-type: none"> <li>• (If more than one cylinder is defective, the display changes every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats.)</li> </ul>	—
61	Malfunction history code <ul style="list-style-type: none"> <li>• No history</li> <li>• History exists</li> </ul>	00 Fault codes 11–50 <ul style="list-style-type: none"> <li>• (If more than one code number is detected, the display changes every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats.)</li> </ul>	—
62	Malfunction history code erasure <ul style="list-style-type: none"> <li>• No history</li> <li>• History exists</li> </ul>	00 Fault codes 01-28 <ul style="list-style-type: none"> <li>• (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.)</li> </ul>	—  To erase the history, set the engine stop switch to “○”.

## FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Meter display	Checking method
63	Malfunction code reinstate • No malfunction code • Malfunction code exists	00 Fault code 24 • (If more than one code number is detected, the display changes every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats.)	—
			To reinstate, set the engine stop switch to “○”.
70	Control number	0–255	—

### Actuator operation table

Diagnostic code No.	Item	Actuation	Checking method
30	Cylinder-#1 ignition coil	Actuates the cylinder-#1 ignition coil five times at one second intervals. Illuminates the engine trouble warning light.	Check the spark five times. • 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 the spark five times. • 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 the spark five times. • 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 the spark five times. • Connect an ignition checker.
36	Injector #1	Actuates the injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #1 five times.
37	Injector #2	Actuates the injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #2 five times.

## FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Actuation	Checking method
38	Injector #3	Actuates the injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #3 five times.
39	Injector #4	Actuates the injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #4 five times.
48	Air induction system solenoid	Actuates the Air induction system solenoid five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the Air induction system solenoid five times.
50	Fuel injection system relay	Actuates the fuel injection system relay five times at one-second intervals. Illuminates the engine trouble warning light. (The engine trouble warning light is OFF when the relay is ON, and the engine trouble warning light is ON when the relay is OFF).	Check the operating sound of the fuel injection system relay five times.
51	Radiator fan motor relay	Actuates the radiator fan motor relay five times at one-second intervals. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the Radiator fan motor relay five times.
52	Headlight relay	Actuates the headlight relay for five times every five-second. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the headlight relay five times.
53	EXUP servo motor	Actuate the servo motor turns to close side and to open side. Illuminates the engine trouble warning light only while the motor is running.	Check the operating sound of the EXUP servo motor.

# FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Actuation	Checking method
56	Sub-throttle servo motor	Actuate the servo motor turns to close side and to open side. Illuminates the engine trouble warning light only while the motor is running.	Check the operating sound of the Sub-throttle servo motor.

EAS27460

## TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Check and service the items or components that are the probable cause of the malfunction following the order given.

After the check and service of the malfunctioning part has been completed, reset the meter display according to the reinstatement method.

Fault code No.:

Code number displayed on the meter when the engine failed to work normally. Refer to Self-Diagnostic Function table.

Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "DIAGNOSTIC MODE" on page 8-42.

Fault code No.	11	Symptom	<b>No normal signals are received from the cylinder identification sensor when the engine is started or while the vehicle is being driven.</b>	
Diagnostic code No.	—	—		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed condition of cylinder identification sensor.		Check for looseness or pinching.	Starting the engine and operate it at idle.
2	Connections <ul style="list-style-type: none"> <li>• Cylinder identification sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between the cylinder identification sensor coupler and ECU coupler (Blue–Blue) (White/Black–White/Black) (Black/Blue–Black/Blue)</li> </ul>	
4	Defective cylinder identification sensor.		<ul style="list-style-type: none"> <li>• Replace if defective. Refer to "CHECKING THE CYLINDER IDENTIFICATION SENSOR" on page 8-156.</li> </ul>	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>12</b>	<b>Symptom</b>	<b>No normal signals are received from the crankshaft position sensor.</b>	
<b>Diagnostic code No.</b>	—		—	
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Installed condition of crankshaft position sensor		Check for looseness or pinching.	Cranking the engine.
2	Connections <ul style="list-style-type: none"> <li>• Crankshaft position sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may have pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between the crankshaft position sensor coupler and ECU coupler. (Gray–Gray) (Black/Blue–Black/Blue)</li> </ul>	
4	Defective crankshaft position sensor.		<ul style="list-style-type: none"> <li>• Replace if defective. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-148.</li> </ul>	

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>13</b>	<b>Symptom</b>	<b>Intake air pressure sensor: open or short circuit detected.</b>	
<b>Diagnostic code No.</b>		<b>03</b>	<b>Intake air pressure sensor</b>	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Intake air pressure sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may have pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turn the main switch to ON.
2	Open or short circuit in wire harness and/or sub wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between intake air pressure sensor coupler and ECU coupler (Black/Blue–Black/Blue) (Pink/White–Pink/White) (Blue–Blue)</li> </ul>	
3	Defective intake air pressure sensor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.03)</li> <li>• Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 8-156.</li> </ul>	

<b>Fault code No.</b>	<b>14</b>	<b>Symptom</b>	<b>Intake air pressure sensor: faulty intake air pressure sensor system.</b>	
<b>Diagnostic code No.</b>		<b>03</b>	<b>Intake air pressure sensor</b>	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Intake air pressure sensor hose		<ul style="list-style-type: none"> <li>• Check the intake air pressure sensor hose condition.</li> <li>• Repair or replace the sensor hose.</li> </ul>	Starting the engine and operate it at idle.
2	Connections <ul style="list-style-type: none"> <li>• Intake air pressure sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
3	Defective intake air pressure sensor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.03)</li> <li>• Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 8-156.</li> </ul>	

# FUEL INJECTION SYSTEM

Fault code No.	15	Symptom	Throttle position sensor: open or short circuit detected.			
Diagnostic code No.	01		Throttle position sensor			
Order	Item/components and probable cause		Check or maintenance job		Reinstatement method	
1	Installed condition of throttle position sensor.		<ul style="list-style-type: none"> <li>• Check for looseness or pinching.</li> <li>• Check that is installed in the specified position.</li> </ul>		Turning the main switch to "ON".	
2	Connections <ul style="list-style-type: none"> <li>• Throttle position sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>			
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between throttle position sensor coupler and ECU coupler (Black/Blue–Black/Blue) (Yellow–Yellow) (Blue–Blue)</li> </ul>			
4	Throttle position sensor lead wire open circuit output voltage check.		<ul style="list-style-type: none"> <li>• Check for open circuit and replace the throttle position sensor. (Black/Blue–Yellow)</li> </ul>			
			Open circuit item	Output voltage		
			Ground wire open circuit	5 V		
			Output wire open circuit	0 V		
		Power supply wire open circuit	0 V			
5	Defective throttle position sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.01)</li> <li>• Replace if defective. Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-153.</li> </ul>			

# FUEL INJECTION SYSTEM

Fault code No.	16	Symptom	Stuck throttle position sensor detected.	
Diagnostic code No.	01	Throttle position sensor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed condition of throttle position sensor.		<ul style="list-style-type: none"> <li>• Check the installed area for looseness or pinching.</li> <li>• Check that is installed in the specified position. Refer to “THROTTLE BODIES” on page 7-4 section.</li> </ul>	Reinstated by starting the engine, operating it at idle, and then racing it.
2	Defective throttle position sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.01)</li> <li>• Replace if defective. Refer to “THROTTLE BODIES” on page 7-4 section.</li> </ul>	

Fault code No.	17	Symptom	EXUP servo motor circuit: open or short circuit detected.	
Diagnostic code No.	53	EXUP servo motor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• EXUP servo motor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to “ON”.
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between EXUP servo motor coupler and ECU coupler (Blue–Blue) (White/Red–White/Red) (Black/Blue–Black/Blue)</li> </ul>	
3	Defective EXUP servo motor (potention circuit).		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.53)</li> <li>• Replace if defective. Refer to “CHECKING THE EXUP SERVO MOTOR” on page 3-18.</li> </ul>	

# FUEL INJECTION SYSTEM

Fault code No.	18	Symptom	EXUP servo motor is stuck.	
Diagnostic code No.	53	EXUP servo motor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• EXUP servo motor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between EXUP servo motor coupler and ECU coupler. (Black/Green–Black/Green) (Black/Red–Black/Red)</li> </ul>	
3	Defective EXUP servo motor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.53)</li> <li>• Replace if defective. Refer to "CHECKING THE EXUP SERVO MOTOR" on page 3-18.</li> </ul>	
4	Defective EXUP valve, pulley, and cables		Replace if defective.	

Fault code No.	19	Symptom	Open circuit is detected in the input line of ECU No.24 terminal is defected when the start switch is pressed.	
Diagnostic code No.	20	Sidestand switch		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.20)</li> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	If the transmission is in gear, retracting the sidestand. If the transmission is in neutral, reconnecting the wiring.
2	Open or short circuit in wire harness or sub lead.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between sidestand switch coupler and ECU coupler (Black–Black)</li> </ul>	
3	Defective sidestand switch		<ul style="list-style-type: none"> <li>• Replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-135.</li> </ul>	

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>20</b>	<b>Symptom</b>	<b>When the main switch is turned to “ON”, the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly.</b>	
<b>Diagnostic code No.</b>	<b>02 03</b>	<b>Atmospheric pressure sensor Intake air pressure sensor</b>		
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Defective intake air pressure sensor or atmospheric pressure sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code Nos. 02, 03)</li> <li>• Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 8-156 or “CHECKING THE ATMOSPHERIC PRESSURE SENSOR” on page 8-155.</li> </ul>	Turning the main switch to “ON”.

<b>Fault code No.</b>	<b>21</b>	<b>Symptom</b>	<b>Coolant temperature sensor: open or short circuit detected.</b>	
<b>Diagnostic code No.</b>	<b>06</b>	<b>Coolant temperature sensor</b>		
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Connections <ul style="list-style-type: none"> <li>• Coolant temperature sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to “ON”.
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between coolant temperature sensor coupler and ECU coupler. (Green/White–Green/White) (Black/Blue–Black/Blue)</li> </ul>	
3	Defective coolant temperature sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.06)</li> <li>• Replace if defective. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-152.</li> </ul>	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>22</b>	<b>Symptom</b>	<b>Intake air temperature sensor: open or short circuit detected.</b>	
<b>Diagnostic code No.</b>	<b>05</b>	<b>Intake air temperature sensor</b>		
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Connections <ul style="list-style-type: none"> <li>• Intake air temperature sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between intake air temperature sensor coupler and ECU coupler. (Brown/White–Brown/White) (Black/Blue–Black/Blue)</li> </ul>	
3	Defective intake air temperature sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.05)</li> <li>• Replace if defective. Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-156.</li> </ul>	

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>23</b>	<b>Symptom</b>	<b>Atmospheric pressure sensor: open or short circuit detected.</b>	
<b>Diagnostic code No.</b>	<b>02</b>	<b>Atmospheric pressure sensor</b>		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Atmospheric pressure sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness and/or sub wire harness 2.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between atmospheric pressure sensor coupler and ECU coupler. (Black/Blue–Black/Blue) (Pink–Pink) (Blue–Blue)</li> </ul>	
3	Defective atmospheric pressure sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.02)</li> <li>• Replace if defective. Refer to "CHECKING THE ATMOSPHERIC PRESSURE SENSOR" on page 8-155.</li> </ul>	

<b>Fault code No.</b>	<b>24</b>	<b>Symptom</b>	<b>No normal signal is received from the O<sub>2</sub> sensor.</b>	
<b>Diagnostic code No.</b>	—	—		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed state of O <sub>2</sub> sensor.		Check for looseness or pinching.	Start and warm up the engine until the coolant temperature rises over 60 °C. when accelerating the throttle, the warning light is turned off, or it is reset by the diagnostic mode (Code No.63).
2	Connections <ul style="list-style-type: none"> <li>• O<sub>2</sub> sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between O<sub>2</sub> sensor coupler and ECU coupler. (Gray/Green–Gray/Green) (Black/Blue–Black/Blue) (Pink/Black–Pink/Black) (Red/White–Red/White)</li> </ul>	
4	Check fuel pressure.		• Refer to "THROTTLE BODIES" on page 7-4.	
5	Defective O <sub>2</sub> sensor.		• Replace if defective.	

# FUEL INJECTION SYSTEM

Fault code No.	30	Symptom	No normal signal is received from the lean angle sensor.	
Diagnostic code No.	08	Lean angle sensor		
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	The vehicle has overturned.	Raise the vehicle upright.	Turning the main switch to "ON" (however, the engine cannot be restarted unless the main switch is first turned to "OFF").	
2	Installed state of the lean angle sensor	Check the installed direction and condition of the sensor.		
3	Connections <ul style="list-style-type: none"> <li>• Lean angle sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>	<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>		
4	Defective lean angle sensor	<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.08)</li> <li>• Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-149.</li> </ul>		

Fault code No.	33	Symptom	Open circuit detected in the primary lead of the cylinder-#1 ignition coil.	
Diagnostic code No.	30	Cylinder-#1 ignition coil		
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	Connections <ul style="list-style-type: none"> <li>• Cylinder-#1 ignition coil coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness 1 coupler</li> </ul>	<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Starting the engine and operating it at idle.	
2	Open or short circuit in wire harness and/or sub-wire harness 1.	<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between cylinder-#1 ignition coil coupler and ECU coupler. (Red/Black–Red/Black) (Orange–Orange)</li> </ul>		
3	Defective cylinder-#1 ignition coil	<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.30)</li> <li>• Test the primary and secondary coils for continuity.</li> <li>• Replace if defective. Refer to "CHECKING THE IGNITION COILS" on page 8-147.</li> </ul>		

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>34</b>	<b>Symptom</b>	<b>Open circuit detected in the primary lead of the cylinder-#2 ignition coil</b>	
<b>Diagnostic code No.</b>	<b>31</b>	<b>Cylinder-#2 ignition coil</b>		
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Connections <ul style="list-style-type: none"> <li>• Cylinder-#2 ignition coil coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness 1 coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub-wire harness 1.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between cylinder-#2 ignition coil coupler and ECU coupler. (Red/Black–Red/Black) (Gray/Red–Gray/Red)</li> </ul>	
3	Defective cylinder-#2 ignition coil.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.31)</li> <li>• Test the primary and secondary coils for continuity.</li> <li>• Replace if defective.</li> </ul> Refer to “CHECKING THE IGNITION COILS” on page 8-147.	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>35</b>	<b>Symptom</b>	<b>Open circuit detected in the primary lead of the cylinder-#3 ignition coil</b>	
<b>Diagnostic code No.</b>	<b>32</b>	<b>Cylinder-#3 ignition coil</b>		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Cylinder-#3 ignition coil coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness 1 coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub-wire harness 1.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between cylinder-#3 ignition coil coupler and ECU coupler. (Red/Black–Red/Black) (Orange/Green–Orange/Green)</li> </ul>	
3	Defective cylinder-#3 ignition coil.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.32)</li> <li>• Test the primary and secondary coils for continuity.</li> <li>• Replace if defective.</li> </ul> Refer to “CHECKING THE IGNITION COILS” on page 8-147.	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>36</b>	<b>Symptom</b>	<b>Open circuit detected in the primary lead of the cylinder-#4 ignition coil</b>	
<b>Diagnostic code No.</b>	<b>33</b>	<b>Cylinder-#4 ignition coil</b>		
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Connections <ul style="list-style-type: none"> <li>• Cylinder-#4 ignition coil coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness 1 coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub-wire harness 1.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between cylinder-#4 ignition coil coupler and ECU coupler. (Red/Black–Red/Black) (Gray/Green–Gray/Green)</li> </ul>	
3	Defective cylinder-#4 ignition coil.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.33)</li> <li>• Test the primary and secondary coils for continuity.</li> <li>• Replace if defective. Refer to “CHECKING THE IGNITION COILS” on page 8-147.</li> </ul>	

# FUEL INJECTION SYSTEM

Fault code No.	39	Symptom	Open circuit detected in a injector.	
Diagnostic code No.		36 37 38 39	Injector #1 Injector #2 Injector #3 Injector #4	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Injector coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Start the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub-wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between primary injector coupler and ECU coupler. (Red/Blue-Red/Blue) #1: (Red/Black-Red/Black) #2: (Green/Black-Green/Black) #3: (Blue/Black-Blue/Black) #4: (Orange/Black-Orange/Black)</li> </ul>	
3	Defective primary injector.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code Nos.36, 37, 38, 39)</li> <li>• Replace if defective. Refer to "CHECKING THE INJECTORS" on page 7-7.</li> </ul>	

# FUEL INJECTION SYSTEM

Fault code No.	41	Symptom	Lean angle sensor: open or short circuit detected.	
Diagnostic code No.	08	Lean angle sensor		
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	Connections <ul style="list-style-type: none"> <li>• Lean angle sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>	<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".	
2	Open or short circuit in lead.	<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between lean angle sensor coupler and ECU coupler. (Blue–Blue) (Yellow/Green–Yellow/Green) (Black/Blue–Black/Blue)</li> </ul>		
3	Defective lean angle sensor.	<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.08)</li> <li>• Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-149.</li> </ul>		

## FUEL INJECTION SYSTEM

Fault code No.	42	Symptom	A. No normal signals are received from the speed sensor. B. Open circuit is detected in the neutral switch.	
Diagnostic code No.	A	07	Speed sensor	
	B	21	Neutral switch	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
A-1	Installed state of speed sensor.		<ul style="list-style-type: none"> <li>• Check for looseness or pinching.</li> </ul>	Starting the engine, and inputting the vehicle speed signals by operating the vehicle at a 20 to 30 km/h.
A-2	Connections <ul style="list-style-type: none"> <li>• Speed sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
A-3	Open or short circuit in lead.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between speed sensor coupler and ECU coupler. (Blue–Blue) (White/Yellow–White/Yellow) (Black/Blue–Black/Blue)</li> </ul>	
A-4	Defective speed sensor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.07)</li> <li>• Replace if defective. Refer to “CHECKING THE SPEED SENSOR” on page 8-152.</li> </ul>	

# FUEL INJECTION SYSTEM

Fault code No.	42	Symptom	A. No normal signals are received from the speed sensor. B. Open circuit is detected in the neutral switch.	
Diagnostic code No.	A	07	Speed sensor	
	B	21	Neutral switch	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
B-1	Installed state of neutral switch.		<ul style="list-style-type: none"> <li>• Check for looseness or pinching.</li> </ul>	Starting the engine, and activating the speed sensor by operating the vehicle at 20 to 30 km/h.
B-2	Connections <ul style="list-style-type: none"> <li>• Neutral switch coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
B-3	Open circuit in neutral switch lead.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between neutral switch coupler and relay unit coupler (Sky blue–Sky blue)</li> <li>• Between relay unit coupler and ECU coupler. (Blue/Yellow–Blue/Yellow)</li> </ul>	
B-4	Defective neutral switch.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.21)</li> <li>• Replace if defective. Refer to “CHECKING THE SWITCHES” on page 8-135.</li> </ul>	
B-5	Faulty shift drum (neutral detection area).		<ul style="list-style-type: none"> <li>• Replace if defective. Refer to “TRANSMISSION” on page 5-81.</li> </ul>	

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>43</b>	<b>Symptom</b>	<b>Power supply to the injectors and fuel pump is not normal.</b>	
<b>Diagnostic code No.</b>	<b>09</b>	<b>Fuel system voltage (battery voltage)</b>		
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Connections <ul style="list-style-type: none"> <li>• Relay unit coupler (fuel pump relay)</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect it securely.</li> </ul>	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between relay unit coupler and ECU coupler. (Blue/Yellow–Blue/Yellow) (Red/Blue–Red/Blue)</li> <li>• Between relay unit coupler and battery terminal. (Red–Red)</li> <li>• Between relay unit coupler and engine stop switch coupler. (Red/Black–Red/Black)</li> </ul>	
3	Malfunction or open circuit in fuel pump relay		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No. 09)</li> <li>• Replace if defective.</li> <li>• If there is no malfunction with the fuel pump relay, replace the ECU.</li> </ul>	

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>	44	<b>Symptom</b>	An error is detected while reading or writing on EEPROM (CO adjustment value).	
<b>Diagnostic code No.</b>	60	<b>EEPROM fault cylinder No.</b>		
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	Malfunction in ECU	<ul style="list-style-type: none"> <li>• Set the faulty cylinder's exhaust gas volume.               <ol style="list-style-type: none"> <li>1. Execute the diagnostic mode (Code No. 60) to check the faulty cylinder number. (If multiple cylinders are defective, the numbers of the faulty cylinders are displayed alternately at 2-second intervals.)</li> <li>2. Execute the CO adjustment mode and set the exhaust gas volume of the faulty cylinder to "0". If "0" is displayed, set the numerical value other than "0". When the malfunction is recovered, reset "0". Refer to "ADJUSTING THE EXHAUST GAS VOLUME" on page 3-8.</li> </ol> </li> <li>• Replace ECU if it does not recover from the malfunction.</li> </ul>	Turning the main switch to "ON". (Readjust the exhaust gas volume after it is reinstated.)	

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>	46	<b>Symptom</b>	Power supply to the fuel injection system relay is not normal.	
<b>Diagnostic code No.</b>	—		—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections. • Main wire harness ECU coupler		<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Starting the engine and operating it at idle.
2	Faulty battery		<ul style="list-style-type: none"> <li>• Replace or change the battery Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-140.</li> </ul>	
3	Malfunction in rectifier/regulator		<ul style="list-style-type: none"> <li>• Replace if defective. Refer to “CHARGING SYSTEM” on page 8-11.</li> </ul>	
4	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between battery and main switch (Red–Red)</li> <li>• Between main switch and ignition fuse (Brown/Blue–Brown/Blue)</li> <li>• Between ignition fuse and ECU (Red/White–Red/White)</li> </ul>	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	47	<b>Symptom</b>	Sub-throttle position sensor: open or short circuit detected.	
<b>Diagnostic monitoring code No.</b>		56	Sub-throttle servo motor	
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Installed state of sub-throttle position sensor.		<ul style="list-style-type: none"> <li>• Check for looseness or pinching.</li> <li>• Check that the sensor is installed in the specified position.</li> </ul>	Turning the main switch to "ON".
2	Connections <ul style="list-style-type: none"> <li>• Sub-throttle position sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between sub-throttle position sensor coupler and ECU coupler. (Black/Blue–Black/Blue) (Green/Yellow–Green/Yellow) (Blue–Blue)</li> </ul>	
4	Defective sub-throttle position sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No. 56)</li> <li>• Replace if defective. Refer to "CHECKING THE SUB-THROTTLE POSITION SENSOR" on page 8-154.</li> </ul>	

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>48</b>	<b>Symptom</b>	<b>Sub-throttle servo motor: stuck.</b>	
<b>Diagnostic code No.</b>	<b>56</b>	<b>Sub-throttle servo motor</b>		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Sub-throttle servo motor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between sub-throttle servo motor coupler and ECU coupler (Yellow/Red–Yellow/Red) (Yellow/White–Yellow/White)</li> </ul>	
3	Defective sub-throttle servo motor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No. 56)</li> <li>• Replace if defective. Refer to "CHECKING THE SUB-THROTTLE SERVO MOTOR" on page 7-10.</li> </ul>	

<b>Fault code No.</b>	<b>50</b>	<b>Symptom</b>	<b>Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)</b>	
<b>Diagnostic code No.</b>	—	—		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Malfunction in ECU.		Replace the ECU. <b>NOTE:</b> _____ Do not perform this procedure with the main switch turned to "ON". _____	Turning the main switch to "ON"

# FUEL INJECTION SYSTEM

Fault code No.	Er-1	Symptom	No signals are received from the ECU.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> <li>• Main wire harness meter assembly coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between meter assembly coupler and ECU coupler. (Yellow/Blue–Yellow/Blue)</li> </ul>	
3	Malfunction in meter assembly.		Replace the meter assembly.	
4	Malfunction in ECU.		Replace the ECU.	

Fault code No.	Er-2	Symptom	No signals are received from the ECU within the specified duration.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> <li>• Main wire harness meter assembly coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between meter assembly coupler and ECU coupler. (Yellow/Blue–Yellow/Blue)</li> </ul>	
3	Malfunction in meter assembly.		Replace the meter assembly.	
4	Malfunction in ECU.		Replace the ECU.	

# FUEL INJECTION SYSTEM

Fault code No.	Er-3	Symptom	Data from the ECU cannot be received correctly.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> <li>• Main wire harness meter assembly coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between meter assembly coupler and ECU coupler. (Yellow/Blue–Yellow/Blue)</li> </ul>	
3	Malfunction in meter assembly.		Replace the meter assembly.	
4	Malfunction in ECU.		Replace the ECU.	

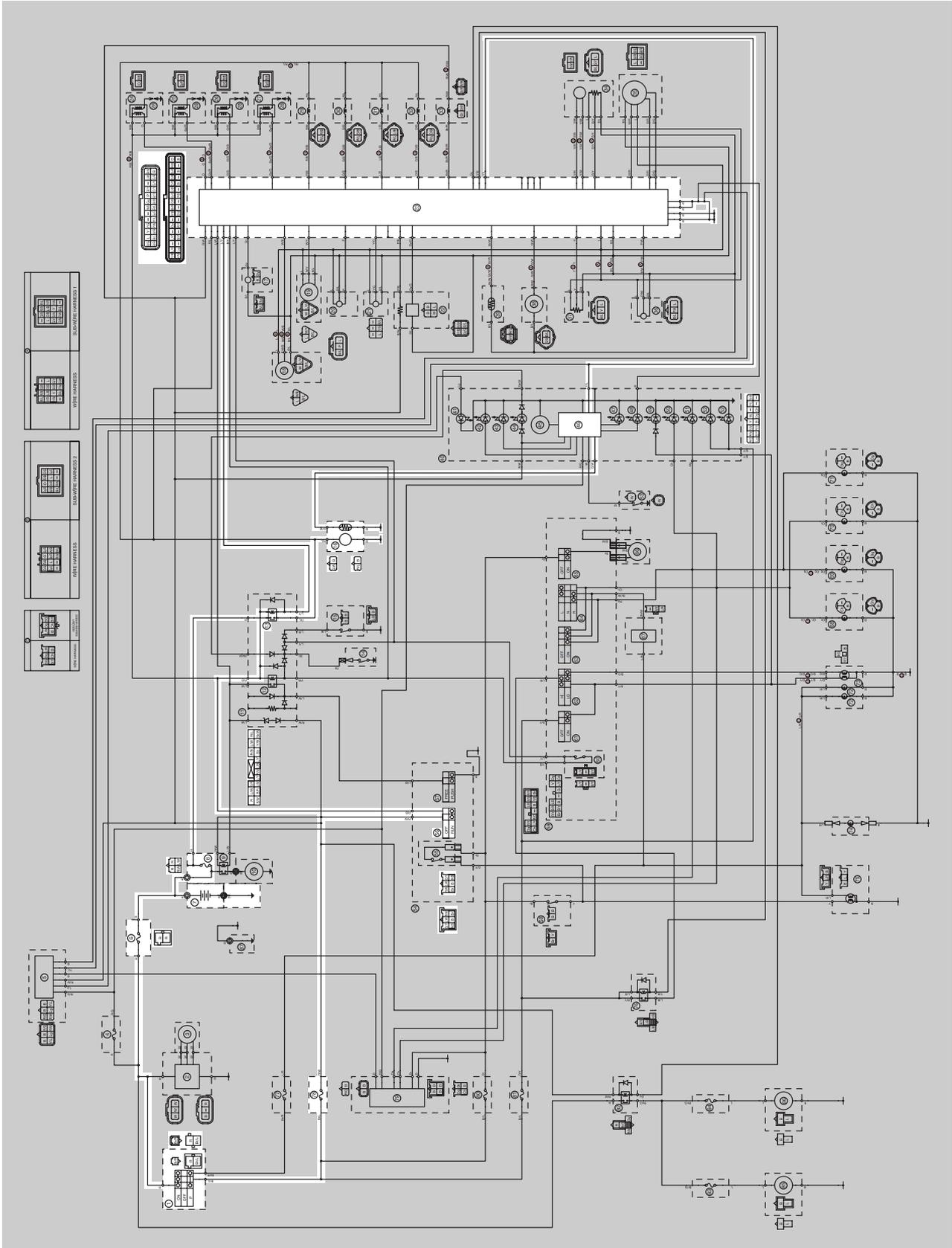
Fault code No.	Er-4	Symptom	Non-registered data has been received from the meter.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> <li>• Main wire harness meter assembly coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between meter assembly coupler and ECU coupler. (Yellow/Blue–Yellow/Blue)</li> </ul>	
3	Malfunction in meter assembly.		Replace the meter assembly.	
4	Malfunction in ECU.		Replace the ECU.	

# FUEL INJECTION SYSTEM

---

EAS27550  
**FUEL PUMP SYSTEM**

EAS27560  
**CIRCUIT DIAGRAM**



# FUEL PUMP SYSTEM

---

- 1. Main switch
- 6. Main fuse
- 7. Battery
- 8. Fuel injection system fuse
- 13. Fuel pump relay
- 16. Fuel pump
- 23. ECU (engine control unit)
- 46. Multi-function meter
- 56. Engine stop switch
- 78. Ignition fuse

# FUEL PUMP SYSTEM

EAS27570

## TROUBLESHOOTING

If the fuel pump fails to operate.

### NOTE:

• Before troubleshooting, remove the following part(s):

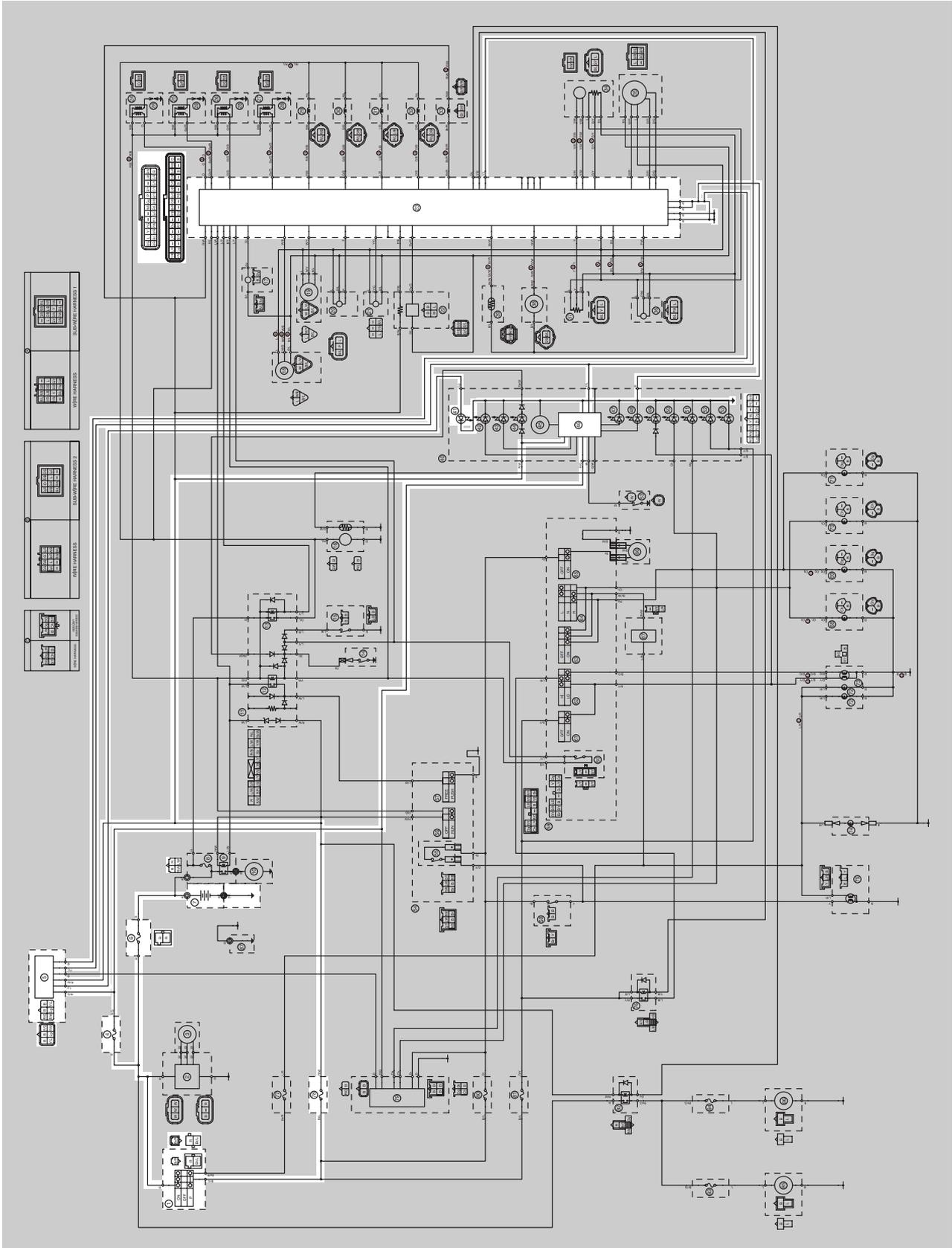
1. Rider and passenger seat
2. Fuel tank
3. Air filter case

1. Check the fuses. (Main, ignition and fuel injection system) Refer to "CHECKING THE FUSES" on page 8-139.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-140.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the immobilizer kit.
OK↓		
4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-135.	NG→	Replace the right handlebar switch.
OK↓		
5. Check the relay unit (fuel pump relay). Refer to "CHECKING THE RELAYS" on page 8-142.	NG→	Replace the relay unit.
OK↓		
6. Check the fuel pump. Refer to "CHECKING THE FUEL PRESSURE" on page 7-7.	NG→	Replace the fuel pump.
OK↓		
7. Check the entire fuel pump system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-75.	NG→	Properly connect or repair the fuel pump system's wiring.
OK↓		
Replace the ECU.		



EAS27640  
**IMMOBILIZER SYSTEM**

EAS27650  
**CIRCUIT DIAGRAM**



# IMMOBILIZER SYSTEM

---

- 1. Main switch
- 4. Backup fuse
- 5. Immobilizer unit
- 6. Main fuse
- 7. Battery
- 23. ECU (engine control unit)
- 41. Immobilizer indicator
- 46. Multi-function meter
- 78. Ignition fuse

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 (which is installed in each key bow)
- An immobilizer unit
- The ECU
- An immobilizer system indicator light

The key with the red bow is used to register codes in each standard key. Do not use the key with the red bow for driving. It should only be used for re-registering new codes in the standard keys. The immobilizer system cannot be operated with a new key until the key registered with a code. If you lose the code re-registering key, the ECU and main switch (included with an immobilizer unit) needs to be replaced.

Therefore, always use a standard key for driving. (See caution below.)

### NOTE:

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

---

ECA14970

### CAUTION:

- **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 (i.e., 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 after any code re-registering and keep the code re-registering key in a safe place.
  - Do not submerge either of the keys in water.
  - Do not expose the keys to excessively high temperatures.
  - Do not place either of the keys close to magnets (this includes, but not limited to, products such as speakers, etc.).
  - Do not place heavy items on either key.
  - Do not grind either key or alter their shape.
  - Do not disassemble the plastic part of either key.
  - Keep other immobilizer keys away for this unit's code re-registering key and main switch.
- 

EAS27691

## PART REPLACEMENT AND KEY CODE REGISTRATION REQUIREMENTS

In the course of use, you may encounter the following cases where replacement of parts and registration of code re-registering/standard keys are required.

### NOTE:

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					√	No required

\* Accessory locks mean the seat lock, fuel tank cap or the helmet holder.

## 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.

### NOTE:

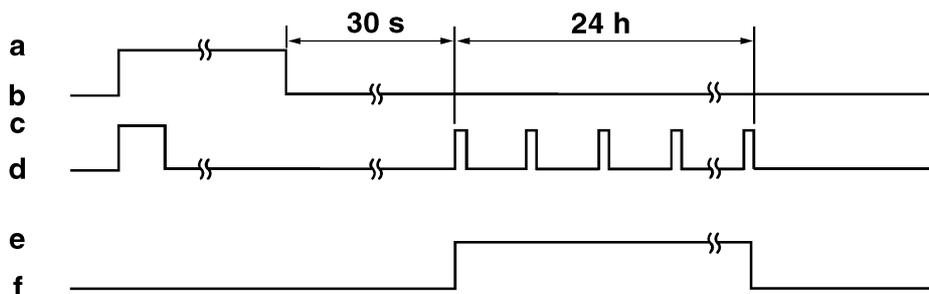
Check that the immobilizer system indicator light comes on for one second, then goes off. When the immobilizer system indicator light goes off, the code re-registering key has been registered.

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.

### NOTE:

Do not start the engine with a standard key that has not been registered. If the main switch is turned "ON" with a standard key that has not been registered, the immobilizer system indicator light flashes to indicate fault code "52". (Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-86).

1. Check that the immobilizer system indicator light signals the standby mode.
2. Using the code re-registering key, turn the main switch "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.

### NOTE:

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.

### NOTE:

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.

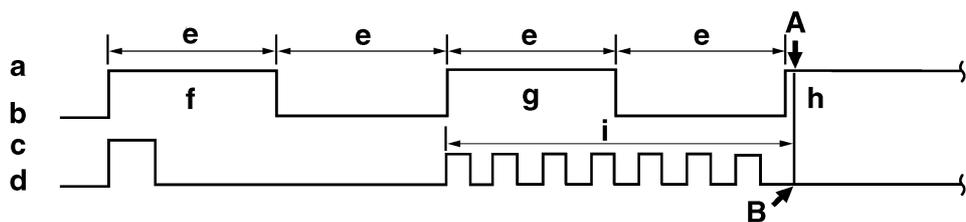
5. Turn the main switch to "ON".

### NOTE:

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



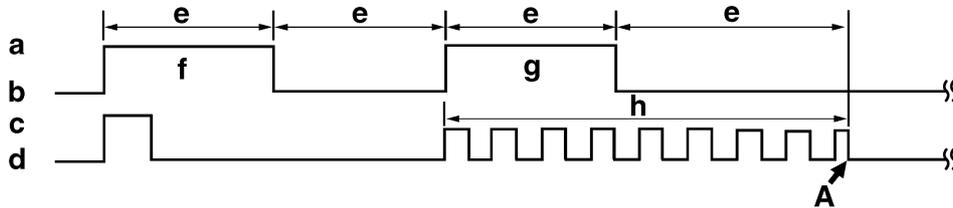
- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. First standard key
- h. Second standard key
- i. Registration mode

- 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 turn "ON", the indicator light does not come on or flashing.

1. Check the fuses.  
(Main, ignition and backup)  
Refer to "CHECKING THE FUSES"  
on page 8-139.

NG→

Replace the fuse(s).

OK↓

2. Check the battery.  
Refer to "CHECKING AND  
CHARGING THE BATTERY" on  
page 8-140.

NG→

- Clean the battery terminals.
- Recharge or replace the battery.

OK↓

3. Check the main switch.  
Refer to "CHECKING THE  
SWITCHES" on page 8-135.

NG→

Replace the immobilizer kit.

OK↓

4. Check the entire immobilizer sys-  
tem's wiring.  
Refer to "CIRCUIT DIAGRAM" on  
page 8-79.

NG→

Properly connect or repair the immobi-  
lizer system's wiring.

OK↓

- Check the condition of the each immobilizer system's circuits.
- Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-86.

# IMMOBILIZER SYSTEM

EAS27720

## SELF-DIAGNOSIS FAULT CODE INDICATION

When the system failure occurred, the error code number is indicated in the immobilizer system indicator light blinks at the same time. The pattern of blinking also shows the error code.

Error code	Detection	Symptoms	Trouble	Measures
51	IMMOBILIZER UNIT	Cannot transmit code between the key and immobilizer unit.	<ol style="list-style-type: none"> <li>1. Objects that may keep off radio waves exist around the keys and antennas.</li> <li>2. Immobilizer unit failure.</li> <li>3. Key failure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Keep clear of magnets, metals and other keys form the surroundings of keys and antennas.</li> <li>2. Replace the immobilizer unit.</li> <li>3. Replace the key.</li> </ol>
52	IMMOBILIZER UNIT	Codes do not match between the key and immobilizer unit.	<ol style="list-style-type: none"> <li>1. Disturbed by other transponder. Failed to verify continually for ten times.</li> <li>2. Unregistered sub key was used.</li> </ol>	<ol style="list-style-type: none"> <li>1. Place the immobilizer unit away more than 50 mm from the transponder of other vehicle.</li> <li>2. Register the standard key.</li> </ol>
53	IMMOBILIZER UNIT	Cannot transmit code between the ECU and immobilizer unit.	<p>Noise interference or disconnected lead/cable.</p> <ol style="list-style-type: none"> <li>1. Obstruction due to radio wave noise.</li> <li>2. Error by disconnection of the communication harness.</li> <li>3. Immobilizer unit failure.</li> <li>4. ECU failure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the wire harness and connector.</li> <li>2. Replace the immobilizer unit.</li> <li>3. Replace the ECU.</li> </ol>
54	IMMOBILIZER UNIT	Codes do not match between ECU and immobilizer unit.	<p>Noise interference or disconnected lead/cable.</p> <ol style="list-style-type: none"> <li>1. Obstruction due to radio wave noise.</li> <li>2. Error by disconnection of the communication harness.</li> <li>3. Immobilizer unit failure.</li> <li>4. ECU failure.</li> </ol> <p>(When the used parts form other vehicles are used, the code re-registering key ID is not registered to the ECU.)</p>	<ol style="list-style-type: none"> <li>1. Register the code re-registering key ID.</li> <li>2. Check the wire harness and connector.</li> <li>3. Replace the immobilizer unit.</li> <li>4. Replace the ECU.</li> </ol>

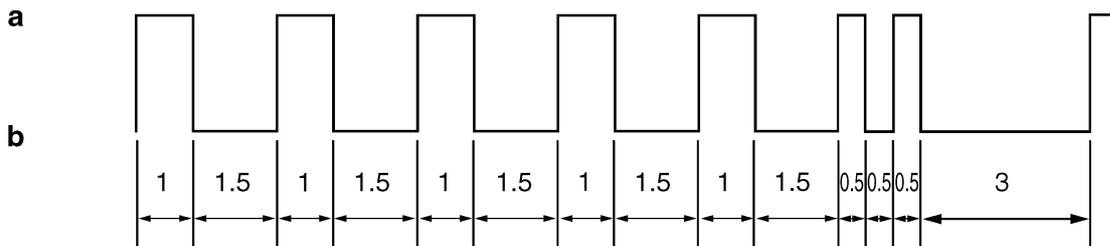
# IMMOBILIZER SYSTEM

Error code	Detection	Symptoms	Trouble	Measures
55	IMMOBILIZER UNIT	Key code registration error.	Same standard key was attempted to continuously two times register.	Prepare the new standard key and register it.
56	ECU	Undefinition code is received.	Noise interference or disconnected lead/cable. 1. Obstruction due to radio wave noise. 2. Error by disconnection of the communication harness. 3. Immobilizer unit failure 4. ECU failure	1. Check the wire harness and connector. 2. Replace the immobilizer unit. 3. Replace the ECU.

## Immobilizer system indicator light error code indication

Digit of 10: Cycles of 1 sec. ON and 1.5 sec. OFF.

Digit of 1: Cycles of 0.5 sec. ON and 0.5 sec. OFF.



a. Light on

b. Light off



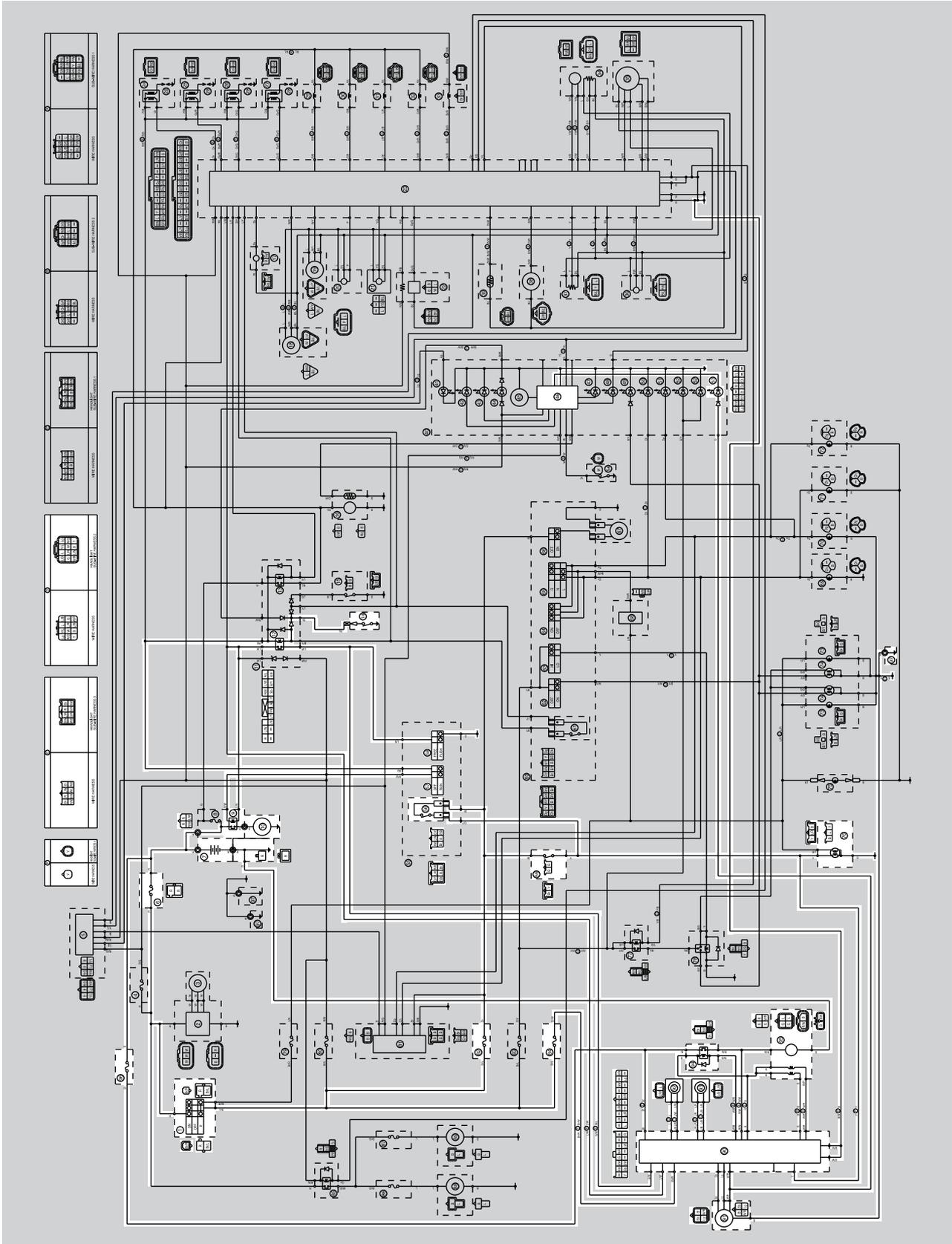
# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS28790

## ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27730

### CIRCUIT DIAGRAM (FZ1-SA)



# ABS (ANTI-LOCK BRAKE SYSTEM)

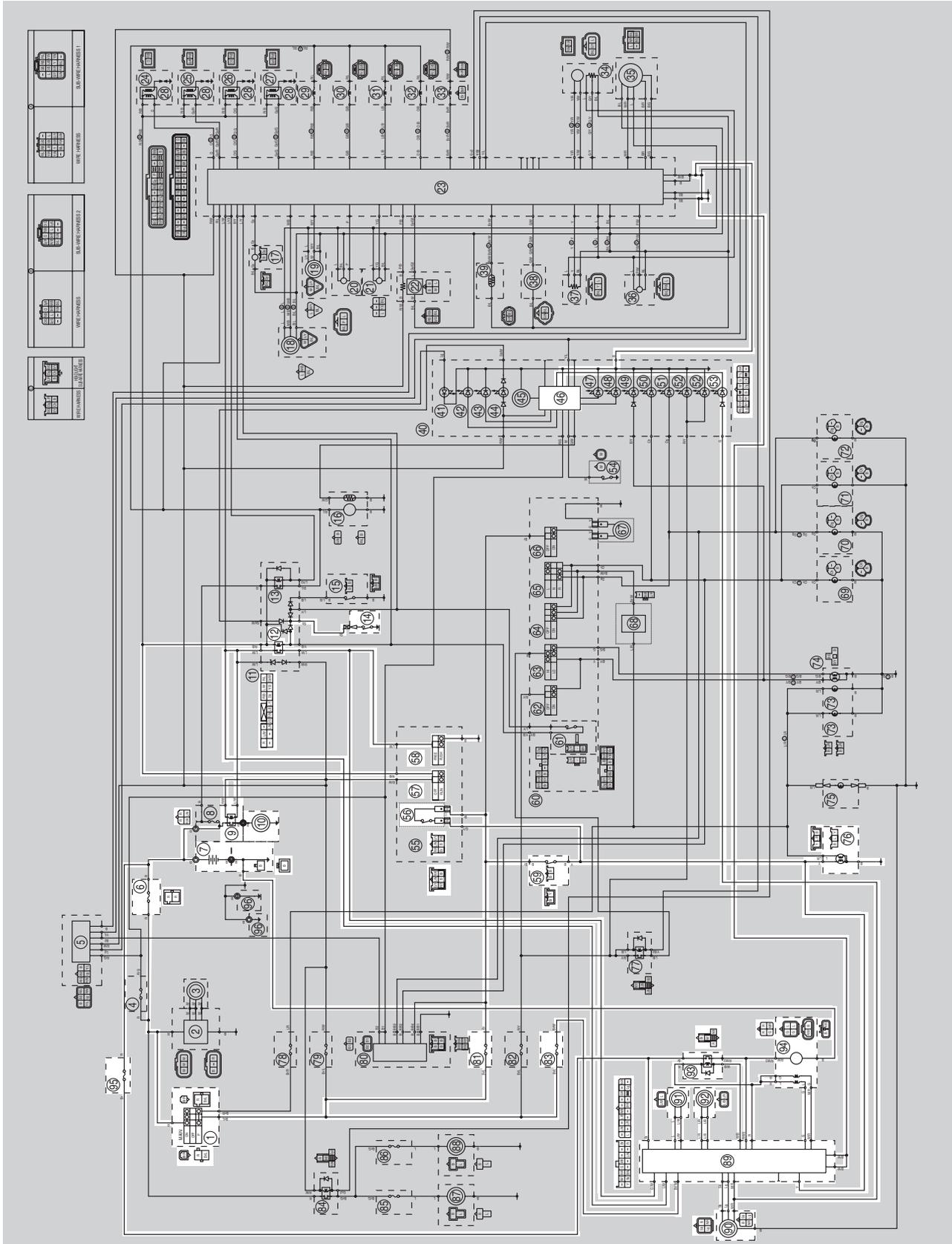
---

## FZ1-SA

1. Main switch
6. Main fuse
7. Battery
9. Starter relay
10. Starter motor
12. Starting circuit cut-off relay
14. Neutral switch
46. Multi-function meter
53. ABS warning light
56. Front brake light switch
57. Engine stop switch
58. Start switch
59. Rear brake light switch
76. Tail/brake light
82. Signal fuse
84. ABS fuse
90. ABS ECU
91. ABS test coupler
92. Front wheel sensor
93. Rear wheel sensor
94. ABS motor relay
95. Hydraulic unit
96. ABS motor fuse

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS22C1001  
CIRCUIT DIAGRAM (FZ1-NA)



# ABS (ANTI-LOCK BRAKE SYSTEM)

---

## FZ1-NA

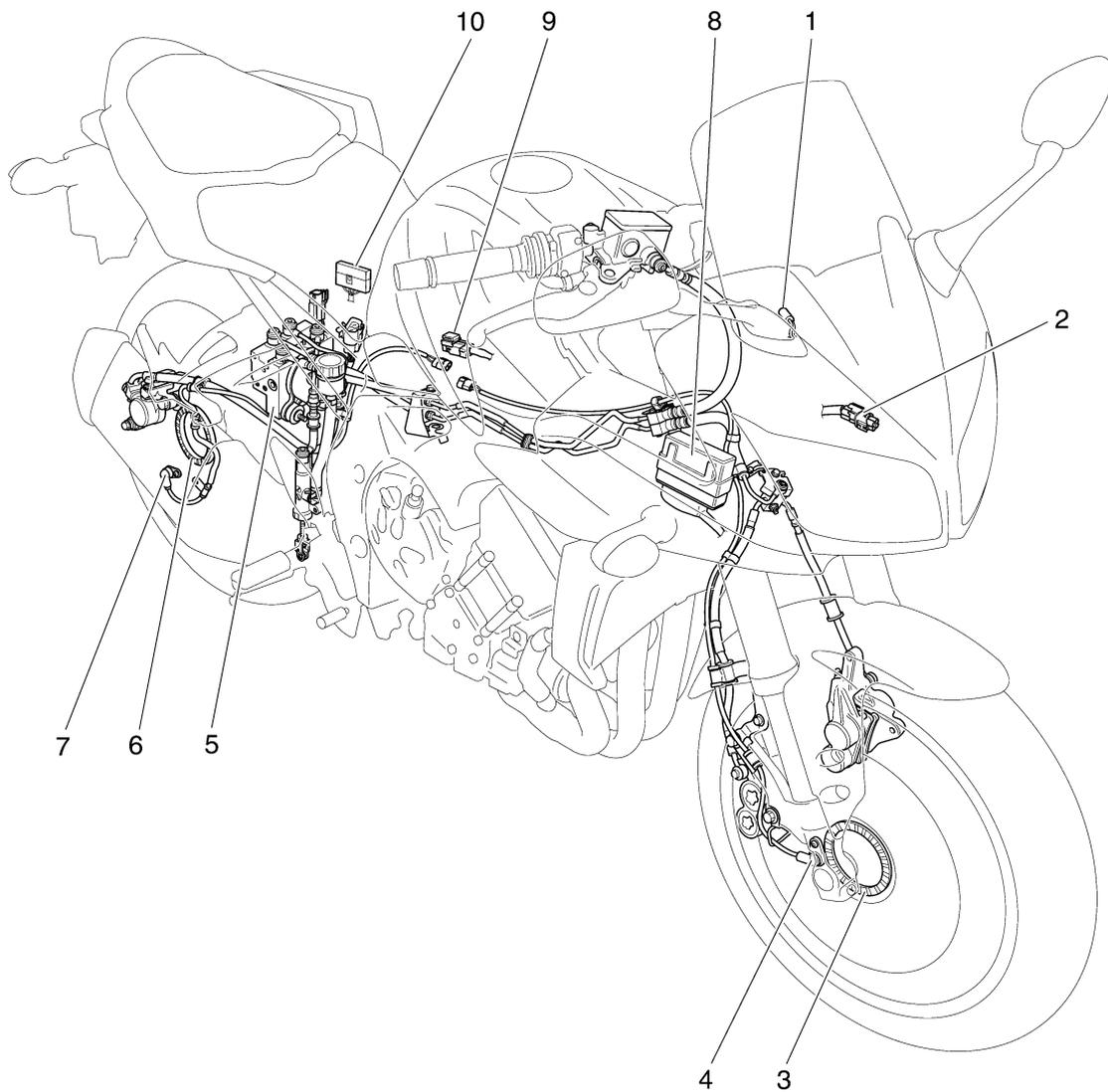
1. Main switch
6. Main fuse
7. Battery
9. Starter relay
10. Starter motor
12. Starting circuit cut-off relay
14. Neutral switch
46. Multi-function meter
53. ABS warning light
56. Front brake light switch
57. Engine stop switch
58. Start switch
59. Rear brake light switch
76. Tail/brake light
81. Signal fuse
83. ABS fuse
89. ABS ECU
90. ABS test coupler
91. Front wheel sensor
92. Rear wheel sensor
93. ABS motor relay
94. Hydraulic unit
95. ABS motor fuse

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27740

## ABS COMPONENTS CHART

FZ1-SA



# ABS (ANTI-LOCK BRAKE SYSTEM)

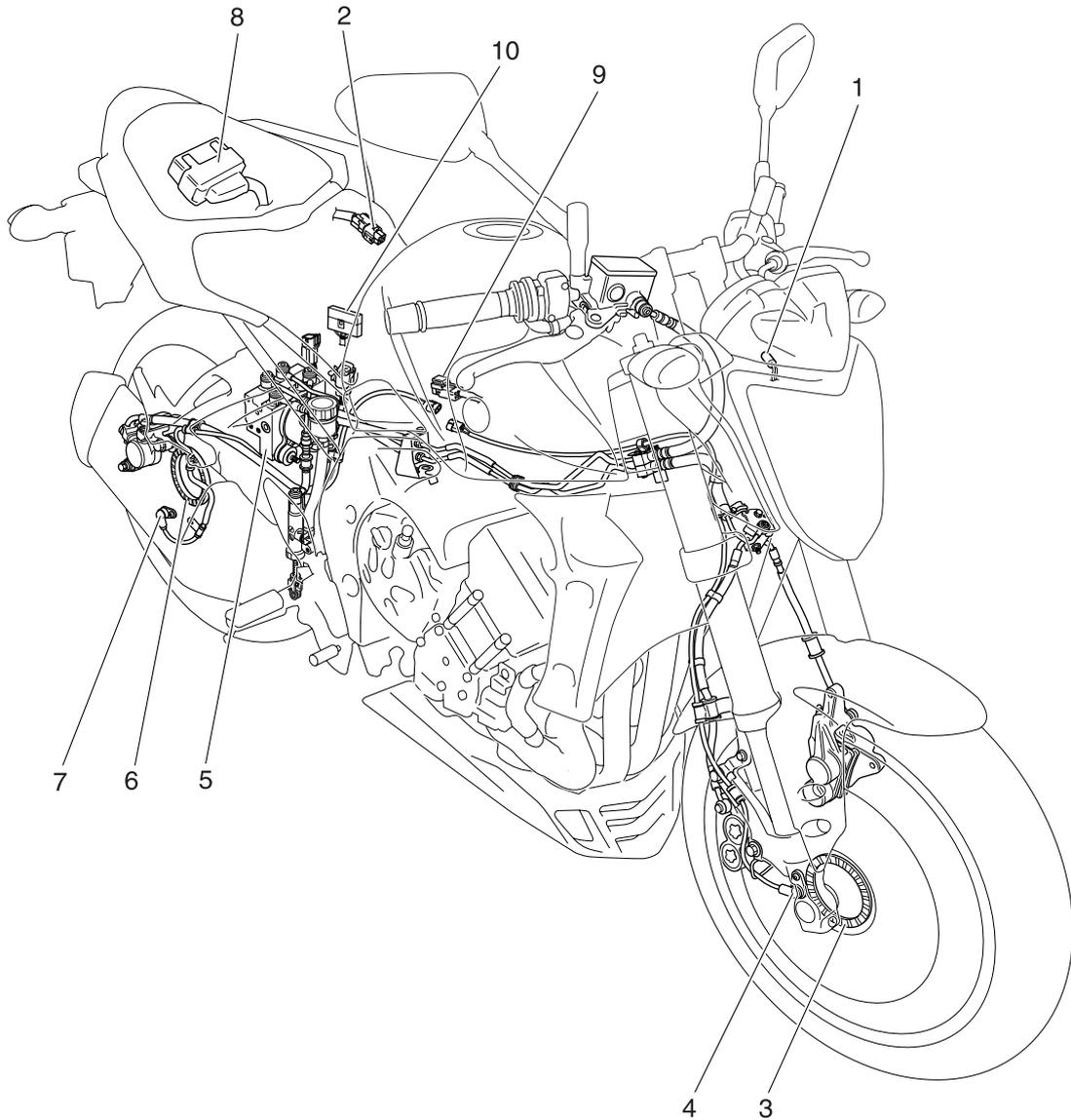
---

## **FZ1-SA**

1. ABS warning light
2. ABS test coupler
3. Front sensor rotor
4. Front wheel sensor
5. Hydraulic unit
6. Rear sensor rotor
7. Rear wheel sensor
8. ABS ECU
9. ABS motor relay
10. Fuse box

# ABS (ANTI-LOCK BRAKE SYSTEM)

FZ1-NA



# ABS (ANTI-LOCK BRAKE SYSTEM)

---

## FZ1-NA

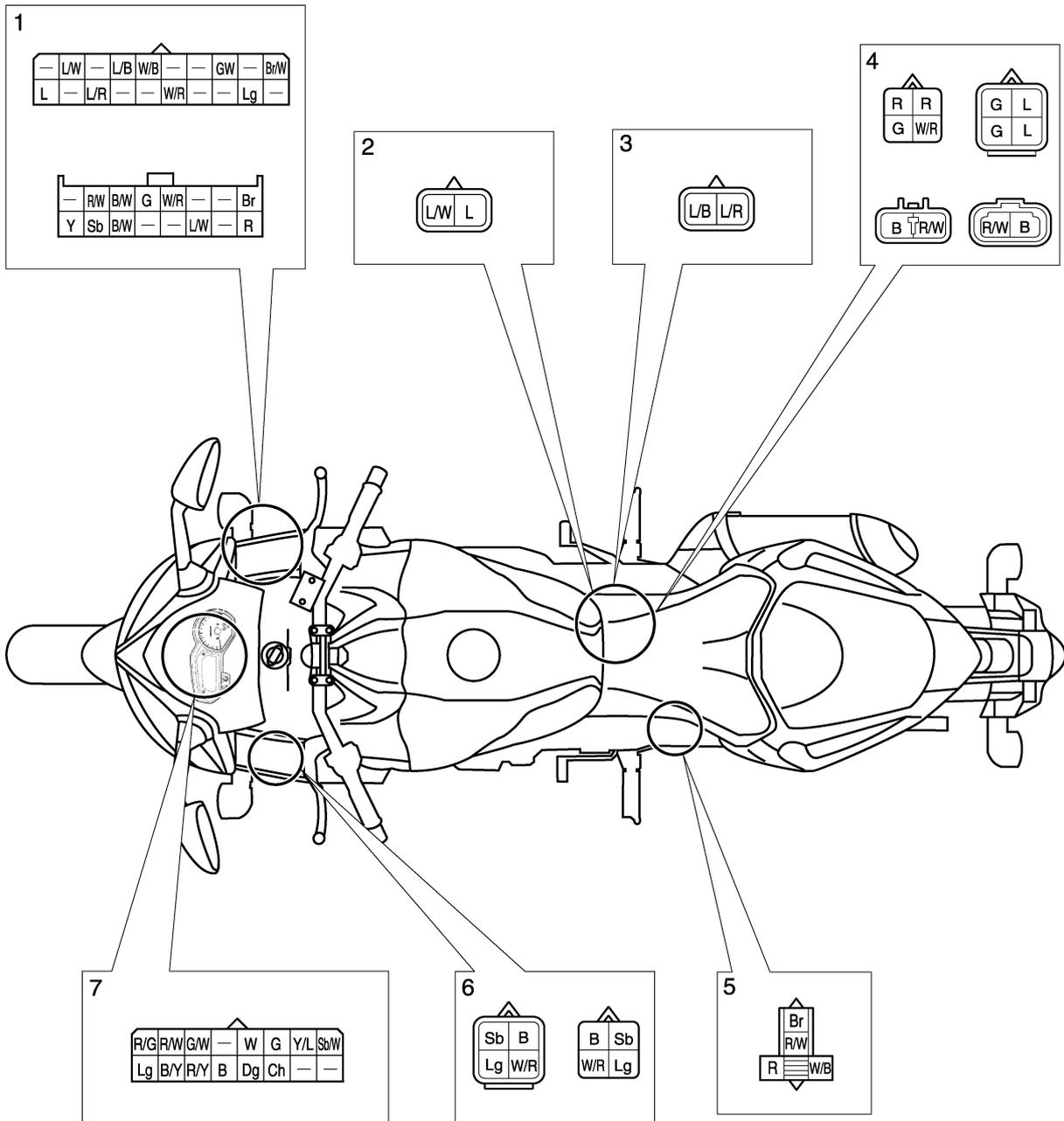
1. ABS warning light
2. ABS test coupler
3. Front sensor rotor
4. Front wheel sensor
5. Hydraulic unit
6. Rear sensor rotor
7. Rear wheel sensor
8. ABS ECU
9. ABS motor relay
10. Fuse box

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27750

## ABS CONNECTOR LOCATION CHART

FZ1-SA



# ABS (ANTI-LOCK BRAKE SYSTEM)

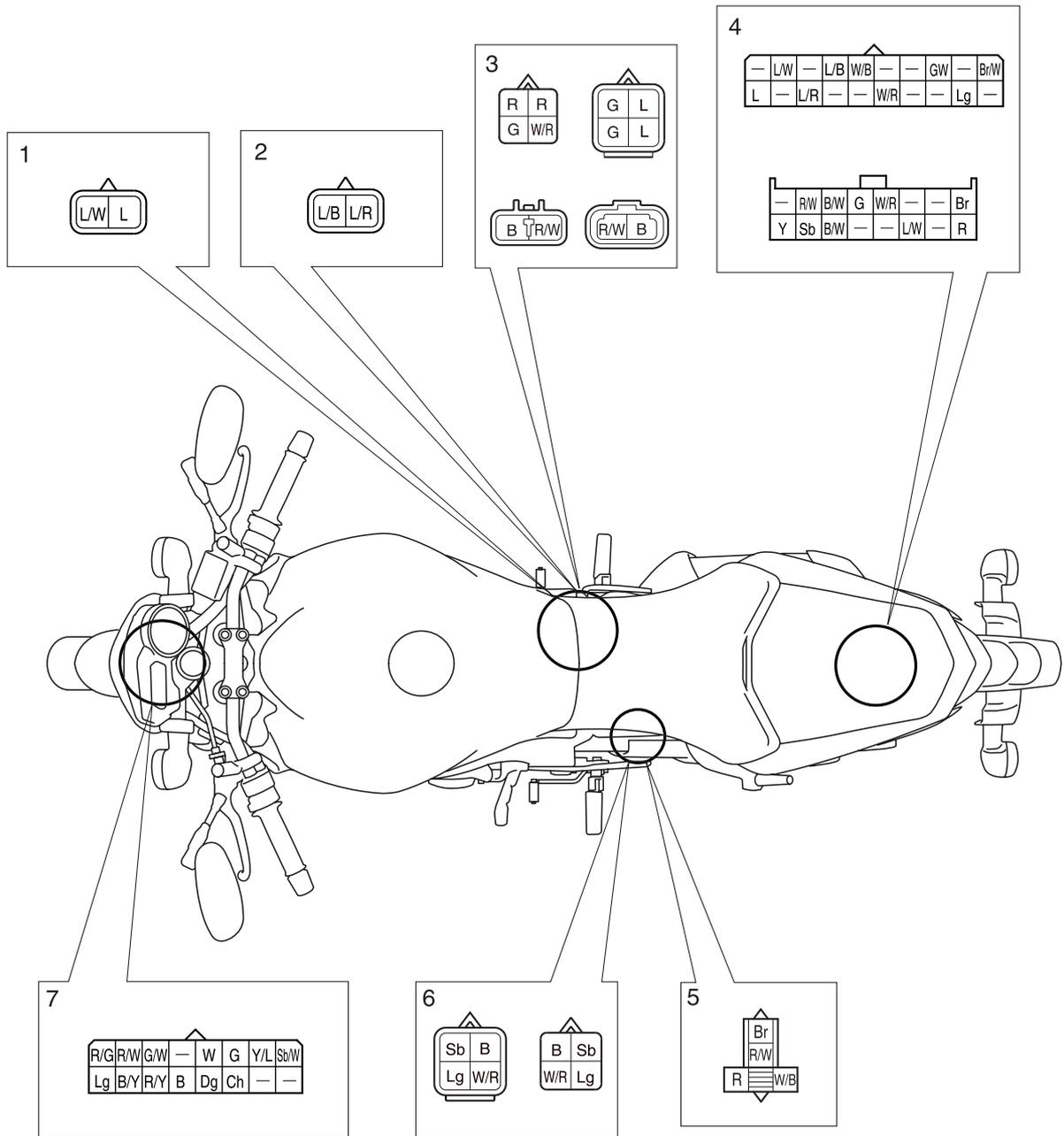
---

## **FZ1-SA**

1. ABS ECU coupler
2. Front wheel sensor coupler
3. Rear wheel sensor coupler
4. Hydraulic unit coupler
5. ABS motor relay
6. ABS test coupler
7. Multi-function coupler

# ABS (ANTI-LOCK BRAKE SYSTEM)

FZ1-NA



# ABS (ANTI-LOCK BRAKE SYSTEM)

---

## FZ1-NA

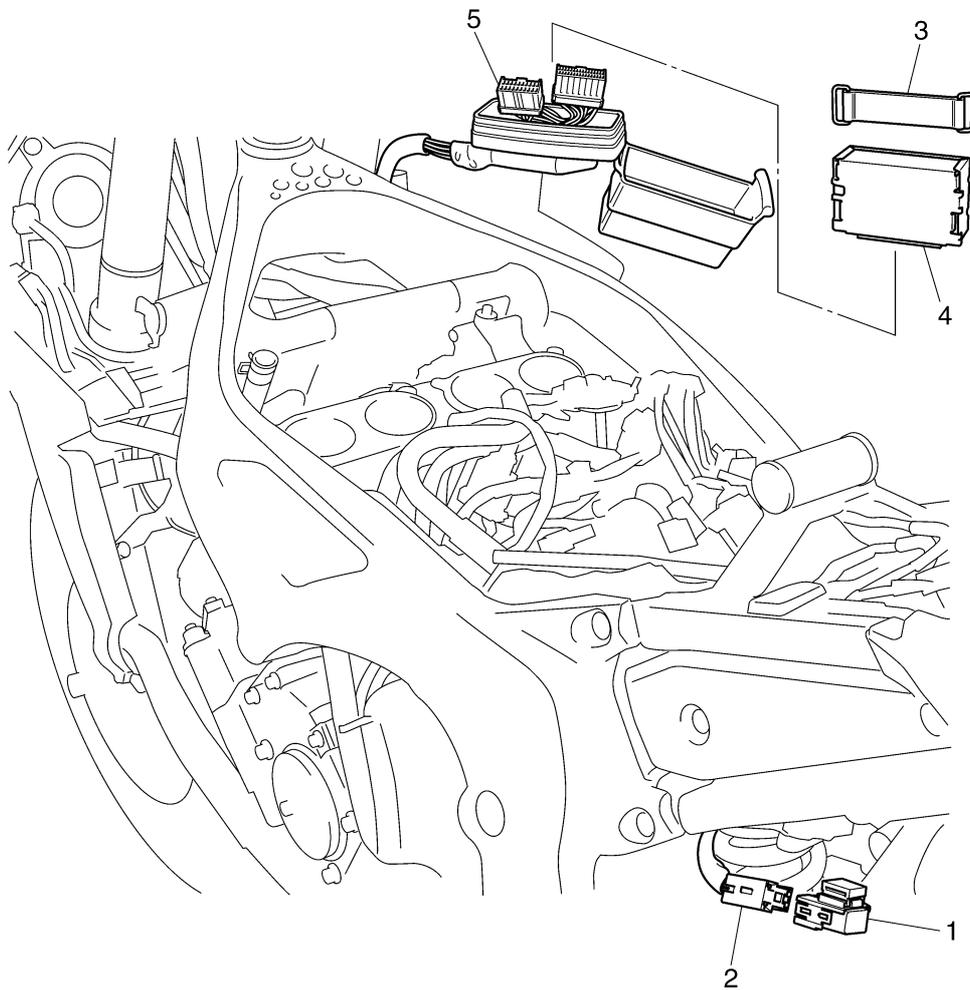
1. Front wheel sensor coupler
2. Rear wheel sensor coupler
3. Hydraulic unit coupler
4. ABS ECU coupler
5. ABS motor relay
6. ABS test coupler
7. Multi-function coupler

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27760

## ABS ECU AND ABS MOTOR RELAY

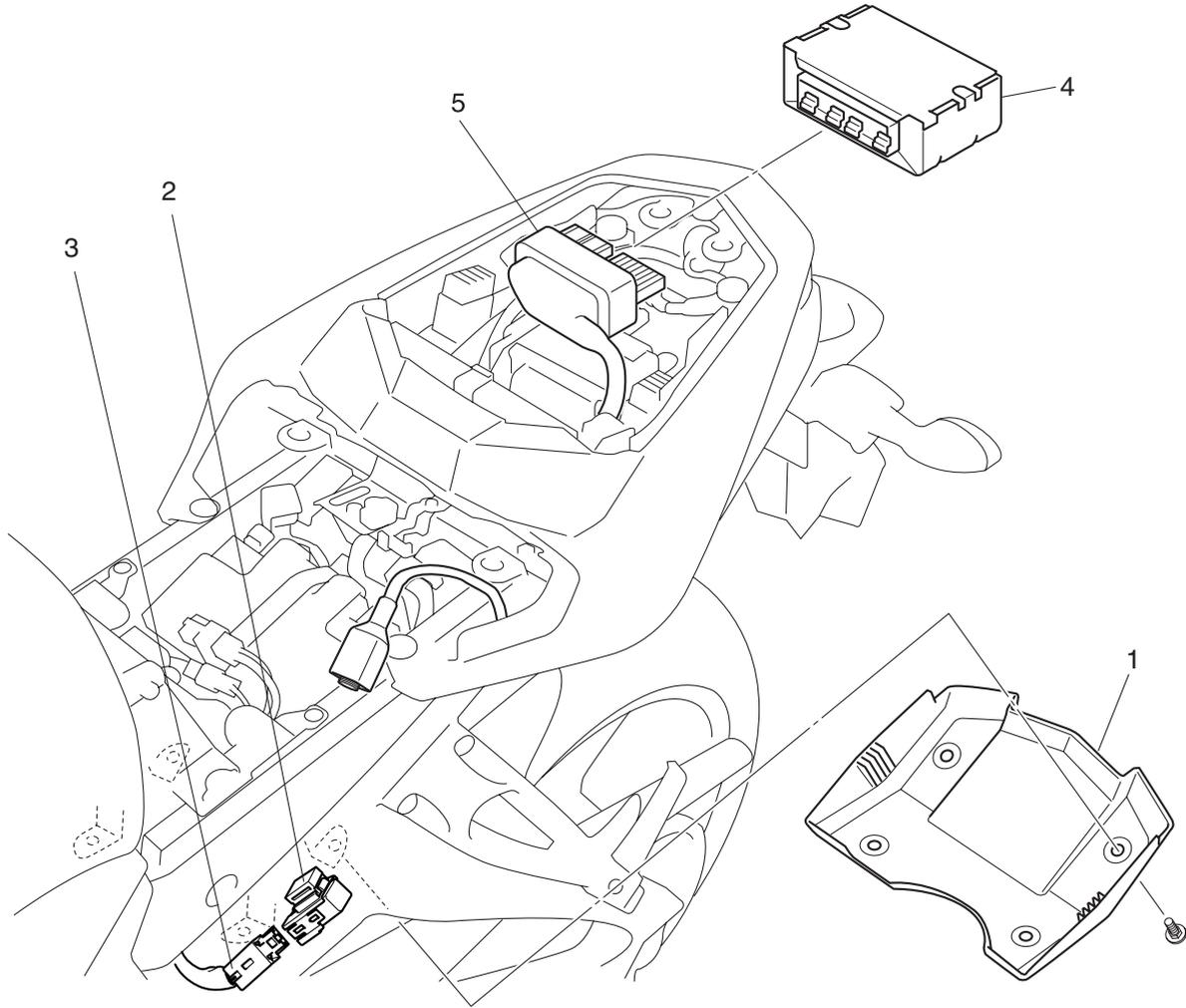
### Removing the ABS ECU and ABS motor relay (FZ1-SA)



Order	Job/Parts to remove	Q'ty	Remarks
	Right front cowling inner panel		Refer to "GENERAL CHASSIS" on page 4-1.
	Under cover		Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-50.
1	ABS motor relay	1	
2	ABS motor relay coupler	1	Disconnect.
3	Band	1	
4	ABS ECU	1	
5	ABS ECU coupler	1	Disconnect.
			For installation, reverse the removal procedure.

# ABS (ANTI-LOCK BRAKE SYSTEM)

## Removing the ABS ECU and ABS motor relay (FZ1-NA)



Order	Job/Parts to remove	Q'ty	Remarks
	Right front cowling inner panel		Refer to "GENERAL CHASSIS" on page 4-1.
	Under cover		Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-50.
1	Rear fender lower cover	1	
2	ABS motor relay	1	
3	ABS motor relay coupler	1	Disconnect.
4	ABS ECU	1	
5	ABS ECU coupler	1	Disconnect.
			For installation, reverse the removal procedure.

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27770

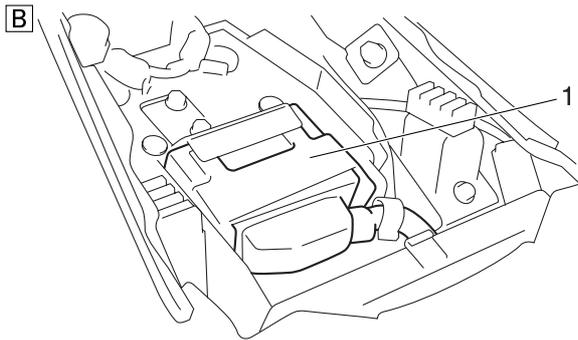
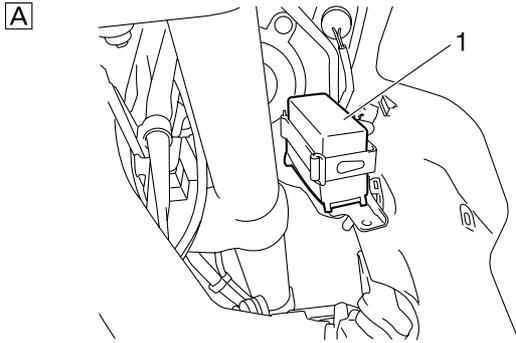
## [D-1] MAINTENANCE OF THE ABS ECU

### Removing the ABS ECU

1. Remove:
  - ABS ECU "1"

#### NOTE:

When removing the ABS ECU, take care not to damage the ABS ECU or ABS ECU couplers.

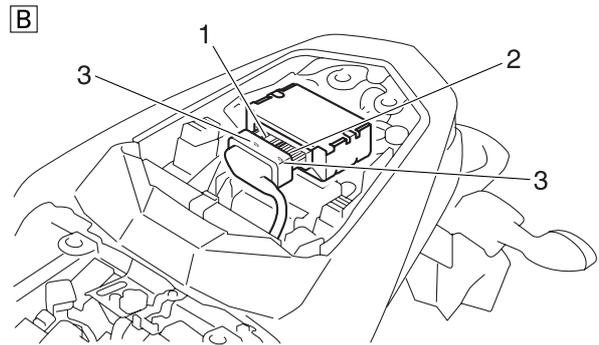
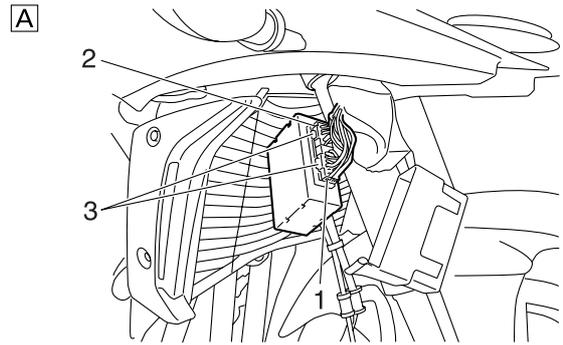


- A. FZ1-SA
- B. FZ1-NA

2. Remove:
  - ABS ECU coupler "1"
  - ABS ECU coupler "2"

#### NOTE:

- Do not pull the ABS ECU leads to remove the ABS ECU couplers.
- Always press on the locks "3" to disconnect the ABS ECU couplers from the ABS ECU.



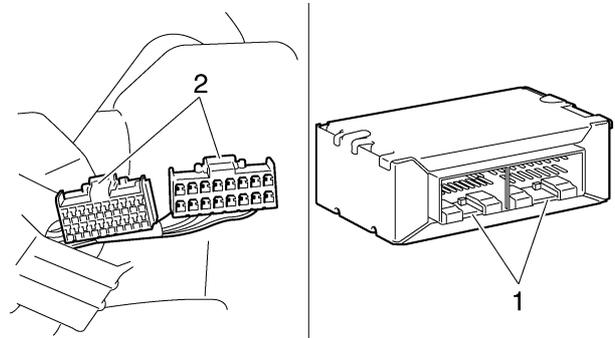
- A. FZ1-SA
- B. FZ1-NA

### Checking the ABS ECU

1. Check:
  - Terminals "1" of the ABS ECU  
Cracks/damages → Replace ABS ECU
  - Terminals "2" of the ABS ECU coupler  
Connection defective, contaminated, come-off → Correct or clean.

#### NOTE:

If the ABS ECU couplers are clogged with mud or dirt, clean with compressed air.



# ABS (ANTI-LOCK BRAKE SYSTEM)

---

EAS27780

## [D-2] MAINTENANCE OF THE ABS MOTOR RELAY

### Removing the ABS motor relay

1. Remove:
  - ABS motor relay coupler

#### NOTE:

Do not pull the ABS motor relay leads to remove the ABS motor relay coupler.

Always press on the lock to disconnect the ABS motor relay coupler from the ABS motor relay.

---

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27790

## ABS TROUBLESHOOTING OUTLINE

This section describes the troubleshooting about ABS in details. Read carefully this service manual before repairing various malfunctions, understand and perform the service.

Electronic control unit (ECU) has the self diagnostic function. When failures occur in the system, the ABS warning light on the meter assembly indicates a malfunction.

Troubleshooting mentioned below describes the cause pursuing and service method according to the indication by the multi-function display. For troubleshooting other than these items, perform by following the normal service method.

EWA13880



**When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer. (Refer to “[D-6] FINAL CHECK” on page 8-130.)**

### ABS warning light goes on and the ABS condition

1. When the ABS warning light keeps going on → It works as a normal brake.
  - Detecting the malfunction by means of the ABS self diagnostic function.
2. Light goes on and off at the time of starting → ABS operation is normal.
  - ABS warning light goes on for 2 seconds every time the main switch is turned on and goes off afterward.
  - ABS warning lights go on while the starter switch is pushed.
3. When the ABS warning light flashes → ABS operation is normal.
  - Brake switch is defective or improperly adjusted.
  - Rear wheel is racing.
  - Continuous riding on extremely uneven roads.
  - Other defective

### Self diagnosis and services

The ABS ECU has a self diagnostic function. By utilizing this function, quick and secure services are possible. Previously occurred error phenomenon can be checked since it also installs the memory for storing malfunction history.

“In case malfunctions are detected”

It is disabled to call the malfunction code by using the multi-function display since the ABS warning light already goes on. Connect the test coupler adapter to the test connector, connect a pocket tester to the terminal of light green lead and check by its pointing needle movement.

Refer to “[B-5] MALFUNCTION CHECK BY THE ABS SELF DIAGNOSIS (PRESENT MALFUNCTION)” on page 8-110.

“In case any malfunctions are not detected”

The multi-function display indicates all the malfunction codes recorded in the ABS ECU. You can check it by using a pocket tester. Note everything if more than two items of malfunction codes are recorded.

“Deleting the malfunction code”

When the malfunction service is finished, check the normal operation of vehicle then delete the malfunction code. By deleting the malfunction code memory, it is possible to pursue the cause correctly if the next defective phenomenon occurred.

### Self diagnosis by ABS ECU

ABS ECU performs the static check for whole system when the main switch is turned on. It is also possible to check the malfunction while riding. It is possible to check the recorded malfunction data by using a pocket tester or the multi-function display of meter by setting the ABS ECU to the self diagnostic mode since all malfunctions which has been once detected are recorded.

# ABS (ANTI-LOCK BRAKE SYSTEM)

---

## Differences between the normal handling and services on a vehicle

- Care should be taken not to damage components by shocks and pulling too much since the ABS components are precisely adjusted.
- ABS ECU, HU, Wheel sensors and ABS motor relay cannot be disassembled.
- Malfunction history in ABS ECU is recorded. Delete it when the service is finished. (This is because the past malfunction contents will be redundantly displayed when the same malfunction occurred again.)

EAS27800

## BASIC INSTRUCTION FOR TROUBLESHOOTING

EWA14030

### **WARNING**

- **Execute the troubleshooting on each malfunction from [A] to [D] in sequence.**
  - **Use the sufficiently charged regular batteries only.**
- 

[A] Malfunction check by the ABS warning light

[B] Detail check of malfunction

Results by self diagnosis are displayed by the multi-function display or a pocket tester according to the ECU's operation.

[C] Supposing the malfunction cause and position

Find the malfunction cause by reasoning the place and situation where it occurred.

[D] ABS system services

Execute the final check after disassembly and assembly.

EWA14040

### **WARNING**

**Perform the troubleshooting [A] → [B] → [C] → [D] in order. Be sure to follow the order since it results in the wrong diagnosis if the order is differently taken or omitted.**

---



# ABS (ANTI-LOCK BRAKE SYSTEM)

---

## NOTE:

Do not delete the malfunction code during the troubleshooting procedures. Be sure to delete it when the service is finished.

---

EWA14050



**Always execute the “final check” when the components related to ABS are checked and serviced.**

---

EAS27830

## **[A] ABS MALFUNCTION CHECK USING THE ABS WARNING LIGHT**

Turn the main switch to “ON”. (Do not start the engine.)

1. The ABS warning light does not come on. [B-1]
2. The ABS warning light remains on. [B-2]
3. The ABS warning light flashes. [B-3]
4. The ABS warning light comes on for 2 seconds, then goes off. [B-4]

EAS4S81017

## **[B] DETAILED ABS MALFUNCTION CHECK**

EAS4S81018

### **[B-1] THE ABS WARNING LIGHT DOES NOT COME ON**

Do other indicators operate normally?

1. Yes [C-1]
2. No [C-2]

EAS4S81019

### **[B-2] THE ABS WARNING LIGHT REMAINS ON**

## NOTE:

Check following the steps in sequence.

---

1. Battery voltage low  
Charge, inspect or replace the battery.
2. Malfunction codes displayed. Check the malfunction codes using the ABS test coupler adaptor. Perform troubleshooting corresponding to the malfunction codes. [B-5]
3. Wire harness, ABS ECU and meter coupler are disconnected.  
Connect the coupler securely until a “click” sound is heard.
4. Check the disconnection between the ABS ECU and meter (ABS warning light).  
Check the conductivity of the wire harness and repair or replace the failure part.
5. Meter circuit malfunction  
Check by the following procedures.
  1. Remove the ABS ECU and connect the ABS test coupler adaptor.
  2. Connect the white/red lead from the test coupler adaptor to the GND terminal and set the main switch to “ON”.
  3. Does the ABS warning light go off?
    1. Yes → Replace the ABS ECU.
    2. No → Replace the meter.

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS4S81020

## [B-3] THE ABS WARNING LIGHT FLASHES

### NOTE:

Check the battery voltage before proceeding.

Check the test coupler located in the left inner panel (front cowling). Is the T/C terminal ground?

1. Yes → Disconnect the grounding lead from the T/C terminal and install the protective cap onto the test coupler.

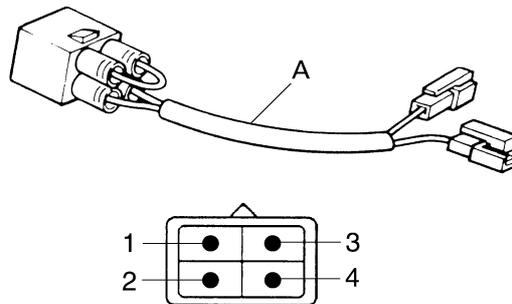
### NOTE:

When the test coupler adaptor is connected to test coupler, the T/C terminal is grounded.

2. No → [C-3]

Arrangement and the function of test couplers

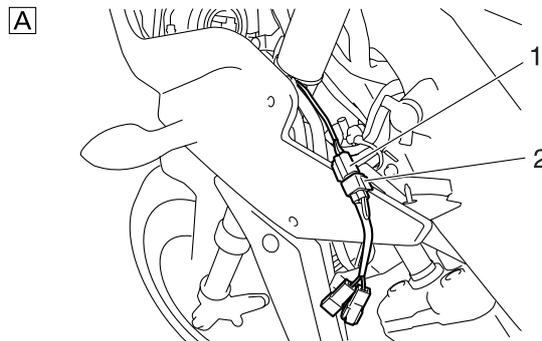
- ECU becomes the malfunction diagnostic mode when the T/C terminal is grounded.
- Malfunction code which the ECU generated in the malfunction diagnostic mode (rise and fall of voltage) is output at the T/F terminal.
- ABS warning light terminal is used when checking the ABS warning light circuit.
- To ground the T/C terminal, connect the test coupler adaptor "A" with the test coupler. Before connecting, check if the battery is sufficiently charged.



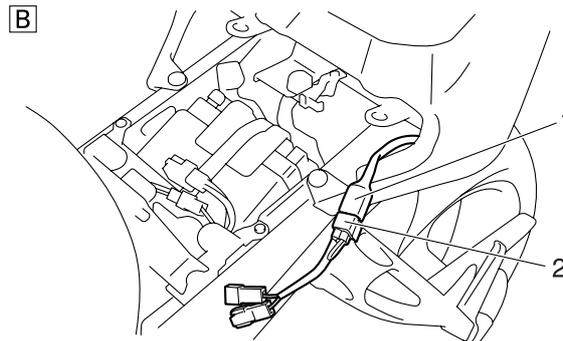
EAS27860

## [B-4] MALFUNCTION CHECK BY THE ABS SELF DIAGNOSIS (PAST MALFUNCTION)

Remove the side cowling (left) and check the location of test coupler "1". Remove the protective cap and connect the ABS test coupler adaptor "2" to the test coupler. The T/C terminal (sky-blue) is now connected to the ground.



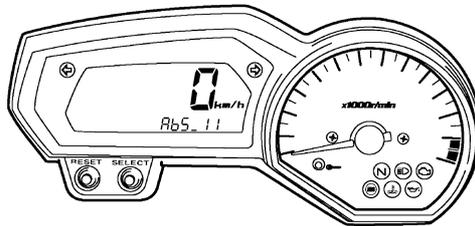
# ABS (ANTI-LOCK BRAKE SYSTEM)



A. FZ1-SA

B. FZ1-NA

1. Indicate the malfunction code (Example: malfunction code 11)



2. ABS warning light flashes every 0.5 second for more than 6 seconds. → [C-4, C-5]  
If the ABS warning light flashes every 0.5 second, the malfunction code of a past malfunction has not been stored in the memory of the ECU (ABS). If a malfunction code is displayed on the multifunction display, the ABS warning light flashes. Make sure that the customer understands the possible conditions when the ABS warning light comes on.

EAS27870

## [B-5] MALFUNCTION CHECK BY THE ABS SELF DIAGNOSIS (PRESENT MALFUNCTION)

### NOTE:

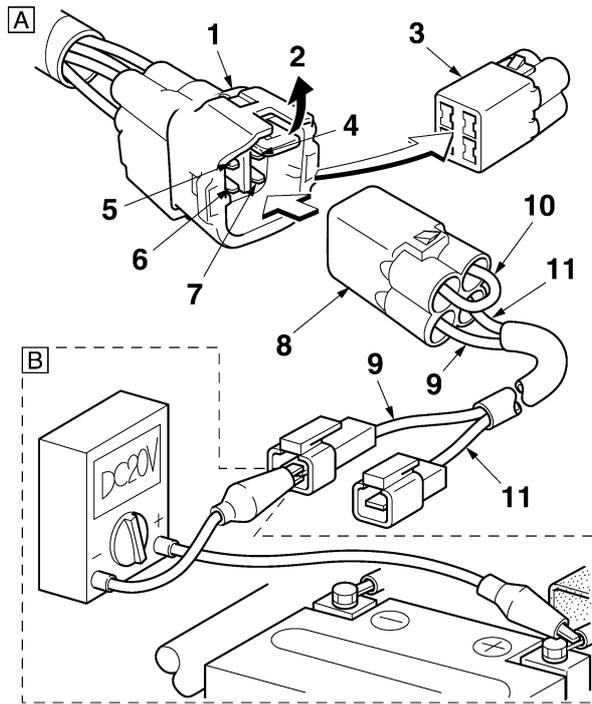
Before proceeding to read the part of "Arrangement and the function of test coupler".

Remove the side cowling (left) and check the location of test coupler. Connect the test coupler adapter with the test coupler in order to ground the T/C terminal (sky-blue). (Figure-"A") Set the range of pocket tester to DC 20 V. Connect the negative (-) terminal of tester to the T/F terminal (light green) and positive (+) terminal to the positive (+) terminal of battery. (Figure-"B") Read the tester indication. (Figure-"C")

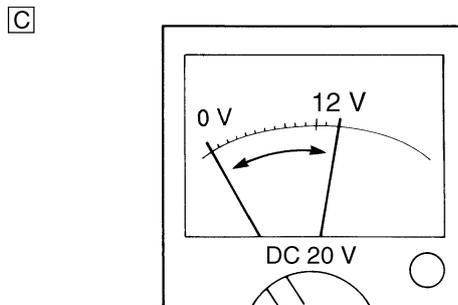
### NOTE:

Read the code through this means so that the "currently malfunction" code is not indicated on the meter.

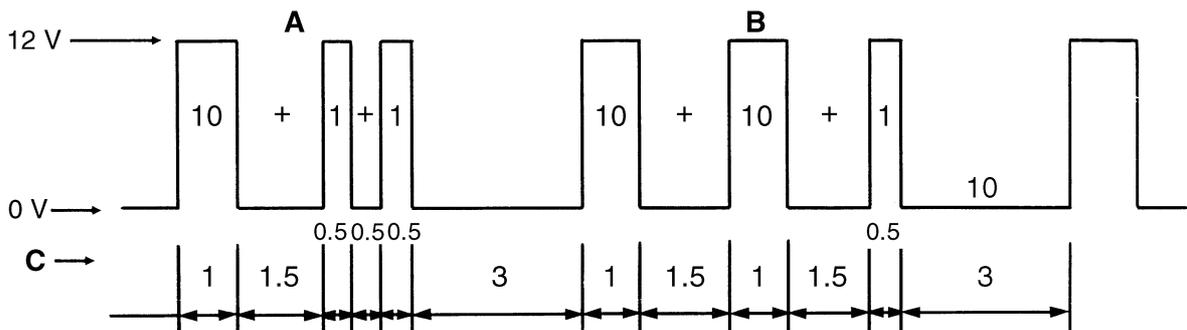
# ABS (ANTI-LOCK BRAKE SYSTEM)



- |                     |   |
|---------------------|---|
| 1. ABS test coupler | 7. ABS warning light terminal (White/Red) |
| 2. Lock plate       | 8. Test coupler adapter                   |
| 3. Protective cap   | 9. Light green                            |
| 4. Grounding        | 10. Black                                 |
| 5. T/C terminal     | 11. White/Red                             |
| 6. T/F terminal     |   |



As an example, "10 digits/1 digit pattern" of tester reading is shown below.





# ABS (ANTI-LOCK BRAKE SYSTEM)

---

EAS4S81024

## **[C-3] ABS WARNING LIGHT FLASHES**

1. When the warning light flashes “ON” for 0.25 seconds and “OFF” for 0.75 seconds, check the stop switch or 3-4), 5).
2. When the warning light flashes “ON” for 0.75 seconds and “OFF” for 0.25 seconds, the starter motor monitor is defective. Same as the error code 22 or 3-1), 2), 3).
3. When the warning light flashes “ON” for 1 second and “OFF” for 1 second, it is another malfunction. Same as the error code 28.

The following are probable causes to explain why the ABS warning light flashed while riding and then stopped flashing or stopped flashing when main switch was set “OFF” to “ON”.

1. The rear wheel was rotated with the vehicle on the centerstand. → The system is normal.
2. The rear wheel was raced. → The system is normal.
3. The vehicle was ridden on the rear wheel with the front wheel elevated. → The system is normal.
4. The vehicle was ridden on extremely uneven roads continuously. → The system is normal.
5. The brake switch is defective or improperly adjusted. → Replace or adjust.

EAS4S81025

## **[C-4] ABS WARNING LIGHT FLASHES EVERY 0.5 SECOND**

If the ABS warning light flashes every 0.5 second, the malfunction code of a past malfunction has not been stored in the memory of the ABS ECU. If a malfunction code is displayed on the multifunction display, the ABS warning light flashes. Make sure that the customer understands the possible conditions when the ABS warning light comes on.

### 1. Voltage drop

For the ABS to operate correctly, the voltage should be always higher than the specified voltage. If the voltage drops to lower than 10 V, the ABS warning light comes on and the ABS does not operate. When the voltage recovers to higher than 10 V, the ABS operates. However, the magneto, battery and rectifier/regulator must be checked. Follow the regular procedures for service of the power supply system.

### 2. ABS is stopped by the ABS ECU

The ABS ECU may stop the ABS operation if it is exposed to extremely strong electromagnetic waves or static electricity.

When the ABS ECU is no longer exposed to the electromagnetic waves, static electricity, and the ABS warning light is not flashing, there is no effect on the operation of the ABS. Explain to the customer that the ABS will operate normally.

# ABS (ANTI-LOCK BRAKE SYSTEM)

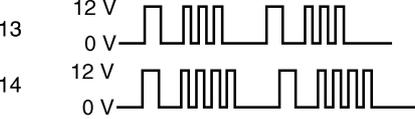
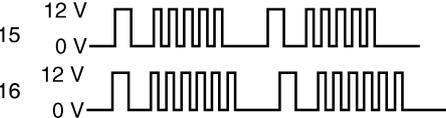
EAS27880

## [C-5] DIAGNOSIS BY THE MALFUNCTION CODE

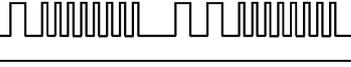
Malfunction codes are used to determine the malfunctions that have occurred. (Refer to “[B-4] MALFUNCTION CHECK BY THE ABS SELF-DIAGNOSIS (PAST MALFUNCTION)” and “[B-5] MALFUNCTION CHECK BY THE ABS SELF-DIAGNOSIS (PRESENT MALFUNCTION)”.) The malfunction codes are explained in the following table.

**NOTE:**

Record all of the malfunction codes displayed and check the check points.

Malfunction code	Problem	Check point	Reference
11*	Front wheel sensor signal is not received properly. 	<ul style="list-style-type: none"> <li>Installation of the front wheel sensor</li> <li>Front wheel sensor lead and coupler</li> <li>ABS wire harness circuit</li> <li>Front wheel sensor rotor</li> </ul>	Malfunction code 11
12	Rear wheel sensor signal is not received properly. 	<ul style="list-style-type: none"> <li>Installation of the rear wheel sensor</li> <li>Rear wheel sensor lead and coupler</li> <li>ABS wire harness circuit</li> <li>Rear wheel sensor rotor</li> </ul>	Malfunction code 12
13 (front) 14 (rear)	Incorrect signal is detected by the front (13) or rear (14) wheel sensor. 	<ul style="list-style-type: none"> <li>Wheel sensor installation</li> <li>Wheel sensor housings</li> <li>Wheel sensor rotors</li> </ul>	Malfunction codes 13 (front wheel) and 14 (rear wheel)
15 (front) 16 (rear)	No continuity in the front or rear wheel sensor circuits 	<ul style="list-style-type: none"> <li>Continuity of sensor circuits</li> <li>ABS wire harness circuit</li> <li>Connection of sensor coupler</li> </ul>	Malfunction codes 15 (front wheel sensor) and 16 (rear wheel sensor)
18	Missing serration of sensor rotor 	<ul style="list-style-type: none"> <li>Sensor rotor</li> </ul>	Malfunction code 18
21	Disconnection and short-circuit of hydraulic unit solenoid 	<ul style="list-style-type: none"> <li>Wire harness circuit</li> <li>Hydraulic unit solenoid coupler</li> <li>Hydraulic unit solenoid</li> <li>Battery terminal is disconnect</li> </ul>	Malfunction code 21
22	Starter motor monitor malfunction 	<ul style="list-style-type: none"> <li>Wire harness circuit</li> <li>Replace the ABS ECU.</li> </ul>	Malfunction code 22

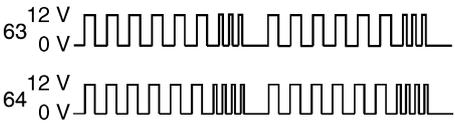
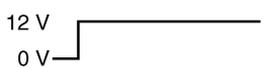
## ABS (ANTI-LOCK BRAKE SYSTEM)

Malfunction code	Problem	Check point	Reference
24	Stop light failure (Brake system circuit has failure.)  12 V  0 V	<ul style="list-style-type: none"> <li>Adjust the brake light switch.</li> <li>Brake light switch</li> <li>Bulb has burned out.</li> <li>Check the wire harness for the brake light system circuit.</li> </ul>	Malfunction code 24
25	At the beginning of running, there is no pulse from the front wheel sensor.  12 V  0 V	<ul style="list-style-type: none"> <li>Rear wheel was rotated with the vehicle on the centerstand.</li> <li>Rear wheel was wheel-spin.</li> <li>Wheelie tried</li> <li>Defective installation of the wheel speed sensor for the front wheel</li> </ul>	Malfunction code 25
26 (front) 27 (rear)	Same as malfunction code 13 and 14 (Running on extremely uneven roads)  26 <sup>12 V</sup>  0 V 27 <sup>12 V</sup>  0 V	<ul style="list-style-type: none"> <li>Same as malfunction code 13 and 14</li> </ul>	Malfunction code 26 (front) and 27 (rear)
28	Other malfunctions (Malfunction of the memory in ABS ECU)  12 V  0 V	<ul style="list-style-type: none"> <li>Replace the ABS ECU</li> </ul>	Malfunction code 28
31	Disconnection is detected between the battery and ABS ECU system.  12 V  0 V	<ul style="list-style-type: none"> <li>ABS motor fuse</li> <li>ABS wire harness circuit (between the battery and ABS ECU)</li> <li>ABS ECU coupler</li> </ul>	Malfunction code 31
32	Circuit malfunction of ABS ECU is detected. Upstream side of the solenoid relay  12 V  0 V	<ul style="list-style-type: none"> <li>Wire harness circuit</li> <li>Replace the ABS ECU.</li> </ul>	Malfunction code 32
33	Defective operation of the ABS motor is detected. (ABS motor stops and will not rotate.)  12 V  0 V	<ul style="list-style-type: none"> <li>ABS wire harness circuit</li> <li>ABS motor coupler</li> <li>ABS motor relay</li> <li>ABS motor circuit</li> <li>ABS motor fuse</li> </ul>	Malfunction code 33
34	Defective operation of the ABS motor is detected. (ABS motor keeps running and will not stop.)  12 V  0 V	<ul style="list-style-type: none"> <li>ABS motor relay</li> <li>ABS wire harness circuit</li> <li>ABS motor circuit</li> </ul>	Malfunction code 34

## ABS (ANTI-LOCK BRAKE SYSTEM)

Malfunction code	Problem	Check point	Reference
35	<p>Disconnection is detected between the ABS ECU and solenoid system. Downstream side of the solenoid relay</p> 	<ul style="list-style-type: none"> <li>• ABS harness circuit (from ABS ECU to the solenoid)</li> <li>• Solenoid coupler</li> <li>• Battery terminal is disconnected.</li> </ul>	Malfunction code 35
41	<p>Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic state (when the battery voltage is normal).</p> 	<ul style="list-style-type: none"> <li>• Brake dragging</li> <li>• Hydraulic unit operation test 2</li> <li>• Front wheel brake line</li> </ul>	Malfunction code 41
42	<p>Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic state (when the battery voltage is normal).</p> 	<ul style="list-style-type: none"> <li>• Brake dragging</li> <li>• Hydraulic unit operation test</li> <li>• Rear wheel brake line</li> </ul>	Malfunction code 42
51	<p>Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic state (when the battery voltage is low).</p> 	<ul style="list-style-type: none"> <li>• Brake dragging</li> <li>• Hydraulic unit operation test 2</li> <li>• Front wheel brake line</li> <li>• Battery voltage</li> </ul>	Malfunction code 51
52	<p>Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic state (when the battery voltage is low).</p> 	<ul style="list-style-type: none"> <li>• Brake dragging</li> <li>• Hydraulic unit operation test 2</li> <li>• Rear wheel brake line</li> <li>• Battery voltage</li> </ul>	Malfunction code 52
61 (front) 62 (rear)	<p>Sensor power supply is low</p> 	<ul style="list-style-type: none"> <li>• Battery voltage low</li> <li>• Battery terminal is disconnected</li> </ul>	Malfunction code 61 (front) and 62 (rear)

# ABS (ANTI-LOCK BRAKE SYSTEM)

Malfunction code	Problem	Check point	Reference
63 (front) 64 (rear)	Sensor power supply failure 	<ul style="list-style-type: none"> <li>• Wire harness circuit</li> <li>• Battery terminal is disconnected</li> <li>• Replace the ABS ECU</li> </ul>	Malfunction code 63 (front) and 64 (rear)
Present malfunction (test always indicates 12 V)	ABS ECU may be malfunctioning 	<ul style="list-style-type: none"> <li>• ABS wire harness circuit (test coupler circuits)</li> <li>• ABS ECU (Replace)</li> </ul>	Maintenance of the ABS ECU [D-1]

\* Malfunction code 11 is indicated if the rear wheel rotates for more than 20 seconds with the front wheel stopped.

**NOTE:**

Malfunction code 15 (front wheel sensor) or 16 (rear wheel sensor) is displayed if a defective connection to either the front or rear sensor is detected whether or not the vehicle is ridden.

**Malfunction code 11 (Front wheel sensor signal is not received properly.)**

Turn the main switch to “OFF”, then back to “ON” after removing the test coupler adapter.

1. ABS warning light remains on.
  - Defective connection in the front wheel sensor circuit.
  - Front wheel sensor coupler is disconnected. → [D-3]
  - Front wheel sensor lead or internal circuit is broken. → [D-3]
  - Wire harness (ABS) sensor circuit is broken. → (Refer to “CIRCUIT DIAGRAM (FZ1-SA)” on page 8-89.)
  - ABS ECU coupler terminal is disconnected. → [D-1]
2. ABS warning light goes on for 2 seconds then goes off.
  1. With the front wheel stopped, the rear wheel was rotated for more than 20 seconds. This is not a malfunction.
  2. Signal is not generated at the front wheel sensor.
    - Front wheel sensor is not installed properly. → [D-3]
    - Front wheel sensor rotor is defective. → [D-3]
  3. Front wheel sensor circuit is short-circuited.
    - Front wheel sensor or lead is short-circuited. → [D-3]
    - Wire harness (ABS) sensor circuit is short-circuited. → (Refer to “CIRCUIT DIAGRAM (FZ1-SA)” on page 8-89.)
  4. Front wheel sensor output drops.
    - Sensor signal output may drop due to failure on bearings, wheel axle, wheel or sensor housing of front wheel. Check these components when installed for looseness, distortion, and bends.

**Malfunction code 12 (Rear wheel sensor signal is not received properly.)**

Turn the main switch to “OFF”, then back to “ON” after removing the test coupler adapter.

1. ABS warning light remains on.
  - Defective connection in the rear wheel sensor circuit.
  - Rear wheel sensor coupler is disconnected. → [D-4]
  - Rear wheel sensor lead or internal circuit is broken. → [D-4]
  - Wire harness (ABS) sensor circuit is disconnected. → (Refer to “CIRCUIT DIAGRAM (FZ1-SA)” on page 8-89.)

# ABS (ANTI-LOCK BRAKE SYSTEM)

---

- ABS ECU coupler terminal is disconnected. → [D-1]
- 2. ABS warning light goes on for 2 seconds then goes off.
  1. With the rear wheel stopped, the front wheel was rotated at a speed faster than 11 km/h. This is not a malfunction.
  2. Signal is not generated at the rear wheel sensor.
    - Rear wheel sensor is not installed properly. → [D-4]
    - Rear wheel sensor rotor is defective. → [D-4]
  3. Rear wheel sensor circuit is short-circuited.
    - Rear sensor or lead is short-circuited. → [D-4]
    - Wire harness (ABS) sensor circuit is short-circuited. → (Refer to “CIRCUIT DIAGRAM (FZ1-SA)” on page 8-89.)
  4. Rear wheel sensor output drops.
    - Sensor signal output may drop due to failure of the bearing, wheel, or brake caliper bracket of the rear wheel. Check these components when installed for looseness, distortion, and bends.

**NOTE:**

---

If the vehicle is ridden on extremely uneven roads continuously, the ABS warning light may flash and malfunction code 11 or 12 may be recorded depending on the condition.

---

**Malfunction code 13 (front wheel) and malfunction code 14 (rear wheel) (Incorrect signal is detected by the front (13) or rear (14) wheel sensor.)**

1. The wheel sensors or sensor rotors are not properly installed.
  1. Installation of the front or rear wheel sensor
    - Check that the wheel sensor is properly installed in the housing. → [D-3, 4]
    - Check if there is looseness between the housing and the front wheel. → [D-3, 4]
    - Check if there is looseness rear brake caliper bracket and the rear wheel. → [D-3, 4]
  2. Installation of the front or rear wheel sensor rotor
    - Check that the sensor rotor is correctly pressed in the front wheel. → [D-3, 4]
    - Check that the sensor rotor is correctly install to the rear wheel. → [D-3, 4]
    - Check the rotor and inside the rotor housing for foreign materials. → [D-3, 4]
2. Teeth surfaces of the sensor rotors are defective.
  - Check for flaws on the teeth surfaces of the front or rear wheel sensor rotors. Also, check for any foreign materials. → [D-3, 4]
3. Sensor output has dropped.
  - Sensor signal output may drop due to failure of the bearings, wheel axle, rear brake caliper bracket wheel or sensor housing of (front) the front or rear wheel. Check these components when installed for looseness, distortion, and bends.

**Malfunction code 15 (front wheel sensor) and malfunction code 16 (rear wheel sensor) (No continuity in the front or rear wheel sensor circuits.)**

Broken front or rear wheel sensor circuit is detected.

- Front or rear wheel sensor coupler is broken. → [D-3, 4]
- Front or rear wheel sensor or lead is broken. → [D-3, 4]
- Sub-wire harness (ABS) sensor circuit is broken. → (Refer to “CIRCUIT DIAGRAM (FZ1-SA)” on page 8-89.)
- Sub-wire harness (ABS) is disconnected from the ABS ECU coupler terminal. → [D-1]

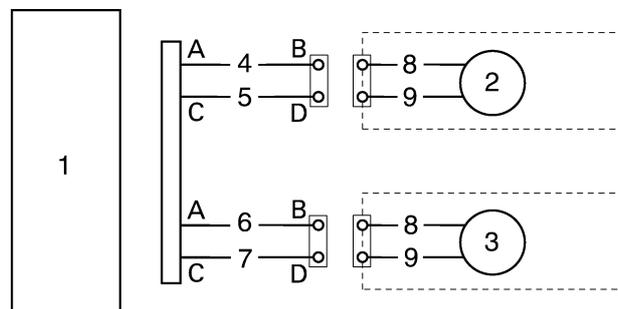
**NOTE:**

---

- Check that both the front and rear wheel sensor couplers are connected securely.
  - If the vehicle is ridden after malfunction code 15 (front wheel sensor) or 16 (rear wheel sensor) is displayed, the malfunction code will be overwritten from 15 to 11 (front wheel sensor signal) or from 16 to 12 (rear wheel sensor signal).
-

# ABS (ANTI-LOCK BRAKE SYSTEM)

1. Check the wheel sensor signal  
Measure the wheel sensor signal output voltage.  
Refer to "CHECKING THE WHEEL SENSOR" on page 8-149.
2. Check the appearance.
3. Check the wire harness.
  1. Disconnection of the ABS ECU coupler terminal
  2. Remove the ABS ECU coupler and wheel sensor coupler and check the conductivity, short-circuit to GND and short-circuit to SSR-VCC from the wire harness.
    - Conductivity of the wire harness  
Check the conductivity between "A"-"B", and "C"-"D".
    - GND short-circuit  
Check the short-circuit to GND between "A"-"B", and "C"-"D".
    - Short-circuit between the wire harnesses  
Check the short-circuit between "A"-"C", and "B"-"D".



- |                       |               |
|-----------------------|---------------|
| 1. ABS ECU            | 6. Blue/Red   |
| 2. Front wheel sensor | 7. Blue/Black |
| 3. Rear wheel sensor  | 8. White      |
| 4. Blue               | 9. Gray       |
| 5. Blue/White         |               |

4. When the items "1" to "4" are normal, replace the wheel sensor.
5. Replace the ABS ECU if the condition does not become normal even if the wheel sensor is replaced.

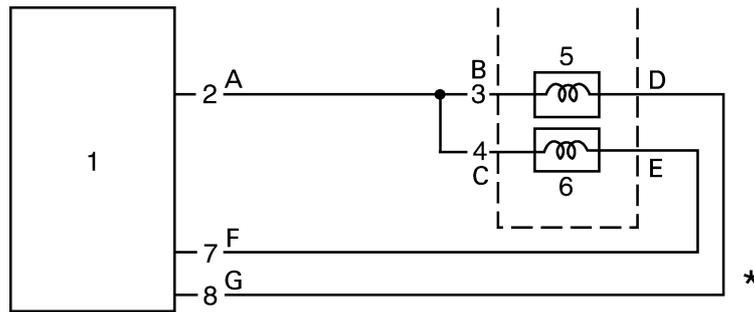
## Malfunction code 18 (Missing serration of sensor rotor)

1. Missing serration of the rear sensor rotor.
  - Replace the rear sensor rotor.

## Malfunction code 21 (Disconnection and short-circuit of hydraulic unit solenoid.)

1. Hydraulic unit solenoid coupler
  - Check if the hydraulic unit solenoid coupler terminal is disconnected. (Refer to "ABS CONNECTOR LOCATION CHART" on page 8-97.)
2. Hydraulic unit solenoid
  - Check the front and rear wheel solenoids for continuity → [D-5]
  - Check the insulation of all solenoid terminals and the negative battery terminal. → [D-5]
3. Wire harness (ABS)
  - Check the hydraulic unit solenoid circuits for continuity. (See the illustration below.)

# ABS (ANTI-LOCK BRAKE SYSTEM)



- |            |                   |
|------------|-------------------|
| 1. ABS ECU | 5. Front solenoid |
| 2. Red     | 6. Rear solenoid  |
| 3. Red     | 7. Green          |
| 4. Red     | 8. White/Red      |

\*Continuity between: "A"–"B", "A"–"C", "D"–"G", "E"–"F"

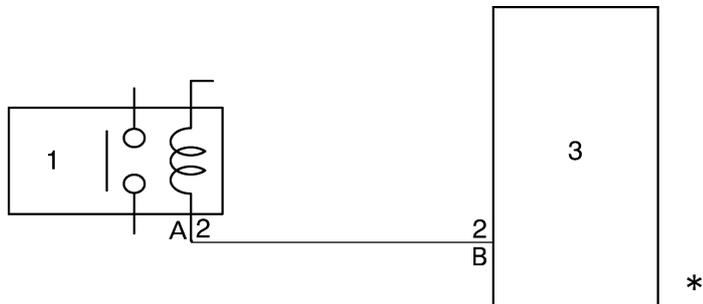
- Check the insulation of the hydraulic unit solenoid circuits and the negative battery terminal.

#### 4. Battery

- Battery terminal is disconnected

### Malfunction code 22 (Starter motor monitor malfunction)

1. Disconnection of the wire harness for the start system circuit  
→ Check the conductivity of the wire harness and repair or replace the failure part.
2. Disconnection of the starter motor monitor  
→ Check the conductivity of the wire harness and repair or replace the failure part.



- |                  |            |
|------------------|------------|
| 1. Starter relay | 3. ABS ECU |
| 2. Blue/White    |            |

\*Continuity between: "A"–"B"

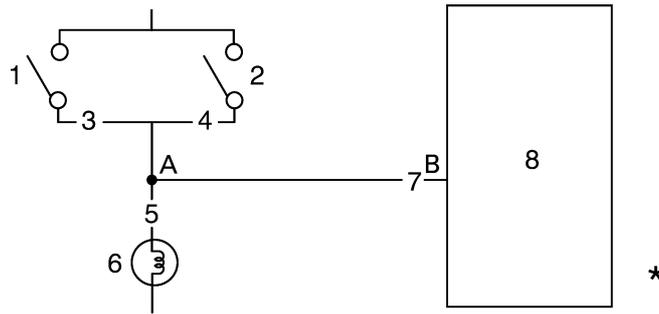
### NOTE:

If you do not start the engine with the starter switch but repeat push-starting the engine excessively, this code may be input.

### Malfunction code 24 (Step light failure [Brake system circuit has failure].)

1. Disconnection of the wire harness for the brake circuit  
→ Check the conductivity of the wire harness and repair or replace the failure part.
2. Disconnection of the stop lamp monitor  
→ Check the conductivity of the wire harness and repair or replace the failure part.

# ABS (ANTI-LOCK BRAKE SYSTEM)



- |                             |                |
|-----------------------------|----------------|
| 1. Front brake light switch | 5. Yellow      |
| 2. Rear brake light switch  | 6. Brake light |
| 3. Green/Yellow             | 7. Yellow      |
| 4. Yellow                   | 8. ABS ECU     |

\*Continuity between: "A"–"B"

## Malfunction code 25 (At the beginning of running, there is no pulse from the front wheel sensor.)

- Rear wheel was rotated with the vehicle on the stand.
- Rear wheel was wheel-spin.
- Wheel tried.
- Defective installation of the wheel speed sensor for the front wheel.

## Malfunction code 28 (Other malfunctions [Malfunction of the memory in ABS ECU].)

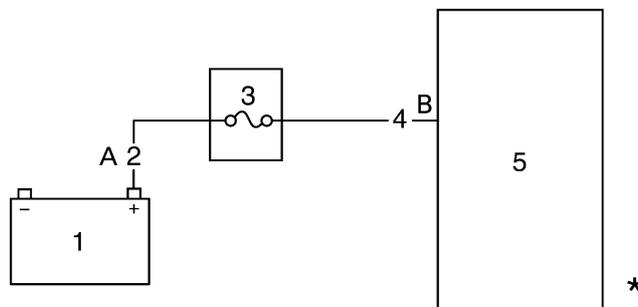
1. Other malfunctions  
→ Replace the ABS ECU.

## Malfunction code 31 (Disconnection is detected between the battery and the ABS ECU system.)

### NOTE:

Check following the steps in sequence.

1. ABS motor fuse blown
  - Replace the ABS motor fuse.
2. Coupler joint between the battery and ABS ECU.
  - Connect the coupler securely until a "click" sound is heard.
3. Disconnection of the wire harness between the battery and ABS ECU
  - Check the conductivity of the wire harness and repair or replace the failure part.



- |                   |            |
|-------------------|------------|
| 1. Battery        | 4. Brown   |
| 2. Red            | 5. ABS ECU |
| 3. ABS motor fuse |            |

\*Continuity between: "A"–"B"

# ABS (ANTI-LOCK BRAKE SYSTEM)

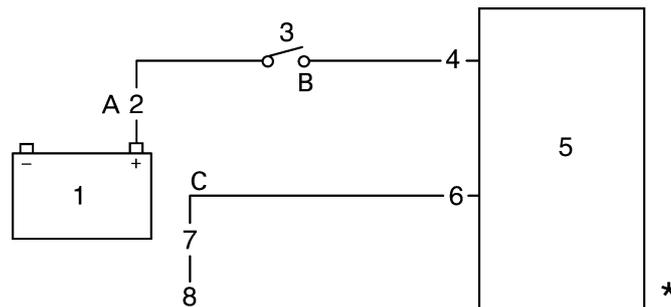
4. When the items 1 to 3 are normal, replace the ABS ECU.

**Malfunction code 32 (Circuit malfunction of ABS ECU is detected. Upstream side of the solenoid relay.)**

**NOTE:**

Check following the steps in sequence.

1. Short-circuit between the battery positive terminal and fail safe relay monitor terminal
  - Check the conductivity of the wire harness and repair or replace the failure part.
2. Short-circuit between the battery ignition terminal and fail safe relay monitor terminal
  - Check the conductivity of the wire harness and repair or replace the failure part.



- |                |            |
|----------------|------------|
| 1. Battery     | 5. ABS ECU |
| 2. Red         | 6. Red     |
| 3. Main switch | 7. Red     |
| 4. Brown/White | 8. To HU   |

\*Continuity between: "A"–"C", "B"–"C"

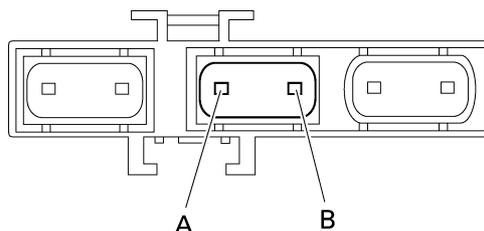
3. When the items 1 to 2 are normal, replace the ABS ECU.

**Malfunction code 33 (Defective operation of the ABS motor is detected. [ABS motor stops and will not rotate.]**

**NOTE:**

Check following the steps in sequence.

1. ABS motor fuse
  - Check if the ABS motor fuse beside the battery is blown.
2. ABS motor relay
  - Check if the ABS motor relay operates correctly. → [D-2]
3. Wire harness
  - Remove the ABS motor relay and the ABS motor fuse, and then check for continuity between the brown (Refer to "ABS CONNECTOR LOCATION CHART" on page 8-97 in ABS motor relay coupler drawing.) terminal of the wire harness (ABS) and the wire harness (ABS) end (terminal A shown in the illustration) of the ABS motor fuse terminal beside the battery. (Refer to "CIRCUIT DIAGRAM (FZ1-SA)" on page 8-89.)



- A. Terminal A
- B. Terminal B

# ABS (ANTI-LOCK BRAKE SYSTEM)

- Check for continuity between the positive battery terminal and the battery end of the ABS motor fuse terminal (terminal “B” shown in the above illustration).
- Remove the ABS ECU and the ABS motor relay from the wire harness (ABS), and then check for continuity between the white/black lead terminals of ABS ECU coupler and the white/red lead terminals of ABS motor coupler.

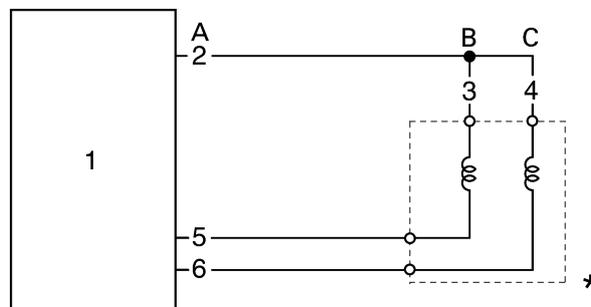
## Malfunction code 34 (Defective operation of the ABS motor is detected. [ABS motor keeps running and will not stop.] )

Check the following:

1. ABS motor
  - Check if the ABS motor coupler located under the fuel tank is connected properly.
  - Check the ABS motor for continuity. → [D-5]
2. Wire harness (ABS)
  - Remove the ABS motor coupler and check for continuity between the black terminal of the ABS motor coupler of the wire harness (ABS) and the negative battery terminal.
  - Remove the ABS ECU coupler and check for continuity between the red/white terminal of the ABS ECU coupler and the red/white terminal of the ABS motor coupler. → [D-1]
  - Remove the ABS motor relay and check for continuity between the red/white terminal of the ABS motor coupler of the wire harness (ABS) and the positive battery terminal.
3. ABS motor relay
  - Check if the ABS motor relay operates correctly. → [D-2]

## Malfunction code 35 (Disconnection is detected between the ABS ECU and solenoid system. Downstream side of the solenoid relay.)

1. Disconnected coupler between the ABS ECU and HU solenoid  
Connect the coupler securely until a “click” sound is heard.
2. Disconnection of the wire harness between the ABS ECU and HU solenoid  
Check the conductivity of the wire harness and repair or replace the failure part.



- |            |              |
|------------|--------------|
| 1. ABS ECU | 4. Red       |
| 2. Red     | 5. Green     |
| 3. Red     | 6. White/Red |

\*Continuity between: “A”–“B”, “A”–“C”

3. Battery terminal is disconnected.
4. When the items 1 to 3 are normal, replace the ABS ECU

## Malfunction code 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 state [when the battery voltage is normal].)

Check the following:

1. Rotation of the front wheel
  - Check that there is no brake disc drag on the front wheel and make sure it rotates smoothly.
  - Check the front wheel axle for loose bearings and bends, and the brake disc for distortion.

# ABS (ANTI-LOCK BRAKE SYSTEM)

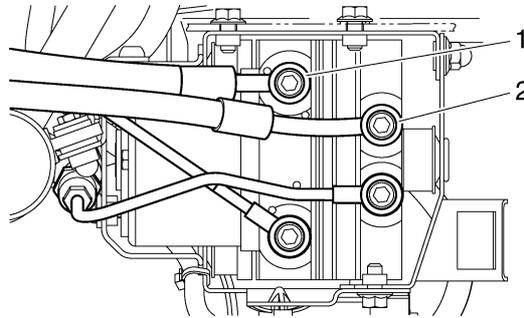
2. Brake master cylinder and brake caliper
  - Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake lever is operated and that the pressure decreases when the lever is released.
3. Brake fluid
  - Visually check the brake fluid in the brake master cylinder reservoir and the fluid for water, foreign materials, solidification and contamination.
  - Check for air in the brake hose lines.
4. Brake hose lines
  - Check the brake hose lines for kinks and deterioration.

EWA4S81009

**⚠ WARNING**

**Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake hose lines.**

- Check that the connections of the brake hose lines from the brake master cylinder to the hydraulic unit and to the front brake caliper from the hydraulic unit are correct.



EWA4S81010

**⚠ WARNING**

**The front brake will not function properly if the connections are reversed.**

- Front brake hose “1” inlet: from the front brake master cylinder
- Front brake hose “2” outlet: to the front brake caliper

**NOTE:**

- If the front brake hose inlet and outlet connections are reversed on the hydraulic unit, the brake lever is pulled to full stroke without responding and will be pushed back slowly without pulsating when the final check in [D-6] is performed.
- If the front and rear brake hose 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 in [D-6] is performed.

5. Hydraulic unit solenoid coupler terminal
  - Check if the front and rear hydraulic unit solenoid coupler terminals (hydraulic unit and wire harness [ABS]) are reversed.

	Terminal color	
	Solenoid side	Wire harness side (ABS)
Front	Red, Green	Red, Green
Rear	Red, Blue	Red, White/Red

6. Hydraulic unit
 

If the malfunction is not corrected after performing steps 1 to 5, replace the hydraulic unit. Be sure to connect the brake hoses and couplers correctly and securely. Check the hydraulic unit operation. (Refer to “[D-6] FINAL CHECK” on page 8-130.)

# ABS (ANTI-LOCK BRAKE SYSTEM)

**Malfunction code 42 (Rear wheel not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic state [when the battery voltage is normal].)**

Check the following:

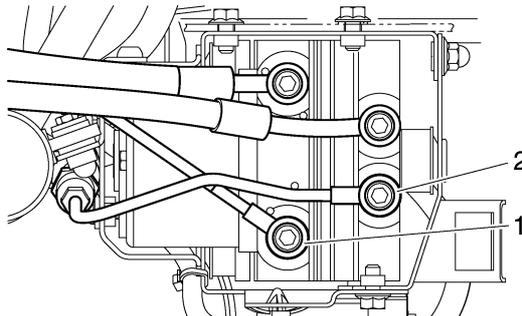
1. Rotation of the rear wheel
  - Check that there is no brake drag on the rear wheel and make sure it rotates smoothly.
  - Check for brake disc distortion.
2. Brake master cylinder and brake caliper
  - Check that the brake fluid pressure is correctly transmitted to the brake disc when the brake pedal is operated and that the pressure decreases when the pedal is released.
3. Brake fluid
  - Visually check the brake fluid in the brake master cylinder reservoir and check the fluid for water, foreign materials, solidification and contamination.
  - Check for air in the brake hose lines.
4. Brake hose lines
  - Check the brake hose lines for kinks and deterioration (particularly between the hydraulic unit and the rear brake caliper).

EWA4S81011



**Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake hose lines.**

- Check that the connections of the brake hose lines from the brake master cylinder to the hydraulic unit and to the rear brake caliper from the hydraulic unit are correct.



EWA4S81012



**The rear brake will not function properly if the connections are reversed.**

- Rear brake hose “1” inlet: from the rear brake master cylinder
- Rear brake hose “2” outlet: to the rear brake caliper

**NOTE:**

- If the rear brake hose inlet and outlet connections are reversed on the hydraulic unit, the brake pedal is pressed down to full stroke without responding and will be pushed back slowly without pulsating when the final check is performed.
- If the front and rear brake hose 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 is performed.

5. Hydraulic unit solenoid coupler terminal
  - Check if the front and rear hydraulic unit solenoid coupler terminals (hydraulic unit and wire harness [ABS]) are reversed.

# ABS (ANTI-LOCK BRAKE SYSTEM)

	Terminal color	
	Solenoid side	Wire harness side (ABS)
Front	Red, Green	Red, Green
Rear	Red, Blue	Red, White/Red

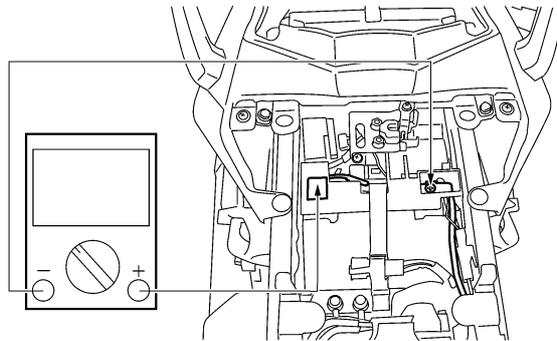
## 6. Hydraulic unit

If the malfunction is not corrected after performing steps 1 to 5, replace the hydraulic unit. Be sure to connect the brake hose lines and couplers correctly and securely. Check the hydraulic unit operation. (Refer to “[D-6] FINAL CHECK” on page 8-130.)

**Malfunction code 51 (Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic state [when the battery voltage is low].)**

Check the following:

1. Rotation of the front wheel  
Refer to “Malfunction code 41”.
2. Brake master cylinder and brake caliper  
Refer to “Malfunction code 41”.
3. Brake fluid  
Refer to “Malfunction code 41”.
4. Brake hose lines  
Refer to “Malfunction code 41”.
5. Hydraulic unit solenoid coupler terminals  
Refer to “Malfunction code 41”.
6. Hydraulic unit  
Refer to “Malfunction code 41”.
7. Battery voltage  
Measure the battery voltage.



**Malfunction code 52 (Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic state [when the battery voltage is low].)**

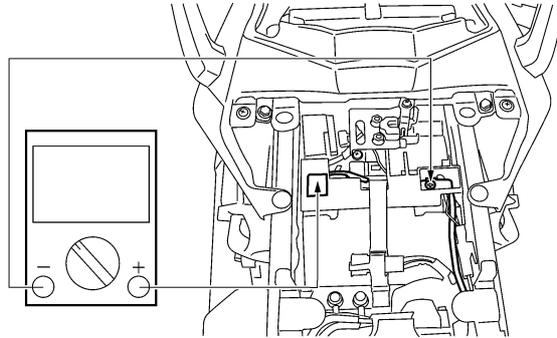
Check the following:

1. Rotation of the rear wheel  
Refer to “Malfunction code 42”.
2. Brake master cylinder and brake caliper  
Refer to “Malfunction code 42”.
3. Brake fluid  
Refer to “Malfunction code 42”.
4. Brake hose lines  
Refer to “Malfunction code 42”.
5. Hydraulic unit solenoid coupler terminals

# ABS (ANTI-LOCK BRAKE SYSTEM)

Refer to "Malfunction code 42".

6. Hydraulic unit  
Refer to "Malfunction code 42".
7. Battery voltage  
Measure the battery voltage.

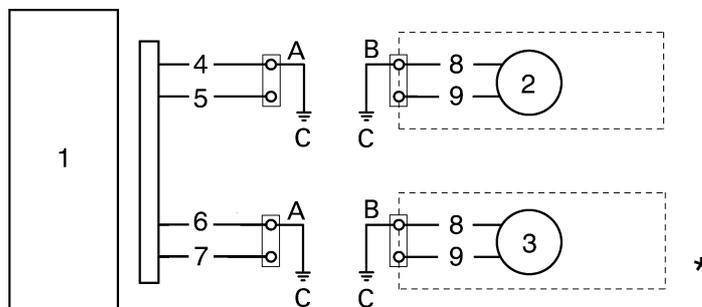


## Malfunction code 61 (front), 62 (rear) (Sensor power supply is low)

1. Battery voltage low  
Charge, check or replace the battery.
2. Battery terminal is disconnected.

## Malfunction code 63 (front), 64 (rear) (Sensor power supply failure)

1. GND short-circuit of the wire harness  
Remove the ABS ECU coupler and wheel sensor coupler and check the conductivity between the wire harness and GND.  
If short-circuit is detected, replace the wire harness because the cause is the wire harness failure.



- |                       |               |
|-----------------------|---------------|
| 1. ABS ECU            | 6. Blue/Red   |
| 2. Front wheel sensor | 7. Blue/Black |
| 3. Rear wheel sensor  | 8. White      |
| 4. Blue               | 9. Gray       |
| 5. Blue/white         |               |

\*Continuity between: "A"-"C", "B"-"C"

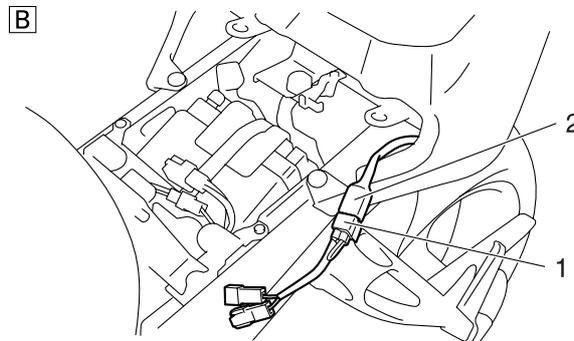
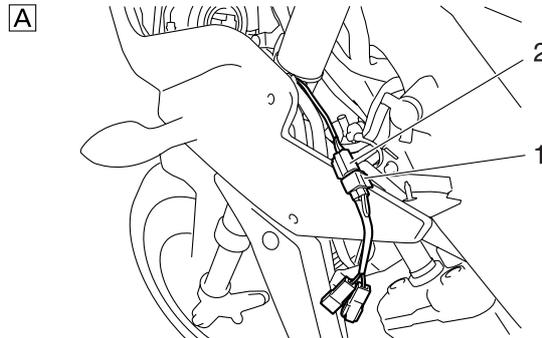
2. Wheel sensor malfunction  
Check the conductivity between the wheel sensor leads (white) and GND.  
If short-circuit is detected, replace the wheel sensor because the cause is the wheel sensor failure.
3. Battery terminal is disconnected.
4. When the items 1 to 3 are normal, replace the ABS ECU.

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS5D01005

## [D-6-4] DELETING THE MALFUNCTION CODE

1. Connect the test coupler adapter "1" to the test coupler "2". Refer to "[B-5] MALFUNCTION CHECK BY THE ABS SELF DIAGNOSIS (PRESENT MALFUNCTION)"



- A. FZ1-SA
- B. FZ1-NA

2. Turn the main switch on.
  - The multi-function display indicates previously recorded malfunction codes.

**NOTE:**

The ABS error code is not displayed during the diagnosis of the fuel injection.

3. Turn the engine stop switch off.

ECA4S81019

**CAUTION:**

**If the starter switch is pushed without turning the engine stop switch off, it may damage the starting motor gears or other parts, therefore be sure to turn it off.**

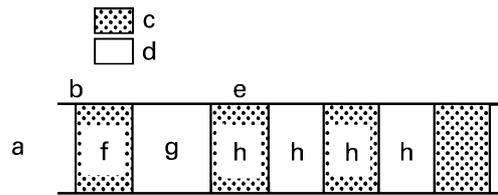
4. Push the starter switch more than 10 times in 4 seconds to delete the malfunction codes.

**NOTE:**

If the malfunction codes cannot be cleared, the disconnection of the starter switch monitor leads could be a cause.

5. Turn the main switch off.
6. Turn the main switch on again.
  - Check that the ABS warning light goes on for 2 seconds, then goes out for 3 seconds and starts flashing.

# ABS (ANTI-LOCK BRAKE SYSTEM)



- a. ABS warning light
- b. ON
- c. Main switch on
- d. Main switch off
- e. Flashing
- f. 2 seconds
- g. 3 seconds
- h. 0.5 seconds

7. Turn the main switch off.
8. Disconnect the test coupler adapter from the test coupler, and install the protective cap with the test coupler adapter. Deleting the malfunction code is now finished.

## NOTE:

Do not forget to install the protective cap.

ECA5D01004

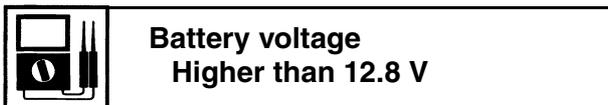
## CAUTION:

Since the ECU remains in the memory until the malfunction code is deleted, always delete the malfunction code when the service work is finished.

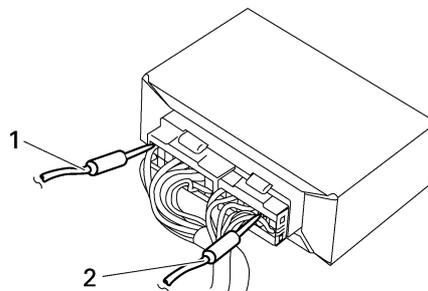
EAS5D01006

## [D-6-6] DELETE FUNCTION TEST

1. Place the vehicle on the sidestand.
2. Set the main switch to "OFF".
3. Connect the test coupler adapter to the test coupler.
4. Set the main switch to "ON".
5. Check:
  - ECU voltage  
Connect the pocket tester (DC 20 V) to the ECU coupler.  
**Tester positive probe → Brown/White "1"**  
**Tester negative probe → Black/White "2"**



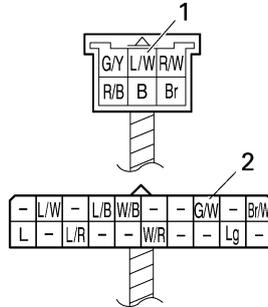
Lower than 12.8 V → Charge or replace the battery.



# ABS (ANTI-LOCK BRAKE SYSTEM)

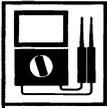
## 6. Check:

- ECU-to-start-switch-lead continuity  
Connect the pocket tester ( $\Omega \times 1$ ) to the ECU coupler and start switch coupler.  
**Tester positive probe** → **Blue/White “1” (start switch)**  
**Tester negative probe** → **Green/White “2” (ECU)**  
No continuity → Replace or repair the wire harness.



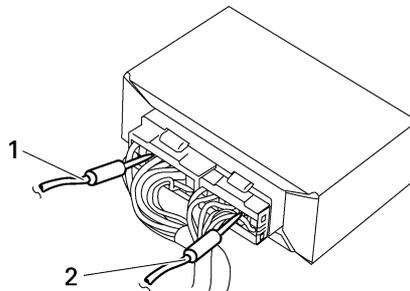
## 7. Check:

- ECU voltage  
Connect the pocket tester (DC 20 V) to the ECU coupler.  
**Tester positive probe** → **Green/White “1”**  
**Tester negative probe** → **Black/White “2”**  
Push the start switch.



**Start switch ON: less than 1 V**  
**Start switch OFF: more than 12 V**

Out of specification → Replace the handlebar switch.



## 8. If the above-mentioned check are within specification, replace the ECU.

EAS5D01007

### [D-6] FINAL CHECK

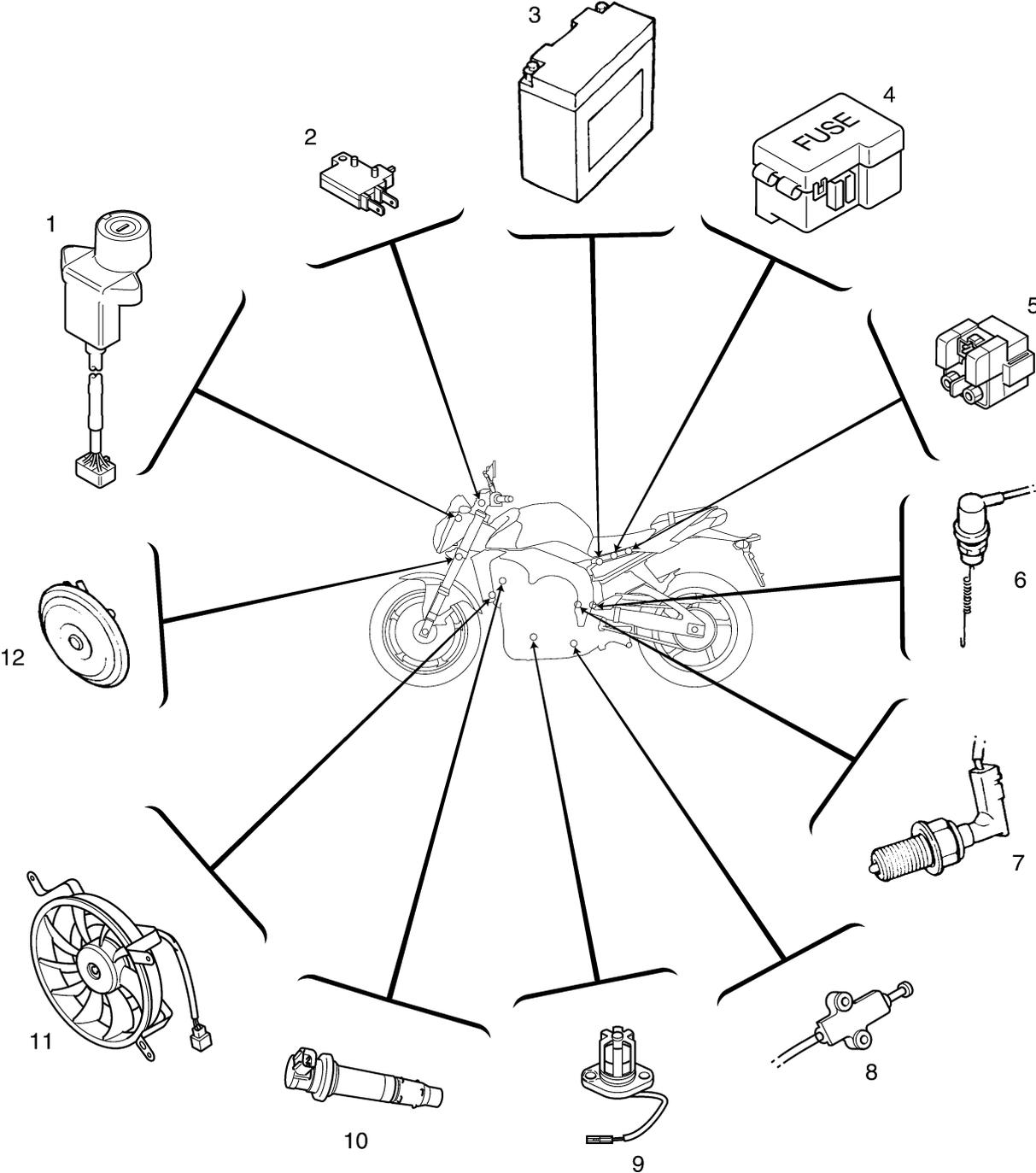
#### Checking procedures

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 3-23.
2. Check the wheel sensor housings and wheel sensors for proper installation.  
Refer to “INSTALLING THE FRONT WHEEL” on page 4-15 and “INSTALLING THE REAR WHEEL” on page 4-24.
3. Perform hydraulic unit operation test 1 or 2.  
Refer to “HYDRAULIC UNIT OPERATION TEST” on page 4-53.
4. Delete the malfunction codes.  
Refer to “[D-6-4] DELETING THE MALFUNCTION CODE” on page 8-128.
5. Perform a trial run.  
Refer to “[D-6-5] TRIAL RUN” on page 4-57.

# ELECTRICAL COMPONENTS

EAS27970

## ELECTRICAL COMPONENTS



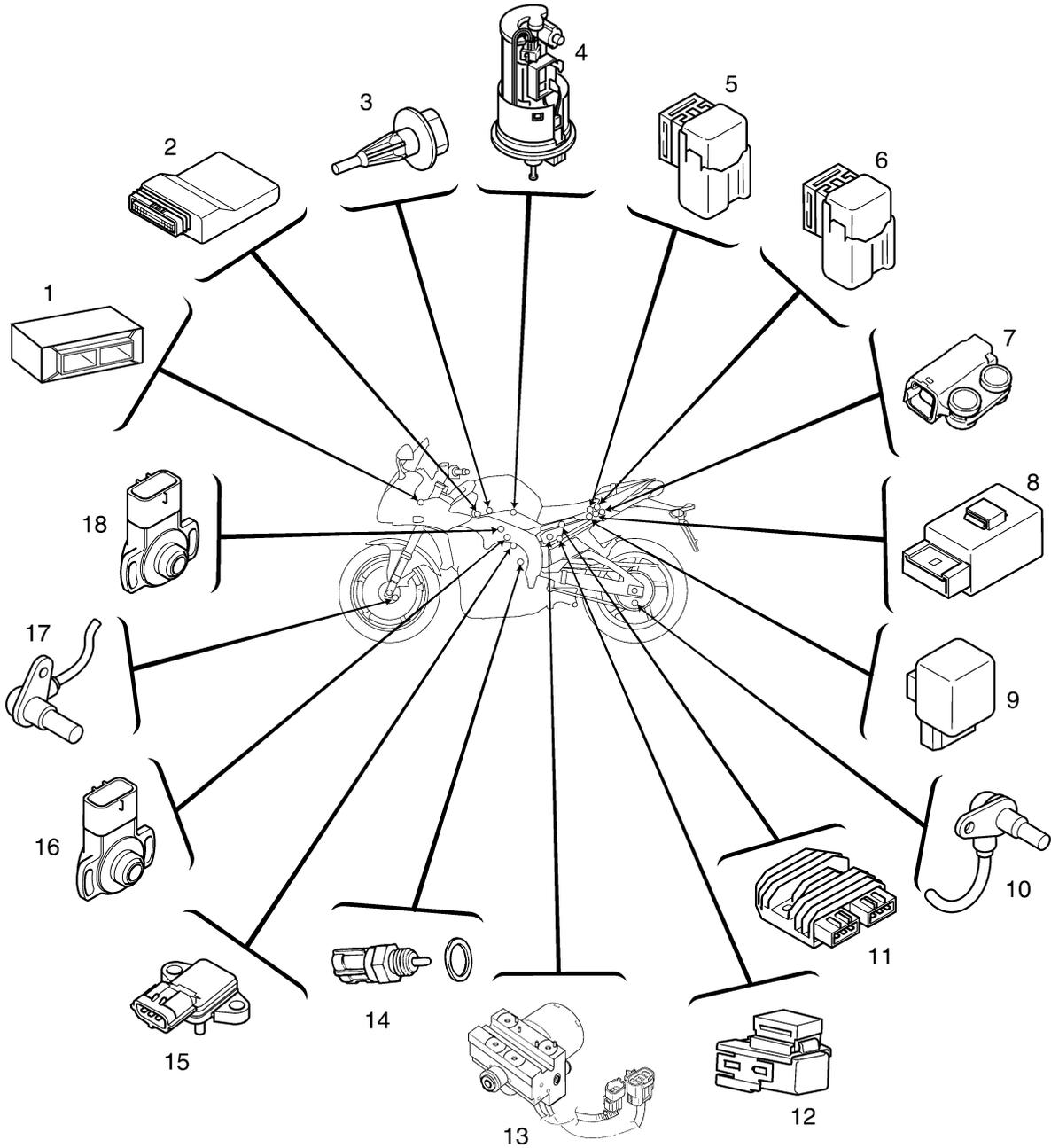
# ELECTRICAL COMPONENTS

---

1. Main switch (immobilizer unit)
2. Front brake light switch
3. Battery
4. Fuse box
5. Starter relay
6. Rear brake light switch
7. Neutral switch
8. Sidestand switch
9. Oil level switch
10. Ignition coil
11. Radiator fan motor
12. Horn

# ELECTRICAL COMPONENTS

---



# ELECTRICAL COMPONENTS

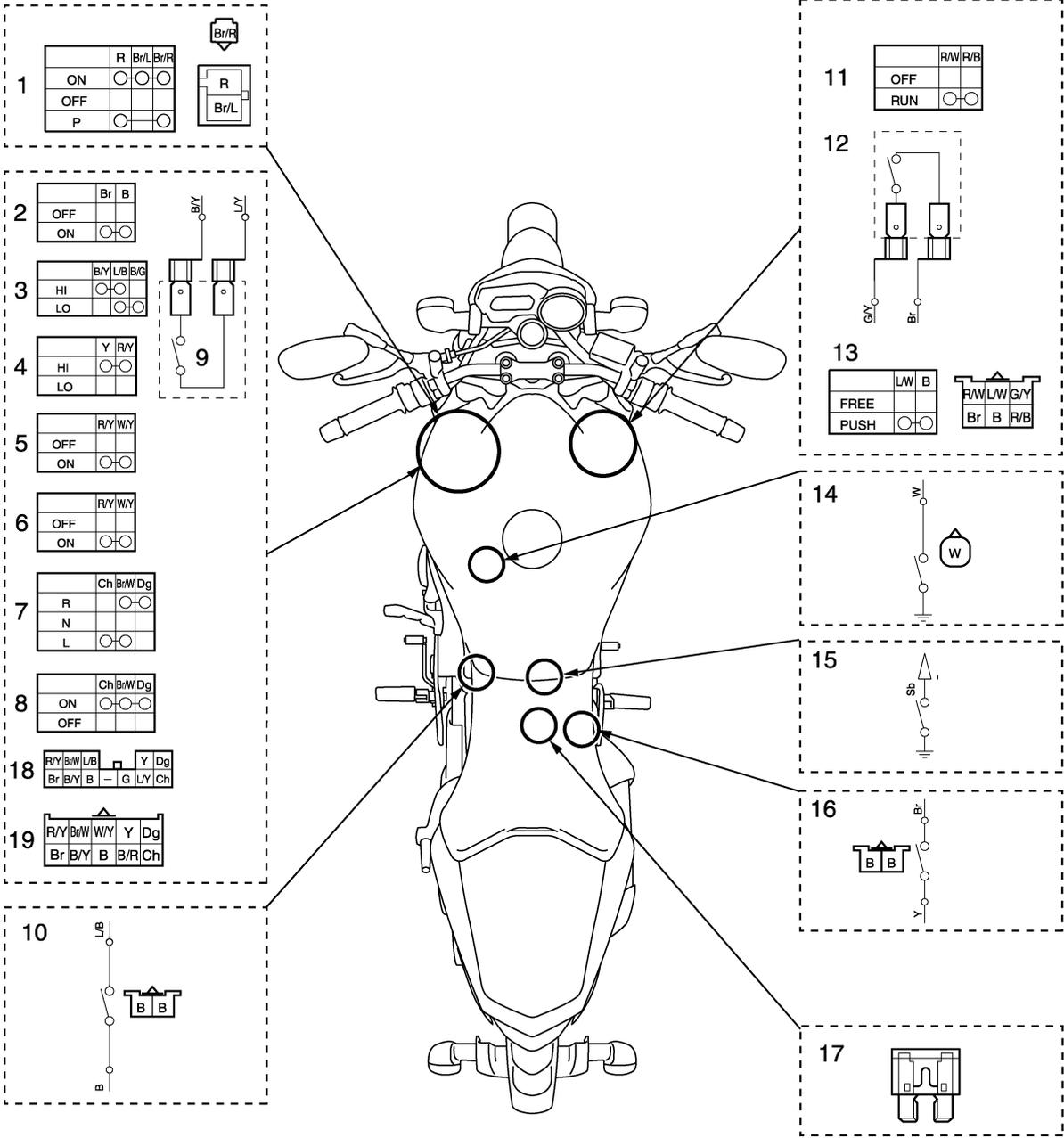
---

1. ABS ECU (FZ1-SA), (FZ1-NA)
2. ECU (engine control unit)
3. Intake air temperature sensor
4. Fuel pump
5. Headlight relay (on/off)
6. Radiator fan motor relay
7. Lean angle sensor
8. Starting circuit cut-off relay
9. Turn signal relay
10. Rear wheel sensor (FZ1-SA), (FZ1-NA)
11. Rectifier/regulator
12. ABS motor relay (FZ1-SA), (FZ1-NA)
13. Hydraulic unit (FZ1-SA), (FZ1-NA)
14. Coolant temperature sensor
15. Intake air pressure sensor
16. Throttle position sensor
17. Front wheel sensor (FZ1-SA), (FZ1-NA)
18. Sub-throttle position sensor

# ELECTRICAL COMPONENTS

EAS27980

## CHECKING THE SWITCHES



# ELECTRICAL COMPONENTS

---

1. Main switch
2. Horn switch
3. Dimmer switch (FZ1-N(X)/FZ1-NA)
4. Dimmer switch (FZ1-S(X)/FZ1-SA)
5. Pass switch (FZ1-N(X)/FZ1-NA)
6. Pass switch (FZ1-S(X)/FZ1-SA)
7. Turn signal switch
8. Hazard switch
9. Clutch switch
10. Sidestand switch
11. Engine stop switch
12. Front brake light switch
13. Start switch
14. Oil level switch
15. Neutral switch
16. Rear brake light switch
17. Fuse box
18. Left handlebar switch lead (FZ1-N(X)/FZ1-NA)
19. Left handlebar switch lead (FZ1-S(X)/FZ1-SA)

# 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

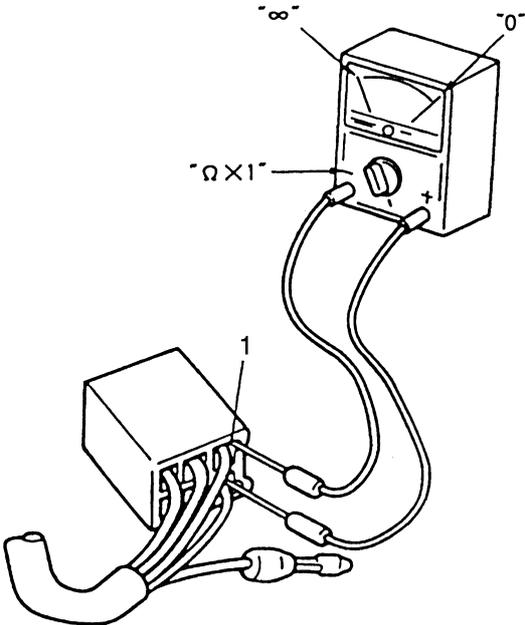
**CAUTION:**

Never insert the tester probes into the coupler terminal slots "1". Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.

	<b>Pocket tester</b>
	<b>90890-03112</b>
	<b>Analog pocket tester</b>
	<b>YU-03112-C</b>

**NOTE:**

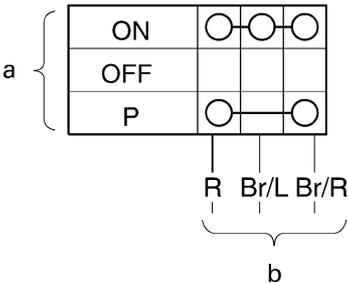
- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.
- When checking for continuity, switch back and forth between the switch positions a few times.



The switches and their terminal connections are illustrated as in the following example of the main switch.

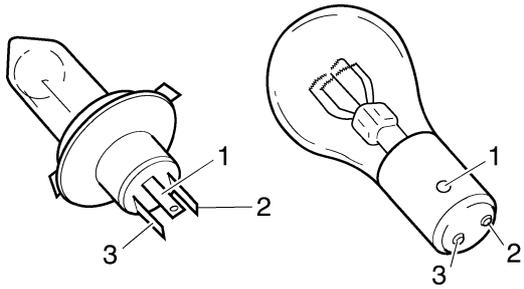
The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row.

The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indication by "○—○". There is continuity between red, brown/blue, and brown/red when the switch is set to "ON" and between red and brown/red when the switch is set to "P".





# ELECTRICAL COMPONENTS



18410602

## 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

### NOTE:

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.

ECA13680

### CAUTION:

**To avoid a short circuit, always set the main switch to “OFF” when checking or replacing a fuse.**

1. Remove:
  - Rider and passenger seat
2. Check:
  - Fuse

- a. Connect the pocket tester to the fuse and check the continuity.

### NOTE:

Set the pocket tester selector to “Ω × 1”.



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

- b. If the pocket tester indicates “∞”, replace the fuse.

3. Replace:

- Blown fuse

- a. Set the main switch to “OFF”.
- b. Install a new fuse of the correct amperage rating.
- c. Set on the switches to verify if the electrical circuit is operational.
- d. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	50 A	1
Headlight (FZ1-N(X), FZ1-SA)	15 A	1
Headlight (FZ1-S(X), FZ1-SA)	25 A	1
Signaling system	10 A	1
Tail/brake light	10 A	1
Ignition	15 A	1
ABS motor (FZ1-SA, FZ1-NA)	30 A	1
ABS control unit (FZ1-SA, FZ1-NA)	10 A	1
Backup	10 A	1
Radiator fan motor	10 A	2
Reserve	10 A	1
Reserve (FZ1-N)	15 A	1
Reserve (FZ1-S(X), FZ1-SA))	25 A	1
Reserve (FZ1-SA))	30 A	1

EWA13310

## **WARNING**

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.



4. Install:
- Rider and passenger seat

EAS28030

## CHECKING AND CHARGING THE BATTERY

EWA13290

## **WARNING**

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

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

### FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

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

### INTERNAL

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

ECA13660

## **CAUTION:**

- This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
- Charging time, charging amperage and charging voltage for an MF battery are dif-

ferent from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.

## **NOTE:**

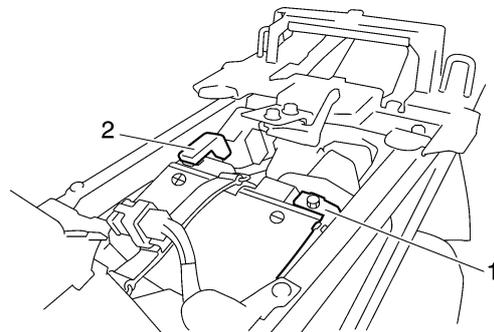
Since MF batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Remove:
  - Rider and passenger seat
2. Disconnect:
  - Battery leads (from the battery terminals)

ECA13640

## **CAUTION:**

First, disconnect the negative battery lead "1", and then positive battery lead "2".



3. Remove:
  - Battery
4. Check:
  - Battery charge



- a. Connect a pocket tester to the battery terminals.

- Positive tester probe → positive battery terminal
- Negative tester probe → negative battery terminal

## **NOTE:**

- The charge state of an MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).

# ELECTRICAL COMPONENTS

- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

b. Check the charge of the battery, as shown in the charts and the following example.

Example  
Open-circuit voltage = 12.0 V  
Charging time = 6.5 hours  
Charge of the battery = 20–30%



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

EWA13300



**WARNING**

**Do not quick charge a battery.**

ECA13670

**CAUTION:**

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

- **As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.**



**Charging method using a variable-current (voltage) charger**

- a. Measure the open-circuit voltage prior to charging.

**NOTE:**

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

- b. Connect a charged and AMP meter to the battery and start charging.

**NOTE:**

Set the charging voltage at 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

- c. Make sure that the current is higher than the standard charging current written on the battery.

**NOTE:**

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.

- Reach the standard charging current  
Battery is good.
- Does not reach the standard charging current  
Replace the battery.

- d. Adjust the voltage so that the current is at the standard charging level.
- e. Set the time according to the charging time suitable for the open-circuit voltage. Refer to “Battery condition checking steps”.
- f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.

# ELECTRICAL COMPONENTS

- g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.  
 12.7 V or less --- Recharging is required.  
 Under 12.0 V --- Replace the battery.



## Charging method using a constant voltage charger

- a. Measure the open-circuit voltage prior to charging.

**NOTE:**

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

- b. Connect a charger and AMP meter to the battery and start charging.  
 c. Make sure that the current is higher than the standard charging current written on the battery.

**NOTE:**

If the current is lower than the standard charging current written on the battery, this type of battery charger cannot charge the MF battery. A variable voltage charger is recommended.

- d. Charge the battery until the battery's charging voltage is 15 V.

**NOTE:**

Set the charging time at 20 hours (maximum).

- e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.  
 12.7 V or less --- Recharging is required.  
 Under 12.0 V --- Replace the battery.

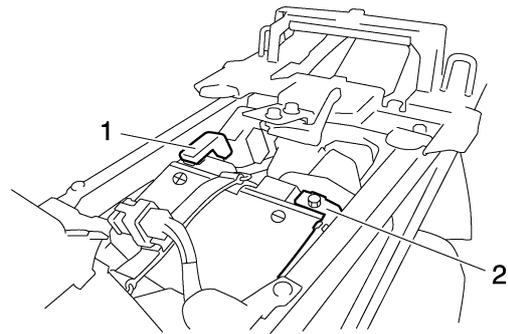


6. Install:  
 • Battery  
 7. Connect:  
 • Battery leads  
 (to the battery terminals)

ECA13630

**CAUTION:**

**First, connect the positive battery lead "1", and then the negative battery lead "2".**



8. Check:  
 • Battery terminals  
 Dirt → Clean with a wire brush.  
 Loose connection → Connect properly.  
 9. Lubricate:  
 • Battery terminals

**Recommended lubricant**  
**Dielectric grease**

10. Install:  
 • Rider and passenger seat

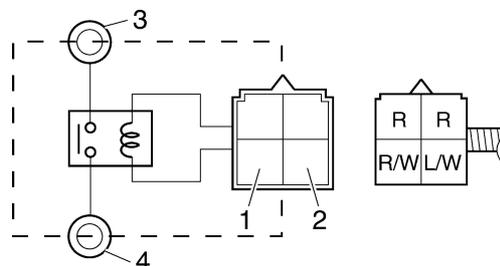
EAS28040

## 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 terminal as shown. Check the relay operation. Out of specification → Replace.



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

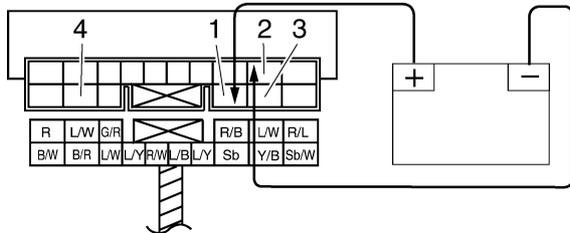
# ELECTRICAL COMPONENTS



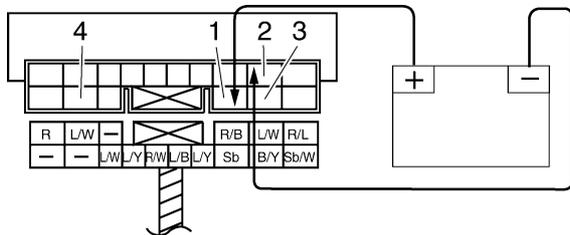
**Relay operation**  
**Continuity/No continuity**  
**(between "3" to "4")**

**Relay unit (starting circuit cut-off relay)**

FZ1-N(X)/FZ1-S(X)/FZ1-NA



FZ1-SA



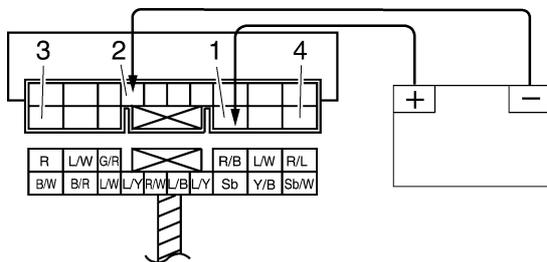
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



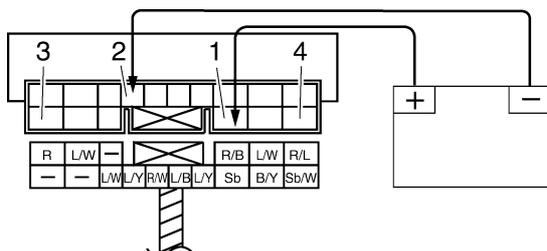
**Result**  
**Continuity/No continuity**  
**(between "3" to "4")**

**Relay unit (fuel pump relay)**

FZ1-N(X)/FZ1-S(X)/FZ1-NA



FZ1-SA



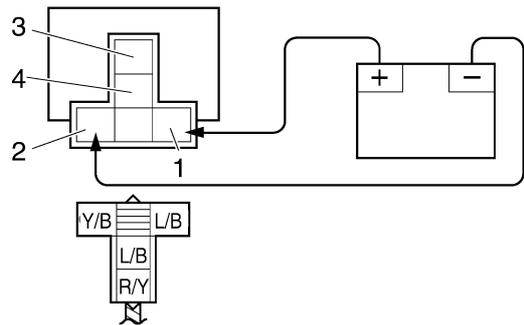
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



**Result**  
**Continuity/No continuity**  
**(between "3" to "4")**

**Headlight relay (on/off)**

(FZ1-N(X))/FZ1-NA



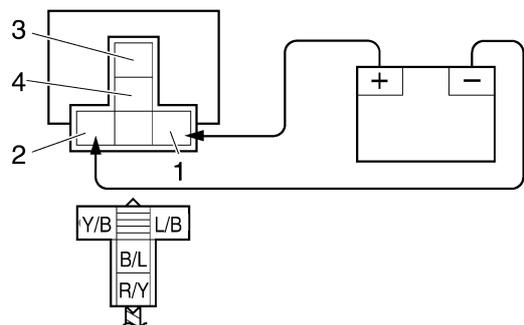
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



**Result**  
**Continuity/No continuity**  
**(between "3" to "4")**

**Headlight relay (on/off)**

FZ1-S(X)/FZ1-SA



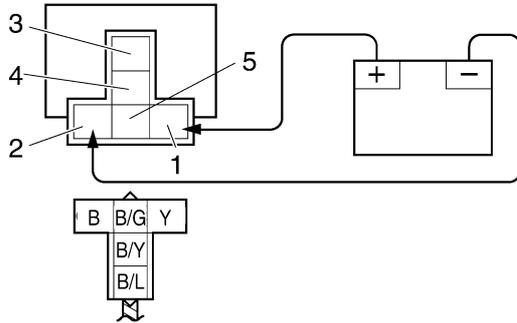
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



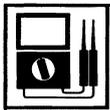
**Result**  
**Continuity/No continuity**  
**(between "3" to "4")**

## Headlight relay (dimmer)

FZ1-S(X)/FZ1-SA

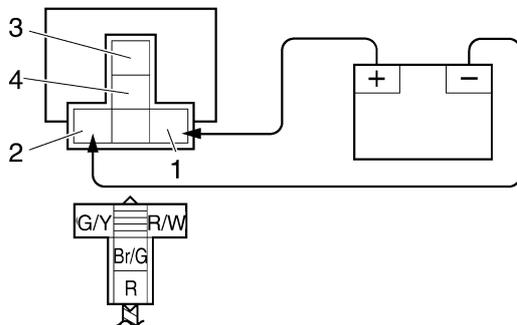


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



**Result**  
Continuity/No continuity  
(between "3" to "4")  
(between "3" to "5")

## Radiator fan motor relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

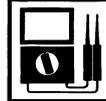


**Result**  
Continuity/No continuity  
(between "3" to "4")

EAS5D01008

### CHECKING THE ABS MOTOR RELAY

1. Check:
  - ABS motor relay for continuity  
Connect the pocket tester ( $\Omega \times 1$ ) to the terminals of ABS motor relay.  
Check for continuity between terminals "1" and "2" of the ABS motor relay.



**ABS motor relay resistance**  
50–150  $\Omega$



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

- Tester positive probe → Terminal "2"
- Tester negative probe → Terminal "1"

Tester reading is " $\infty$ ". → Replace the ABS motor relay.

ECA5D01005

#### CAUTION:

**Do not reverse the connections. If the pocket tester leads are connected in reverse to terminals "1" and "2", a correct pocket tester reading cannot be obtained.**

- Connect the positive battery terminal to terminal "2" and the negative battery terminal to terminal "1", and then check for continuity between terminals "3" and "4" of the ABS motor relay.

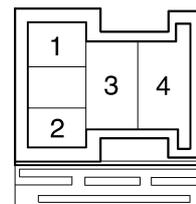
- Tester positive probe → Terminal "3"
- Tester negative probe → Terminal "4"

Tester reading is " $\infty$ ". → Replace the ABS motor relay.

ECA5D01006

#### CAUTION:

- **Be sure to connect the pocket tester positive and negative probes correctly. If the pocket tester probes are connected in reverse, the diode of the ABS motor relay will be broken.**
- **When connecting the ABS motor relay and battery terminals, be careful not to short-circuit the positive and negative battery terminals.**



# ELECTRICAL COMPONENTS

EAS5D01009

## CHECKING THE SOLENOID VALVES AND MOTOR

ECA4S81023

### CAUTION:

When check the hydraulic unit solenoid relay and ABS motor, do not remove the brake hoses.

#### 1. Check:

- Solenoid valve resistance (front)  
Out of specification → Replace the hydraulic unit.



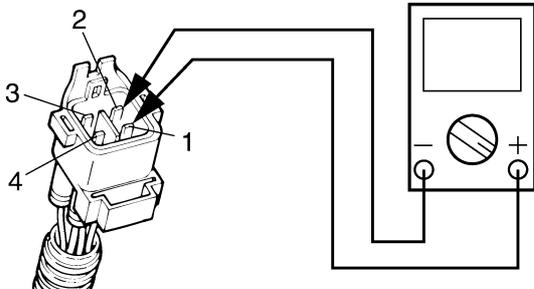
**Solenoid valve resistance**  
2.96–3.20 Ω at 20 °C (68 °F)

- a. Connect the pocket tester ( $\Omega \times 1$ ) to the solenoid valve (front) terminal as shown.



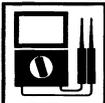
**Pocket tester**  
90890-03112  
**Analog Pocket tester**  
YU-03112-C

- Positive tester probe → terminal “1”
- Negative tester probe → terminal “2”



#### 2. Check:

- Solenoid valve resistance (rear)  
Out of specification → Replace the hydraulic unit.



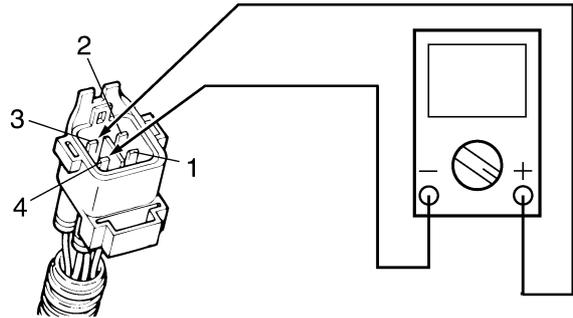
**Solenoid valve resistance**  
2.96–3.20 Ω at 20 °C (68 °F)

- a. Connect the pocket tester ( $\Omega \times 1$ ) to the solenoid valve (rear) terminal as shown.



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

- Positive tester probe → terminal “3”
- Negative tester probe → terminal “4”



#### 3. Check:

- ABS motor continuity  
No continuity → Replace the hydraulic unit.



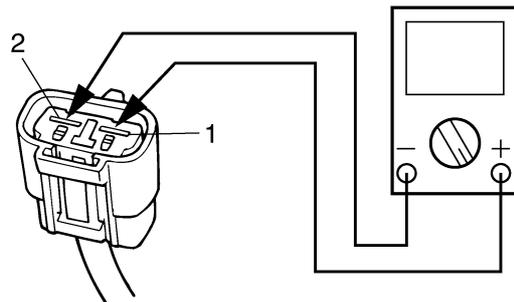
**There is continuity.**

- a. Connect the pocket tester ( $\Omega \times 1$ ) to the ABS motor coupler terminal as shown.



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

- Positive tester probe → terminal “1”
- Negative tester probe → terminal “2”



# ELECTRICAL COMPONENTS

EAS5D01028

## CHECKING THE TURN SIGNAL/HAZARD RELAY

1. Check:

- Turn signal/hazard relay input voltage  
Out of specification → The wiring circuit from the main switch to the turn signal/hazard relay coupler is faulty and must be repaired.



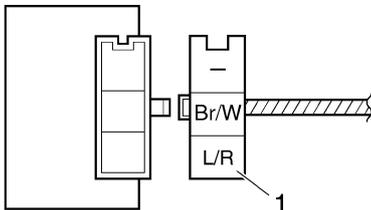
**Turn signal/hazard relay input voltage**  
DC 12 V

a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.



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

- Positive tester probe →  
Blue/Red “1”
- Negative tester probe →  
Ground



- b. Turn the main switch to “ON”.
- c. Measure the turn signal/hazard relay input voltage.

2. Check:

- Turn signal/hazard relay output voltage  
Out of specification → Replace.



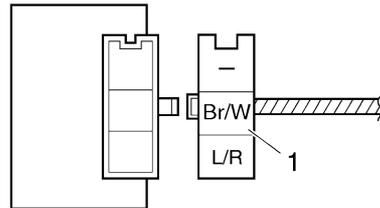
**Turn signal/hazard relay output voltage**  
DC 12 V

a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.



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

- Positive tester probe →  
Brown/White “1”
- Negative tester probe →  
Ground



- b. Turn the main switch to “ON”.
- c. Measure the turn signal/hazard relay output voltage.

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

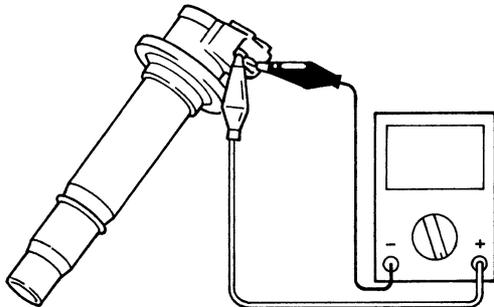
### NOTE:

The pocket tester and the analog pocket tester readings are shown in the following table.



# ELECTRICAL COMPONENTS

- Positive tester probe  
Ignition coil terminal
- Negative tester probe  
Ignition coil terminal



c. Measure the primary coil resistance.

2. Check:

- Secondary coil resistance  
Out of specification → Replace.



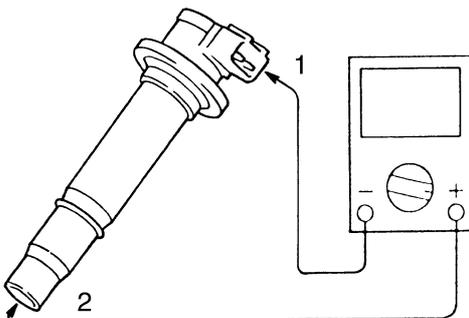
**Secondary coil resistance**  
8.5–11.5 k $\Omega$  at 20 °C (68 °F)

- Disconnect the ignition coil leads from the wire harness.
- Connect the pocket tester ( $\Omega \times 1k$ ) to the ignition coil as shown.



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

- Negative tester probe  
Ignition coil terminal "1"
- Positive tester probe  
Spark plug terminal "2"



c. Measure the secondary coil resistance.

- Check:
  - Ignition spark gap "a"  
Out of specification → Replace.

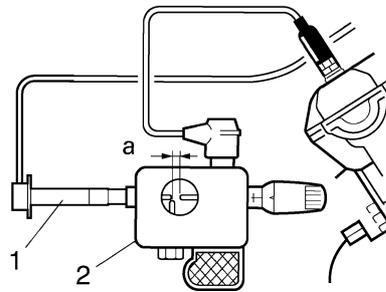


**Minimum ignition spark gap**  
6.0 mm (0.24 in)

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker/dynamic spark tester "2" as shown.



**Ignition checker**  
90890-06754  
**Opama pet-4000 spark checker**  
YM-34487



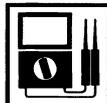
18110202

- Spark plug cap
- Set the main switch to "ON".
- Measure the ignition spark gap "a".
- Crank the engine by pushing the starter switch and gradually increase the spark gap until a misfire occurs.

EAS28110

## CHECKING THE CRANKSHAFT POSITION SENSOR

- Disconnect:
  - Crankshaft position sensor coupler  
(from the wire harness)
- Check:
  - Crankshaft position sensor resistance  
Out of specification → Replace the crankshaft position sensor.



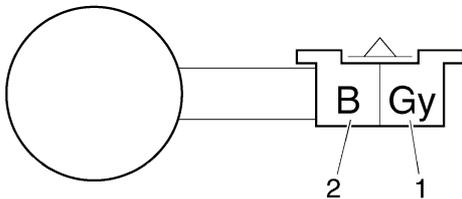
**Crankshaft position sensor resistance**  
336–504  $\Omega$  at 20 °C (68 °F)

a. Connect the pocket tester ( $\Omega \times 100$ ) to the crankshaft position sensor coupler as shown.



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

- Positive tester probe  
Gray "1"
- Negative tester probe  
Black "2"



b. Measure the crankshaft position sensor resistance.

EAS28130  
**CHECKING THE LEAN ANGLE SENSOR**

1. Remove:
  - Lean angle sensor
2. Check:
  - Lean angle sensor out put voltage  
Out of specification → Replace.



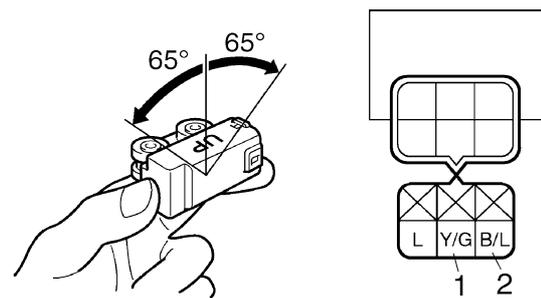
**Lean angle sensor output voltage**  
Less than 65°: 0.4–1.4 V  
More than 65°: 3.7–4.4 V

a. Connect the lean angle sensor coupler to the wire harness.  
b. Connect the pocket tester (DC 20 V) to the lean angle sensor coupler as shown.



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

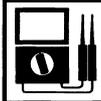
- Positive tester probe  
Yellow/Green "1"
- Negative tester probe  
Black/Blue "2"



c. When turn the lean angle sensor to 65°.  
d. Measure the lean angle sensor output voltage.

EAS5D01010  
**CHECKING THE WHEEL SENSOR**

1. Check:
  - Front wheel sensor output voltage  
Out of specification → Replace



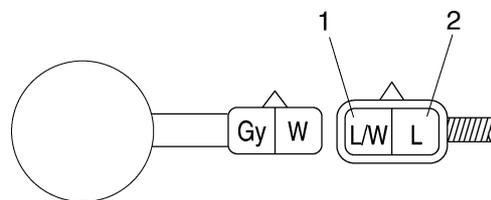
**Output voltage reading cycle**  
Hi: 1.1 V–1.7 V  
Lo: 0.5 V–0.9 V

a. Connect the pocket tester (DC20 V) to the front wheel sensor coupler as shown.



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

- Positive tester probe  
Blue/White "1"
- Negative tester probe  
Blue "2"



b. Turn the main switch to "ON".  
c. Elevate the front wheel and slowly rotate it.  
d. Measure the voltage with each full rotation of the front wheel, the voltage reading should cycle from Lo (0.5–0.9 V) to Hi (1.1–1.7 V) to Lo to Hi.

EAS5D01030

## CHECKING THE STARTER MOTOR OPERATION

1. Check:

- Starter motor operation  
Does not operate → Perform the electric starting system troubleshooting, starting with step5.  
Refer to “TROUBLESHOOTING” on page 8-9.

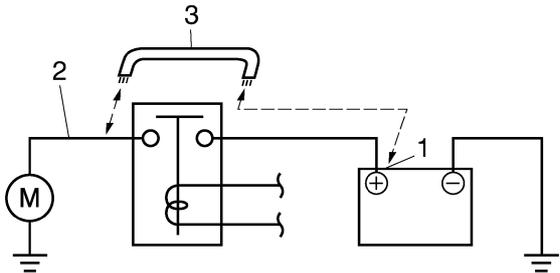


a. Connect the positive battery terminal “1” and starter motor lead “2” with a jumper lead “3”.

EWA13810

### **⚠ WARNING**

- A wire that is used as a jumper lead must have at least the same capacity of the battery, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.



18210801

b. Check the starter motor operation.



2. Check:

- Stator coil resistance  
Out of specification → Replace the starter coil.

EAS28150

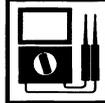
## CHECKING THE STATOR COIL

1. Disconnect:

- Stator coil coupler (from the wire harness)

2. Check:

- Stator coil resistance  
Out of specification → Replace the stator coil.



### Stator coil resistance

0.144–0.176 Ω at 20 °C (68 °F)  
(FZ1-S(X), FZ1-N(X), FZ1-SA)  
0.153–0.187 Ω at 20 °C (68 °F)  
(FZ1-NA)



a. Connect the pocket tester (Ω × 1) to the stator coil coupler as shown.



### Pocket tester

90890-03112

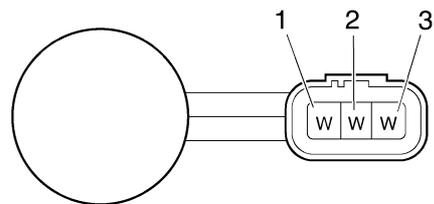
### Analog pocket tester

YU-03112-C

- Positive tester probe  
White “1”
- Negative tester probe  
White “2”

- Positive tester probe  
White “1”
- Negative tester probe  
White “3”

- Positive tester probe  
White “2”
- Negative tester probe  
White “3”



b. Measure the stator coil resistance.

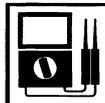


EAS28170

## CHECKING THE RECTIFIER/REGULATOR

1. Check:

- Charging voltage  
Out of specification → Replace the rectifier/regulator.



### Charging voltage

14 V at 5000 r/min

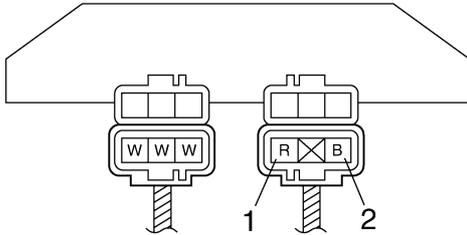
# ELECTRICAL COMPONENTS

- a. Set the engine tachometer to the ignition coil of cylinder #1.
- b. Connect the pocket tester (AC 20 V) to the rectifier/regulator coupler as shown.



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

- Positive tester probe  
Red "1"
- Negative tester probe  
Black "2"



- c. Start the engine and let it run at approximately 5000 r/min.
- d. Measure the charging voltage.

EAS28180

## CHECKING THE HORN

1. Check:
  - Horn resistance  
Out of specification → Replace.



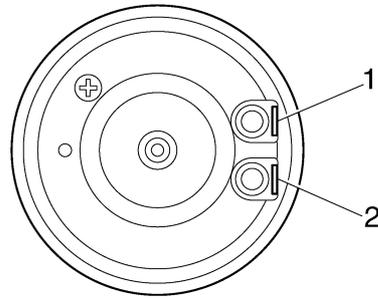
**Horn resistance**  
1.15–1.25 Ω at 20 °C (68 °F)

- a. Disconnect the horn leads from the horn terminals.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the horn terminals.



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

- Positive tester probe  
Horn terminal "1"
- Negative tester probe  
Horn terminal "2"

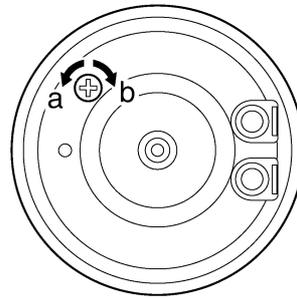


- c. Measure the horn resistance.

## 2. Check:

- Horn sound  
Faulty sound → Adjust or replace.

- a. Connect a battery (12 V) to the horn.
- b. Turn the adjusting screw in direction "a" or "b" until the specified horn sound is obtained.



EAS28230

## CHECKING THE FUEL SENDER

1. Remove:
  - Fuel tank
2. Disconnect:
  - Fuel pump coupler
  - Fuel sender coupler  
(from the wire harness)
3. Remove:
  - Fuel pump  
(from the fuel tank)
4. Check:
  - Fuel sender resistance

# ELECTRICAL COMPONENTS



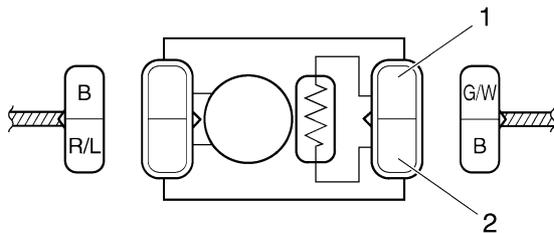
**Fuel sender resistance**  
**Full position of the float**  
 19–21  $\Omega$  at 20 °C (68 °F)  
**Empty position of the float**  
 139–141  $\Omega$  at 20 °C (68 °F)

- a. Connect the pocket tester ( $\Omega \times 10$ ) to the fuel sender terminal as shown.



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

- Positive tester probe  
Green/white “1”
- Negative tester probe  
Black “2”



- b. Measure the fuel sender resistance.

EAS28240

## CHECKING THE SPEED SENSOR

1. Check:
- Speed sensor output voltage  
Out of specification → Replace.



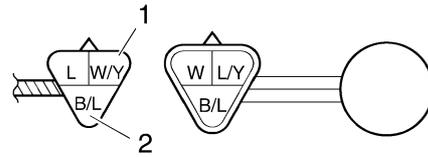
**Output voltage reading cycle**  
 0.6 V to 4.8 V to 0.6 V to 4.8 V

- a. Connect the pocket tester (DC 20 V) to the speed sensor coupler (wire harness side) as shown.



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

- Positive tester probe  
White/Yellow “1”
- Negative tester probe  
Black/Blue “2”



- b. Set the main switch to “ON”.  
 c. Elevate the rear wheel and slowly rotate it.  
 d. Measure the voltage (DC 5 V) of White/Yellow and Blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.

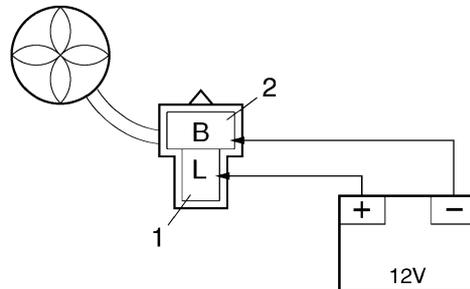
EAS28250

## CHECKING THE RADIATOR FAN MOTOR

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 tester probe  
Blue “1”
- Negative tester probe  
Black “2”



- c. Measure the radiator fan motor movement.

EAS28260

## CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
- Coolant temperature sensor

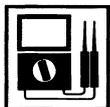
EWA14130

### 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.

# ELECTRICAL COMPONENTS

2. Check:
- Coolant temperature sensor resistance  
Out of specification → Replace.



### Coolant temperature sensor resistance

0 °C (32 °F) : 5.21–6.37 kΩ  
80 °C (176 °F) : 0.29–0.35 kΩ

- a. Connect the pocket tester ( $\Omega \times 1k$ ) to the coolant temperature sensor “1” as shown.



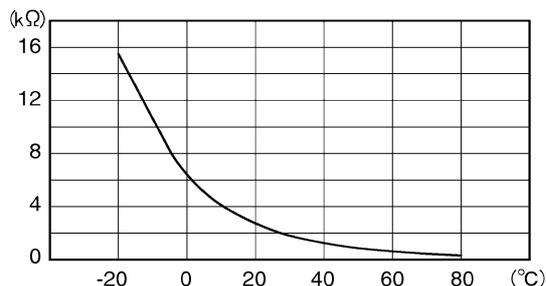
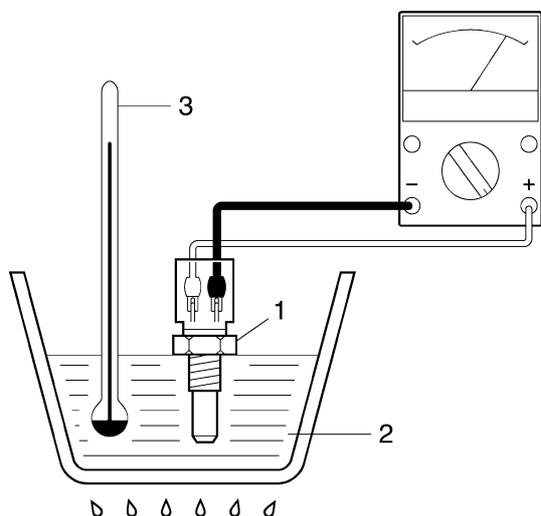
### Pocket tester 90890-03112 Analog pocket tester YU-03112-C

- Positive tester probe  
Coolant temperature sensor terminal
- Negative tester probe  
Coolant temperature sensor terminal

- b. Immerse the coolant temperature sensor in a container filled with coolant “2”.

**NOTE:**  
Make sure the coolant temperature sensor terminals do not get wet.

- c. Place a thermometer “3” in the coolant.



- d. Slowly heat the coolant, and then let it cool to the specified temperature indicated in the table.
- e. Check the coolant temperature sensor for continuity at the temperatures indicated in the table.



EAS28300

### CHECKING THE THROTTLE POSITION SENSOR

1. Remove:
  - Throttle position sensor  
(from the throttle body)
2. Check:
  - Throttle position sensor



- a. Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor as shown.



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

- Tester positive lead →  
Blue “1”
- Tester negative lead →  
Black/Blue “2”

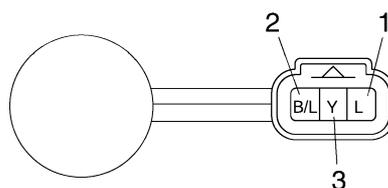
- b. Check the throttle position sensor maximum resistance.  
Out of specification → Replace the throttle position sensor.



### Maximum throttle position sensor resistance 4–6 kΩ at 20 °C (68 °F)

- c. Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor as shown.

- Tester positive lead →  
Yellow “3”
- Tester negative lead →  
Black/Blue “2”

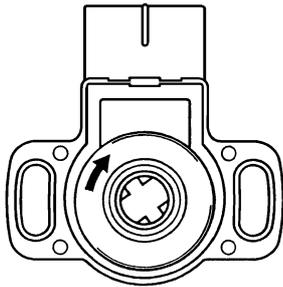


# ELECTRICAL COMPONENTS

- d. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.  
The resistance does not change or it changes abruptly → Replace the throttle position sensor.



**Throttle position sensor resistance**  
0–6 kΩ at 20 °C (68 °F)



3. Install:

- Throttle position sensor

**NOTE:**

When installing the throttle position sensor, adjust its angle properly. Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-7.

EAS2D1010

## CHECKING THE SUB-THROTTLE POSITION SENSOR

1. Remove:
  - Sub-throttle position sensor (from the throttle body)
2. Check:
  - Sub-throttle position sensor

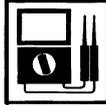
- a. Disconnect the sub-throttle motor coupler.
- b. Disconnect the sub-throttle position sensor coupler.
- c. Remove the sub-throttle position sensor from the sub-throttle servo motor.
- d. Connect the pocket tester ( $\Omega \times 1k$ ) to the sub-throttle position sensor as shown.



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

- Tester positive lead → Blue “1”
- Tester negative lead → Black/Blue “2”

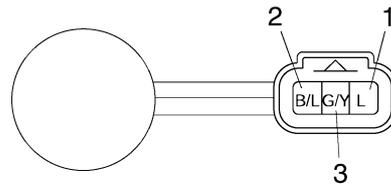
- e. Check the throttle position sensor maximum resistance.  
Out of specification → Replace the throttle position sensor.



**Maximum sub-throttle position sensor resistance**  
4–6 kΩ at 20 °C (68 °F)

- f. Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor as shown.

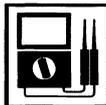
- Tester positive lead → Green/Yellow “3”
- Tester negative lead → Black/Blue “2”



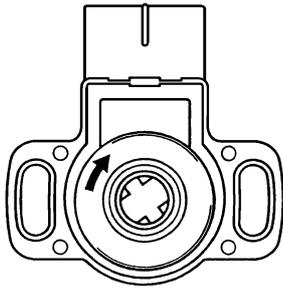
- g. While slowly opening the sub-throttle worm nut, check that the sub-throttle position sensor resistance is within the specified range.  
The resistance does not change or it changes abruptly → Replace the sub-throttle position sensor.

**NOTE:**

Check mainly that the resistance changes gradually when turning the sub-throttle worm nut, since the readings (from closed to wide-open sub-throttle) may differ slightly from those specified.



**Throttle position sensor resistance**  
0–6 kΩ at 20 °C (68 °F)



3. Install:
- Sub-throttle position sensor

**NOTE:**

When installing the throttle position sensor, adjust its angle properly. Refer to “CHECKING THE SUB-THROTTLE POSITION SENSOR” on page 8-154.

EAS28370

**CHECKING THE AIR INDUCTION SYSTEM SOLENOID**

1. Check:
- Air induction system solenoid resistance  
Out of specification → Replace.



**Air induction system solenoid resistance**  
18–22 Ω at 20 °C (68 °F)

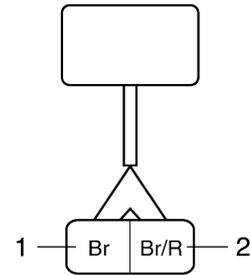


- a. Remove the Air induction system solenoid coupler from the wire harness.  
b. Connect the pocket tester ( $\Omega \times 1$ ) to the Air induction system solenoid terminal as shown.



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

- Positive tester probe  
Brown “1”
- Negative tester probe  
Brown/Red “2”



- c. Measure the Air induction system solenoid resistance.



EAS28380

**CHECKING THE ATMOSPHERIC PRESSURE SENSOR**

1. Check:
- Atmospheric pressure sensor output voltage  
Out of specification → Replace.



**Atmospheric pressure sensor output voltage**  
3.75–4.25 V

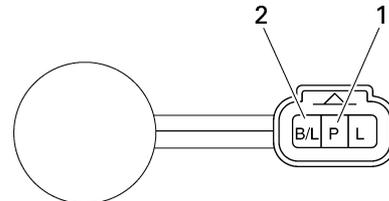


- a. Connect the pocket tester (DC 20 V) to the atmospheric pressure sensor coupler (wire harness side) as shown.



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

- Positive tester probe  
Pink “1”
- Negative tester probe  
Black/Blue “2”



- b. Set the main switch to “ON”.  
c. Measure the atmospheric pressure sensor output voltage.



# ELECTRICAL COMPONENTS

EAS28390

## CHECKING THE CYLINDER IDENTIFICATION SENSOR

- Check:
  - Cylinder identification sensor output voltage  
Out of specification → Replace.



### Cylinder identification sensor output voltage

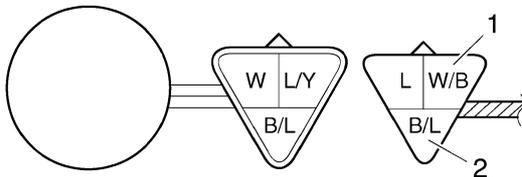
When sensor is on  
4.8 V or more  
When sensor is off  
0.8 V or less

- Connect the pocket tester (DC 20 V) to the cylinder identification sensor coupler (wire harness side) as shown.



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

- Positive tester probe  
White/Black “1”
- Negative tester probe  
Black/Blue “2”

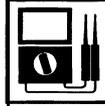


- Set the main switch to “ON”.
- Rotate the crankshaft.
- Measure the voltage (DC 20 V) of White/Black and Black/Blue. With each full rotation of the crankshaft, the voltage reading should cycle from 0.8 V to 4.8 V to 0.8 V to 4.8 V.

EAS28410

## CHECKING THE INTAKE AIR PRESSURE SENSOR

- Check:
  - Intake air pressure sensor output voltage  
Out of specification → Replace.



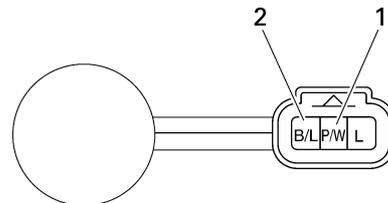
Intake air pressure sensor output voltage  
3.75–4.25 V

- Connect the pocket tester (DC 20 V) to the intake air pressure sensor coupler (wire harness side) as shown.



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

- Positive tester probe  
Pink/White “1”
- Negative tester probe  
Black/Blue “2”



- Set the main switch to “ON”.
- Measure the intake air pressure sensor output voltage.

EAS28420

## CHECKING THE INTAKE AIR TEMPERATURE SENSOR

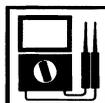
- Remove:
  - Intake air temperature sensor  
(from the air filter case.)

EWA14110

### WARNING

- Handle the intake air temperature sensor with special care.
- Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.

- Check:
  - Intake air temperature sensor resistance  
Out of specification → Replace.



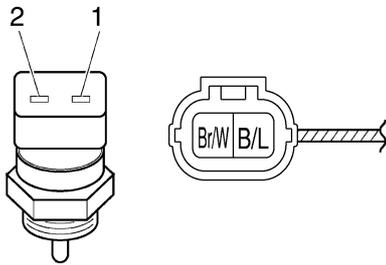
Intake air temperature sensor resistance  
2.21–2.69 kΩ at 20 °C (68 °F)



- a. Connect the pocket tester ( $\Omega \times 100$ ) to the intake air temperature sensor terminal as shown.

	<b>Pocket tester</b> <b>90890-03112</b> <b>Analog pocket tester</b> <b>YU-03112-C</b>
---	--

- Positive tester probe  
Brown/White "1"
- Negative tester probe  
Black/Blue "2"



- b. Measure the intake air temperature sensor resistance.



3. Install:
- Intake air temperature sensor

	<b>Intake air temperature sensor bolt</b> <b>1.2 Nm (0.12 m·kg, 0.87 ft·lb)</b>
---	--

---

## TROUBLESHOOTING

<b>TROUBLESHOOTING</b> .....	9-1
GENERAL INFORMATION .....	9-1
STARTING FAILURES .....	9-1
INCORRECT ENGINE IDLING SPEED .....	9-1
POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE .....	9-2
FAULTY GEAR SHIFTING .....	9-2
SHIFT PEDAL DOES NOT MOVE .....	9-2
JUMPS OUT OF GEAR .....	9-2
FAULTY CLUTCH .....	9-2
OVERHEATING .....	9-2
OVER COOLING .....	9-3
POOR BRAKING PERFORMANCE .....	9-3
FAULTY FRONT FORK LEGS .....	9-3
UNSTABLE HANDLING .....	9-3
FAULTY LIGHTING OR SIGNALING SYSTEM .....	9-4
TROUBLESHOOTING AT THE ABS WARNING LIGHT .....	9-4

EAS28450

## TROUBLESHOOTING

EAS28460

### GENERAL INFORMATION

#### NOTE:

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAS28470

### STARTING FAILURES

#### Engine

1. Cylinder(s) and cylinder head(s)
  - Loose spark plug
  - Loose cylinder head or cylinder
  - Damaged cylinder head gasket
  - Damaged cylinder gasket
  - Worn or damaged cylinder
  - Incorrect valve clearance
  - Improperly sealed valve
  - Incorrect valve-to-valve-seat contact
  - Incorrect valve timing
  - Faulty valve spring
  - Seized valve
2. Piston(s) and piston ring(s)
  - Improperly installed piston ring
  - Damaged, worn or fatigued piston ring
  - Seized piston ring
  - Seized or damaged piston
3. Air filter
  - Improperly installed air filter
  - Clogged air filter element
4. Crankcase and crankshaft
  - Improperly assembled crankcase
  - Seized crankshaft

#### Fuel system

1. Fuel tank
  - Empty fuel tank
  - Clogged fuel filter
  - Clogged fuel strainer
  - Clogged fuel tank drain hose
  - Clogged rollover valve hose
  - Deteriorated or contaminated fuel
2. Fuel pump
  - Faulty fuel pump
  - Faulty fuel pump relay
3. Throttle body (-ies)
  - Deteriorated or contaminated fuel

- Sucked-in air

#### Electrical system

1. Battery
  - Discharged battery
  - Faulty battery
2. Fuse(s)
  - Blown, damaged or incorrect fuse
  - Improperly installed fuse
3. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
  - Fouled spark plug
  - Worn or damaged electrode
  - Worn or damaged insulator
4. Ignition coil(s)
  - Cracked or broken ignition coil body
  - Broken or shorted primary or secondary coils
5. Ignition system
  - Faulty ECU
  - Faulty crankshaft position sensor
6. Switches and wiring
  - Faulty main switch
  - Faulty engine stop switch
  - Broken or shorted wiring
  - Faulty neutral switch
  - Faulty start switch
  - Faulty sidestand switch
  - Faulty clutch switch
  - Improperly grounded circuit
  - Loose connections
7. Starting system
  - Faulty starter motor
  - Faulty starter relay
  - Faulty starting circuit cut-off relay
  - Faulty starter clutch

EAS28490

### INCORRECT ENGINE IDLING SPEED

#### Engine

1. Cylinder(s) and cylinder head(s)
  - Incorrect valve clearance
  - Damaged valve train components
2. Air filter
  - Clogged air filter element

#### Fuel system

1. Throttle body (-ies)
  - Damaged or loose throttle body joint
  - Improperly synchronized throttle bodies
  - Improperly adjusted engine idling speed (idle adjusting screw)

- Improper throttle cable free play
- Flooded throttle body
- Faulty air induction system

## Electrical system

1. Battery
  - Discharged battery
  - Faulty battery
2. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
  - Fouled spark plug
  - Worn or damaged electrode
  - Worn or damaged insulator
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

EAS28510

## POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURES" on page 9-1.

## Engine

1. Air filter
  - Clogged air filter element

## Fuel system

1. Fuel pump
  - Faulty fuel pump

EAS28530

## FAULTY GEAR SHIFTING

### Shifting is difficult

Refer to Clutch drags.

EAS28540

## SHIFT PEDAL DOES NOT MOVE

### Shift shaft

- Improperly adjusted shift rod
- Bent shift shaft

### Shift drum and shift forks

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

### Transmission

- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

EAS28550

## JUMPS OUT OF GEAR

### Shift shaft

- Incorrect shift pedal position
- Improperly returned stopper lever

### Shift forks

- Worn shift fork

### Shift drum

- Incorrect axial play
- Worn shift drum groove

### Transmission

- Worn gear dog

EAS28560

## FAULTY CLUTCH

### Clutch slips

1. Clutch
  - Improperly assembled clutch
  - Improperly adjusted clutch cable
  - Loose or fatigued clutch spring
  - Worn friction plate
  - Worn clutch plate
2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity (low)
  - Deteriorated oil

### Clutch drags

1. Clutch
  - Unevenly tensioned clutch springs
  - Warped pressure plate
  - Bent clutch plate
  - Swollen friction plate
  - Bent clutch push rod
  - Broken clutch boss
  - Burnt primary driven gear bushing
  - Match marks not aligned
2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity (high)
  - Deteriorated oil

EAS28600

## OVERHEATING

### Engine

1. Clogged coolant passages
  - Cylinder head(s) and piston(s)
  - Heavy carbon buildup
2. Engine oil
  - Incorrect oil level

- Incorrect oil viscosity
- Inferior oil quality

## Cooling system

1. Coolant
  - Low coolant level
2. Radiator
  - Damaged or leaking radiator
  - Faulty radiator cap
  - Bent or damaged radiator fin
3. Water pump
  - Damaged or faulty water pump
  - Thermostat
  - Thermostat stays closed
  - Oil cooler
  - Clogged or damaged oil cooler
  - Hose(s) and pipe(s)
  - Damaged hose
  - Improperly connected hose
  - Damaged pipe
  - Improperly connected pipe

## Fuel system

1. Throttle body (-ies)
  - Damaged or loose throttle body joint
2. Air filter
  - Clogged air filter element

## Chassis

1. Brake(s)
  - Dragging brake

## Electrical system

1. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
2. Ignition system
  - Faulty ECU

EAS28610

## OVER COOLING

### Cooling system

1. Thermostat
  - Thermostat stays open

EAS28620

## POOR BRAKING PERFORMANCE

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit
- Faulty brake caliper seal
- Loose union bolt

- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

EAS28660

## FAULTY FRONT FORK LEGS

### Leaking oil

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Cracked or damaged cap bolt O-ring

### Malfunction

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS28670

## UNSTABLE HANDLING

1. Handlebar
  - Bent or improperly installed handlebar
2. Steering head components
  - Improperly installed upper bracket
  - Improperly installed lower bracket (improperly tightened ring nut)
  - Bent steering stem
  - Damaged ball bearing or bearing race
3. Front fork leg(s)
  - Uneven oil levels (both front fork legs)
  - Unevenly tensioned fork spring (both front fork legs)
  - Broken fork spring
  - Bent or damaged inner tube
  - Bent or damaged outer tube
4. Swingarm
  - Worn bearing or bushing
  - Bent or damaged swingarm
5. Rear shock absorber assembly(-ies)
  - Faulty rear shock absorber spring
  - Leaking oil or gas
6. Tire(s)
  - Uneven tire pressures (front and rear)
  - Incorrect tire pressure
  - Uneven tire wear

7. Wheel(s)
  - Incorrect wheel balance
  - Deformed cast wheel
  - Damaged wheel bearing
  - Bent or loose wheel axle
  - Excessive wheel runout
8. Frame
  - Bent frame
  - Damaged steering head pipe
  - Improperly installed bearing race

EAS28710

## **FAULTY LIGHTING OR SIGNALING SYSTEM**

### **Headlight does not come on**

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

### **Headlight bulb burnt out**

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

### **Tail/brake light does not come on**

- Wrong tail/brake light bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

### **Tail/brake light bulb burnt out**

- Wrong tail/brake light bulb
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

### **Turn signal does not come on**

- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

### **Turn signal blinks slowly**

- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

### **Turn signal remains lit**

- Faulty turn signal relay
- Burnt-out turn signal bulb

### **Turn signal blinks quickly**

- Incorrect turn signal bulb
- Faulty turn signal relay
- Burnt-out turn signal bulb

### **Horn does not sound**

- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

EAS5D01011

## **TROUBLESHOOTING AT THE ABS WARNING LIGHT**

When the main switch is turned "ON". (Engine does not start.)

### **Only the ABS warning light does not come on**

- Defective connection of the ABS wire harness and the wire harness
- Defective connection of the ABS wire harness and the ABS ECU
- ABS warning light bulb is burnt out or the bulb contact is defective
- ABS ECU defective

### **All indicators do not come on**

- Battery defective
- Blown, damaged, or incorrect fuse (main fuse)
- Defective connection of the main fuse coupler
- Defective connection of the wire harness
- Defective connection of the main switch coupler
- Defective connection of the meter coupler

### **ABS warning light continues to flashes**

- Brake light switch (front or rear) is defective
- Brake light switch front or rear coupler has come off

- Defective starter motor monitor
- Other defective

### **ABS warning light flashes every 0.5 seconds**

- Voltage drop (Less than 10 V)
- Battery
- Rectifier/regulator
- AC magneto
- Strong radio waves or static electricity
- Test coupler adapter is connected to test coupler

### **ABS Warning light continues to come on**

- Defective connection of the wheel sensor (front or rear) circuit
- Wheel sensor lead (front or rear) coupler has come off
- Wheel sensor lead (front or rear) or the IC internal circuit is disconnected
- Sensor circuit of the ABS harness is disconnected
- ABS ECU coupler terminal has come off



**WIRING DIAGRAM****FZ1-N(X) 2008**

1. Main switch
2. Rectifier/regulator
3. AC magneto
4. Backup fuse
5. Immobilizer unit
6. Main fuse
7. Battery
8. Fuel injection system fuse
9. Starter relay
10. Starter motor
11. Relay unit
12. Starting circuit cut-off relay
13. Fuel pump relay
14. Neutral switch
15. Sidestand switch
16. Fuel pump
17. Crankshaft position sensor
18. Cylinder identification sensor
19. Speed sensor
20. Atmospheric pressure sensor
21. Lean angle sensor
22. O<sub>2</sub> sensor
23. ECU (engine control unit)
24. Ignition coil #1
25. Ignition coil #2
26. Ignition coil #3
27. Ignition coil #4
28. Spark plug
29. Injector #1
30. Injector #2
31. Injector #3
32. Injector #4
33. Air induction system solenoid
34. Sub-throttle position sensor
35. EXUP servo motor
36. Intake air pressure sensor
37. Throttle position sensor
38. Coolant temperature sensor
39. Air temperature sensor
40. Meter assembly
41. Immobilizer indicator light
42. Fuel level warning light
43. Oil level warning light
44. Neutral indicator light
45. Tachometer
46. Multi-function meter
47. Engine trouble warning light
48. Coolant temperature indicator light
49. Hi beam indicator light
50. Left turn signal indicator light (left)
51. Right turn signal indicator light (light)
52. Meter light
53. Oil level switch
54. Right handlebar switch

55. Front brake light switch
56. Engine stop switch
57. Start switch
58. Rear brake light switch
59. Left handlebar switch
60. Clutch switch
61. Pass switch
62. Dimmer switch
63. Hazard switch
64. Turn signal switch
65. Horn switch
66. Horn
67. Turn signal relay
68. Front left turn signal light
69. Front right turn signal light
70. Rear left turn signal light
71. Rear right turn signal light
72. Auxiliary light
73. Headlight
74. License plate light
75. Tail/brake light
76. Headlight relay (on/off)
77. Taillight fuse
78. Ignition fuse
79. Anti-theft alarm
80. Signal fuse
81. Headlight fuse
82. Radiator fan motor relay
83. Left radiator fan motor fuse
84. Right radiator fan motor fuse
85. Left radiator fan motor
86. Right radiator fan motor
87. Ground

Br/W	Brown/White
Br/Y	Brown/Yellow
G/B	Green/Black
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/G	Gray/Green
Gy/R	Gray/Red
L/B	Blue/Black
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
O/B	Orange/Black
O/G	Orange/Green
O/Y	Orange/Yellow
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/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

**COLOR CODE**

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red

---

**FZ1-S(X) 2008**

1. Main switch	59. Left handlebar switch	G/W	Green/White
2. Rectifier/regulator	60. Clutch switch	G/Y	Green/Yellow
3. AC magneto	61. Pass switch	Gy/G	Gray/Green
4. Backup fuse	62. Dimmer switch	Gy/R	Gray/Red
5. Immobilizer unit	63. Hazard switch	L/B	Blue/Black
6. Main fuse	64. Turn signal switch	L/R	Blue/Red
7. Battery	65. Horn switch	L/W	Blue/White
8. Fuel injection system fuse	66. Horn	L/Y	Blue/Yellow
9. Starter relay	67. Turn signal relay	O/B	Orange/Black
10. Starter motor	68. Front left turn signal light	O/G	Orange/Green
11. Relay unit	69. Front right turn signal light	O/Y	Orange/Yellow
12. Starting circuit cut-off relay	70. Rear left turn signal light	P/B	Pink/Black
13. Fuel pump relay	71. Rear right turn signal light	P/W	Pink/White
14. Neutral switch	72. Auxiliary light	R/B	Red/Black
15. Sidestand switch	73. Headlight	R/G	Red/Green
16. Fuel pump	74. License plate light	R/L	Red/Blue
17. Crankshaft position sensor	75. Tail/brake light	R/W	Red/White
18. Cylinder identification sensor	76. Headlight relay (on/off)	R/Y	Red/Yellow
19. Speed sensor	77. Taillight fuse	Sb/W	Sky blue/White
20. Atmospheric pressure sensor	78. Ignition fuse	W/B	White/Black
21. Lean angle sensor	79. Anti-theft alarm	W/R	White/Red
22. O <sub>2</sub> sensor	80. Signal fuse	W/Y	White/Yellow
23. ECU (engine control unit)	81. Headlight fuse	Y/B	Yellow/Black
24. Ignition coil #1	82. Radiator fan motor relay	Y/G	Yellow/Green
25. Ignition coil #2	83. Left radiator fan motor fuse	Y/L	Yellow/Blue
26. Ignition coil #3	84. Right radiator fan motor fuse	Y/R	Yellow/Red
27. Ignition coil #4	85. Left radiator fan motor	Y/W	Yellow/White
28. Spark plug	86. Right radiator fan motor		
29. Injector #1	87. Ground		
30. Injector #2			
31. Injector #3			
32. Injector #4			
33. Air induction system solenoid			
34. Sub-throttle position sensor			
35. EXUP servo motor			
36. Intake air pressure sensor			
37. Throttle position sensor			
38. Coolant temperature sensor			
39. Air temperature sensor			
40. Meter assembly			
41. Immobilizer indicator light			
42. Fuel level warning light			
43. Oil level warning light			
44. Neutral indicator light			
45. Tachometer			
46. Multi-function meter			
47. Engine trouble warning light			
48. Coolant temperature indicator light			
49. Hi beam indicator light			
50. Left turn signal indicator light			
51. Right turn signal indicator light			
52. Meter light			
53. Oil level switch			
54. Right handlebar switch			
55. Front brake light switch			
56. Engine stop switch			
57. Start switch			
58. Rear brake light switch			

EAS5D01034

**COLOR CODE**

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
Br/Y	Brown/Yellow
G/B	Green/Black
G/R	Green/Red

---

**FZ1-SA 2008**

1. Main switch	59. Rear brake light switch	B/W	Black/White
2. Rectifier/regulator	60. Left handlebar switch	B/Y	Black/Yellow
3. AC magneto	61. Clutch switch	Br/G	Brown/Green
4. Backup fuse	62. Pass switch	Br/L	Brown/Blue
5. Immobilizer unit	63. Dimmer switch	Br/R	Brown/Red
6. Main fuse	64. Hazard switch	Br/W	Brown/White
7. Battery	65. Turn signal switch	Br/Y	Brown/Yellow
8. Fuel injection system fuse	66. Horn switch	G/B	Green/Black
9. Starter relay	67. Horn	G/R	Green/Red
10. Starter motor	68. Turn signal relay	G/W	Green/White
11. Relay unit	69. Front left turn signal light	G/Y	Green/Yellow
12. Starting circuit cut-off relay	70. Front right turn signal light	Gy/G	Gray/Green
13. Fuel pump relay	71. Rear left turn signal light	Gy/R	Gray/Red
14. Neutral switch	72. Rear right turn signal light	L/B	Blue/Black
15. Sidestand switch	73. Auxiliary light	L/R	Blue/Red
16. Fuel pump	74. Headlight	L/W	Blue/White
17. Crankshaft position sensor	75. License plate light	L/Y	Blue/Yellow
18. Cylinder identification sensor	76. Tail/brake light	O/B	Orange/Black
19. Speed sensor	77. Headlight relay (on/off)	O/G	Orange/Green
20. Atmospheric pressure sensor	78. Headlight relay (dimmer)	O/Y	Orange/Yellow
21. Lean angle sensor	79. Taillight fuse	P/B	Pink/Black
22. O <sub>2</sub> sensor	80. Ignition fuse	P/W	Pink/White
23. ECU (engine control unit)	81. Anti-theft alarm	R/B	Red/Black
24. Ignition coil #1	82. Signal fuse	R/G	Red/Green
25. Ignition coil #2	83. Headlight fuse	R/L	Red/Blue
26. Ignition coil #3	84. ABS fuse	R/W	Red/White
27. Ignition coil #4	85. Radiator fan motor relay	R/Y	Red/Yellow
28. Spark plug	86. Left radiator fan motor fuse	Sb/W	Sky blue/White
29. Injector #1	87. Right radiator fan motor fuse	W/B	White/Black
30. Injector #2	88. Left radiator fan motor	W/R	White/Red
31. Injector #3	89. Right radiator fan motor	W/Y	White/Yellow
32. Injector #4	90. ABS ECU	Y/B	Yellow/Black
33. Air induction system solenoid	91. ABS test terminal	Y/G	Yellow/Green
34. Sub-throttle position sensor	92. Front wheel sensor	Y/L	Yellow/Blue
35. EXUP servo motor	93. Rear wheel sensor	Y/R	Yellow/Red
36. Intake air pressure sensor	94. ABS motor relay	Y/W	Yellow/White
37. Throttle position sensor	95. Hydraulic unit		
38. Coolant temperature sensor	96. ABS motor fuse		
39. Air temperature sensor	97. Ground		
40. Meter assembly			
41. Immobilizer indicator light			
42. Fuel level warning light			
43. Oil level warning light			
44. Neutral indicator light			
45. Tachometer			
46. Multi-function meter			
47. Engine trouble warning light			
48. Coolant temperature indicator light			
49. Hi beam indicator light			
50. Left turn signal indicator light			
51. Right turn signal indicator light			
52. Meter light			
53. ABS warning light			
54. Oil level switch			
55. Right handlebar switch			
56. Front brake light switch			
57. Engine stop switch			
58. Start switch			

EAS5D01031

**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

---

**FZ1-NA 2008**

1. Main switch	59. Rear brake light switch	B/W	Black/White
2. Rectifier/regulator	60. Left handlebar switch	B/Y	Black/Yellow
3. AC magneto	61. Clutch switch	Br/G	Brown/Green
4. Backup fuse	62. Pass switch	Br/L	Brown/Blue
5. Immobilizer unit	63. Dimmer switch	Br/R	Brown/Red
6. Main fuse	64. Hazard switch	Br/W	Brown/White
7. Battery	65. Turn signal switch	Br/Y	Brown/Yellow
8. Fuel injection system fuse	66. Horn switch	G/B	Green/Black
9. Starter relay	67. Horn	G/R	Green/Red
10. Starter motor	68. Turn signal relay	G/W	Green/White
11. Relay unit	69. Front left turn signal light	G/Y	Green/Yellow
12. Starting circuit cut-off relay	70. Front right turn signal light	Gy/G	Gray/Green
13. Fuel pump relay	71. Rear left turn signal light	Gy/R	Gray/Red
14. Neutral switch	72. Rear right turn signal light	L/B	Blue/Black
15. Sidestand switch	73. Auxiliary light	L/R	Blue/Red
16. Fuel pump	74. Headlight	L/W	Blue/White
17. Crankshaft position sensor	75. License plate light	L/Y	Blue/Yellow
18. Cylinder identification sensor	76. Tail/brake light	O/B	Orange/Black
19. Speed sensor	77. Headlight relay (on/off)	O/G	Orange/Green
20. Atmospheric pressure sensor	78. Taillight fuse	O/Y	Orange/Yellow
21. Lean angle sensor	79. Ignition fuse	P/B	Pink/Black
22. O <sub>2</sub> sensor	80. Anti-theft alarm	P/W	Pink/White
23. ECU (engine control unit)	81. Signal fuse	R/B	Red/Black
24. Ignition coil #1	82. Headlight fuse	R/G	Red/Green
25. Ignition coil #2	83. ABS fuse	R/L	Red/Blue
26. Ignition coil #3	84. Radiator fan motor relay	R/W	Red/White
27. Ignition coil #4	85. Left radiator fan motor fuse	R/Y	Red/Yellow
28. Spark plug	86. Right radiator fan motor fuse	Sb/W	Sky blue/White
29. Injector #1	87. Left radiator fan motor	W/B	White/Black
30. Injector #2	88. Right radiator fan motor	W/R	White/Red
31. Injector #3	89. ABS ECU	W/Y	White/Yellow
32. Injector #4	90. ABS test terminal	Y/B	Yellow/Black
33. Air induction system solenoid	91. Front wheel sensor	Y/G	Yellow/Green
34. Sub-throttle position sensor	92. Rear wheel sensor	Y/L	Yellow/Blue
35. EXUP servo motor	93. ABS motor relay	Y/R	Yellow/Red
36. Intake air pressure sensor	94. Hydraulic unit	Y/W	Yellow/White
37. Throttle position sensor	95. ABS motor fuse		
38. Coolant temperature sensor	96. Ground		
39. Air temperature sensor			
40. Meter assembly			
41. Immobilizer indicator light			
42. Fuel level warning light			
43. Oil level warning light			
44. Neutral indicator light			
45. Tachometer			
46. Multi-function meter			
47. Engine trouble warning light			
48. Coolant temperature indicator light			
49. Hi beam indicator light			
50. Left turn signal indicator light			
51. Right turn signal indicator light			
52. Meter light			
53. ABS warning light			
54. Oil level switch			
55. Right handlebar switch			
56. Front brake light switch			
57. Engine stop switch			
58. Start switch			

EAS22C1100

**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



YAMAHA MOTOR CO., LTD.  
2500 SHINGAI IWATA SHIZUOKA JAPAN

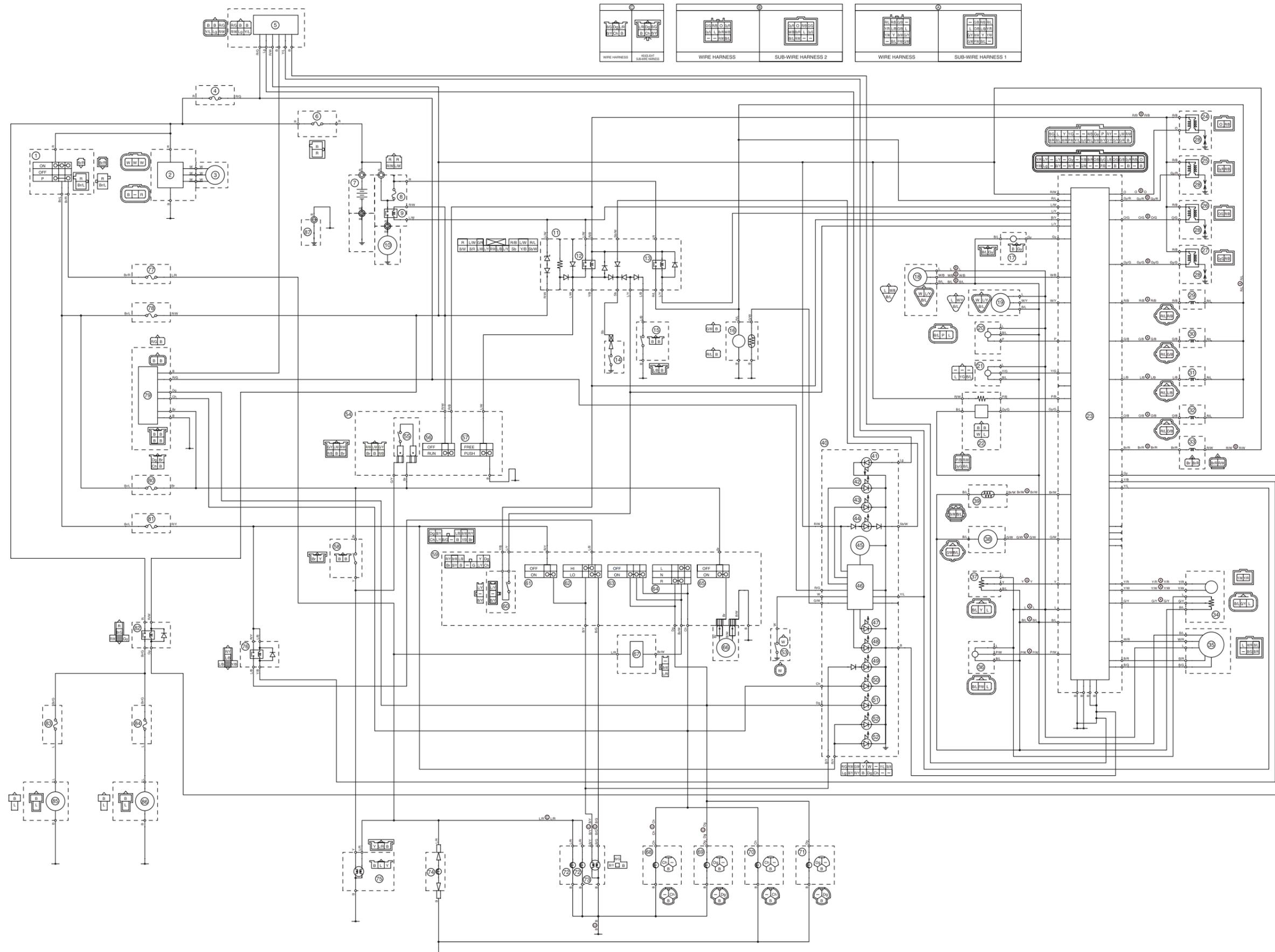
FZ1-N(X) 2008  
WIRING DIAGRAM

FZ1-N(X) 2008  
SCHEMA DE CABLAGE

FZ1-N(X) 2008  
SCHALTPLAN

FZ1-N(X) 2008  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-N(X) 2008



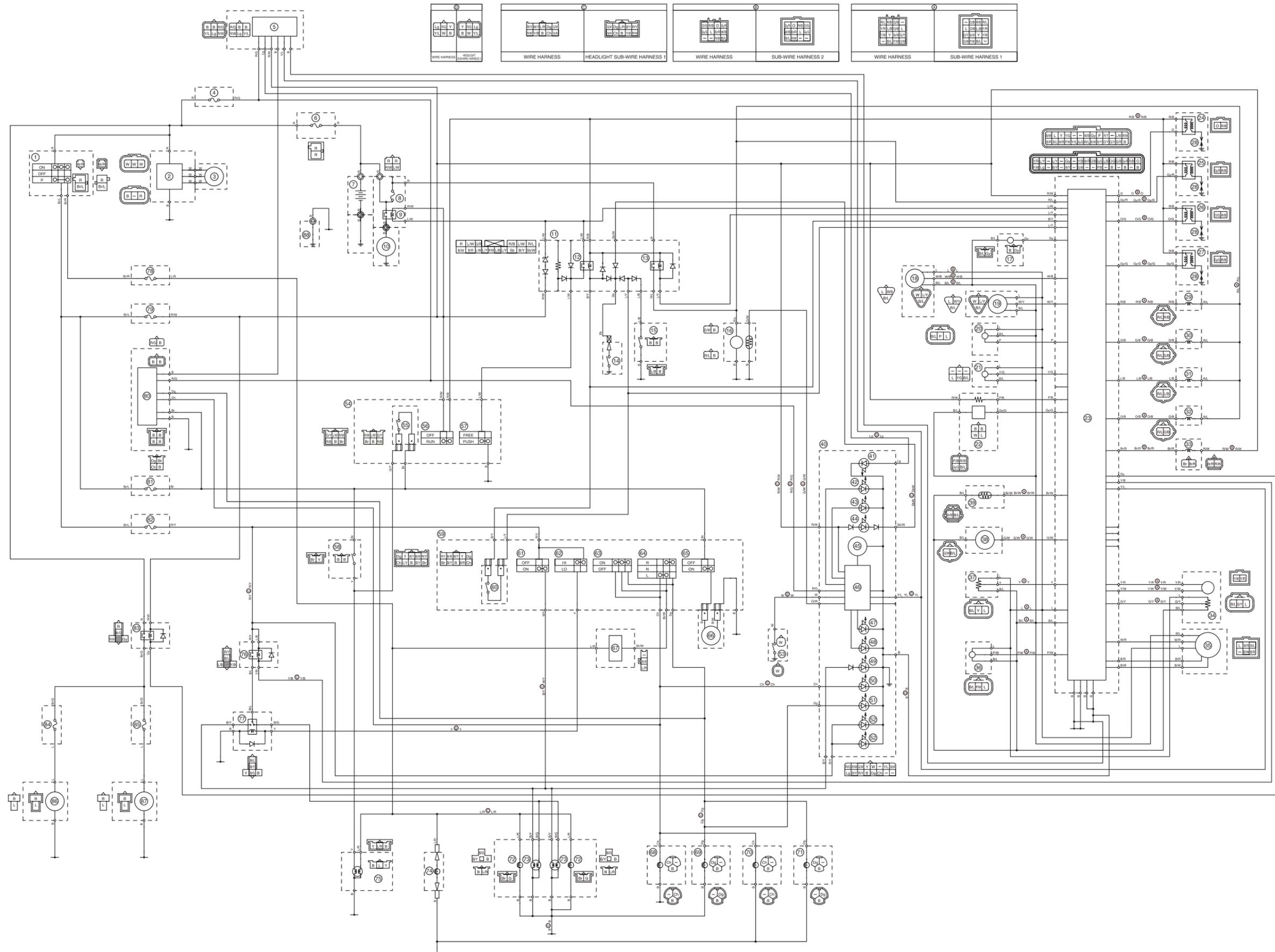
**FZ1-S(X) 2008  
WIRING DIAGRAM**

**FZ1-S(X) 2008  
SCHEMA DE CABLAGE**

**FZ1-S(X) 2008  
SCHALTPLAN**

**FZ1-S(X) 2008  
SCHEMA ELETTRICO**

**DIAGRAMA DE CONEXIONES  
DE FZ1-S(X) 2008**



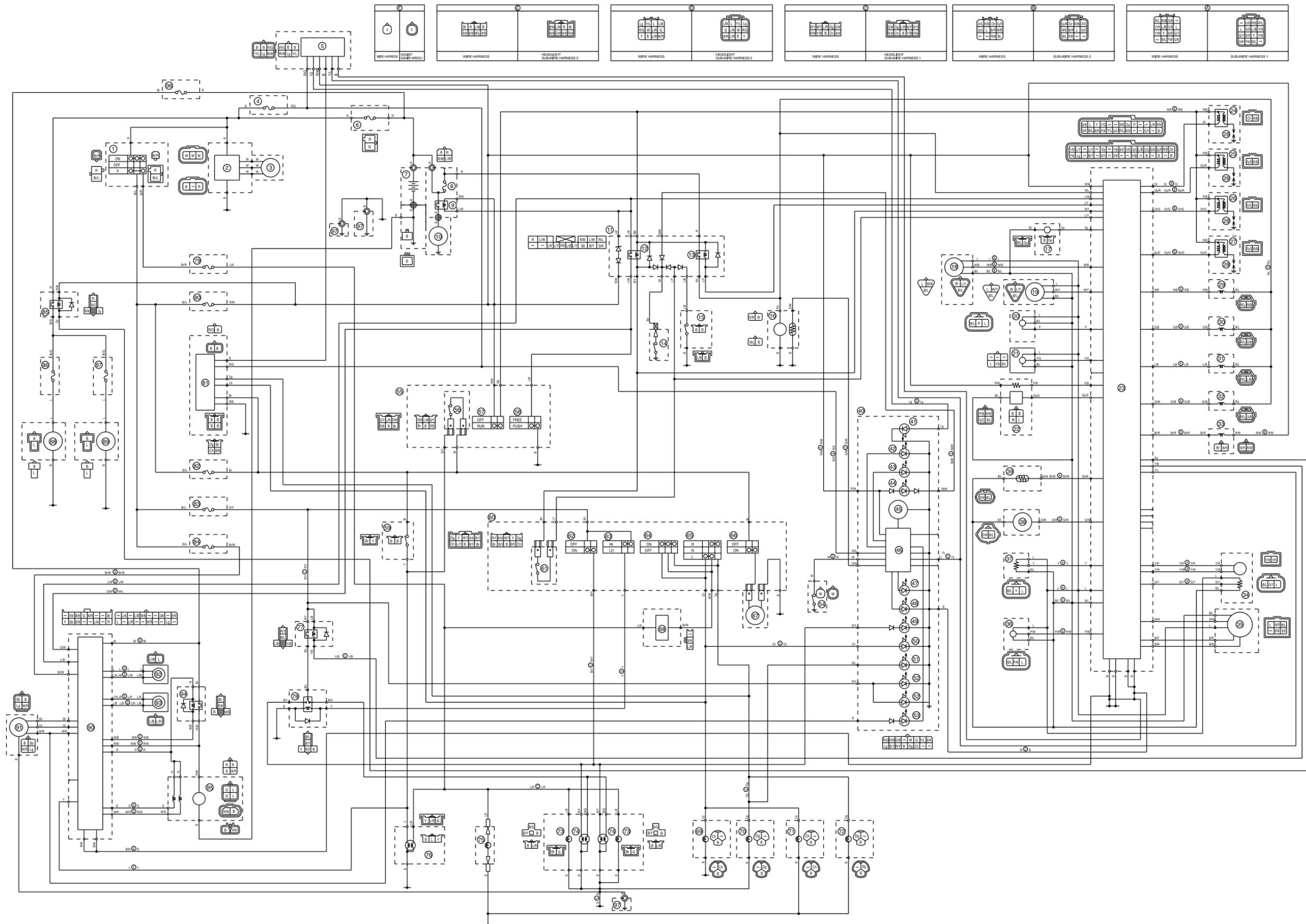
**FZ1-SA 2008  
WIRING DIAGRAM**

**FZ1-SA 2008  
SCHEMA DE CABLAGE**

**FZ1-SA 2008  
SCHALTPLAN**

**FZ1-SA 2008  
SCHEMA ELETTRICO**

**DIAGRAMA DE CONEXIONES  
DE FZ1-SA 2008**



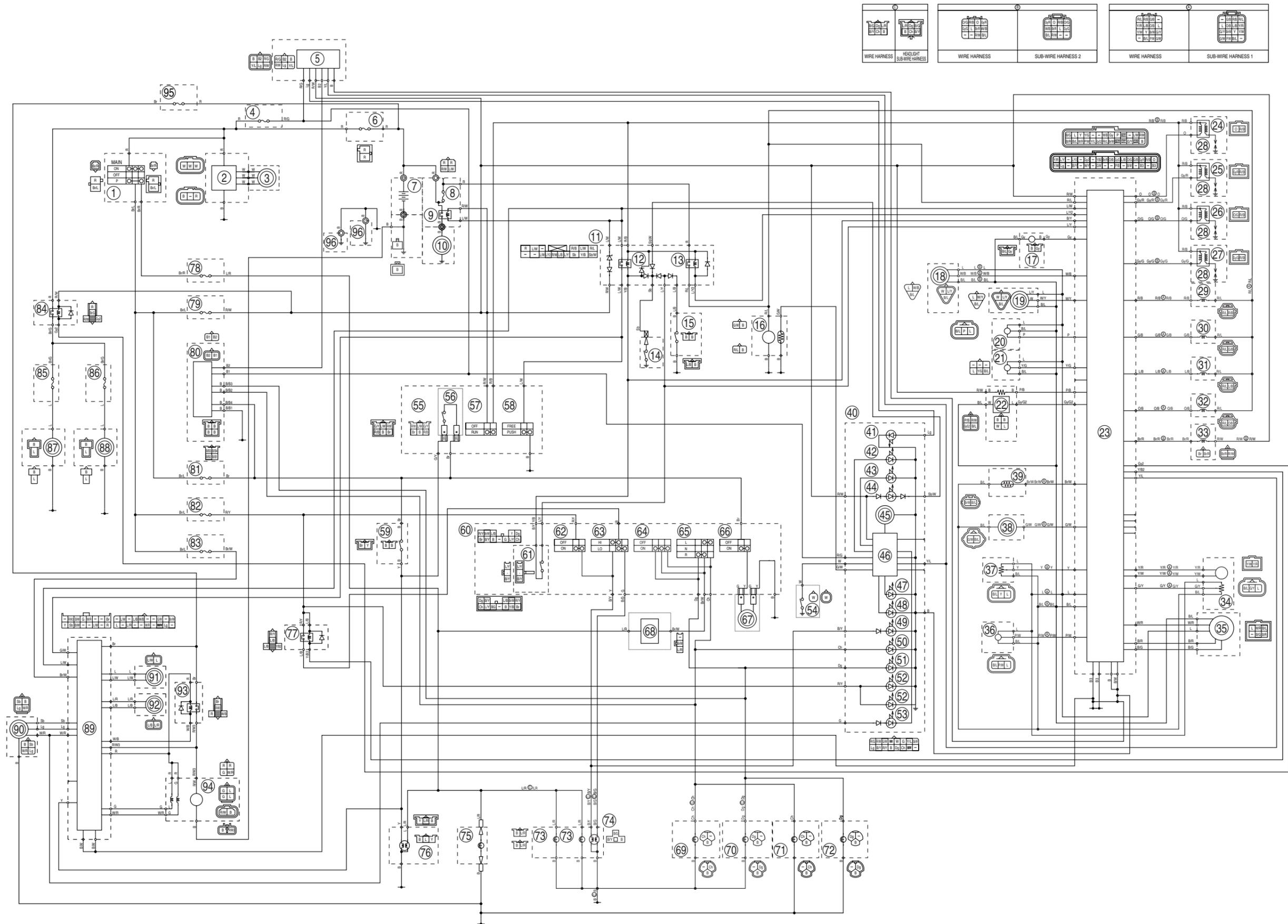
FZ1-NA 2008  
WIRING DIAGRAM

FZ1-NA 2008  
SCHEMA DE CABLAGE

FZ1-NA 2008  
SCHALTPLAN

FZ1-NA 2008  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-NA 2008



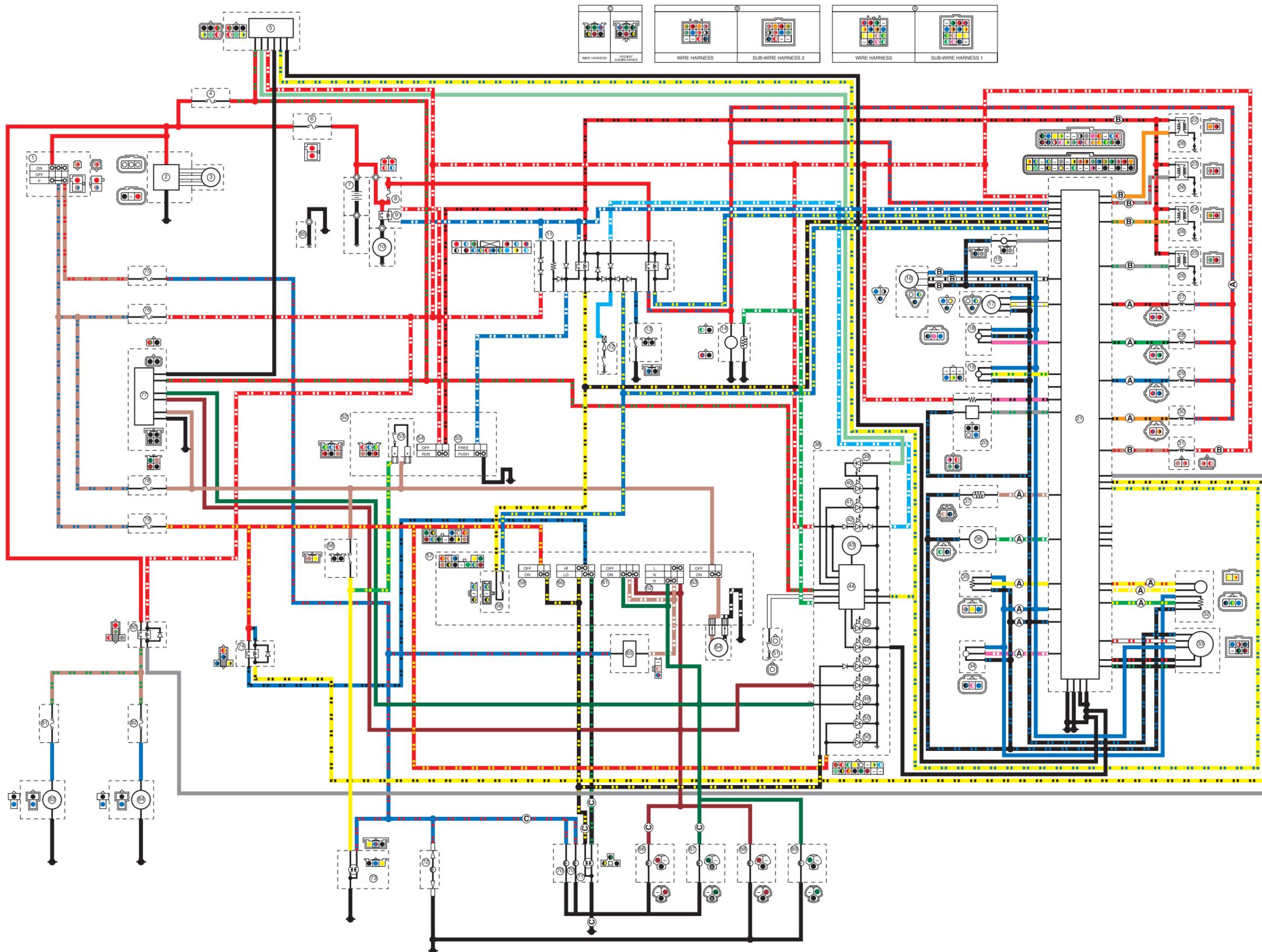
FZ1-N(X) 2008  
WIRING DIAGRAM

FZ1-N(X) 2008  
SCHEMA DE CABLAGE

FZ1-N(X) 2008  
SCHALTPLAN

FZ1-N(X) 2008  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-N(X) 2008



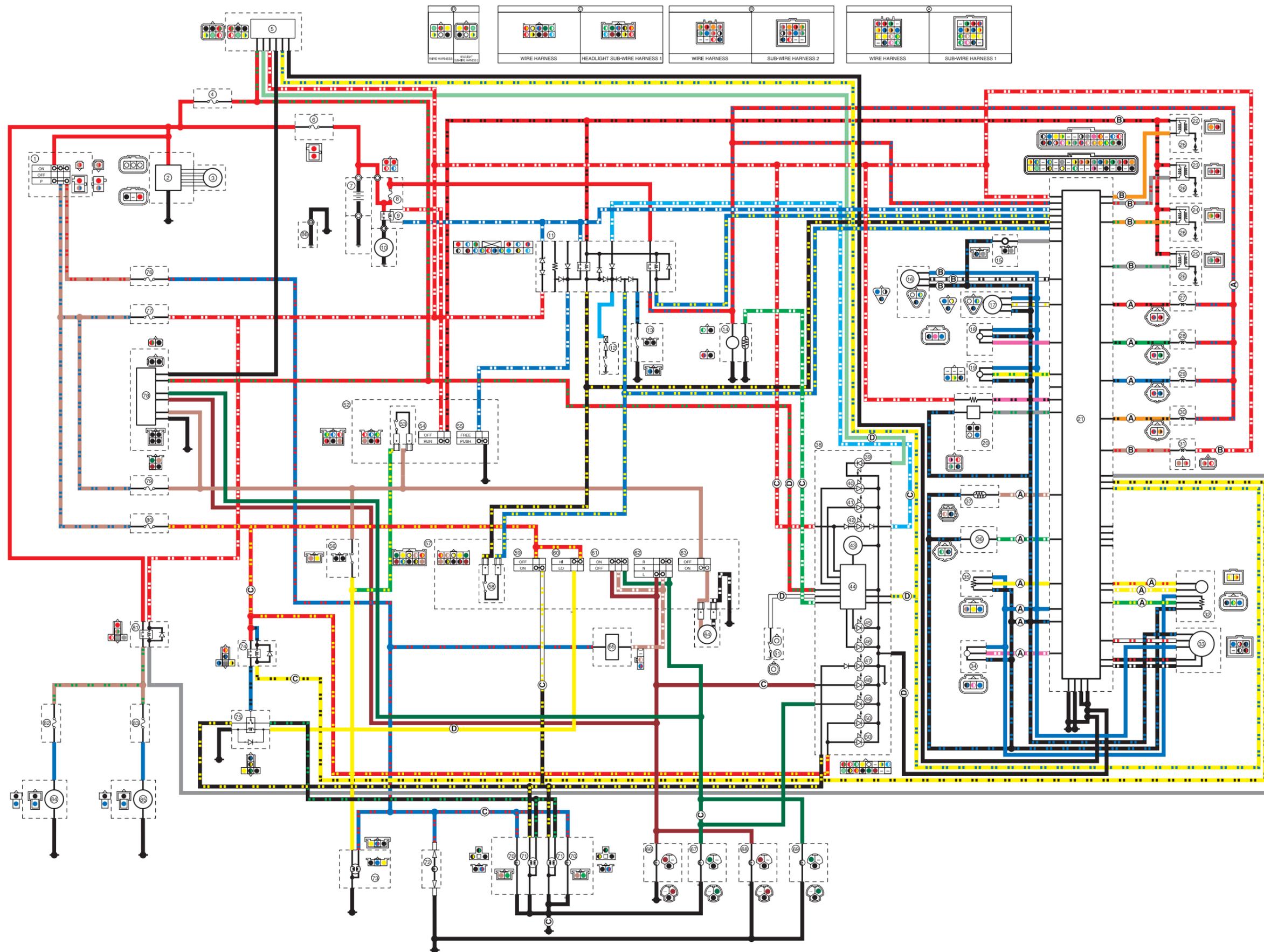
FZ1-S(X) 2008  
WIRING DIAGRAM

FZ1-S(X) 2008  
SCHEMA DE CABLAGE

FZ1-S(X) 2008  
SCHALTPLAN

FZ1-S(X) 2008  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-S(X) 2008



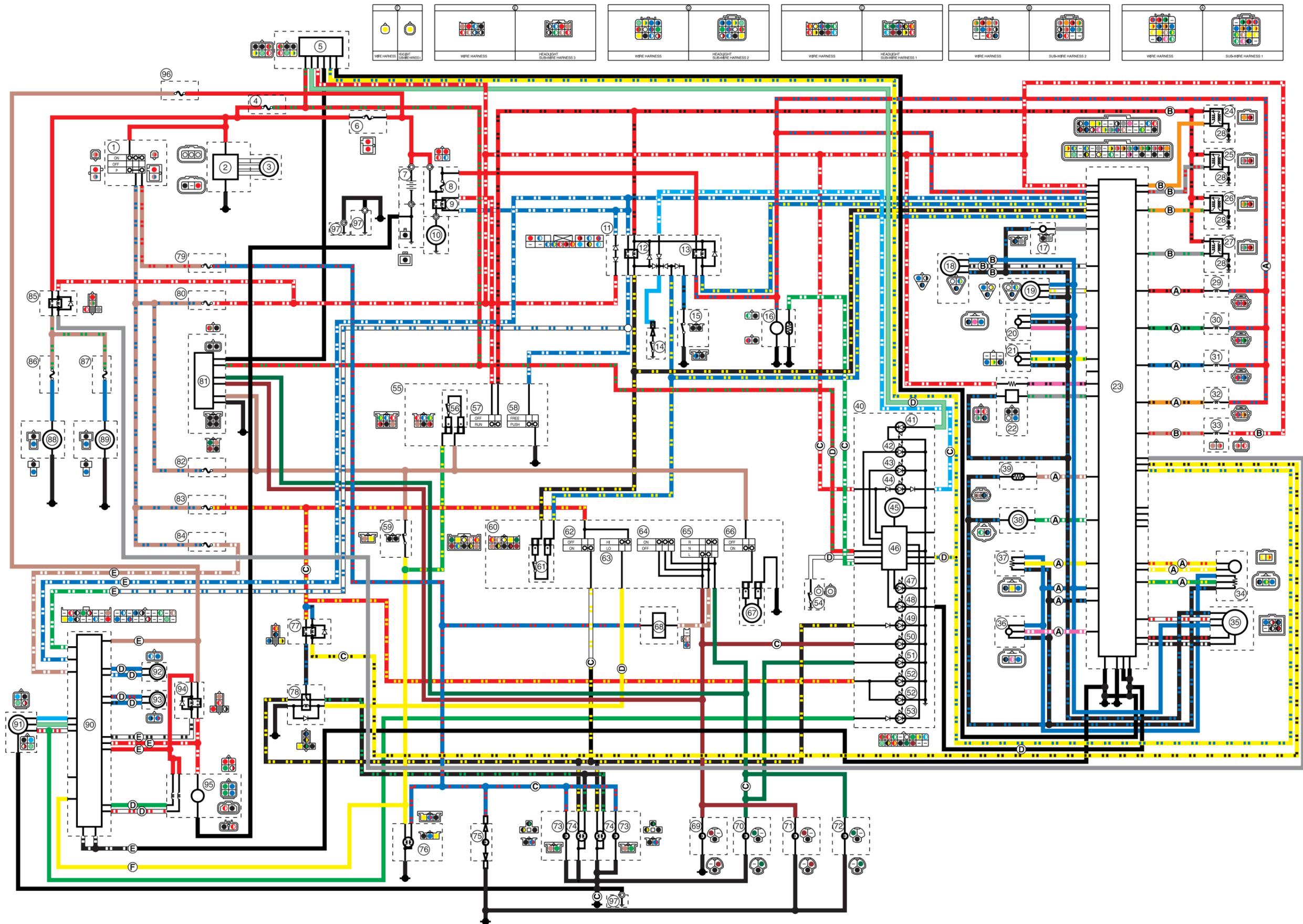
FZ1-SA 2008  
WIRING DIAGRAM

FZ1-SA 2008  
SCHEMA DE CABLAGE

FZ1-SA 2008  
SCHALTPLAN

FZ1-SA 2008  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-SA 2008



FZ1-NA 2008  
WIRING DIAGRAM

FZ1-NA 2008  
SCHEMA DE CABLAGE

FZ1-NA 2008  
SCHALTPLAN

FZ1-NA 2008  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-NA 2008

