

# **SERVICE MANUAL**

# MTM850 MTM850G



MTM850
MTM850G
SERVICE MANUAL
©2015 by Yamaha Motor Co., Ltd.
First edition, December 2015
All rights reserved.
Any reproduction or unauthorized use without the written permission of Yamaha Motor Co., Ltd. is expressly prohibited.

#### **IMPORTANT**

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

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

TIP -

Designs and specifications are subject to change without notice.

FAS3000

#### **IMPORTANT MANUAL INFORMATION**

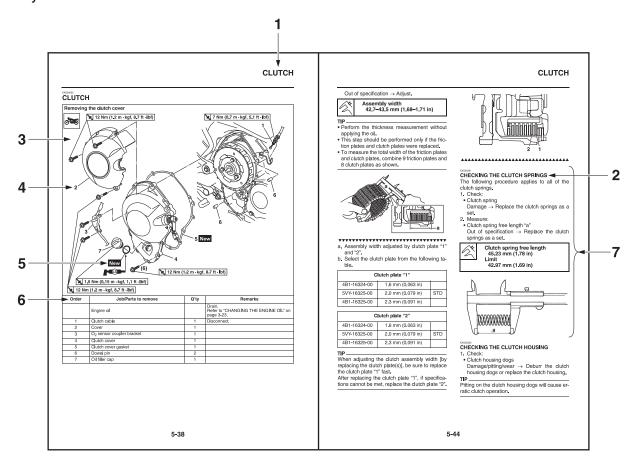
Particularly important information is distinguished in this manual by the following notations.

, and an	· ····································
$\triangle$	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
<b>▲</b> WARNING	A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
NOTICE	A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.
TIP	A TIP provides key information to make procedures easier or clearer.

#### **HOW TO USE THIS MANUAL**

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

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



## **SYMBOLS**

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

TIF

The following symbols are not relevant to every vehicle.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
0000	Serviceable with engine mounted	<u> </u>	Gear oil
	Filling fluid		Molybdenum disulfide oil
_	Lubricant	BF	Brake fluid
	Special tool	B	Wheel bearing grease
	Tightening torque	— (s)	Lithium-soap-based grease
	Wear limit, clearance		Molybdenum disulfide grease
	Engine speed	S	Silicone grease
	Electrical data	<u> </u>	Apply locking agent (LOCTITE®).
Ē	Engine oil	New	Replace the part with a new one.
<u> </u>	Silicone fluid		

# **TABLE OF CONTENTS**

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

# **GENERAL INFORMATION**

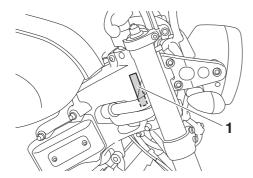
IDENTIFICATION	1-1
VEHICLE IDENTIFICATION NUMBER	1-1
MODEL LABEL	
FEATURES	
YCC-T (Yamaha Chip Controlled Throttle)	1-2
OUTLINE OF THE TCS (Traction Control System)	
INSTRUMENT FUNCTIONS	
IMPORTANT INFORMATION	1-13
PREPARATION FOR REMOVAL AND DISASSEMBLY	1-13
REPLACEMENT PARTS	
GASKETS, OIL SEALS AND O-RINGS	
LOCK WASHERS/PLATES AND COTTER PINS	
BEARINGS AND OIL SEALS	
CIRCLIPS	
RUBBER PARTS	
BASIC SERVICE INFORMATION	1-15
QUICK FASTENERS	1-15
ELECTRICAL SYSTEM	
SPECIAL TOOLS	1-20

#### **IDENTIFICATION**

EAS30002

#### VEHICLE IDENTIFICATION NUMBER

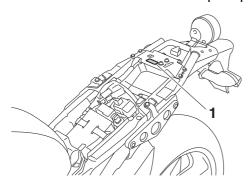
The vehicle identification number "1" is stamped into the right side of the steering head pipe.



EAS30003

#### **MODEL LABEL**

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



#### **FEATURES**

EAS30852

#### YCC-T (Yamaha Chip Controlled Throttle)

#### **Mechanism characteristics**

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

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

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

#### Aims and advantages of using YCC-T

• Increased engine power

By shortening the air intake path, higher engine speed is possible  $\rightarrow$  Increased engine power.

Improved driveability

Air intake volume is controlled according to the operating conditions  $\rightarrow$  Improved throttle response to meet engine requirement.

Driving force is controlled at the optimal level according to the transmission gear position and engine speed  $\rightarrow$  Improved throttle control.

• Engine braking control

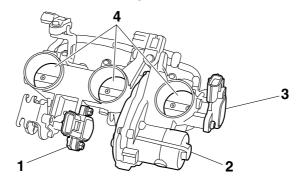
Due to the throttle control, optimal engine braking is made possible.

• Simplified idle speed control (ISC) mechanism

The bypass mechanism and ISC actuator are eliminated  $\rightarrow$  A simple mechanism is used to maintain a steady idle speed.

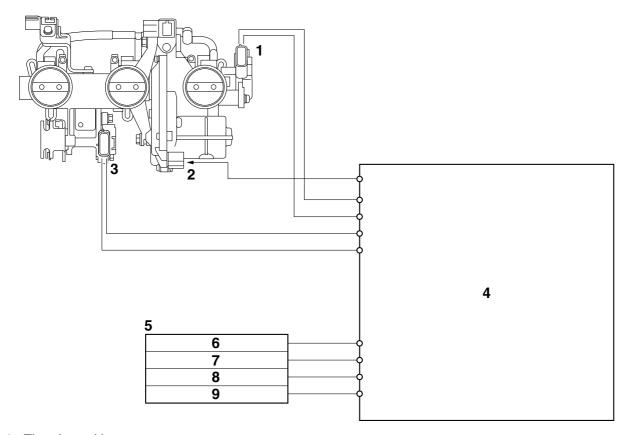
Reduced weight

Compared to using a sub-throttle mechanism, weight is reduced.



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

### **YCC-T** system outline



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

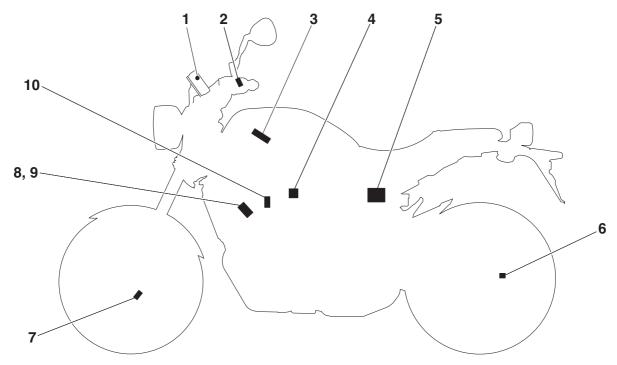
#### **OUTLINE OF THE TCS (Traction Control System)**

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

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

The traction control system can be set to one of two operation modes or turned off.

#### TCS (Traction control system) layout

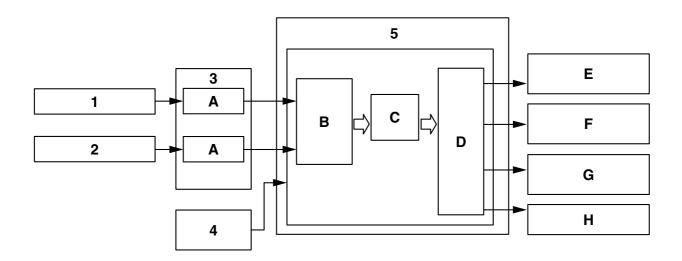


- 1. Traction control system indicator light
- 2. Traction control system switch
- 3. ECU
- 4. Throttle servo motor
- 5. ABS ECU
- 6. Rear wheel sensor
- 7. Front wheel sensor
- 8. Ignition coils
- 9. Spark plugs
- 10.Fuel injector

#### TCS (Traction control system) block diagram

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

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



- 1. Front wheel sensor
- 2. Rear wheel sensor
- 3. ABS ECU
- 4. Traction control system switch
- 5. ECU
- A. Signal conversion
- B. Slip amount calculation
- C. Exceeds preset value
- D. Actuator control
- E. Fuel cut-off
- F. Ignition timing (retarded)
- G. Traction control system indicator light (flashes)
- H. YCC-T motor throttle valve opening (decreased)

#### **Traction control system**

The traction control system (TCS) helps maintain traction when accelerating on slippery surfaces, such as unpaved or wet roads. If sensors detect that the rear wheel is starting to slip (uncontrolled spinning), the traction control system assists by regulating engine power as needed until traction is restored.

### **WARNING**

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

The "TCS" indicator light flashes when traction control has engaged. You may notice slight changes in engine and exhaust sounds when the system has engaged.

In certain conditions, the traction control system may be automatically disabled. Should this happen, the "TCS" indicator light and the "TCS" warning light will come on.

The TCS display indicates the current TCS setting. There are three settings.

#### TCS "OFF"

TCS "OFF" turns the traction control system off.

#### TCS "1"

TCS "1" minimizes traction control system assist.

#### TCS "2"

TCS "2" maximizes traction control assist; wheel spin is most strongly controlled.

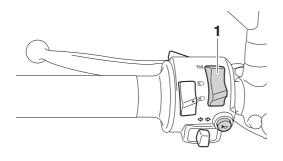
#### TIP

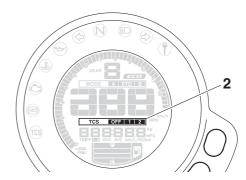
- Use the traction control switch to change TCS settings.
- Traction control can be turned on or off only when the vehicle is stopped.
- When the key is turned to "ON", traction control is turned on and set to TCS "1" or "2" (whichever was last selected).
- Turn the traction control system off to help free the rear wheel if the vehicle gets stuck in mud, sand, or other soft surfaces.

ECA19650

#### NOTICE

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





- 1. Traction control system switch "TCS"
- 2. TCS display

#### **Setting the traction control system**

With the throttle closed, push traction control system switch down to change from TCS "1" to "2". Push up to change from TCS "2" to "1".

With the vehicle stopped, push this switch up for two seconds to turn the system off. Push down to turn the system on.

#### TIP\_

The current TCS setting is shown in the TCS display.

#### Resetting the traction control system

The traction control system will automatically disable when:

- the front wheel or rear wheel comes off the ground while riding.
- excessive rear wheel spin is detected while riding.
- either wheel is rotated with the key turned to "ON" (such as when performing maintenance).

If the traction control system is disabled, both the " $_{TCS}$ " indicator light and the " $_{ICS}$ " warning light will come on.

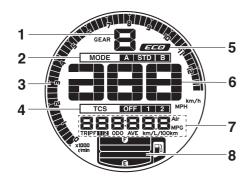
Should this occur, try resetting the system as follows.

- 1. Stop the vehicle and turn the key to "OFF".
- 2. Wait a few seconds and then turn key back "ON".
- 3. The "TCS" indicator light should turn off and the system be enabled.
- 4. The "" warning light should go off after the vehicle reaches a traveling speed of 20 km/h (12 mi/h).

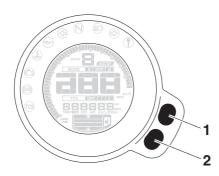
#### TIP.

If the "TCS" indicator light or the "TCS" warning light remains on after resetting, check the fuel injection system (Refer to "FUEL INJECTION SYSTEM" on page 8-33).

# INSTRUMENT FUNCTIONS Multi-function meter unit



- 1. Transmission gear display
- 2. Drive mode display
- 3. Tachometer
- 4. TCS display
- 5. Eco indicator "ECO"
- 6. Speedometer
- 7. Multi-function display
- 8. Fuel meter



- 1. Top set button
- 2. Bottom set button

EWA12423

#### **WARNING**

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

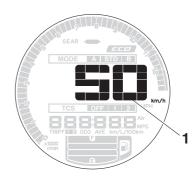
The multi-function meter unit is equipped with the following:

- a speedometer
- a tachometer
- a fuel meter
- an eco indicator
- a transmission gear display
- a drive mode display
- a traction control system display
- a multi-function display

#### TIP

- Except when switching to the brightness control mode or to display the clock, turn the key to "ON" before using the bottom and top set buttons.
- For the UK: To switch the speedometer and multi-function display between kilometers and miles, set the multi-function display to the odometer mode or a tripmeter mode, and then press the bottom set button for three seconds.

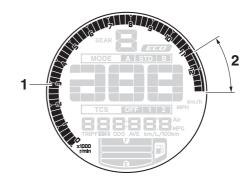
#### **Speedometer**



1. Speedometer

The speedometer shows the vehicle's traveling speed.

#### **Tachometer**



- 1. Tachometer
- 2. Tachometer red zone

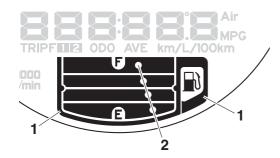
The tachometer allows the rider to monitor the engine speed and keep it within the ideal power range.

ECA19660

#### **NOTICE**

Do not operate the engine in the tachometer red zone.

#### **Fuel meter**



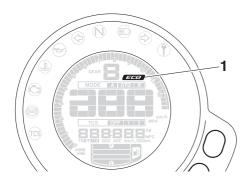
- 1. Frame
- 2. Fuel meter

The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the fuel meter disappear from "F" (full tank) towards "E" (empty tank) as the fuel level decreases. When the last segment and frame start flashing, refuel as soon as possible.

#### TIP\_

This fuel meter is equipped with a self-diagnosis system. If a problem is detected in the fuel tank electrical circuit, the fuel level segments, frame, and "▶" will flash repeatedly. If this occurs, check the electrical circuit. Refer to "CHECKING THE FUEL METER/FUEL LEVEL WARNING LIGHT" on page 8-163.

#### **Eco indicator**



#### 1. Eco indicator "ECO"

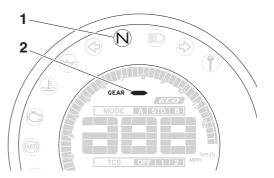
This indicator comes on when the vehicle is being operated in an environmentally friendly, fuel-efficient manner. The indicator goes off when the vehicle is stopped.

#### TIP.

Consider the following tips to reduce fuel consumption:

- Avoid high engine speeds during acceleration.
- Travel at a constant speed.
- Select the transmission gear that is appropriate for the vehicle speed.

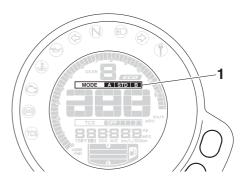
#### Transmission gear display



- 1. Neutral indicator light "N"
- 2. Transmission gear display

This display shows the selected gear. The neutral position is indicated by "-" and by the neutral indicator light.

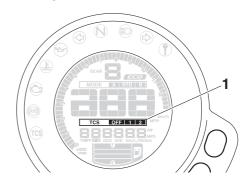
#### **Drive mode display**



#### 1. Drive mode display

This display indicates which drive mode has been selected: "STD", "A" or "B". For more details on the modes and on how to select them, refer to "D-mode (drive mode)" on page 1-12.

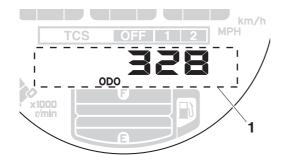
#### TCS display



#### 1. TCS display

This display indicates which traction control system setting has been selected: "1", "2" or "OFF". For more details on the TCS settings and on how to select them, refer to "OUTLINE OF THE TCS (Traction Control System)" on page 1-4.

#### **Multi-function display**



#### 1. Multi-function display

The multi-function display is equipped with the following:

- an odometer
- two tripmeters
- a fuel reserve tripmeter
- an instantaneous fuel consumption display
- an average fuel consumption display
- a coolant temperature display
- an air temperature display
- a clock
- · a brightness level display

The odometer "ODO" shows the total distance the vehicle has traveled.

The tripmeters "TRIP" show the distance traveled since they were last reset.

#### TIF

- The odometer will lock at 999999.
- The tripmeters will reset and continue counting after 9999.9 is reached.

Push the bottom set button to switch the display between odometer "ODO", tripmeters "TRIP 1" and "TRIP 2", instantaneous fuel consumption "km/L" or "L/100 km", average fuel consumption "AVE\_\_.\_ km/L" or "AVE\_\_.\_ L/100 km", coolant temperature "\_\_ °C", ambient temperature "Air\_\_ °C", and clock "\_\_:\_ " in the following order:

ODO 
$$\rightarrow$$
 TRIP 1  $\rightarrow$  TRIP 2  $\rightarrow$  km/L or L/100 km  $\rightarrow$  AVE\_ \_.\_ km/L or AVE\_ \_.\_ L/100 km  $\rightarrow$  \_ \_ °C  $\rightarrow$  Air\_ \_ °C  $\rightarrow$  Clock \_ \_ : \_  $\rightarrow$  ODO

#### For the UK:

Push the bottom set button to switch the display between odometer "ODO", tripmeters "TRIP 1" and "TRIP 2", instantaneous fuel consumption "km/L", "L/100 km" or "MPG", average fuel consumption "AVE\_\_.\_ km/L", "AVE\_\_.\_ L/100 km"

or "AVE\_ \_.\_ MPG", coolant temperature "\_ \_ °C", and ambient temperature, and "Air\_ \_ °C", and clock "\_ \_:\_ \_" in the following order:

ODO  $\rightarrow$  TRIP 1  $\rightarrow$  TRIP 2  $\rightarrow$  km/L, L/100 km or MPG  $\rightarrow$  AVE\_ \_.\_ km/L, AVE\_ \_.\_ L/100 km or AVE\_ \_.\_ MPG  $\rightarrow$  \_ \_ °C  $\rightarrow$  Air\_ \_ °C  $\rightarrow$  Clock \_ \_ : \_  $\rightarrow$  ODO

#### TIP\_

- Push the top set button to switch the display in the reverse order.
- The fuel reserve tripmeter comes on automatically.

If the last segment and frame of the fuel meter start flashing, the display automatically changes to fuel reserve tripmeter "TRIP F" and starts counting the distance traveled from that point. In this case, push the bottom set button to switch the display in the following order:

TRIP F  $\rightarrow$  km/L or L/100 km  $\rightarrow$  AVE\_ \_.\_ km/L or AVE\_ \_.\_ L/100 km  $\rightarrow$  \_ \_ °C  $\rightarrow$  Air\_ \_ °C  $\rightarrow$  Clock \_ \_ :\_ \_  $\rightarrow$  ODO  $\rightarrow$  TRIP 1  $\rightarrow$  TRIP 2  $\rightarrow$  TRIP F

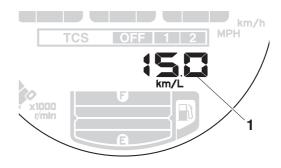
#### For the UK:

TRIP F  $\rightarrow$  km/L, L/100 km or MPG  $\rightarrow$  AVE\_ ... km/L, AVE\_ ... L/100 km or AVE\_ ... MPG  $\rightarrow$  ... °C  $\rightarrow$  Air\_ ... °C  $\rightarrow$  Clock ... :...  $\rightarrow$  ODO  $\rightarrow$  TRIP 1  $\rightarrow$  TRIP 2  $\rightarrow$  TRIP F

To reset a tripmeter, push the top set button for one second.

If you do not reset the fuel reserve tripmeter manually, after refueling and traveling 5 km (3 mi) it resets automatically and disappears from the display.

#### Instantaneous fuel consumption



1. Instantaneous fuel consumption display

The instantaneous fuel consumption display can be set to either "km/L" or "L/100 km"; or for the UK, to "MPG" as well.

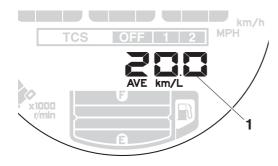
- "km/L": The distance that can be traveled on 1.0 L of fuel under current riding conditions.
- "L/100 km": The amount of fuel necessary to travel 100 km under current riding conditions.
- "MPG": The distance that can be traveled on 1.0 Imp.gal of fuel under current riding conditions.

To switch the instantaneous fuel consumption display settings, push the bottom set button for two seconds.

#### TIP

If traveling at speeds under 20 km/h (12 mi/h), "\_\_\_." is displayed.

#### Average fuel consumption



#### 1. Average fuel consumption display

This display shows the average fuel consumption since it was last reset.

The average fuel consumption display can be set to either "AVE\_\_.\_km/L" or "AVE\_\_.\_L/100 km", or for the UK, to "AVE\_\_.\_MPG" as well.

- "AVE\_ \_.\_ km/L": The average distance that can be traveled on 1.0 L of fuel.
- "AVE\_ \_.\_ L/100 km": The average amount of fuel necessary to travel 100 km.
- "AVE\_ \_.\_ MPG": The average distance that can be traveled on 1.0 Imp.gal of fuel.

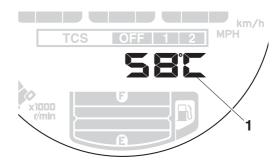
To switch the average fuel consumption display settings, push the bottom set button for two seconds.

To reset the average fuel consumption, push the top set button for one second.

#### TIP\_

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

#### Coolant temperature



#### 1. Coolant temperature display

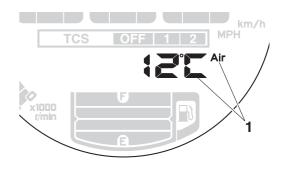
This display shows the coolant temperature from 40 °C to 116 °C in 1 °C increments.

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

#### TIF

- When the coolant temperature is below 40 °C, "Lo" will be displayed.
- The coolant temperature varies with changes in the weather and engine load.

#### Air temperature



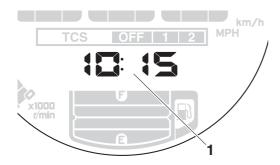
#### 1. Air temperature display

This display shows the air temperature from -9 °C to 99 °C in 1 °C increments. The temperature displayed may vary from the actual ambient temperature.

#### TIP.

- When the air temperature is below -9 °C, "Lo" will be displayed.
- The accuracy of the temperature reading may be affected when riding slowly (under 20 km/h [12.5 mi/h]) or when stopped at traffic signals, railroad crossings, etc.

#### Clock



#### 1. Clock

The clock displays time in 12-hour format. Even when the key is not in the "ON" position, the clock can be viewed for 10 seconds by pushing the bottom set button.

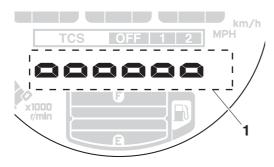
#### To set the clock

- 1. Turn the key to "ON".
- 2. Switch the display to the clock.
- 3. Push the bottom set button and top set button together for two seconds and the hour digits will start flashing.
- 4. Push the top set button to set the hours.
- 5. Push the bottom set button and the minute digits will start flashing.
- 6. Push the top set button to set the minutes.
- 7. Push the bottom set button to confirm settings and start the clock.

#### TIP

When setting the hours and minutes, push the top set button briefly to increase the increment value one by one, or push and hold the button to increase the increment value continuously.

#### **Brightness control**



1. Brightness level display

The brightness level of the multi-function meter unit panel can be adjusted to six brightness level settings.

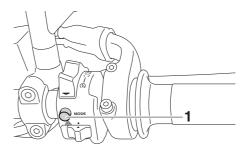
#### To adjust the brightness

- 1. Turn the key to "OFF".
- 2. Push and hold the bottom set button.
- 3. Turn the key to "ON" and continue pushing the bottom set button until the display switches to the brightness level display.
- 4. Push the top set button to set the brightness level.
- 5. Push the bottom set button to confirm the selected brightness level and exit the brightness level display.

#### D-mode (drive mode)

D-mode is an electronically controlled engine performance system with three mode selections ("STD", "A", and "B").

Push the drive mode switch "MODE" to switch between modes.



1. Drive mode switch "MODE"

#### TIP

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

#### Mode "STD"

Mode "STD" is suitable for various riding conditions

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

#### Mode "A"

Mode "A" offers a sportier engine response in the low- to mid-speed range compared to mode "STD".

#### Mode "B"

Mode "B" offers response that is somewhat less sharp compared to mode "STD" for riding situations that require especially sensitive throttle operation.

## **WARNING**

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

#### IMPORTANT INFORMATION

EAS30006

# 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 1-20.
- 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.

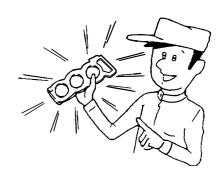


- 4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
- 5. Keep all parts away from any source of fire.

EAS30007

#### **REPLACEMENT PARTS**

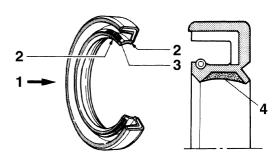
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



EAS30008

#### **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.

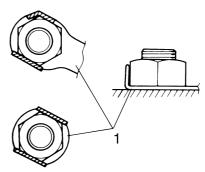


- 1. Oil
- 2. Lip
- 3. Spring
- 4. Grease

EAS30009

# LOCK WASHERS/PLATES AND COTTER PINS

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



## **IMPORTANT INFORMATION**

EAS30010

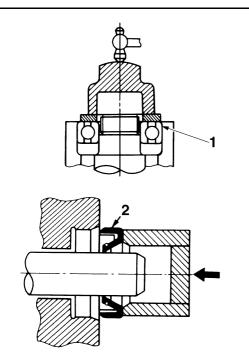
#### **BEARINGS AND OIL SEALS**

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

ECA13300

#### NOTICE

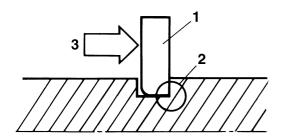
Do not spin the bearing with compressed air because this will damage the bearing surfaces.



EAS30011

#### **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.



EAS30012

#### **RUBBER PARTS**

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

#### **BASIC SERVICE INFORMATION**

EAS30013

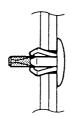
#### QUICK FASTENERS Rivet type

- 1. Remove:
  - Quick fastener

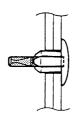
TIP\_

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







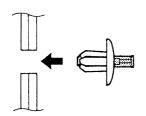


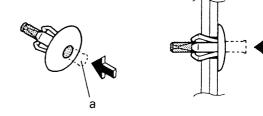
- 2. Install:
  - Quick fastener

TID

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







#### **Screw type**

- 1. Remove:
  - Quick fastener

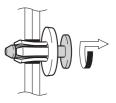
TIP

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







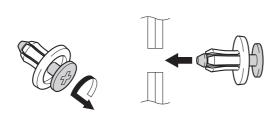


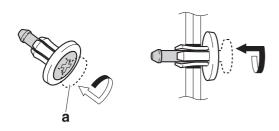
- 2. Install:
  - Quick fastener

TIP\_

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

#### BASIC SERVICE INFORMATION





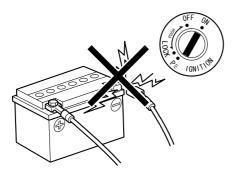
EAS30014

# **ELECTRICAL SYSTEM Electrical parts handling**

ECA16600

#### NOTICE

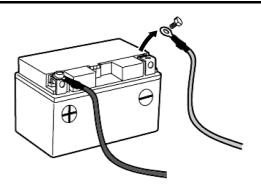
Never disconnect a battery lead while the engine is running; otherwise, the electrical components could be damaged.



ECA16751

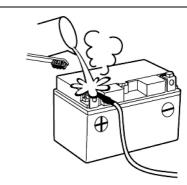
NOTICE

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



TIP

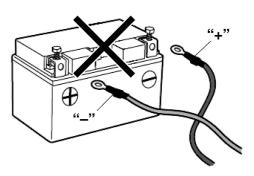
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



ECA16760

#### **NOTICE**

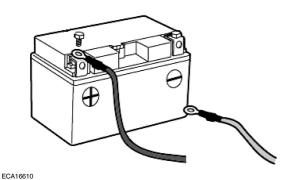
Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



NOTICE

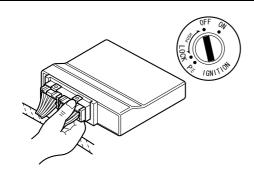
When connecting the battery leads to the battery, be sure to connect the positive battery lead first, then the negative battery lead. If the negative battery lead is connected first and a tool or similar item contacts the vehicle while the positive battery lead is being connected, a spark could be generated,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

#### **BASIC SERVICE INFORMATION**



**NOTICE** 

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



NOTICE

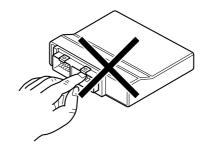
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16630

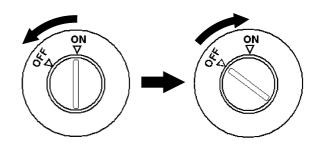
**NOTICE** 

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



TIP.

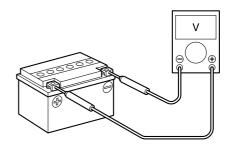
When resetting the ECU by turning the main switch to "OFF", be sure to wait approximately 5 seconds before turning the main switch back to "ON".



#### Checking the electrical system

TIP

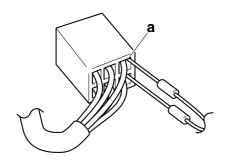
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

NOTICE

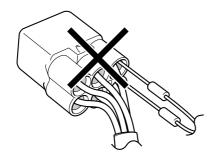
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



ECA16640

#### **NOTICE**

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



#### Checking the connections

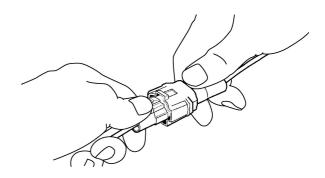
Check the leads, couplers, and connectors for stains, rust, moisture, etc.

- 1. Disconnect:
- Lead
- Coupler
- Connector

ECA16780

#### NOTICE

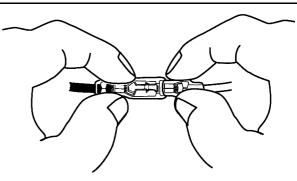
- When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.
- There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.



ECA16790

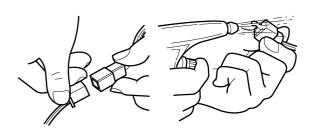
#### NOTICE

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



- 2. Check:
  - Lead
  - Coupler
  - Connector

Moisture  $\rightarrow$  Dry with an air blower. Rust/stains  $\rightarrow$  Connect and disconnect several times.

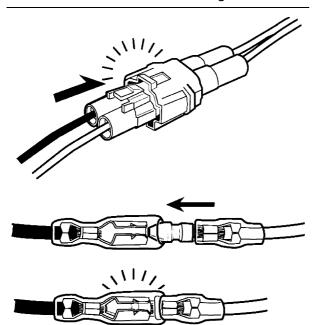


- 3. Connect:
  - Lead
  - Coupler
  - Connector

#### **BASIC SERVICE INFORMATION**

#### TIP

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



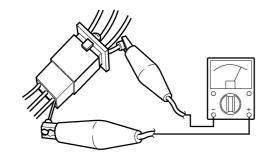
- 4. Check:
  - Continuity (with the pocket tester)

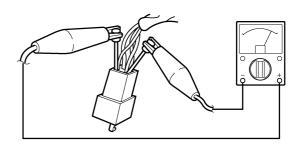


Pocket tester 90890-03112 Analog pocket tester YU-03112-C

#### TIP

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





- 5. Check:
  - Resistance



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

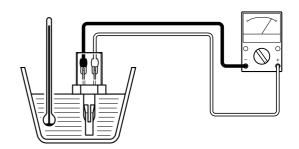
#### TIP.

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



Intake air temperature sensor resistance

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



#### **SPECIAL TOOLS**

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

#### TIP -

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

Tool name/Tool No.	Illustration	Reference pages
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-19, 8-149, 8-150, 8-151, 8-155, 8-156, 8-157, 8-158, 8-159, 8-160, 8-161, 8-162, 8-163, 8-164, 8-165, 8-166, 8-167, 8-168
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		3-6, 4-17, 4-25, 5-20, 5-43
Valve lapper 90890-04101 Valve lapping tool YM-A8998	90890-04101	3-6
	YM-A8998	
Vacuum gauge 90890-03094 Vacuummate YU-44456	90890-03094	3-8
	YU-44456	

Tool name/Tool No.	Illustration	Reference pages
Carburetor angle driver 2 90890-03173		3-9
Yamaha diagnostic tool 90890-03250	O YAMAHA  O YAMAHA	3-10, 4-56, 4-58, 8-36, 8-121, 8-141
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472	R20	3-19, 4-78
Oil filter wrench 90890-01426 Oil filter wrench YU-38411	64.2	3-24
Pressure gauge 90890-03153 Pressure gauge YU-03153	The state of the s	3-25, 7-12
Oil pressure adapter H 90890-03139	M16×P1.5	3-25
Fork spring compressor 90890-01441 Fork spring compressor YM-01441	955	4-68, 4-73, 4-74
Rod holder 90890-01434 Damper rod holder double ended YM-01434	111	4-68, 4-73, 4-74

Tool name/Tool No.	Illustration	Reference
Tool name/Tool No.	illustration	pages
Damper rod holder (ø27) 90890-01582 Damper rod holder YM-01582		4-69, 4-71
Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442		4-71, 4-72
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703	90890-01437 YM-A8703	4-72, 4-73, 4-74
Rod puller attachment (M10 long) 90890-01578 Universal damping rod bleeding tool set YM-A8703	90890-01578 YM-A8703	4-72, 4-73, 4-74
Ring nut wrench 90890-01268 Spanner wrench YU-01268	R38	4-78
Drive chain cut & rivet tool 90890-01550 Drive chain cut & rivet tool YM-01550		4-88, 4-90

Tool name/Tool No.	Illustration	Reference pages
Compression gauge 90890-03081 Engine compression tester YU-33223	90890-03081	5-1
	YU-33223	
Extension 90890-04136	122	5-1
Pivot shaft wrench 90890-01485 Frame mount insert wrench YM-01485		5-7
Pivot shaft wrench 90890-01518 Frame spanner socket YM-01518		5-7, 5-8
Pivot shaft wrench adapter 90890-01476		5-7, 5-8
Camshaft wrench 90890-04162 Camshaft wrench YM-04162		5-12, 5-14
Valve spring compressor 90890-04019 Valve spring compressor YM-04019	931 M6×P1.0	5-23, 5-28

Tool name/Tool No.	Illustration	Reference pages
Valve spring compressor attachment 90890-04179 Valve spring compressor adapter 23 mm YM-04179	ø23 <b>0</b> 0	5-23, 5-28
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-25
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117	Ø4.5 Ø10	5-25
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-25
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-31, 5-32
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-31
Yamaha bond No. 1215 90890-85505 (Three bond No.1215®)		5-33, 5-58
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		5-36, 8-160, 8-162, 8-166

Tool name/Tool No.	Illustration	Reference pages
Universal clutch holder 90890-04086 Universal clutch holder YM-91042	90890-04086 M8×P1.25 30 119 156	5-42, 5-46
	YM-91042	
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304 M6×P1.0	5-62
	YU-01304	
Piston installing tool 90890-04161 Piston installing tool YM-04161		5-69
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A	90890-01325	6-2
	YU-24460-A	

Tool name/Tool No.	Illustration	Reference pages
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984	90890-01352 031.4 038	6-2
	YU-33984	
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A	ø27.5 4 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	6-11
Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058	ø40 Ø40	6-11
Fuel injector pressure adapter 90890-03210 Fuel injector pressure adapter YU-03210		7-12
Fuel pressure adapter 90890-03176 Fuel pressure adapter YM-03176		7-12
OBD/ GST Leadwire kit 90890-03249		8-36
Ignition checker 90890-06754 Oppama pet–4000 spark checker YM-34487		8-159

Tool name/Tool No.	Illustration	Reference pages
Test harness– lean angle sensor (6P) 90890-03209 Test harness– lean angle sensor (6P) YU-03209		8-160
Test harness S- pressure sensor (3P) 90890-03207 Test harness S- pressure sensor (3P) YU-03207		8-166

# **SPECIFICATIONS**

GENERAL SPECIFICATIONS	2-1
ENGINE SPECIFICATIONS	2-2
CHASSIS SPECIFICATIONS	2-7
ELECTRICAL SPECIFICATIONS	2-10
TIGHTENING TORQUES  GENERAL TIGHTENING TORQUE SPECIFICATIONS  ENGINE TIGHTENING TORQUES  CHASSIS TIGHTENING TORQUES	2-12 2-13
LUBRICATION POINTS AND LUBRICANT TYPES	2-15
LUBRICATION SYSTEM CHART AND DIAGRAMS ENGINE OIL LUBRICATION CHART LUBRICATION DIAGRAMS	2-19
COOLING SYSTEM DIAGRAMS	2-31
CABLE ROUTING	2-35

# **GENERAL SPECIFICATIONS**

Model		
Model	B901 (EUR,ZAF) B902 (AUS) B906 (RUS) B908 (EUR,ZAF) B90A (RUS)	
Dimensions		
Overall length	2075 mm (81.7 in)	
Overall width	815 mm (32.1 in)	
Overall height	1140 mm (44.9 in)	
Seat height	830 mm (32.7 in)	
Wheelbase	1440 mm (56.7 in)	
Ground clearance	135 mm (5.31 in)	
Minimum turning radius	3.0 m (9.84 ft)	
Weight		
Curb weight	195 kg (430 lb)	
Loading		
Maximum load	170 kg (375 lb)	
Riding capacity	2 person	

ENGINE SPECIFICATIONS	
Engine	
Combustion cycle	4-stroke
Cooling system	Liquid cooled
Valve train	DOHC
Displacement	847 cm <sup>3</sup>
Cylinder arrangement	Inline
Number of cylinders	3-cylinder
Bore × stroke	78.0 × 59.1 mm (3.07 × 2.33 in)
Compression ratio	11.5 : 1
Compression pressure	1331-1713 kPa/680 r/min (13.3-17.1
	kgf/cm²/680 r/min, 189.3–243.7 psi/680 r/min)
Starting system	Electric starter
Fuel	
Recommended fuel	Premium unleaded gasoline (Gasohol [E10] ac-
	ceptable) (AUS,EUR,ZAF)
	Unleaded gasoline only. Minimum research oc-
	tane number 95 (RUS)
Fuel tank capacity	14 L (3.7 US gal, 3.1 lmp.gal)
Fuel reserve amount	2.6 L (0.69 US gal, 0.57 Imp.gal)
Engine oil	
Recommended brand	YAMALUBE
SAE viscosity grades	10W-40
Recommended engine oil grade	API service SG type or higher, JASO standard
	MA
Lubrication system	Wet sump
Engine oil quantity	
Oil change	2.40 L (2.54 US qt, 2.11 Imp.qt)
With oil filter removal	2.70 L (2.85 US qt, 2.38 Imp.qt)
Quantity (disassembled)	3.40 L (3.59 US qt, 2.99 Imp.qt)
Oil filter	
Oil filter type	Cartridge
Oil pump	
Inner-rotor-to-outer-rotor-tip clearance	Less than 0.120 mm (0.0047 in)
Limit	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.09–0.19 mm (0.0035–0.0075 in)
Limit	0.21 mm (0.0083 in)
Oil pressure	230.0 kPa/5000 r/min (2.30 kgf/cm²/5000 r/min,
	33.4 psi/5000 r/min)
Bypass valve opening pressure	80.0–120.0 kPa (0.80–1.20 kgf/cm², 11.6–17.4
Poliof valve enerating procesure	psi) 740.0 kPo (7.40 kat/am², 107.3 poi)
Relief valve operating pressure	740.0 kPa (7.40 kgf/cm², 107.3 psi)
Coolege quantity	
Coolant quantity	4.001./0.04110 4.701 1
Radiator (including all routes)	1.93 L (2.04 US qt, 1.70 lmp.qt)
Coolant reservoir (up to the maximum level	0.25 L (0.26 US qt, 0.22 Imp.qt)
mark)	02 2 100 7 kPa (0.00 1.00 kat/am2 10 5 17 0
Radiator cap valve opening pressure	93.3–122.7 kPa (0.93–1.23 kgf/cm², 13.5–17.8
	psi)

Water pump	
Water pump type	Single suction centrifugal pump
Impeller shaft tilt limit	0.15 mm (0.006 in)
Spark plug(s)	
Manufacturer/model	NGK/CPR9EA9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)
Cylinder head	
Warpage limit	0.10 mm (0.0039 in)
Camshaft	
Camshaft cap inside diameter	24.500–24.521 mm (0.9646–0.9654 in)
Camshaft journal diameter	24.459-24.472 mm (0.9630-0.9635 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Limit	0.080 mm (0.0032 in)
Camshaft lobe dimensions	
Lobe height (Intake)	36.290-36.390 mm (1.4287-1.4327 in)
Limit	36.190 mm (1.4248 in)
Lobe height (Exhaust)	35.720-35.820 mm (1.4063-1.4102 in)
Limit	35.620 mm (1.4024 in)
Camshaft runout limit	0.030 mm (0.0012 in)
Valve, valve seat, valve guide	
Valve clearance (cold)	
Intake	0.11-0.20 mm (0.0043-0.0079 in)
Exhaust	0.26-0.30 mm (0.0102-0.0118 in)
Valve dimensions	
Valve seat contact width (intake)	0.90-1.10 mm (0.0354-0.0433 in)
Limit	1.60 mm (0.06 in)
Valve seat contact width (exhaust)	1.10–1.30 mm (0.0433–0.0512 in)
Limit	1.80 mm (0.07 in)
Valve stem diameter (intake)	4.475-4.490 mm (0.1762-0.1768 in)
Limit	4.445 mm (0.1750 in)
Valve stem diameter (exhaust)	4.460–4.475 mm (0.1756–0.1762 in)
Limit	4.430 mm (0.1744 in)
Valve guide inside diameter (intake)	4.500–4.512 mm (0.1772–0.1776 in)
Valve guide inside diameter (exhaust)	4.500–4.512 mm (0.1772–0.1776 in)
Valve-stem-to-valve-guide clearance (in-	0.010–0.037 mm (0.0004–0.0015 in)
take)	,
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (ex-	0.025–0.052 mm (0.0010–0.0020 in)
haust)	,
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)
Valve spring	
Free length (intake)	39.31 mm (1.55 in)
Limit	37.34 mm (1.47 in)
Free length (exhaust)	37.78 mm (1.49 in)
Limit	35.89 mm (1.41 in)
Spring tilt (intake)	1.7 mm (0.07 in)
Spring tilt (intake) Spring tilt (exhaust)	1.6 mm (0.06 in)
Cylinder	· · ·
Bore	78.000–78.010 mm (3.0709–3.0713 in)
2010	. 5.555 75.575 11111 (5.5755 5.0715 111)

Taper limit	0.050 mm (0.0020 in)
Out of round limit	0.050 mm (0.0020 in)
Piston	
Diameter	77.975–77.990 mm (3.0699–3.0705 in)
Measuring point (from piston skirt bottom)	12.0 mm (0.47 in)
Piston-to-cylinder clearance	0.010–0.035 mm (0.0004–0.0014 in)
Piston pin bore inside diameter	17.002–17.013 mm (0.6694–0.6698 in)
Limit	17.043 mm (0.6710 in)
Piston pin outside diameter	16.990–16.995 mm (0.6689–0.6691 in)
Limit	16.970 mm (0.6681 in)
Piston-pin-to-piston-pin-bore clearance	0.007-0.023 mm (0.0003-0.0009 in)
Piston ring	
Top ring	
Ring type	Barrel
End gap (installed)	0.15-0.25 mm (0.0059-0.0098 in)
End gap limit	0.50 mm (0.0197 in)
Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
Side clearance limit	0.115 mm (0.0045 in)
2nd ring	,
Ring type	Taper
End gap (installed)	0.30–0.45 mm (0.0118–0.0177 in)
End gap limit	0.80 mm (0.0315 in)
Ring side clearance	0.020–0.055 mm (0.0008–0.0022 in)
Side clearance limit	0.115 mm (0.0045 in)
Connecting rod	
Oil clearance	0.027-0.051 mm (0.0011-0.0020 in)
Bearing color code	0.027-0.031 11111 (0.0011-0.0020 111)
Code 1	Blue
Code 1 Code 2	Black
Code 3	Brown
Code 3 Code 4	Green
	Green
Crankshaft	
Runout limit	0.030 mm (0.0012 in)
Journal oil clearance	0.014-0.038 mm (0.0006-0.0015 in)
Bearing color code	
Code 0	White
Code 1	Blue
Code 2	Black
Code 3	Brown
Code 4	Green
Balancer	
Balancer shaft runout limit	0.030 mm (0.0012 in)
Bearing color code	
Code 1	Blue
Code 2	Black
Code 3	Brown
Code 4	Green
Code 5	Yellow
Balancer shaft journal to balancer shaft bear-	0.024-0.048 mm (0.0009-0.0019 in)
ing clearance	

Clutch			
Clutch type	Wet, multiple-disc		
Clutch lever free play	10.0–15.0 mm (0.39–0.59 in)		
Friction plate 1 thickness	2.92–3.08 mm (0.115–0.121 in)		
Wear limit	2.82 mm (0.111 in)		
Plate quantity	3 pcs		
Friction plate 2 thickness	2.92–3.08 mm (0.115–0.121 in)		
Wear limit	2.82 mm (0.111 in)		
Plate quantity	6 pcs		
Clutch plate 2 thickness	1.90–2.10 mm (0.075–0.083 in)		
Plate quantity	7 pcs		
Warpage limit	0.10 mm (0.004 in)		
Clutch plate 1 thickness	2.20-2.40 mm (0.087-0.094 in)		
Plate quantity	1 pcs		
Warpage limit	0.10 mm (0.004 in)		
Clutch spring free length	45.23 mm (1.78 in)		
Limit	42.97 mm (1.69 in)		
Spring quantity	3 pcs		
Drivetrain			
Primary reduction ratio	1.681 (79/47)		
Transmission type	Constant mesh 6-speed		
Gear ratio			
1st	2.667 (40/15)		
2nd	2.000 (38/19)		
3rd	1.619 (34/21)		
4th	1.381 (29/21)		
5th	1.190 (25/21)		
6th	1.037 (28/27)		
Main axle runout limit	0.08 mm (0.0032 in)		
Drive axle runout limit	0.08 mm (0.0032 in)		
Secondary reduction ratio	2.813 (45/16)		
Final drive	Chain `		
Shifting mechanism			
Installed shift rod length	256.9–258.9 mm (10.11–10.19 in)		
Air filter			
Air filter element	Oil-coated paper element		
Fuel pump			
Pump type	Electrical		
Maximum consumption amperage	3.3 A		
Fuel injector			
Resistance	12.0 Ω		
Throttle body			
ID mark	B901 00		
Throttle position sensor			
Output voltage (at idle)	0.63–0.73 V		
Accelerator position sensor			
Resistance	1.08–2.52 kΩ		
Output voltage	0.63–0.73 V		

**Idling condition** 

Engine idling speed 1100-1300 r/min

Al system Inactive O<sub>2</sub> feedback control Inactive

Exhaust gas sampling point Sampling port on the exhaust pipe

To be measured Coolant temperature Temperature 90-110 °C (194-230 °F) Difference in vacuum pressure between the 1.3 kPa (10 mmHg, 0.4 inHg)

cylinders

CO% 1.5-3.5 %

Fuel line pressure (at idle) 300.0-390.0 kPa (3.00-3.90 kgf/cm<sup>2</sup>, 43.5-56.6

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

Air induction system

Solenoid resistance 20–24 Ω

# **CHASSIS SPECIFICATIONS**

CHASSIS SPECIFICATIONS	
Chassis	
Frame type	Diamond
Caster angle	25.0 °
Trail	103 mm (4.1 in)
Front wheel	
Wheel type	Cast wheel
Rim size	17M/C x MT3.50
Rim material	Aluminum
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 MT5.50
Rim material	Aluminum
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Front tire	
Type	Tubeless
Size	120/70 ZR17M/C (58W)
Manufacturer/model	BRIDGESTONE/S20F M
Rear tire	
Type	Tubeless
Size	180/55 ZR17M/C (73W)
Manufacturer/model	BRIDGESTONE/S20R M
Tire air pressure (measured on cold tires)	
1 person	
Front	250 kPa (2.50 kgf/cm², 36 psi)
Rear	290 kPa (2.90 kgf/cm², 42 psi)
2 persons	
Front	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)
Rear	290 kPa (2.90 kgf/cm², 42 psi)
Front brake	
Type	Hydraulic dual disc brake
Disc outside diameter × thickness	$298.0 \times 4.5 \text{ mm } (11.73 \times 0.18 \text{ in})$
Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc runout limit (as measured on	0.10 mm (0.0039 in)
wheel) Brake pad lining thickness	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Master cylinder inside diameter	15.00 mm (0.59 in)
Caliper cylinder inside diameter (Left)	30.23 mm, 27.00 mm (1.19 in, 1.06 in)
Caliper cylinder inside diameter (Right)	30.23 mm, 27.00 mm (1.19 in, 1.06 in)
Specified brake fluid	DOT 4
Rear brake	·
Type	Hydraulic single disc brake
Disc outside diameter × thickness	245.0 $\times$ 5.0 mm (9.65 $\times$ 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Diano dio dilonitoso illilit	(0. 10 11)

# **CHASSIS SPECIFICATIONS**

Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)	
Brake pad lining thickness	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	38.18 mm (1.50 in)	
Specified brake fluid	DOT 4	
Front suspension		
Type	Telescopic fork	
Spring	Coil spring	
Shock absorber	Hydraulic damper	
Front fork travel	137.0 mm (5.39 in)	
Wheel travel	137 mm (5.4 in)	
Fork spring free length	305.3 mm (12.02 in)	
Limit	299.1 mm (11.78 in)	
Inner tube bending limit	0.2 mm (0.01 in)	
Recommended oil	Yamaha Suspension Oil G10	
Quantity (left)	444.0 cm <sup>3</sup> (15.01 US oz, 15.66 lmp.oz)	
Quantity (right)	431.0 cm <sup>3</sup> (14.57 US oz, 15.20 lmp.oz)	
Level (left)	174 mm (6.9 in)	
Level (right)	175 mm (6.9 in)	
Spring preload		
Adjusting system	Mechanical adjustable type	
Unit for adjustment	mm	
Adjustment value (Soft)	19	
Adjustment value (STD)	16	
Adjustment value (Hard)	4	
Rebound damping		
Adjusting system	Mechanical adjustable type	
Unit for adjustment	Click	
Adjustment value from the start position (Soft)	12	
Adjustment value from the start position (STD)	7	
Adjustment value from the start position	1	
(Hard)		
Rear suspension		
Туре	Swingarm (link suspension)	
Spring	Coil spring	
Shock absorber	Gas-hydraulic damper	
Rear shock absorber assembly travel	60.0 mm (2.36 in)	
Wheel travel	130 mm (5.1 in)	
Spring preload		
Adjusting system	Mechanical adjustable type	
Unit for adjustment	Cam position	
Adjustment value (Soft)	1	
Adjustment value (STD)	4	
Adjustment value (Hard)	7	
Rebound damping		
Adjusting system	Mechanical adjustable type	
Unit for adjustment	Turn	

#### **CHASSIS SPECIFICATIONS**

Adjustment value from the start position (Soft)	3
Adjustment value from the start position (STD)	1-1/2
Adjustment value from the start position (Hard)	0

#### **Drive chain**

Size DID525V10
Chain type Sealed type

Number of links 110

Drive chain slack (Maintenance stand) 5.0–15.0 mm (0.20–0.59 in)
Drive chain slack (Sidestand) 5.0–15.0 mm (0.20–0.59 in)

Limit 25.0 mm (0.98 in) 15-link length limit 239.3 mm (9.42 in)

# **ELECTRICAL SPECIFICATIONS**

EAS20016 EL ECTRICAL CRECIEICATIONS			
ELECTRICAL SPECIFICATIONS			
Voltage System voltage	12 V		
Ignition system			
Ignition system	TCI		
Advancer type Ignition timing (B.T.D.C.)	Digital 5.0 °/1200 r/min		
	3.0 / 1200 1/111111		
Engine control unit  Model/manufacturer	TBDFU5/DENSO		
Ignition coil			
Primary coil resistance	1.19–1.61 $Ω$		
Secondary coil resistance	9.35–12.65 kΩ		
Lean angle sensor output voltage			
Operating angle	65 °		
Output voltage up to operating angle	0.4–1.4 V		
Output voltage over operating angle	3.7–4.4 V		
Charging system			
Charging system	AC magneto		
Standard output	14.0 V, 29.6 A at 5000 r/min		
Standard output Stator coil resistance	14.0 V, 415 W at 5000 r/min 0.152–0.228 Ω (W-W)		
	0.152-0.226 t2 (VV-VV)		
Rectifier/regulator	Thurst phase		
Regulator type Regulated voltage (DC)	Three-phase 14.3–14.7 V		
Rectifier capacity (DC)	50.0 A		
Battery Model	YTZ10S		
Voltage, capacity	12 V, 8.6 Ah (10 HR)		
Headlight Bulb type	Halogen bulb		
	- Laiogen baib		
Bulb wattage × quantity Headlight	H4, 60.0 W/55.0 W x 1		
Brake/tail light	LED		
Front turn signal light	10.0 W × 2		
Rear turn signal light	10.0 W × 2		
Auxiliary light	5.0 W × 1		
License plate light	5.0 W × 1		
Meter lighting	LED		
Indicator light			
Neutral indicator light	LED		
High beam indicator light	LED		
Oil level warning light	LED		
Turn signal indicator light	LED		
Coolant temperature warning light	LED		
Engine trouble warning light ABS warning light	LED LED		
Immobilizer system indicator light	LED		
mimobilizer system indicator light	LLU		

# **ELECTRICAL SPECIFICATIONS**

Traction control system indicator/warning light	LED
Starter motor	
Power output	0.70 kW
Armature coil resistance	$0.0050$ – $0.0150~\Omega$
Brush overall length	12.0 mm (0.47 in)
Limit	6.50 mm (0.26 in)
Brush spring force	6.03–6.52 N (615–665 gf, 21.71–23.47 oz)
Mica undercut (depth)	0.70 mm (0.03 in)
Oil level switch	
Oil level switch resistance (maximum level position)	484.0–536.0 $\Omega$
Oil level switch resistance (minimum level position)	114.0–126.0 Ω
Fuel sender unit	
Sender unit resistance (full)	9.0–11.0 Ω
Sender unit resistance (empty)	213.0–219.0 $\Omega$
Fuel injection sensor	
Crankshaft position sensor resistance	228–342 $Ω$
Intake air temperature sensor resistance	5400.0–6600.0 $\Omega$ at 0 °C (5400.0–6600.0 $\Omega$ at 32 °F)
Intake air temperature sensor resistance	290–390 $\Omega$ at 80 °C (290–390 $\Omega$ at 176 °F)
Coolant temperature sensor resistance	2512–2777 $\Omega$ at 20 °C (2512–2777 $\Omega$ at 68 °F)
Coolant temperature sensor resistance	210–221 $\Omega$ at 100 °C (210–221 $\Omega$ at 212 °F)
Fuse(s)	
Main fuse	50.0 A
Headlight fuse	15.0 A
Signaling system fuse	7.5 A
Ignition fuse	15.0 A
Parking lighting fuse	7.5 A
Radiator fan motor fuse	15.0 A
Fuel injection system fuse	10.0 A
ABS control unit fuse	7.5 A
ABS motor fuse	30.0 A
ABS solenoid fuse	15.0 A
Auxiliary fuse 1	2.0 A
Backup fuse	7.5 A
Electronic throttle valve fuse	7.5 A
	-

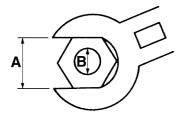
EAS20017

#### **TIGHTENING TORQUES**

EAS3001

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

EAS30016

#### **ENGINE TIGHTENING TORQUES**

Item	Thread size	Q'ty	Tightening torque	Remarks
Exhaust pipe nut	M8	6	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Muffler protector bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	-(6)
Spark plug	M10	3	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
Cylinder head cover bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Generator rotor bolt	M12	1	75 Nm (7.5 m·kgf, 54 ft·lbf)	<b>⊣</b> €
Generator cover bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	-(6)
Generator cover bolt	M6	8	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Clutch boss nut	M20	1	125 Nm (12.5 m·kgf, 90 ft·lbf)	Stake. - <b>⊕</b>
Clutch spring bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Clutch cover bolt	M6	11	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Oil filter cartridge	M20	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	
Oil filter cartridge union bolt	M20	1	70 Nm (7.0 m·kgf, 51 ft·lbf)	<b>⊸</b> €
Water pump drain bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kgf, 31 ft·lbf)	

EAS30017

#### **CHASSIS TIGHTENING TORQUES**

Item	Thread size	Q'ty	Tightening torque	Remarks
Front wheel axle	M16	1	65 Nm (6.5 m·kgf, 47 ft·lbf)	
Front wheel axle pinch bolt	M8	1	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Rear wheel sprocket nut	M10	6	80 Nm (8.0 m·kgf, 58 ft·lbf)	
Rear wheel axle nut	M18	1	150 Nm (15 m·kgf, 108 ft·lbf)	
Rear brake caliper bolt (front)	M12	1	27 Nm (2.7 m-kgf, 20 ft-lbf)	<b>-</b> (S)-
Rear brake caliper bolt (rear)	M8	1	22 Nm (2.2 m-kgf, 16 ft-lbf)	and
Brake caliper bleed screw	M8	3	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Front brake caliper bolt	M10	4	35 Nm (3.5 m·kgf, 25 ft·lbf)	
Upper handlebar holder bolt	M8	4	22 Nm (2.2 m·kgf, 16 ft·lbf)	
Lower handlebar holder nut	M10	2	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Clutch cable locknut	M8	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Lower bracket pinch bolt	M8	4	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Upper bracket pinch bolt	M8	2	26 Nm (2.6 m·kgf, 19 ft·lbf)	
Lower ring nut	M25	2	See TIP.	

#### **TIGHTENING TORQUES**

Item	Thread size	Q'ty	Tightening torque	Remarks
Drive sprocket nut	M22	1	95 Nm (9.5 m·kgf, 69 ft·lbf)	Stake. <b>⊸</b> (€

#### TIP\_

#### Lower ring nut

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

EAS2001

#### **LUBRICATION POINTS AND LUBRICANT TYPES**

EAS30018

#### **ENGINE**

Lubrication point	Lubricant
Oil seal lips	
O-rings	<b>-C3-</b>
Coolant hose insertion part	Water or <b>⊸</b>
Bearing	<b>⊸</b> €
Cylinder head cover bolt gasket and timing chain bolt gasket	<b>⊸©</b>
Camshaft lobes and journals (intake and exhaust)	(M)
Valve stem seals (intake and exhaust)	<b>⊸©</b>
Valve lifter outer surface (intake and exhaust)	<b>⊸</b> €
Valve stems and stem ends (intake and exhaust)	(M)
Crankshaft big ends	<b>⊸</b> €
Piston surfaces	<b>⊸</b> €
Piston pins	<b>⊸</b> €
Connecting rod bolts	(M)
Crankshaft journals	<b>⊸</b> €
Balancer shaft journals	<b>⊸</b> €
Generator rotor assembly	<b>⊸</b> €
Water pump impeller shaft	<b>⊸</b> €
Oil pump rotors (inner and outer)	<b>-(s)-</b>
Oil pump assembly	-(E)
Oil cooler bolts	<b>⊸</b> €
Oil filter cartridge union bolt	<b>⊸</b> €
Oil nozzle O-rings	→©S→1 or →(E)
Main gallery bolt O-ring	<b>−©S−</b> Or <b>⊸©</b>
Oil cooler sub gallery O-ring	→©S→Or →©
Drive axle sub gallery O-ring	<b>-</b> €9 <b>-1</b> or - <b>1</b> €
Balancer journal bolt O-rings	<b>⊸</b> €
Idler gear inner surface and end	⊸ <b>©</b>
Starter clutch outer assembly	<b>⊸</b> €
Starter clutch gear	<b>⊸</b> €
Primary driven gear end	<b>⊸</b> €
Crankcase cover and clutch pull rod	<b>-C9-1</b>

Lubrication point	Lubricant
Clutch housing spacer	⊸©
Clutch boss conical washer	<b>⊸</b> €
Transmission gears inner surface	<b>⊸</b> @
Transmission collar	<b>⊸</b> @
Transmission gears outer surface (shift fork contact parts)	<b>⊸</b> @
Drive sprocket washer	<b>⊸</b> €
Shit drum moving surface	<b>⊸</b> €
Shift fork pin	<b>⊸</b> €
Shift forks guide bar outer surface	<b>⊸</b> €
Shift shaft washer	<b>⊸</b> €
Shift shaft moving surface	<b>⊸</b> €
Crankcase mating surface	Yamaha bond No. 1215 (Three bond No. 1215®)
Stator coil assembly lead grommet	Yamaha bond No. 1215 (Three bond No. 1215®)
Cylinder head cover mating surface	Three Bond No. 1541C®

EAS30019

#### **CHASSIS**

Lubrication point	Lubricant	
Steering bearings, seal lip and ball race lip	<b>-CD</b>	
Tube guide (throttle grip) inner surface and throttle cables	<b>-CD</b>	
Brake lever pivot bolt and metal-to-metal moving parts	<b>-(9)</b>	
Clutch lever pivot bolt, metal-to-metal moving parts and clutch cable end	<b>-CD</b>	
Swingarm collar outer surface, oil seal lip	<b>-CD</b>	
Pivot shaft	<b>-CD</b>	
Swingarm pivot bush outer surface, oil seal lip	<b>-CD</b>	
Swingarm pivot thrust cover inner surface	<b>-CD-1</b>	
Relay arm collar outer surface, oil seal inner lip	<b>-CD-1</b>	
Sidestand pivoting point and metal-to-metal moving parts		
Sidestand switch contact point	<b>-CD-1</b>	
Sidestand hook and spring contact point	<b>-CD-1</b>	
Shift pedal pivoting parts	<b>-CD-1</b>	
Rear footrest ball and metal-to-metal moving parts	<b>-CD-1</b>	
Shift shaft joint rod moving parts	<b>-CD-1</b>	
Front wheel oil seal (left and right)	<b>-</b>	

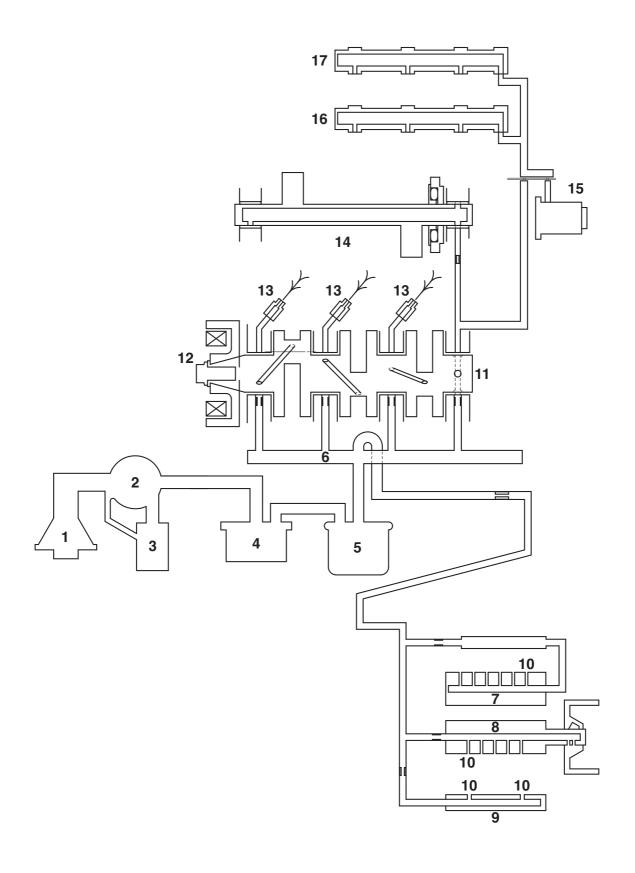
Lubrication point	Lubricant
Rear wheel oil seal	<b>-C9-</b>
Rear wheel drive hub oil seal	-C9-1
Rear wheel drive hub mating surface	-494
Brake caliper piston seal	<b>⊸</b> ®
Master cylinder inside	<b>⊸</b> ®
Brake caliper piston dust seal	<b>-©</b>
Brake caliper bolts	<b>-49</b>

EAS2001

#### **LUBRICATION SYSTEM CHART AND DIAGRAMS**

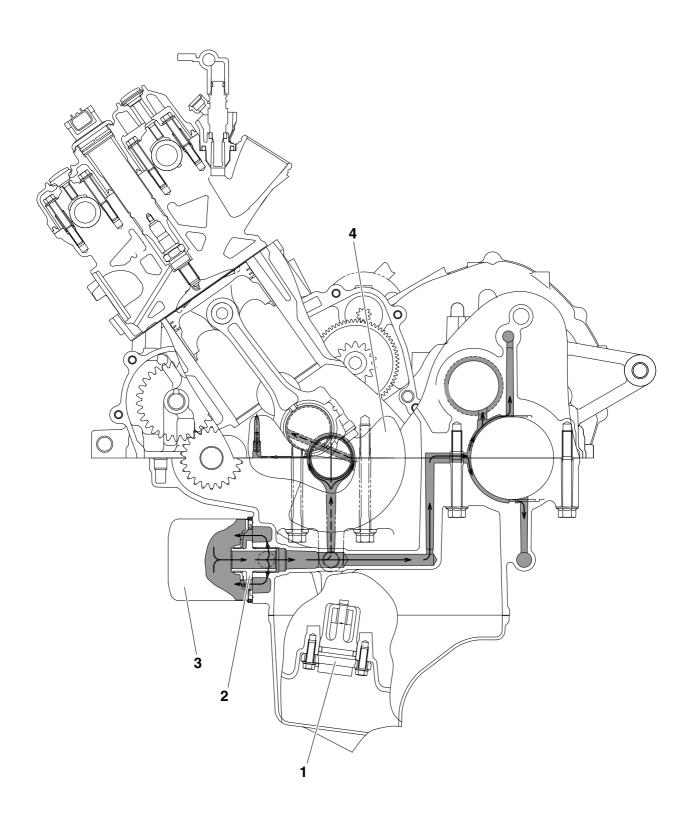
EAS30020

#### **ENGINE OIL LUBRICATION CHART**

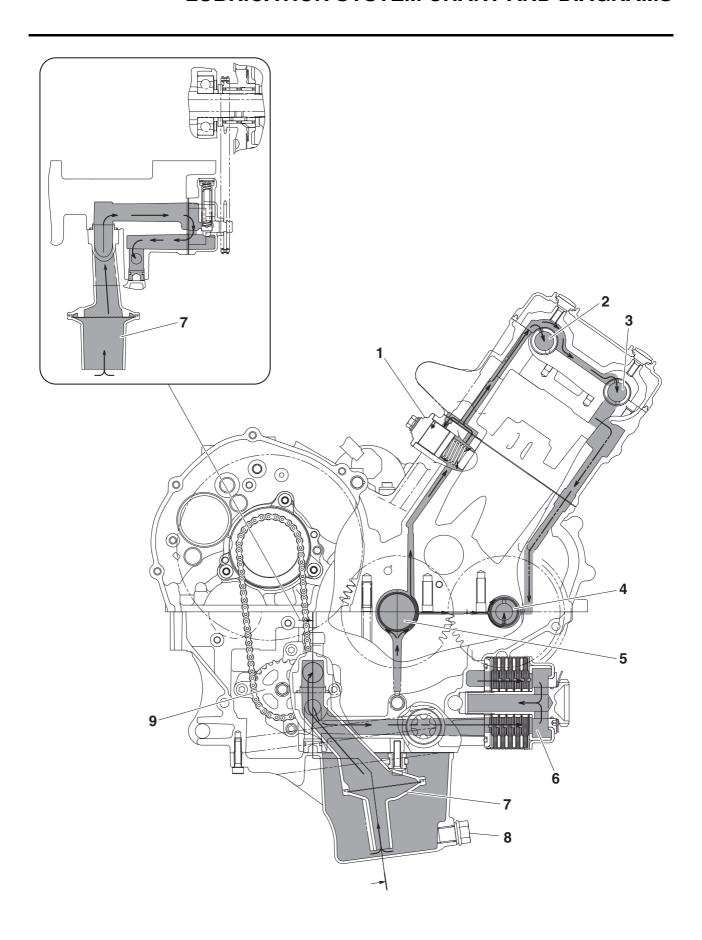


- 1. Oil strainer
- 2. Oil pump
- 3. Relief valve
- 4. Oil cooler
- 5. Oil filter cartridge
- 6. Main gallery
- 7. Drive axle
- 8. Main axle
- 9. Shift fork (upper)
- 10. Mission shower
- 11.Crankshaft
- 12.AC magneto
- 13.Oil nozzle
- 14.Balancer shaft
- 15. Timing chain tensioner
- 16.Intake camshaft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

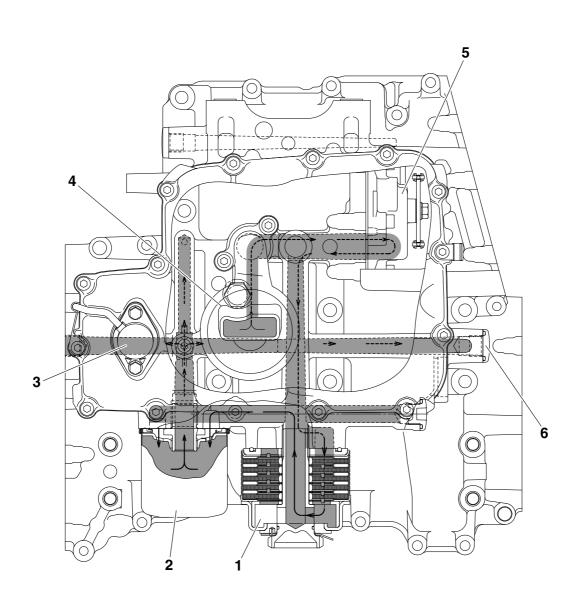
# EAS30021 LUBRICATION DIAGRAMS



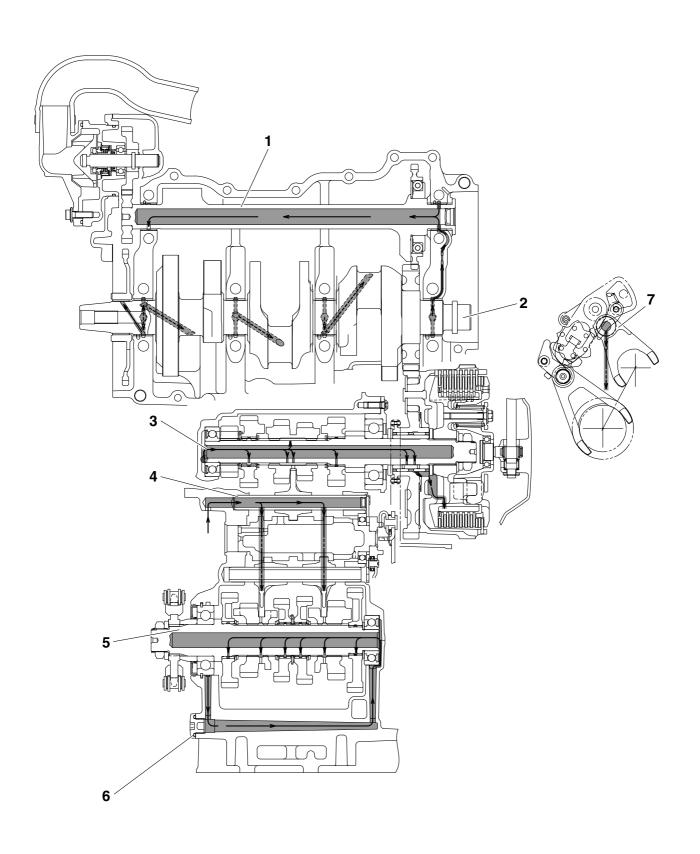
- 1. Oil level switch
- 2. Oil filter cartridge union bolt
- 3. Oil filter cartridge4. Crankshaft



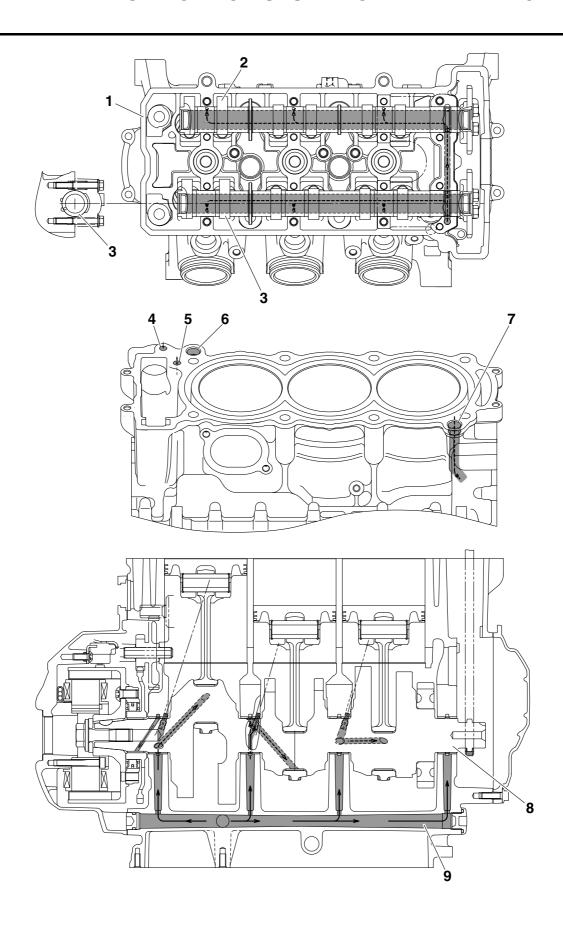
- 1. Timing chain tensioner
- 2. Intake camshaft
- 3. Exhaust camshaft
- 4. Balancer shaft
- 5. Crankshaft
- 6. Oil cooler
- 7. Oil strainer
- 8. Oil drain bolt
- 9. Oil pump driven sprocket



- 1. Oil cooler
- 2. Oil filter cartridge
- 3. Oil level switch
- 4. Oil strainer
- 5. Oil pump
- 6. Main gallery bolt



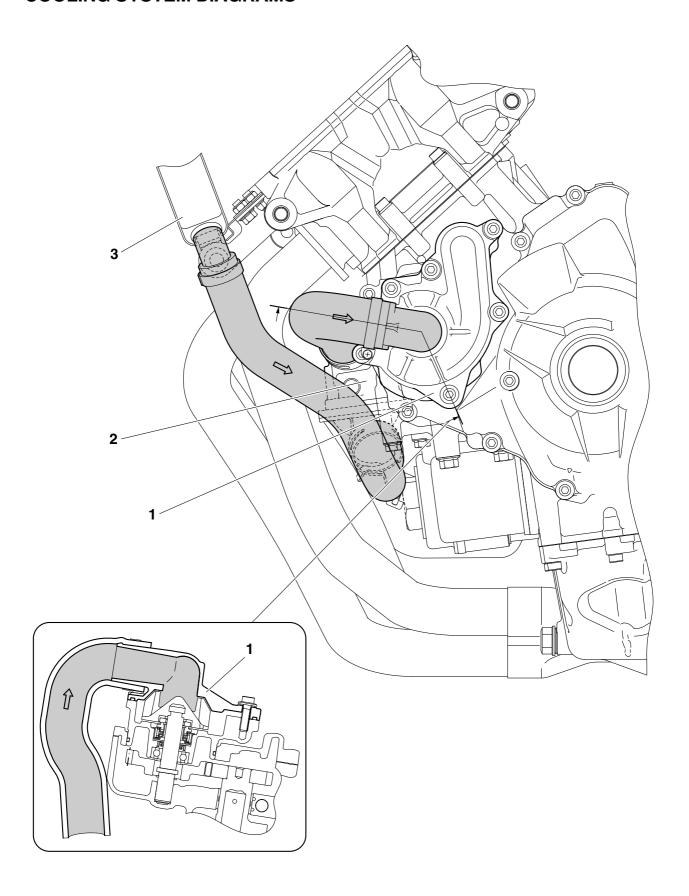
- 1. Balancer shaft
- 2. Crankshaft
- 3. Main axle
- 4. Shift fork guide bar (shift fork-C side)
- 5. Drive axle
- 6. Sub gallery bolt
- 7. Shift fork



- 1. Cylinder head
- 2. Exhaust camshaft
- 3. Intake camshaft
- 4. Oil passage to the timing chain tensioner
- 5. Oil passage to the cylinder head
- 6. Oil passage to the clutch chamber
- 7. Oil return passage from the cylinder head
- 8. Crankshaft
- 9. Main gallery

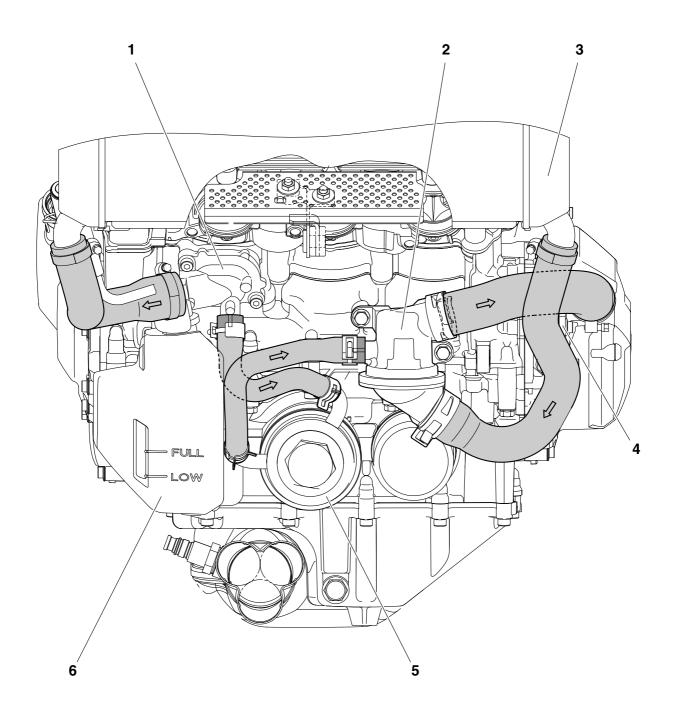
#### EAS20020

#### **COOLING SYSTEM DIAGRAMS**



# **COOLING SYSTEM DIAGRAMS**

- 1. Water pump
- 2. Thermostat
- 3. Radiator



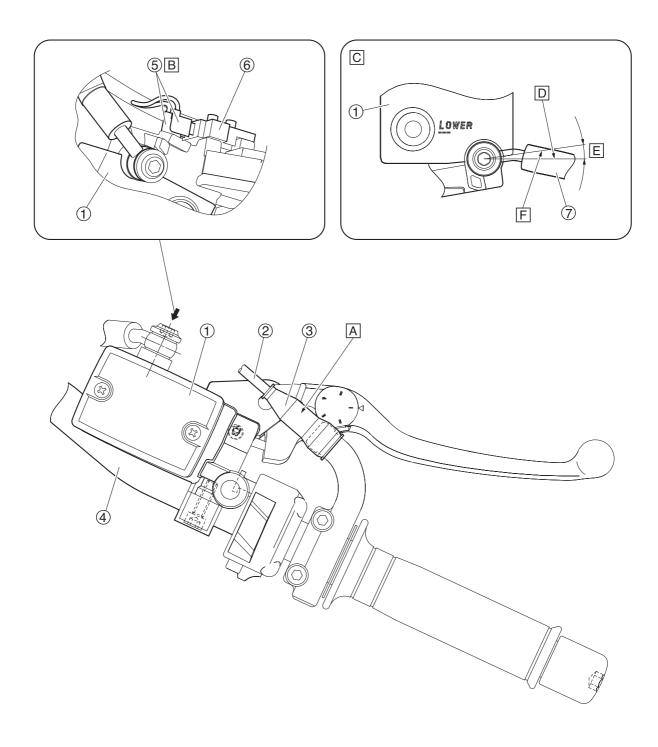
# **COOLING SYSTEM DIAGRAMS**

- 1. Water jacket
- 2. Thermostat
- 3. Radiator
- 4. Water pump
- 5. Oil cooler
- 6. Coolant reservoir

EAS20021

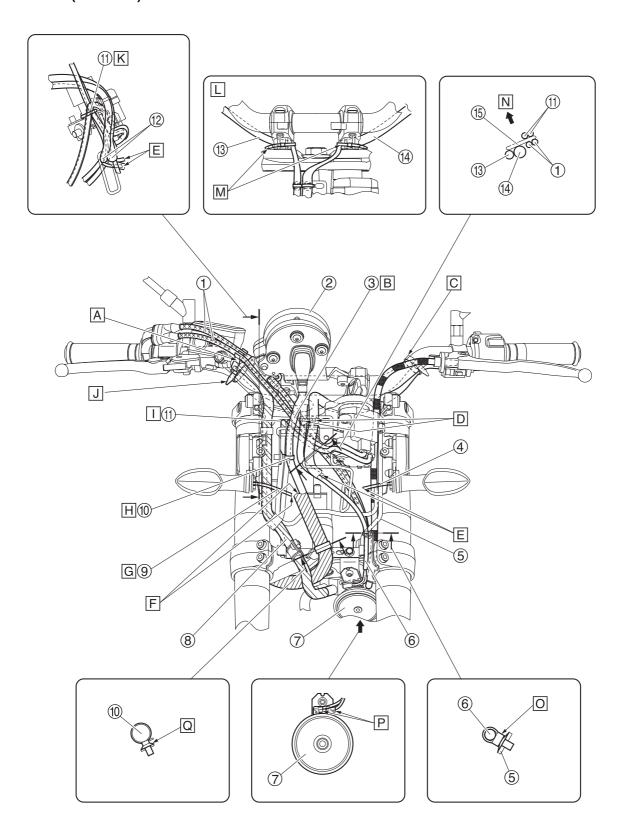
#### **CABLE ROUTING**

Handlebar (top view)



- 1. Front brake master cylinder
- 2. Throttle cable
- 3. Rubber cover
- 4. Handlebar
- 5. Front brake light switch connector
- 6. Front brake light switch
- 7. Front brake hose
- A. When installing the rubber cover, silicone water or soapy water may be applied to the inside of the rubber cover.
- B. Connect the front brake light switch connector onto the front brake light switch.
- C. Detailed drawing of around the front brake master cylinder
- Straight line parallel to the front brake master cylinder reservoir cap
- E. 3-13°
- F. Center of the metal fitting for the front brake hose

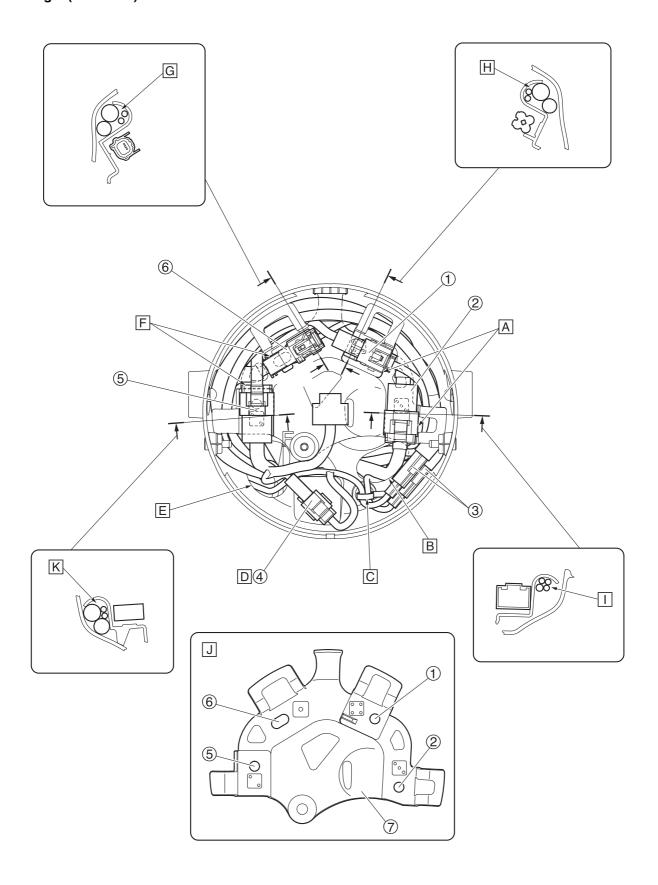
## Handlebar (front view)



- 1. Throttle cable
- 2. Meter assembly
- 3. Meter assembly lead
- 4. Front turn signal light lead (left)
- Headlight stay
- 6. Horn lead
- 7. Horn
- Brake hose
- 9. Front turn signal light lead (right)
- 10.Wire harness
- 11. Main switch lead/Immobilizer unit lead
- 12.Handlebar switch lead (left)/Handlebar switch lead (right)
- 13. Handlebar switch lead (right)
- 14. Handlebar switch lead (left)
- 15.Guide
- A. Fasten the center of the metallic area of the brake hose with the clamp. The opening in the clamp should face downward then. Fasten the protector area of the throttle cables with the clamp (opening side).
- B. Pass the meter lead in front of the throttle cable.
- C. Fasten the handlebar switch lead (left) to the handlebar next to the clutch lever with the plastic locking tie. The buckle of the plastic locking tie should face toward the front upper side and the end should face downward.
- D. Install the clamp of the handlebar switch lead (left) and handlebar switch lead (right) into the guide holes.
- E. Pass the front turn signal light lead (left), handlebar switch lead (left) and handlebar switch lead (right) through the holes on the left side of the headlight body.
- F. Pass the front turn signal light lead (right) and wire harness through the holes on the right side of the headlight body.
- G. Pass the front turn signal light lead in front of the brake hose.
- H. Install the wire harness clamp into the long hole on the guide.
- Pass the main switch lead and immobilizer unit lead on top of the guide.
- J. Fasten the handlebar switch lead (right) to the handlebar next to the brake master cylinder with the plastic locking tie. The buckle of the plastic locking tie should face toward the front upper side and the end should face downward.
- K. Pass the main switch lead, immobilizer unit lead and throttle cables through the guide. Pass the main switch lead and immobilizer unit lead on the right side of the vehicle.
- L. Handlebar front view
- M. Fasten the handlebar switch lead to the lower handlebar holder with the plastic locking tie. The buckle of the plastic locking tie should face the front and the end should face the outside of the vehicle.

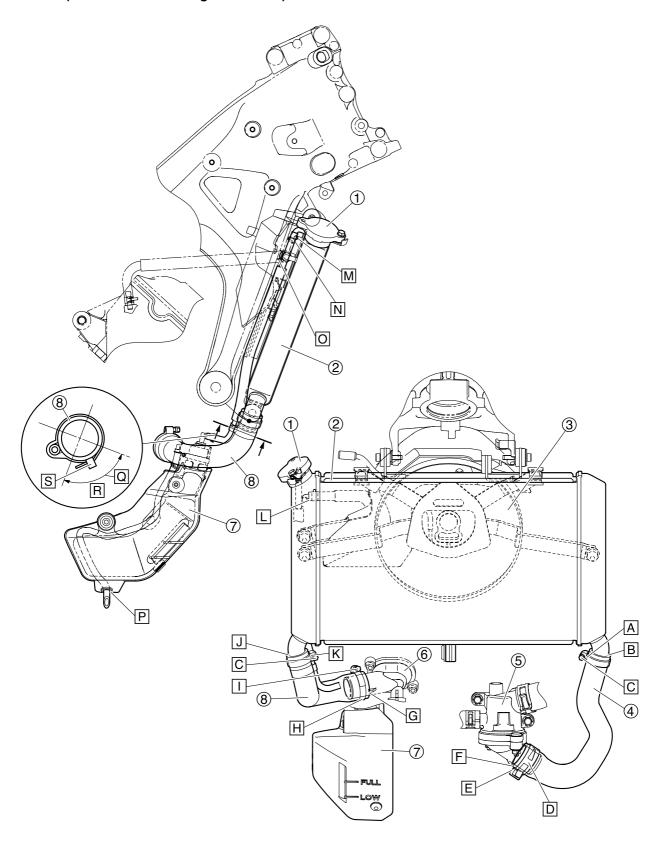
- N. Vehicle forward direction
- O. Install the clamp of the horn lead to the headlight stay as shown in the illustration.
- P. The terminals should face the outside of the vehicle.
- Q. Install the wire harness clamp into the hole on the headlight stay.

## Headlight (front view)



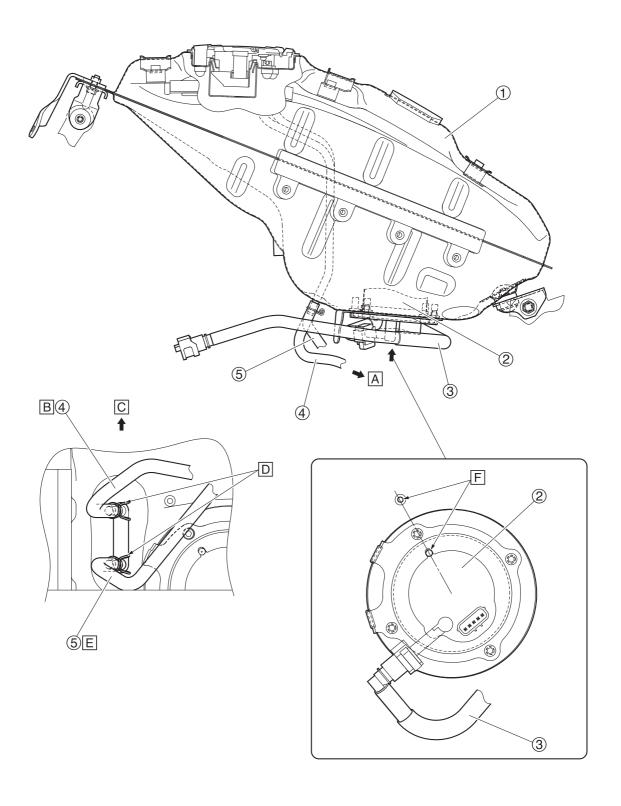
- 1. Handlebar switch coupler 2 (left)
- 2. Handlebar switch coupler 1 (left)
- Turn signal light coupler (left)/Turn signal light coupler (right)
- Auxiliary light coupler
- 5. Handlebar switch coupler 1 (right)
- 6. Handlebar switch coupler 2 (right)
- 7. Coupler holder
- A. Connect the handlebar switch coupler (left) and install the wire harness side of the handlebar switch coupler into the hole on the coupler holder.
- B. Headlight body left hole
- C. Fasten the positioning tape area of the turn signal light lead with the clamp and install the clamp into the hole on the headlight body. The end of the clamp should face the left side.
- After connecting the auxiliary light coupler, install the wire harness side of the auxiliary light coupler into the hole on the headlight body.
- E. Headlight body right side hole
- F. Connect the handlebar switch coupler (right) and install the wire harness side of the handlebar switch coupler into the hole on the coupler holder.
- G. Pass the handlebar switch lead 1 (right), handlebar switch lead 1 (left), handlebar switch lead 2 (left), turn signal light lead (wire harness side) on the inside of the guide. The position of each lead does not matter.
- H. Pass the handlebar switch lead 1 (right), handlebar switch lead 2 (right), handlebar switch lead 1 (left), turn signal light lead (wire harness side) on the inside of the guide. The position of each lead does not matter.
- Pass the handlebar switch lead 1 (right), handlebar switch lead 2 (right), handlebar switch lead 2 (left), turn signal light lead (wire harness side) on the inside of the guide. The position of each lead does not matter.
- J. When installing the coupler to the coupler holder, install the handlebar switch coupler 2 (right) first followed by the handlebar switch coupler 1 (right), handlebar switch coupler 1 (left) and handlebar switch coupler 2 (left).
- K. Pass the handlebar switch lead 2 (right), handlebar switch lead 1 (left), handlebar switch lead 2 (left), turn signal light lead (wire harness side) on the inside of the guide. The position of each lead does not matter.

## Radiator (front side view and right side view)



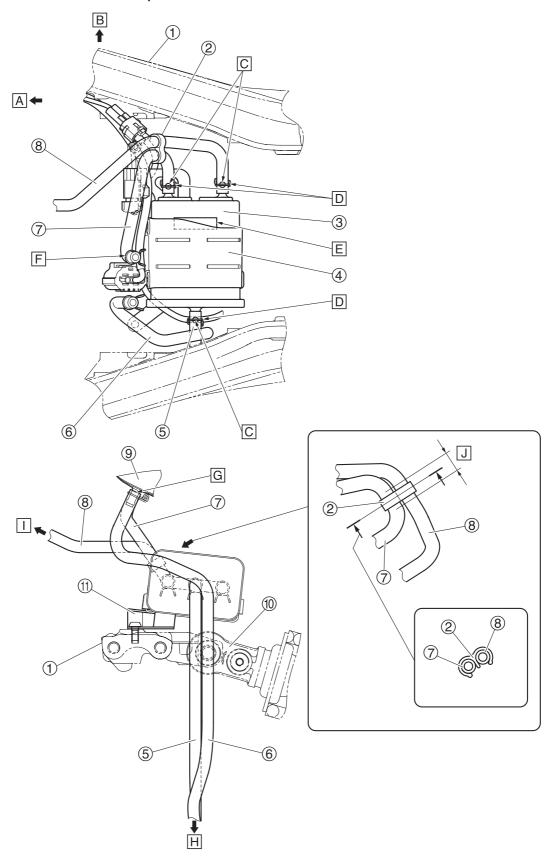
- 1. Radiator cap
- 2. Radiator
- 3. Radiator fan
- 4. Radiator outlet hose
- 5. Thermostat assembly
- 6. Water jacket joint
- 7. Coolant reservoir
- 8. Radiator inlet hose
- A. Install the radiator outlet hose with its white paint mark facing inward.
- B. Install the radiator outlet hose up to the base of the bend in the radiator pipe.
- C. Point the hose clamp installation bolt inward.
- D. Point the end of the hose clip downward.
- E. Align the yellow paint mark of the radiator outlet hose with the rib of the thermostat assembly, and then install it.
- F. Install the radiator outlet hose so that the tip of the hose contacts the rib of the thermostat assembly.
- G. Install the radiator inlet hose so that the tip of the hose contacts the rib of the water jacket joint.
- H. Install the radiator inlet hose with its yellow paint mark facing downward.
- I. Point the hose clamp installation bolt upward.
- J. Install the radiator inlet hose up to the base of the bend in the radiator pipe.
- K. Install the radiator inlet hose with its white paint mark facing inward.
- L. Install the radiator hose up to the base of the bend in the radiator pipe.
- M. Point the end of the clip outward.
- N. Install the coolant reservoir hose up to the base of the bend in the radiator pipe.
- O. Point the end of the clip rearward.
- P. Install the grommet on the coolant reservoir drain hose to the hole in the coolant reservoir cover.
- Q. Place the lock of the hose clamp within the area shown in the illustration, placing as close to the center as possible.
- R. 90°
- S. Point the tip of the clamp rearward.

## Fuel tank (left and bottom view)



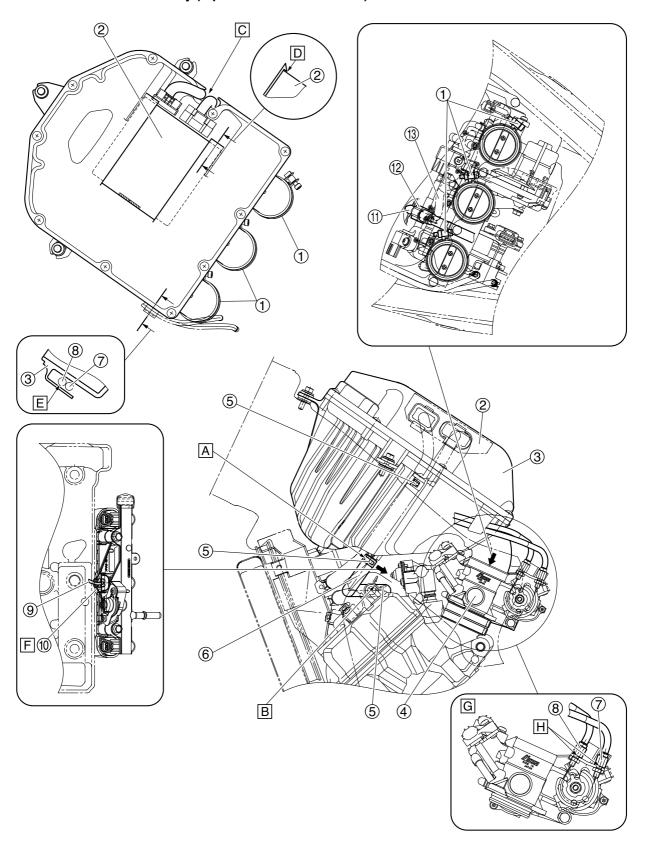
- 1. Fuel tank
- 2. Fuel pump
- 3. Fuel hose
- 4. Fuel tank drain hose
- 5. Fuel tank breather hose
- A. Atmosphere
- B. Insert the fuel tank drain hose up to the section where the fuel tank pipe increases in diameter. Install it so that the white paint mark faces the rearward. Position the hose so that its paint mark is visible from the rear of the vehicle. (Within ±45°)
- C. Outside of the vehicle
- D. Install the clip so that the end is on the paint mark. Point the end to the rear, and store it inside to the hose.
- E. Insert the fuel tank breather hose up to the section where the fuel tank pipe increases in diameter. Install it so that the yellow paint mark faces the rearward. Position the hose so that its paint mark is visible from the rear of the vehicle. (Within ±45°)
- F. Align the fuel pump positioning to the inner panel marking (visual guide during installation).

## Canister (top view and left side view)



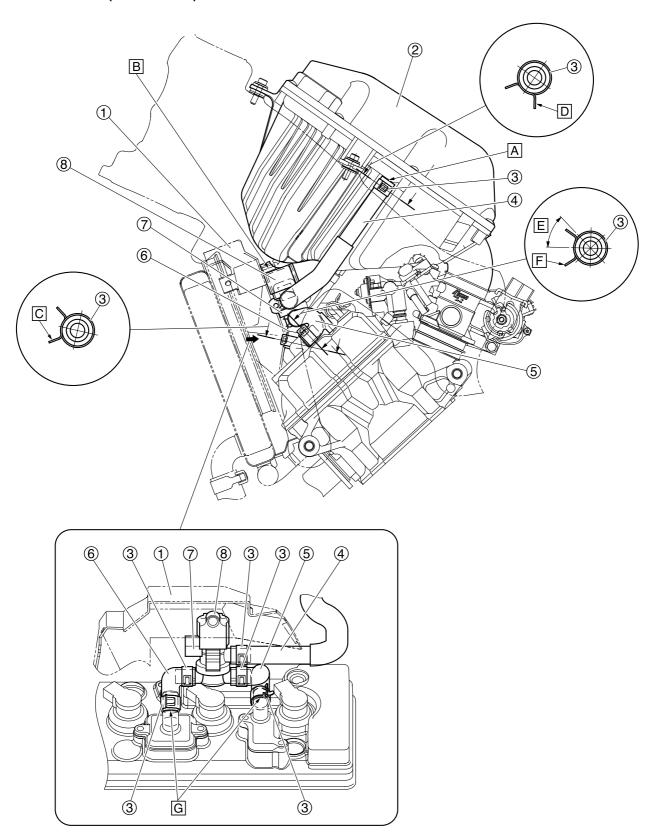
- 1. Frame
- 2. Clamp
- 3. Canister
- 4. Canister holder
- 5. Canister breather hose
- 6. Fuel tank drain hose
- 7. Fuel tank breather hose
- 8. Canister purge hose
- 9. Fuel tank
- 10. Rear shock absorber assembly
- 11.Canister bracket
- A. Front side of the vehicle
- B. Right side of the vehicle
- C. Face the white paint mark on the hose upward.
- D. Point the end of the clip downward
- E. Install the canister with its stamped mark facing upward.
- F. The tip of the clip and the yellow paint mark on the hose should face backward. Position the hose so that its paint mark is visible from the rear of the vehicle. (Within ±45°)
- G. Insert the hose up to the section where the fuel tank pipe increases in diameter.
- H. Atmosphere
- I. To Throttle body
- J. Place the clamp on the straight portion of the fuel tank breather hose.

## Air filter case and throttle body (top view and left side view)

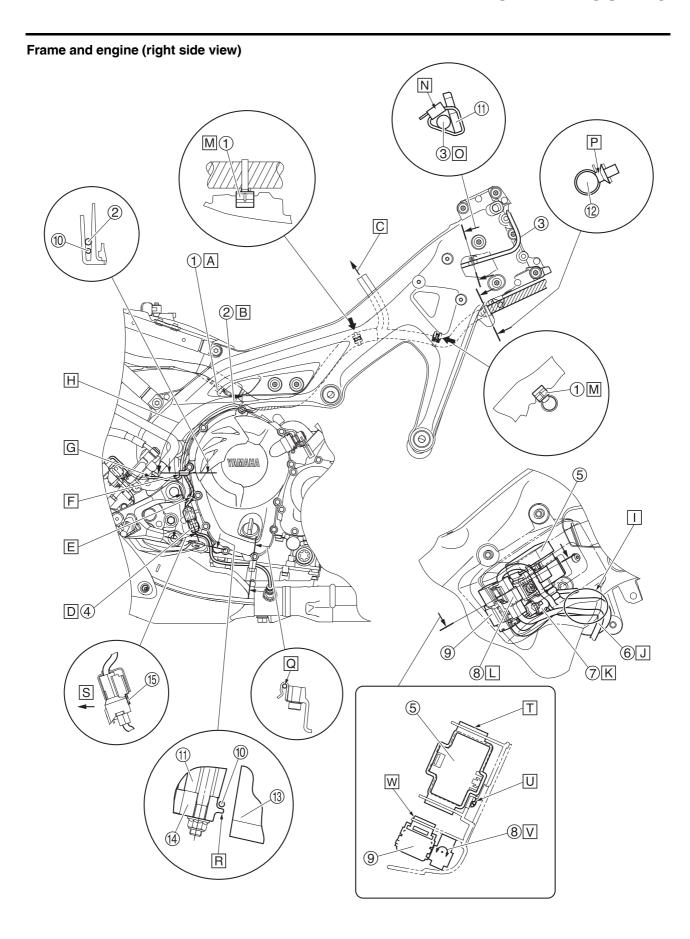


- 1. Air filter case joint clamp
- 2. ECU (Engine Control Unit)
- 3. Air filter case
- 4. Throttle body
- 5. Clip
- 6. Cylinder head breather hose
- Throttle cable (decelerator cable) (white plating)
- Throttle cable (accelerator cable) (black plating)
- 9. Injector lead
- 10.Injector coupler
- 11.Fuel rail
- 12. Fuel hose (black side)
- 13. Canister purge hose
- A. Install the breather hose on the yellow paint mark side to the air filter case, with its yellow paint mark facing toward left side of the vehicle.
  - Point the end of the clip toward left.
- B. Install the breather hose so that the tip touches the pipe of the cylinder head. Install the breather hose on the white paint mark side to the engine. Install the breather hose so that the white paint mark is in the rear of the vehicle and parallel to the cylinder head mating surfaces. Install the clip so that the end is in the rear of the vehicle and parallel to the cylinder head mating surfaces.
- C. Install the ECU harness by storing it in the recess in the air filter case.
- D. Install the ECU so that the hooks on the air filter case go over the ECU edges.
- E. Store the throttle cables on the protrusion of the air filter case.
- F. Insert the injector coupler all the way in.
- G. Instructive drawing for assembling the throttle cables
- H. Install the throttle cable so that the nut of the throttle cable touches the stay.

## Air cut-off valve (left side view)

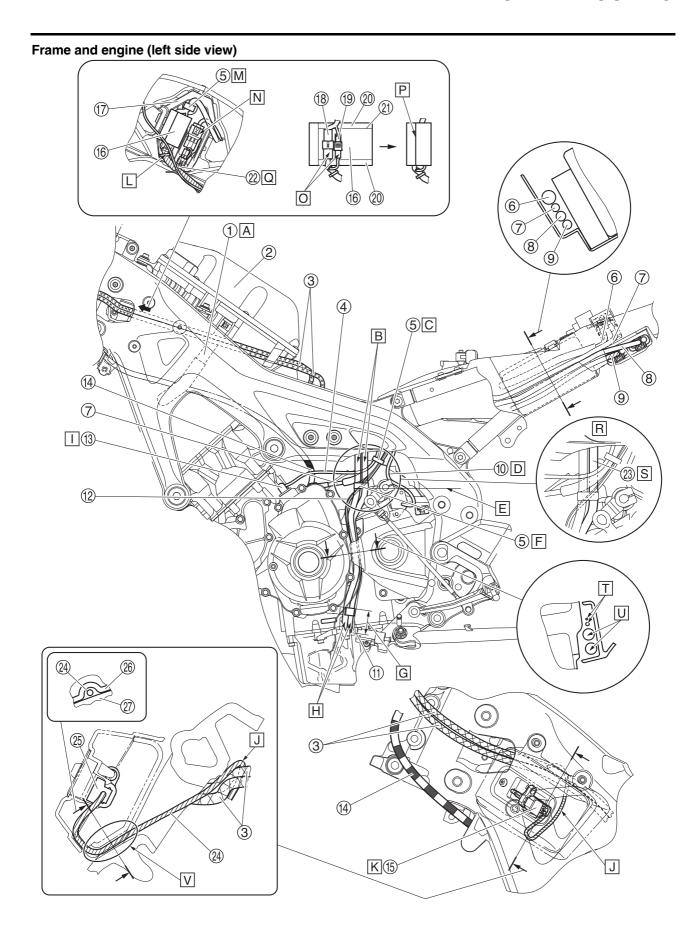


- 1. Radiator fan cover
- 2. Air filter case
- 3. Clip
- Air induction system hose (air filter case to air cut-off valve)
- 5. Air induction system hose (air cut-off valve to reed valve cover #1)
- Air induction system hose (air cut-off valve to reed valve cover #2/#3)
- 7. Air cut-off valve
- 8. Air cut-off valve holder
- A. Install the air induction system hose (air filter case to air cut-off valve) so that the tip of the hose contacts the air filter case.
- B. Insert the protrusion on the radiator fan cover into the hole in the air cut-off valve holder.
- C. Point the end of the clip for the air induction system hose (air cut-off valve to reed valve cover #2/#3) forward.
- D. Point the end of the clip for the air induction system hose (air filter case to air cut-off valve) to the left.
- E. 45°
- F. Point the end of the clip for the air induction system hose (air cut-off valve to reed valve cover #1) diagonally left forward.
- G. Install the hose so that the tip of the hose touches the protrusion of the pipe.



- 1. Clamp
- 2. Rear brake light switch lead
- 3. Main switch lead/Immobilizer unit lead
- O<sub>2</sub> sensor coupler
- 5. Fuse box 1
- 6. Radiator fan motor lead
- 7. Auxiliary DC outlet
- 8. Radiator fan motor coupler
- Headlight relay
- 10.02 sensor lead
- 11.Frame
- 12. Wire harness
- 13. Engine
- 14. Adapter bracket
- 15.Bracket
- A. Insert the clamp into the long hole in the battery box.
- B. Route the rear brake light switch lead outside the wire harness branch to the O<sub>2</sub> sensor
- C. To the ECU coupler
- D. Connect the O<sub>2</sub> sensor coupler, and then fasten to the bracket. Make sure that the top of the coupler does not protrude. It is okay if the cover is deformed.
- E. Fasten the O<sub>2</sub> sensor lead with the clamp, and then install it on the bracket.
- F. Route the O<sub>2</sub> sensor lead and the rear brake light switch lead through the bracket guide.
- G. Route the rear brake light switch lead outside brake fluid reservoir hose.
- H. It does not matter whether the O<sub>2</sub> sensor lead or the rear brake light switch lead is on top (bottom) in the area shown in the illustration.
- Pass the wire harness through the openings in the side panel and rubber cover.
- Pass the radiator fan motor lead at the back of the vehicle where the wire harness is located.
- K. Place the auxiliary DC outlet below the fuse box parallel to the bottom of the fuse box.
- L. Connect the radiator fan motor coupler. Place the radiator fan motor coupler in the direction indicated in the illustration.
- M. Insert the clamp so that it touches the rim of the frame
- N. Fasten the main switch lead/immobilizer unit lead with the plastic locking tie. For the main switch lead, fasten the positioning tape at the center with the plastic locking tie. Cut off the end of the plastic locking tie on the outside.
- O. Positioning tape for the main switch lead and the immobilizer unit lead.
- P. Install the wire harness clamp into the hole of the bracket.
- Q. Fasten the O<sub>2</sub> sensor lead with the holder.

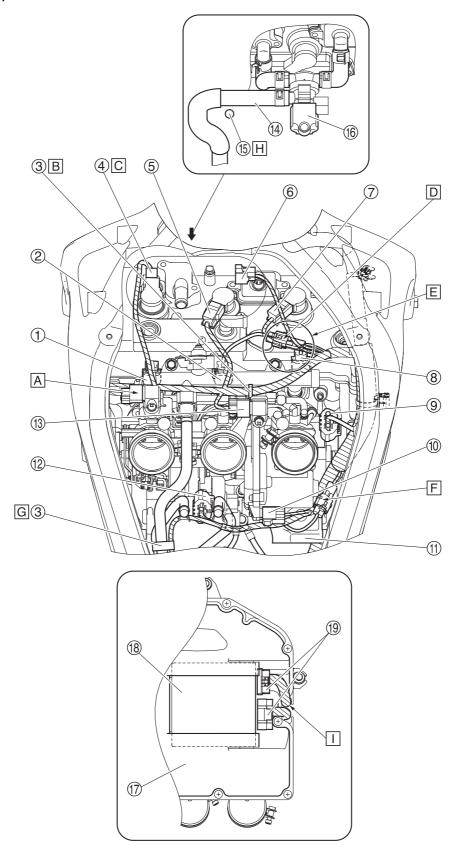
- R. Route O<sub>2</sub> sensor lead inside to the protrusion of the adapter bracket.
- S. Inside vehicle
- T. Attach the fuse box 1 to the rubber clamp and plug in the rubber clamp until it contacts the rib of the side panel.
- U. In order to prevent biting of the radiator fan motor lead, attach the radiator fan motor lead to the hook on the side panel when inserting the fuse box into the rib of the side panel.
- V. Place the radiator fan motor coupler in the direction indicated in the illustration or turn it 180 degrees to place it in the opposite direction
- W. Insert the headlight relay into the rib of the side panel. The rubber bracket of the headlight relay must be below the rib of the side panel.



- Air induction system hose (air filter case to air cut-off valve)
- 2. Air filter case
- 3. Throttle cables
- 4. Stator coil assembly lead
- 5. Clamp
- 6. Positive battery lead
- 7. Starter motor lead
- 8. Stator coil lead
- 9. Wire harness (to rectifier/regulator)
- 10.Gear position switch lead
- 11. Sidestand switch lead
- 12.Oil level switch lead
- 13.Boots
- 14.Clutch cable
- 15. Intake air temperature sensor coupler
- 16. Wire harness protector
- 17. Coupler cover
- 18. Main switch coupler 1
- 19. Main switch coupler 2
- 20.Sponge
- 21. Sponge edge
- 22. Front wheel sensor
- 23. Canister breather hose
- 24. Intake air temperature sensor lead
- 25.Intake air temperature sensor
- 26. Rubber cover
- 27.Frame
- A. Route the air induction system hose (air filter case to air cut-off valve) inside the throttle cable
- B. Route the fuel tank drain hose/canister breather hose outside to the wire harnesses. Route them inside to the brake hose.
- C. Fasten the sidestand switch lead, stator coil assembly lead, starter motor lead, and oil level switch lead with the clamp. The order of the leads does not matter. Align the clamp with the tape on the starter motor lead. Do not cut off the clamp end and point it forward. Fasten each lead while pulling up the oil level switch lead.
- D. Route the gear position switch lead inside to the shift arm.
- E. Hose bending edge
- F. Align the sidestand switch lead, oil level switch lead, fuel tank drain hose, and canister breather hose with the bending edge of the hose, and then install them. Face the clamp opening to the rearward.
- G. 30-50 mm (1.18-1.97 in)
- H. Point the tips of fuel tank drain hose and canister breather hose as shown in the illustration.
- Place the stator coil assembly lead so that bare copper wires do not protrude from the boots.

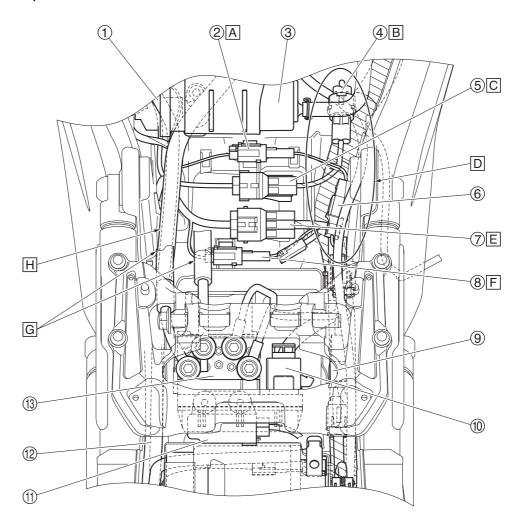
- J. Route the intake air temperature sensor lead above the throttle cable in the frame, and feed it outside the vehicle through the triangle hole in the frame.
- K. Install the intake air temperature sensor coupler to the protrusion on the side panel.
- L. Install the clamp to the hole in the bottom of the coupler cover.
- M. Fasten the main switch coupler to the coupler cover with the clamp.
- N. The positions for the leads on the immobilizer unit side do not matter regarding the main switch lead.
- O. Make sure that the main switch coupler does not protrude from the sponge edge.
- P. Align the wire harness protector with the edge of the Velcro tape and wrap it. However, the tape surface may protrude somewhat.
- Q. Route the front wheel sensor lead rear side of the vehicle respect to the main switch lead.
- R. Detail of the canister breather hose routing
- S. Route the canister breather hose to the inside of the stator coil assembly lead and starter motor lead, also outside to the sidestand switch lead and the oil level switch lead.
- T. It does not matter whether the oil level switch lead or the sidestand switch lead is on top.
- U. It does not matter whether the fuel tank drain hose or the canister breather hose is on top but make sure that these hoses are not twisted each other.
- V. Pass the intake air temperature sensor lead through the groove on the rubber cover.

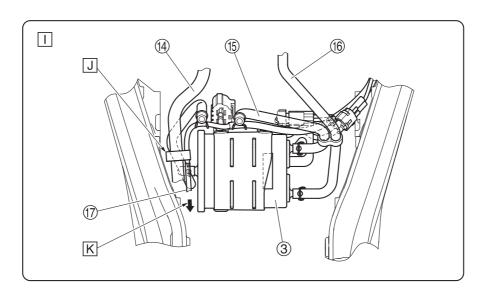
## Frame (top view)



- 1. Injector #1 coupler
- 2. Injector #2 coupler
- 3. Clamp
- 4. Ignition coil #1 coupler
- 5. Ignition coil #2 coupler
- 6. Air cut-off valve coupler
- 7. Ignition coil #3 coupler
- 8. Injector #3 coupler
- 9. Throttle position sensor coupler
- 10. Throttle servo motor coupler
- 11.Cross tube
- 12. Accelerator position sensor coupler
- 13.Intake air pressure sensor coupler
- Air induction system hose (air filter case to air cut-off valve)
- 15.Clutch cable
- 16.Air cut-off valve
- 17. Air filter case
- 18.ECU (Engine Control Unit)
- 19.ECU (engine control unit) coupler
- A. Fold back the intake air pressure sensor lead by the coupler, and then fasten it with tape.
- B. Insert the clamp into the fuel rail hole.
- C. Fold back the injector lead #1 by the coupler, and then fasten it with tape.
- D. Connect the sub-lead to the injector coupler #2. Fasten the injector coupler on the wire harness side with tape.
- E. For the air cut-off valve lead, ignition coil lead #3, and fuel injector lead #3, it does not matter which is routed above the others.
- F. Route the coolant temperature sensor sublead between the cross tube and the wire harness.
- G. Fasten the fuel hose at the mark and the wire harness at the positioning tape with the clamp. The opening of the clamp can face either way.
- H. Route the clutch cable above to the air induction system hose (air filter case to air cut-off valve).
- Route the ECU lead for the front of the vehicle through the rib of the air filter case.

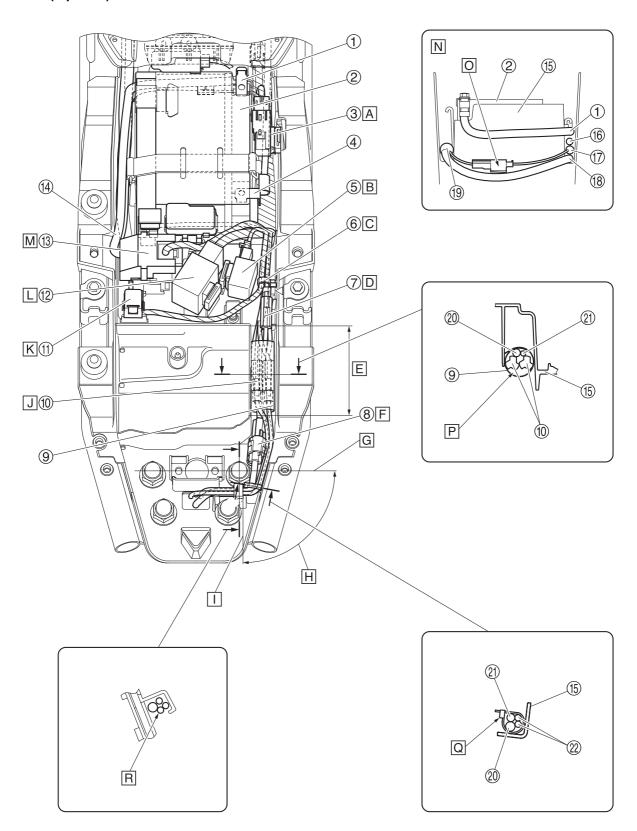
## Frame (top view)





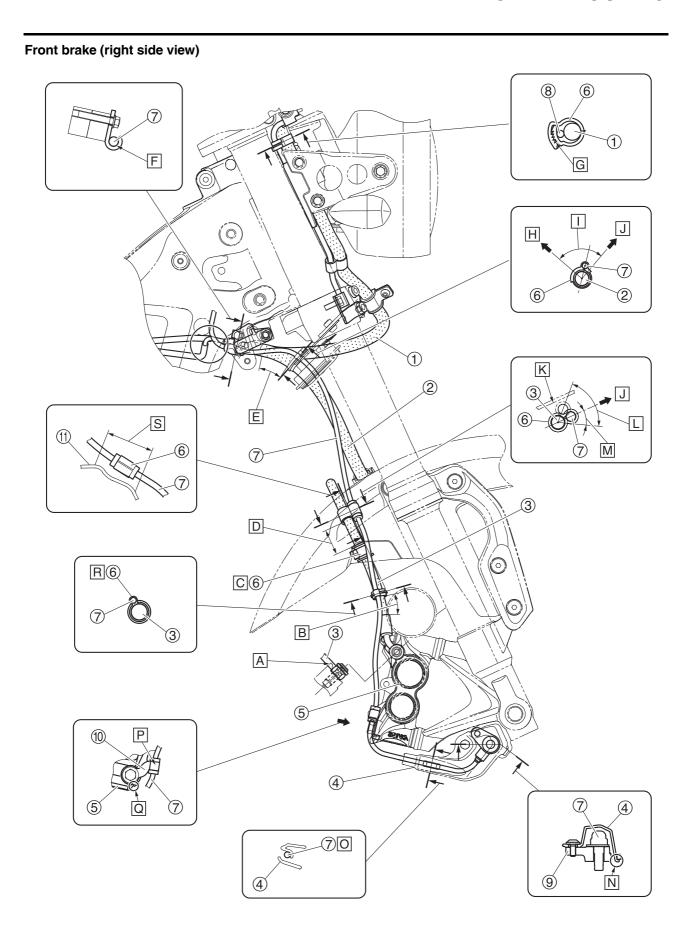
- 1. Stator coil assembly lead
- 2. Oil level switch coupler
- 3. Canister
- 4. Rear brake light switch coupler
- 5. Sidestand switch coupler
- 6. Negative battery lead 2 coupler
- 7. Gear position switch coupler 1
- 8. Gear position switch coupler 2
- 9. Negative battery lead coupler
- 10.ABS ECU coupler
- 11.Lean angle sensor
- 12. Starter motor lead
- 13. Hydraulic unit
- 14. Fuel hose
- 15. Fuel tank breather hose (fuel tank to canister)
- 16. Canister purge hose (hose joint to canister)
- 17. Fuel pump lead
- A. Fasten the wire harness side of the oil level switch coupler to the battery box.
- B. Fasten the rear brake light switch coupler on the wire harness with tape.
- C. Fasten the sidestand switch coupler of the wire harness to the battery box.
- D. Route the negative battery lead inside to the branch of the O<sub>2</sub> sensor lead and the rear brake light switch lead, and through between the wire harness and the frame. For rear side of the vehicle, route it above the wire harness
- E. Fasten the wire harness side of gear position switch coupler 1 to the battery box.
- F. Fasten the wire harness side of gear position switch coupler 2 to the battery box.
- G. Route the brake hose above all the other leads.
- H. Leads on the front of the battery box are, from the top of the vehicle, in the following order: starter motor lead, stator coil assembly lead. The orders for other leads do not matter
- I. Details around the canister
- J. Fasten the mark area of the fuel hose and the positioning tape area of the fuel pump lead with the clamp. The orientation of the clamp opening does not matter.
- K. To fuel pump

## Frame (top view)



- 1. Positive battery terminal
- 2. Battery
- 3. Radiator fan motor relay
- 4. Negative battery terminal
- 5. Turn signal/hazard relay
- 6. Wire harness clamp
- 7. License plate light coupler
- 8. Tail/brake light coupler
- 9. Protector
- Turn signal light coupler (left)/Turn signal light coupler (right)
- 11. Yamaha diagnostic tool coupler
- 12.Relay unit
- 13.Starter relay
- 14. Positive battery lead
- 15.Battery box
- 16. Starter motor lead
- 17. Stator coil lead
- 18. Wire harness (to rectifier/regulator)
- 19. Wire harness
- 20. Tail/brake light lead
- 21.License plate light lead
- 22. Turn signal light lead
- A. Install the rubber bracket of the radiator fan motor relay in the battery box. Make sure to route the lead under the relay.
- B. Install the rubber bracket of the turn signal/hazard relay in the battery box.
- C. Install the wire harness clamp into the hole in the battery box.
- D. Connect the license plate light coupler.
- E. Range "A"
- F. After connecting the tail/brake light coupler, insert the coupler on the wire harness side into the hole on the battery box.
- G Center of nut
- H. Fasten the leads with the plastic locking tie within this range.
- I. End section of guide
- Connect the turn signal light coupler to the corresponding coupler of the same color.
- K. Insert the Yamaha diagnostic tool coupler to the battery box.
- Install the rubber bracket of the relay unit in the battery box.
- M. Install the rubber bracket of the starter relay in the battery box.
- N. Instructional drawing for routes in the front of the battery
- Fasten the crankshaft position sensor coupler of the wire harness with tape.

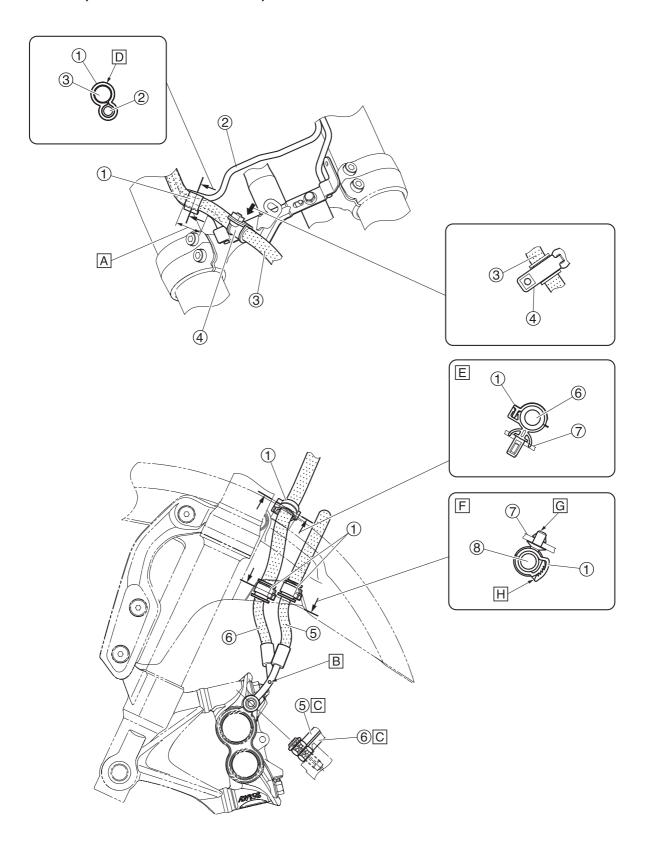
- P. Wind the turn signal light coupler (left), turn signal light coupler (right), license plate light lead and tail/brake light lead around the protector within the range "A" and insert them into the battery box. The orientation of the protector does not matter. The positioning order of the couplers and leads does not matter.
- Q. Cut off the excess end of the plastic locking tie. The orientation of the plastic locking tie does not matter. The order that each lead is passed through does not matter.
- R. Route the tail/brake light lead, license plate light lead, and turn signal light leads through the guide of the battery box. After routing, if some leads become dislodged from the guide this is not a problem. The routing order of the leads does not matter.



- Brake hose (front brake master cylinder to hydraulic unit)
- Brake hose (hydraulic unit to left brake caliper)
- Brake hose (left brake caliper to right brake caliper)
- 4. Front wheel sensor protector
- Brake caliper (right)
- 6. Clamp
- 7. Front wheel sensor
- 8. Headlight stay
- 9. Front wheel sensor housing
- 10. Front wheel sensor lead holder
- 11.Front fender
- A. Install the brake pipe so that it contacts the projection on the brake caliper.
- B. Install the clamp so that the bottom side of the clamp is 10–30 mm (0.39–1.18 in) from the end of the front brake pipe. Route the front wheel sensor lead outside of the front brake hose.
- C. Insert the clamp into the front fender securely. Face the catch of the clamp backward, and then close the clamp until three clicks or more are heard.
- D. Place the clamp within this range (30–50 mm (1.18–1.97 in)) or at the position indicated by "S".
- E. Route the front wheel sensor lead along the front brake hose in the area shown in the illustration. For the installation position of the clamp, slide the protector of the front wheel sensor lead as far down as possible, and then align the clamp with the upper end of the protector.
- F. Fasten the grommet on the front wheel sensor lead with the clamp. When installing, silicone water or soapy water may be applied.
- G. Make sure the clamp is engaged by 3 or more notches. The orientation of the clamp opening does not matter.
- H. Right side of the vehicle
- Place the front wheel sensor lead on the right side of the vehicle relative to the brake hose. Make sure the center line of the front wheel sensor lead is inside the range indicated in the illustration.
- J. Front of the vehicle
- K. Maintain a gap of 2 mm (0.08 in) or more between the fender and clamp.
- L. Place the front wheel sensor lead in front of the vehicle relative to the brake hose. Make sure the center line of the front wheel sensor lead is inside the range indicated in the illustration.
- M. 30°
- N. Insert the projection on the front wheel sensor protector into the slot in the front wheel sensor housing.

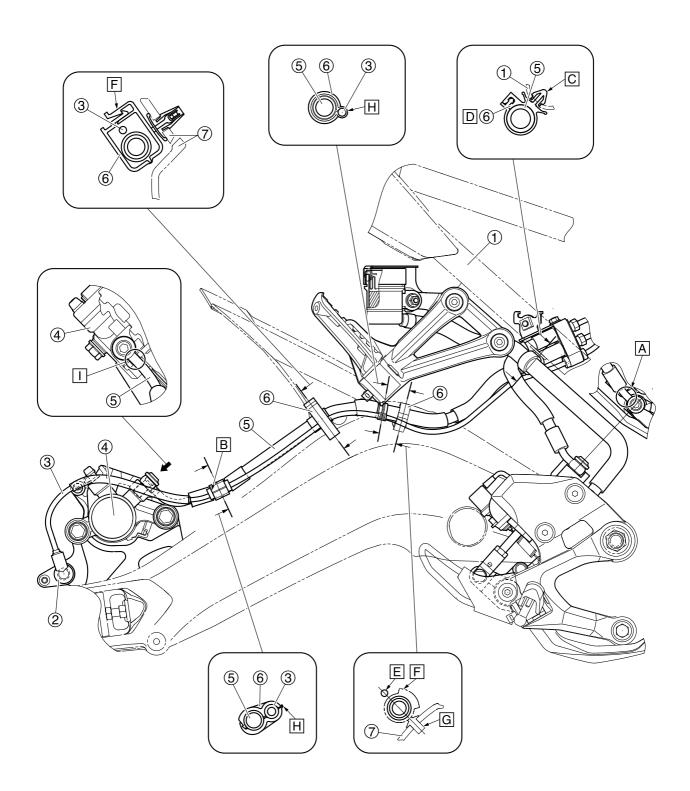
- Fasten the front wheel sensor lead with the holder on the front wheel sensor protector.
- P. Fasten the grommet on the front wheel sensor lead with the front wheel sensor lead holder.
- Q. Contact the projection on the front wheel sensor holder with the side of the right brake caliper as shown in the illustration.
- R. Install the clamp so that the front wheel sensor lead is on the right side of the vehicle.
- S. Place the clamp within this range.

## Front brake (front view and left side view)

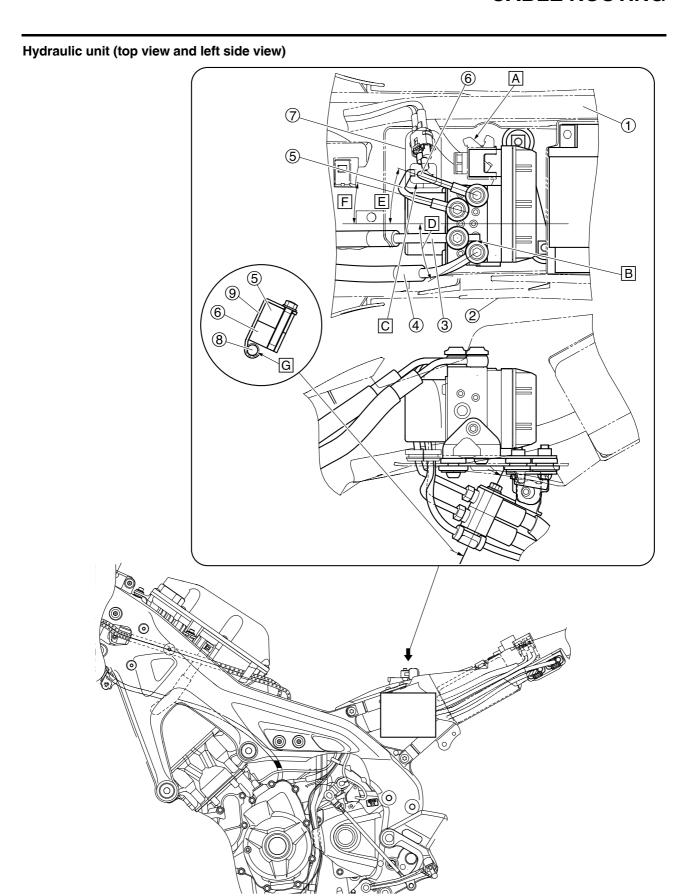


- 1. Clamp
- 2. Headlight stay
- 3. Brake hose (front brake master cylinder to hydraulic unit)
- 4. Brake hose holder
- Brake hose (left brake caliper to right brake caliper)
- Brake hose (hydraulic unit to left brake caliper)
- 7. Front fender
- 8. Brake hose
- A. Fasten the brake hose at the straight section of the range indicated in the illustration with the clamp.
- B. Install the front brake hose with its blue paint mark facing outward.
- C. Install the brake hose from the hydraulic unit so that the brake pipe touches the projection on the brake caliper. Install the brake hose to the right brake caliper so that it aligned with the direction of the brake pipe from the hydraulic unit.
- D. Place the brake hose in front of the vehicle where the headlight stay is located.
- E. The opening in the clamp should face the front of the vehicle.
- F. How to attach the 3 clamps on the left and right sides of the fender.
- G. Insert the clamp into the front fender securely.
- H. Face the catch of the clamp backward, and then close the clamp until three clicks or more are heard.

#### Rear brake



- 1. Rear frame
- 2. Rear wheel sensor
- 3. Rear wheel sensor lead
- 4. Rear brake caliper
- 5. Rear brake hose
- 6. Clamp
- 7. Swingarm assembly
- A. Install the brake pipe so that it contact with the protrusion on the master cylinder at outside vehicle.
- B. Install the rear wheel sensor lead aligning with the brake pipe edge, and then fasten it with the clamp.
- C. Make sure to install the clamp all the way in the rear frame.
- D. Install the clamp facing the direction in the illustration.
- E. Do not clamp the rear wheel sensor lead.
- F. Fasten the protector of the brake hose with the clamp. Install the mating section on the top of the vehicle.
- G. Make sure to install the clamp all the way in the swingarm assembly.
- H. Install the rear wheel sensor lead so that it facing outward.
- I. Install the brake pipe so that it aligned with the cutout in the caliper.



- 1. Wire harness
- 2. Battery box
- 3. Brake hose (front brake master cylinder to hydraulic unit)
- Brake hose (hydraulic unit to front brake calipers)
- 5. Brake hose (rear brake master cylinder to hydraulic unit)
- Brake hose (hydraulic unit to rear brake caliper)
- 7. Plug
- 8. Rear wheel sensor lead
- 9. Bracket
- A. Make sure to insert the ABS ECU coupler all the way in.
- B. Install the brake hose (front brake master cylinder to hydraulic unit) so that the protrusion contact to the brake hose (hydraulic unit to front brake calipers).
- C. In the plug hole, install the brake hose (rear brake master cylinder to hydraulic unit), the brake hose (hydraulic unit to rear brake caliper) and rear wheel sensor lead.
- D. 28-34°
- E. 17-21°
- F. 13-17°
- G. When installing the rear wheel sensor lead, silicone water or soapy water may be applied.

# PERIODIC CHECKS AND ADJUSTMENTS

PERIODIC MAINTENANCE	3-1
INTRODUCTION	3-1
PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL	0.4
SYSTEM	
GENERAL MAINTENANCE AND LUBRICATION CHART	
CHECKING THE FUEL LINE	
CHECKING THE SPARK PLUGS	
ADJUSTING THE VALVE CLEARANCE	
CHECKING THE ENGINE IDLING SPEED	
SYNCHRONIZING THE THROTTLE BODIES	
CHECKING THE THROTTLE BODY JOINTS	
CHECKING THE CANISTER	
ADJUSTING THE EXHAUST GAS VOLUME	
CHECKING THE AIR INDUCTION SYSTEM	
CHECKING THE CYLINDER HEAD BREATHER HOSE	
REPLACING THE AIR FILTER ELEMENT	
ADJUSTING THE CLUTCH LEVER FREE PLAY	
CHECKING THE BRAKE OPERATION	
CHECKING THE BRAKE FLUID LEVEL	
ADJUSTING THE FRONT DISC BRAKE	.3-13
CHECKING THE FRONT BRAKE PADS	.3-13
ADJUSTING THE REAR DISC BRAKE	.3-13
CHECKING THE REAR BRAKE PADS	.3-14
CHECKING THE FRONT BRAKE HOSES	.3-14
CHECKING THE REAR BRAKE HOSE	.3-14
BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)	.3-14
CHECKING THE WHEELS	
CHECKING THE TIRES	.3-16
CHECKING THE WHEEL BEARINGS	.3-17
CHECKING THE SWINGARM OPERATION	.3-17
LUBRICATING THE SWINGARM PIVOT	
DRIVE CHAIN SLACK	
LUBRICATING THE DRIVE CHAIN	
CHECKING AND ADJUSTING THE STEERING HEAD	
LUBRICATING THE STEERING HEAD	
CHECKING THE CHASSIS FASTENERS	
LUBRICATING THE BRAKE LEVER	
LUBRICATING THE CLUTCH LEVER	
LUBRICATING THE PEDAL	
ADJUSTING THE SHIFT PEDAL	
CHECKING THE SIDESTAND	
LUBRICATING THE SIDESTAND	
CHECKING THE SIDESTAND SWITCH	
CHECKING THE SIDESTAND SWITCH	
ADJUSTING THE FRONT FORK LEGS	
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY	
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY	
CHECKING THE CONNECTING ARM AND RELAY ARM	
CHECKING THE ENGINE OIL LEVEL	
CHANGING THE ENGINE OII	3-23

MEASURING THE ENGINE OIL PRESSURE	3-24
CHECKING THE COOLANT LEVEL	3-25
CHECKING THE COOLING SYSTEM	3-26
CHANGING THE COOLANT	3-26
CHECKING THE FRONT BRAKE LIGHT SWITCH	3-28
ADJUSTING THE REAR BRAKE LIGHT SWITCH	3-28
CHECKING AND LUBRICATING THE CABLES	3-28
CHECKING THE THROTTLE GRIP	3-28
CHECKING AND CHARGING THE BATTERY	3-29
CHECKING THE FUSES	3-29
REPLACING THE HEADLIGHT BULB	3-29
ADJUSTING THE HEADLIGHT BEAM	3-30
REPLACING THE LICENSE PLATE LIGHT BULB	3-31

EAS2002

# PERIODIC MAINTENANCE

EAS30022

# INTRODUCTION

This chapter includes all information necessary to perform recommended checks and adjustments. If followed, these preventive maintenance procedures will ensure more reliable vehicle operation, a longer service life and reduce the need for costly overhaul work. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

#### TIP -

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

FAS30614

#### PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING					ANNUAL
				1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	CHECK
1	*	Fuel line	Check fuel hoses for cracks or damage.		V	<b>V</b>	V	V	<b>V</b>
2	*	Spark plugs	Check condition.     Clean and regap.		$\checkmark$		$\checkmark$		
			Replace.			√		√	
3	*	Valves	Check valve clearance.     Adjust.		E	very 40000	km (24000 m	ni)	
4	*	Fuel injection system	Adjust synchronization.	V	√	√	V	V	<b>V</b>
5	*	Evaporative emission control system	Check control system for damage.     Replace if necessary.			V		V	
6	*	Air induction system	Check the air cut-off valve, reed valve, and hose for damage.     Replace any damaged parts if necessary.		V	V	V	<b>√</b>	<b>\</b>

FAS30615

### GENERAL MAINTENANCE AND LUBRICATION CHART

NO.		ITEM	CHECK OR MAINTENANCE JOB		ANNUAL				
				1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	CHECK
1	*	Air filter element	Replace.					√	
2		Clutch	Check operation.     Adjust.	V	V	V	<b>V</b>	<b>V</b>	
3	*	Front brake	Check operation, fluid level and vehicle for fluid leakage.	V	V	<b>V</b>	<b>V</b>	<b>V</b>	V
			Replace brake pads.		V	Whenever wo	rn to the limi	it	
4	*	Rear brake	Check operation, fluid level and vehicle for fluid leakage.	V	V	V	V	<b>V</b>	V
			Replace brake pads.		V	Whenever wo	rn to the limi	it	

			CHECK OR MAINTENANCE JOB	ODOMETER READING					ANNUAL		
NO	).	ITEM		1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	CHECK		
5	*	Brake hoses	Check for cracks or damage.     Check for correct routing and clamping.		<b>V</b>	<b>V</b>	V	<b>V</b>	V		
			Replace.			Every 4	4 years				
6	*	Brake fluid	Change.			Every 2	2 years				
7	*	Wheels	Check runout and for damage.		√	√	V	√			
8	*	Tires	Check tread depth and for damage. Replace if necessary. Check air pressure. Correct if necessary.		V	V	V	V	V		
9	*	Wheel bearings	Check bearings for looseness or damage.		√	√	√	√			
10	*	Swingarm	Check operation and for excessive play.		√	√	V	<b>V</b>			
		Jg	Lubricate with lithium-soap- based grease.		E	very 50000 l	km (30000 m	ni)			
11		Drive chain	Check chain slack, alignment and condition.     Adjust and lubricate chain with a special O-ring chain lubricant thoroughly.	Every 800	) km (500 mi	) and after w rain or riding	ashing the m in wet areas	notorcycle, ric	ling in the		
12	*	Steering bearings	Check bearing play and steering for roughness.	V	$\checkmark$	√	V	√			
12			Lubricate with lithium-soap- based grease.	Every 20000 km (12000 mi)							
13	*	Chassis fasteners	Make sure that all nuts, bolts and screws are properly tight- ened.		V	V	V	V	V		
14		Brake lever pivot shaft	Lubricate with silicone grease.		<b>√</b>	√	V	V	V		
15		Brake pedal pivot shaft	Lubricate with lithium-soap- based grease.		√	√	V	V	V		
16		Clutch lever pivot shaft	Lubricate with lithium-soap- based grease.		√	√	V	V	V		
17		Shift pedal pivot shaft	Lubricate with lithium-soap- based grease.		√	√	V	V	V		
18		Sidestand	Check operation.     Lubricate with lithium-soap-based grease.		V	V	V	<b>V</b>	$\checkmark$		
19	*	Sidestand switch	Check operation.	√	√	√	√	V	V		
20	*	Front fork	Check operation and for oil leakage.		<b>V</b>	<b>V</b>	V	√			
21	*	Shock absorber assembly	Check operation and shock absorber for oil leakage.		V	V	V	√			
22	*	Rear suspension relay arm and connecting arm pivoting points	Check operation.		<b>V</b>	<b>V</b>	<b>V</b>	√			
23		Engine oil	Change. Check oil level and vehicle for oil leakage.	V	V	V	V	V	$\sqrt{}$		
24		Engine oil filter cartridge	Replace.	V		√		√			

		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING					ANNUAL
N	О.			1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	CHECK
25	*	Cooling system	Check coolant level and vehi- cle for coolant leakage.		<b>V</b>	<b>V</b>	V	V	V
			Change coolant.			Every	3 years		
26	*	Front and rear brake switches	Check operation.	√	√	√	V	V	V
27		Moving parts and cables	Lubricate.		√	√	V	V	V
28	*	Throttle grip	Check operation. Check throttle grip free play, and adjust if necessary. Lubricate cable and grip housing.		V	V	V	V	V
29	*	Lights, signals and switches	Check operation.     Adjust headlight beam.	$\checkmark$	√	√	V	V	V

# TIP -

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

EAS30619

# **CHECKING THE FUEL LINE**

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

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

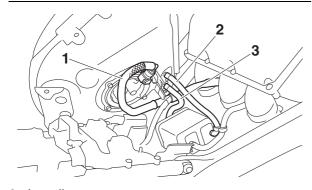
ECA14940

#### NOTICE

Make sure the fuel tank breather hose is routed correctly.

TIP\_

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



- 3. Install:
  - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
  - Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS3062

# **CHECKING THE SPARK PLUGS**

The following procedure applies to all of the spark plugs.

- 1. Remove:
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page

4-1.

- Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
- Fuel tank
   Refer to "FUEL TANK" on page 7-1.
- Air filter case Refer to "GENERAL CHASSIS (2)" on page 4-3.
- Air cut-off valve Refer to "AIR INDUCTION SYSTEM" on page 7-15.
- 2. Remove:
  - Ignition coils
- Spark plugs

ECA13320

# NOTICE

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

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



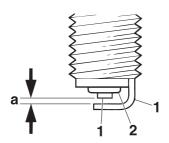
# Manufacturer/model NGK/CPR9EA9

- 4. Check:
  - Electrode "1"
     Damage/wear → Replace the spark plug.
- Insulator "2"
   Abnormal color → Replace the spark plug.

   Normal color is medium-to-light tan.
- 5. Clean:
  - Spark plug (with a spark plug cleaner or wire brush)
- 6. Measure:
  - Spark plug gap "a" (with a wire thickness gauge)
     Out of specification → Regap.



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



- 7. Install:
  - Spark plugs
  - Ignition coils



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

#### TIP\_

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

- 8. Install:
  - Air cut-off valve Refer to "AIR INDUCTION SYSTEM" on page 7-15.
  - Air filter case Refer to "GENERAL CHASSIS (2)" on page 4-3.
  - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
  - Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30622

# **ADJUSTING THE VALVE CLEARANCE**

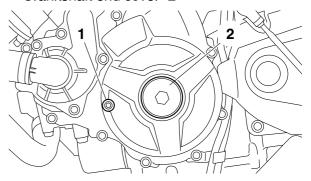
The following procedure applies to all of the valves.

### TIP -

Valve clearance adjustment should be made on a cold engine, at room temperature.

- 1. Remove:
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.
  - Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
  - Fuel tank Refer to "FUEL TANK" on page 7-1.
  - Air filter case

- Refer to "GENERAL CHASSIS (2)" on page 4-3.
- Air cut-off valve Refer to "AIR INDUCTION SYSTEM" on page 7-15.
- Radiator
   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:
  - Timing mark accessing bolt "1"
  - Crankshaft end cover "2"



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

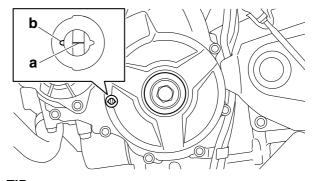


Valve clearance (cold)

0.11-0.20 mm (0.0043-0.0079 in) Exhaust

0.26-0.30 mm (0.0102-0.0118 in)

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



TIP

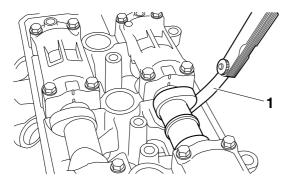
TDC on the compression stroke can be found

when the camshaft lobes are turned away from each other.

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



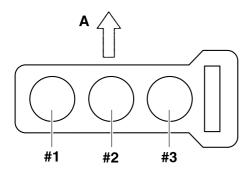
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9



#### TIP

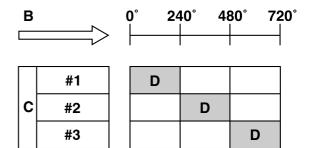
- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

Valve clearance measuring sequence Cylinder #1  $\rightarrow$  #2  $\rightarrow$  #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.



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

Cylinder #2	240°
Cylinder #3	480°

\*\*\*\*

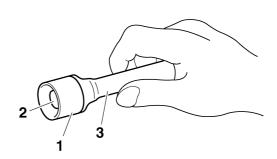
#### 5. Remove:

Camshaft

#### TIP

- 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".



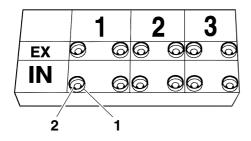


Valve lapper 90890-04101 Valve lapping tool YM-A8998

#### TIP

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

stalled in the correct place.



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

# Example:

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

Measured 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)

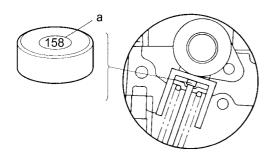
c. Check the thickness of the current valve pad.

#### TIF

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

#### Example:

If the valve pad is marked "158", the pad thickness is 1.58 mm (0.062 in).



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

### Example:

1.58 mm (0.062 in) + 0.05 mm (0.002 in) = 1.63 mm (0.064 in)

The valve pad number is 163.

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

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

# TIP -

Refer to the following table for the available valve pads.

Valve pad range	Nos. 150–240
Valve pad thickness	1.50–2.40 mm (0.0590–0.0944 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

### Example:

Valve pad number = 163

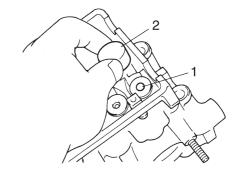
Rounded value = 165

New valve pad number = 165

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

#### TIP.

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



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



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

# TIP

- Refer to "CAMSHAFTS" on page 5-9.
- Lubricate the camshaft lobes and camshaft

journals.

- First, install the exhaust camshaft.
- Align the camshafts marks with the camshaft cap marks.
- Turn the crankshaft counterclockwise several full turns to seat the parts.
- h. Measure the valve clearance again.
- If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

7. Install:

· All removed parts

TIP

For installation, reverse the removal procedure.

EAS31017

# **CHECKING THE ENGINE IDLING SPEED**

TIF

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

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



Engine idling speed 1100–1300 r/min

- 3. Check:
  - ISC (idle speed control) learning value "00" or "01" → Check the intake system. "02" → Clean the throttle bodies. Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-9.

a. Connect the Yamaha diagnostic tool.
Use the diagnostic code number "67".

Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-5.

b. Check the ISC (idle speed control) leaning

EAS30797

#### SYNCHRONIZING THE THROTTLE BODIES

TIP

Before synchronizing the throttle bodies, check the following items:

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

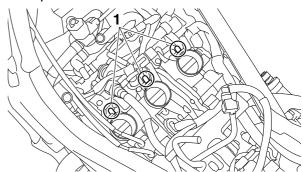
# Checking the throttle body synchronization

1. Stand the vehicle on a level surface.

TIP

Place the vehicle on a maintenance stand.

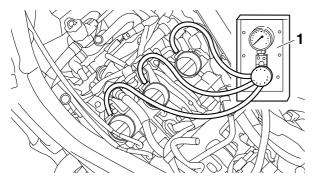
- 2. Remove:
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.
  - Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
- Fuel tank
   Refer to "FUEL TANK" on page 7-1.
- Air filter case
   Refer to "GENERAL CHASSIS (2)" on page 4-3.
- 3. Remove:
- Caps "1"



- 4. Install:
  - Vacuum gauge "1"



Vacuum gauge 90890-03094 Vacuummate YU-44456



- 5. Install:
  - Air filter case Refer to "GENERAL CHASSIS (2)" on page 4-3.
  - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
- 6. Check:
  - Throttle body synchronization
- a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

\*



Engine idling speed 1100–1300 r/min

b. Check the vacuum pressure.



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

If out of specification  $\rightarrow$  Adjust the throttle body synchronization.

# Adjusting the throttle body synchronization

- 1. Adjust:
  - Throttle body synchronization
- a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.



# Engine idling speed 1100–1300 r/min

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

NOTICE

Do not turn the bypass air screw (white paint mark) of the throttle body that is the stan-

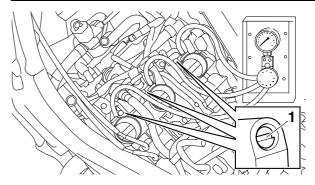
dard. Otherwise, the engine may run roughly at idle and the throttle bodies may not operate properly.

#### TIP

- Turn the bypass air screw using the carburetor angle driver.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If a bypass air screw was removed, turn the screw in fully and be sure to synchronize the throttle bodies.
- If the throttle body synchronization can not be adjusted using the bypass air screw, clean or replace the throttle bodies.
- The difference in vacuum pressure between the throttle bodies should not exceed 1.33 kPa (10 mmHg).



# Carburetor angle driver 2 90890-03173



- 2. Stop the engine and remove the measuring equipment.
- 3. Install:
  - Caps
- 4. Install:
  - Air filter case
     Refer to "GENERAL CHASSIS (2)" on page
     4-3.
  - Fuel tank
  - Refer to "FUEL TANK" on page 7-1.
     Fuel tank cover
  - Refer to "GENERAL CHASSIS (2)" on page 4-3.
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.
- 5. Adjust:
  - Throttle grip free play Refer to "CHECKING THE THROTTLE

GRIP" on page 3-28.

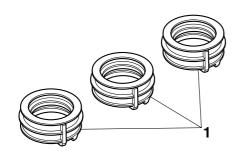


Throttle grip free play 3.0–5.0 mm (0.12–0.20 in)

EAS3079

# **CHECKING THE THROTTLE BODY JOINTS**

- 1. Remove:
  - Throttle bodies Refer to "THROTTLE BODIES" on page 7-6.
- 2. Check:
  - Throttle body joints "1"
     Cracks/damage → Replace.



- 3. Install:
  - Throttle bodies Refer to "THROTTLE BODIES" on page 7-6.

EAS3192

# **CHECKING THE CANISTER**

- 1. Remove:
- Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
- Fuel tank
   Refer to "FUEL TANK" on page 7-1.
- 2. Check:
  - Canister
  - Canister purge hose
  - Fuel tank breather hose
  - Canister breather hose Cracks/damage → Replace.
- 3. Install:
  - Fuel tank

Refer to "FUEL TANK" on page 7-1.

- Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
- Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS3079

#### ADJUSTING THE EXHAUST GAS VOLUME

#### TIP

- Be sure to set the CO density level to standard, and then adjust the exhaust gas volume.
- To adjust the exhaust gas volume, use the CO adjustment mode of the Yamaha diagnostic tool. For more information, refer to the operation manual of the Yamaha diagnostic tool.
- Connect the Yamaha diagnostic tool to the coupler. For information about connecting the Yamaha diagnostic tool, refer to "YAMAHA DIAGNOSTIC TOOL" on page 8-36.



Yamaha diagnostic tool 90890-03250

EAS30627

# **CHECKING THE AIR INDUCTION SYSTEM**

Refer to "CHECKING THE AIR INDUCTION SYSTEM" on page 7-18.

EAS30623

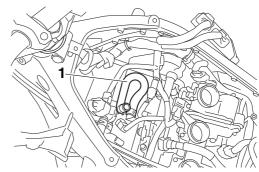
# CHECKING THE CYLINDER HEAD BREATHER HOSE

- 1. Remove:
  - Air filter case Refer to "GENERAL CHASSIS (2)" on page 4-3.
- 2. Check:
  - Cylinder head breather hose "1"
     Cracks/damage → Replace.
     Loose connection → Connect properly.

ECA14920

# NOTICE

# Make sure the cylinder head breather hose is routed correctly.

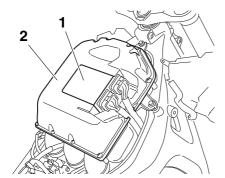


- 3. Install:
  - Air filter case Refer to "GENERAL CHASSIS (2)" on page 4-3.

EAS30628

#### REPLACING THE AIR FILTER ELEMENT

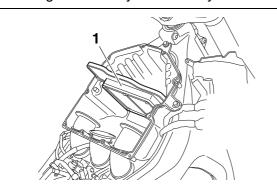
- 1. Remove:
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.
  - Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
  - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
- 2. Remove:
  - ECU (Engine Control Unit) "1"
  - Air filter case cover "2"
     Refer to "GENERAL CHASSIS (2)" on page 4-3.



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

# TIP -

- Replace the air filter element every 40000 km (24000 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.



- 4. Install:
  - Air filter element
  - Air filter case cover
  - ECU (Engine Control Unit)

ECA20710

### NOTICE

Never operate the engine without the air filter element installed. Unfiltered air will cause

rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect throttle body synchronization, leading to poor engine performance and possible overheating.

#### TIP

When installing the air filter element into the air filter case 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.
  - Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.

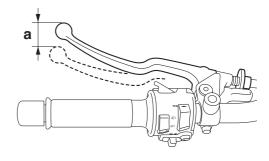
EAS30629

# ADJUSTING THE CLUTCH LEVER FREE PLAY

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



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



- 2. Adjust:
- Clutch lever free play

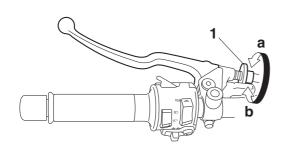
# Handlebar side

a. Turn the adjusting bolt "1" in direction "a" or "b" until the specified clutch lever free play is obtained.

Direction "a"

Clutch lever free play is increased. Direction "b"

Clutch lever free play is decreased.



TIP

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

# **Engine side**

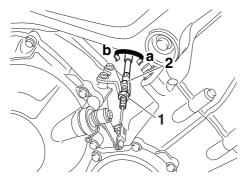
- a. Loosen the locknut "1".
- b. Turn the adjusting nut "2" in direction "a" or "b" until the specified clutch lever free play is obtained.

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

c. Tighten the locknut "1".



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



EAS3080

# **CHECKING THE BRAKE OPERATION**

- 1. Check:
- Brake operation
   Brake not working properly → Check the brake system.

Refer to "FRONT BRAKE" on page 4-26 and "REAR BRAKE" on page 4-39.

#### TIP

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

EAS30632

#### CHECKING THE BRAKE FLUID LEVEL

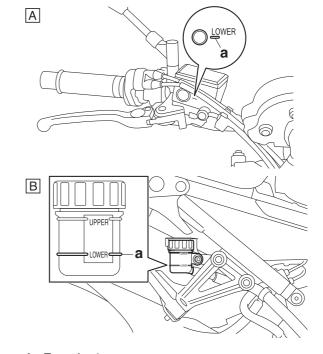
1. Stand the vehicle on a level surface.

TIP

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



Front brake
Specified brake fluid
DOT 4
Rear brake
Specified brake fluid
DOT 4



- A. Front brake
- B. Rear brake

EWA13090

# **WARNING**

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

may result in a harmful chemical reaction, leading to poor brake performance.

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

ECA1354

# NOTICE

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

TIP -

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

EAS30630

# ADJUSTING THE FRONT DISC BRAKE

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

TIP

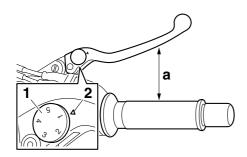
- While pushing the brake lever forward, turn the adjusting dial "1" until the brake lever is in the desired position.
- Be sure to align the setting on the adjusting dial with the arrow mark "2" on the brake lever holder

Position #1

Distance "a" is the largest.

Position #5

Distance "a" is the smallest.



EWA17050

# **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 brake performance resulting in loss of control and possibly cause an accident. Therefore, check and if necessary, bleed the brake system.

ECA13490

#### NOTICE

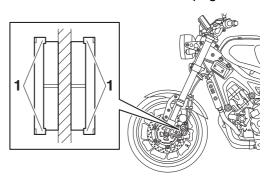
After adjusting the brake lever position, make sure there is no brake drag.

EAS30633

# **CHECKING THE FRONT BRAKE PADS**

The following procedure applies to all of the brake pads.

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



EAS3063

# ADJUSTING THE REAR DISC BRAKE

- 1. Adjust:
  - Brake pedal position

a. Loosen the locknut "1".

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

Direction "a"

Brake pedal is raised.

Direction "b"

Brake pedal is lowered.

WA13070

# **WARNING**

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

c. Tighten the locknut "1" to specification.



Rear brake master cylinder lock nut

18 Nm (1.8 m·kgf, 13 ft·lbf)

EWA17030

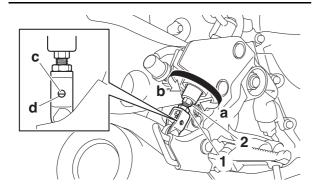
# **WARNING**

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

ECA13510

# NOTICE

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



### 2. Adjust:

 Rear brake light switch Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-28.

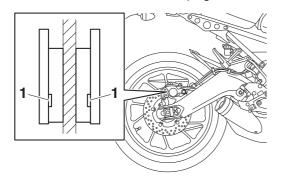
EAS30634

# **CHECKING THE REAR BRAKE PADS**

The following procedure applies to all of the brake pads.

- 1. Operate the brake.
- 2. Check:
- Rear brake pad

Wear indicator grooves "1" almost disappeared → Replace the brake pads as a set. Refer to "REAR BRAKE" on page 4-39.



-AS3063

# **CHECKING THE FRONT BRAKE HOSES**

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

- 1. Check:
  - Brake hose Cracks/damage/wear → Replace.
- 2. Check:
  - Brake hose holder
     Loose → Tighten the holder bolt.
- 3. Hold the vehicle upright and apply the brake several times.
- 4. Check:
  - Brake hose

Brake fluid leakage  $\rightarrow$  Replace the damaged hose.

Refer to "FRONT BRAKE" on page 4-26.

EAS3063

#### CHECKING THE REAR BRAKE HOSE

- 1. Check:
- Brake hose
   Cracks/damage/wear → Replace.
- 2 Check
- Brake hose holder
   Loose Connection → Tighten the holder bolt.
- 3. Hold the vehicle upright and apply the rear brake several times.
- 4. Check:
  - Brake hose

Brake fluid leakage  $\rightarrow$  Replace the damaged hose.

Refer to "REAR BRAKE" on page 4-39.

EAS3089

# BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)

EWA1400

# **WARNING**

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

CA18050

### **NOTICE**

- Bleed the brake system in the following order.
- 1st step: Front brake calipers
- 2nd step: Rear brake caliper

EWA16530

# **WARNING**

Bleed the ABS whenever:

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

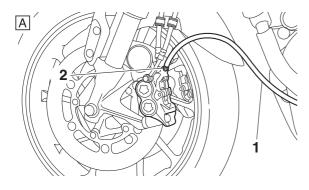
# • brake operation is faulty.

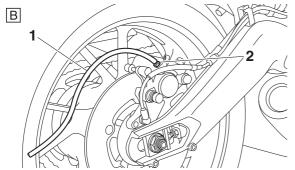
TIP

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

\*

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





- A. Front
- 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.

#### TIP\_

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

- h. Tighten the bleed screw and then release the brake lever or brake pedal.
- Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- j. Check the operation of the hydraulic unit.
   Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-56.

ECA17061

# NOTICE

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

- k. After operating the ABS, repeat steps (e) to (i), and then fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the specified brake fluid.
- I. Tighten the bleed screw to specification.



Brake caliper bleed screw 5 Nm (0.5 m·kgf, 3.6 ft·lbf)

m. Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the specified brake fluid.

Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-12.

EWA13110

# **WARNING**

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

EAS30638

### **CHECKING THE WHEELS**

The following procedure applies to both of the wheels.

- 1. Check:
  - Wheel

Damage/out-of-round  $\rightarrow$  Replace.

EWA13260

# **♠** WARNING

Never attempt to make any repairs to the wheel.

TIP.

After a tire or wheel has been changed or re-

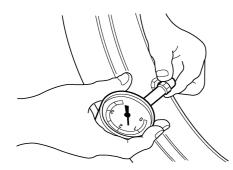
placed, always balance the wheel.

#### EAS30640

#### **CHECKING THE TIRES**

The following procedure applies to both of the tires.

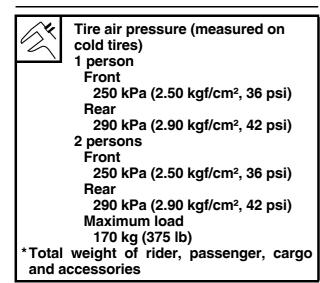
- 1. Check:
  - Tire pressure
     Out of specification → Regulate.



#### EWA13181

# **WARNING**

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

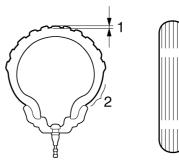


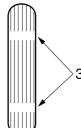
- 2. Check:
  - Tire surfaces
     Damage/wear → Replace the tire.

# EWA13190

# **WARNING**

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





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



Wear limit (front)

1.5 mm (0.06 in) (AUS)

1.6 mm (0.06 in) (EUR) (RUS)

Wear limit (rear)

1.5 mm (0.06 in) (AUS)

1.6 mm (0.06 in) (EUR) (RUS)

# EWA14090

# **WARNING**

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



Front tire
Size
120/70 ZR17M/C (58W)
Manufacturer/model
BRIDGESTONE/S20F M



Rear tire
Size
180/55 ZR17M/C (73W)
Manufacturer/model
BRIDGESTONE/S20R M

# WARNING

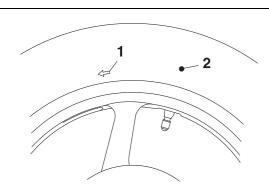
New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km

should be traveled at normal speed before any high-speed riding is done.

### TIP.

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

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



#### EAS30641

#### **CHECKING THE WHEEL BEARINGS**

The following procedure applies to all of the wheel bearings.

- 1. Check:
  - Wheel bearings
     Refer to "CHECKING THE FRONT WHEEL"
     on page 4-12 and "CHECKING THE REAR
     WHEEL" on page 4-22.

#### EAS30802

# **CHECKING THE SWINGARM OPERATION**

- 1. Check:
- Swingarm operation Swingarm not working properly → Check the swingarm.
- Refer to "SWINGARM" on page 4-84.
- 2. Check:
  - Swingarm excessive play Refer to "SWINGARM" on page 4-84.

#### EAS30643

#### LUBRICATING THE SWINGARM PIVOT

- 1. Lubricate:
  - Oil seals
  - Collars



Recommended lubricant Lithium-soap-based grease

Refer to "INSTALLING THE SWINGARM" on page 4-86.

#### EAS3192

DRIVE CHAIN SLACK
Checking the drive chain slack

# **WARNING**

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

#### ECA1355

### NOTICE

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

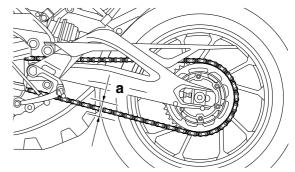
- 1. Shift the transmission into the neutral position.
- 2. Check:
  - Drive chain slack "a"
     Out of specification → Adjust.



Drive chain slack (Maintenance stand)

5.0-15.0 mm (0.20-0.59 in) Drive chain slack (Sidestand) 5.0-15.0 mm (0.20-0.59 in) Limit





#### CA20870

# **NOTICE**

Improper drive chain slack will overload the engine as well as other vital parts of the motorcycle and can lead to chain slippage or breakage. If the drive chain slack is more than the specified limit, the chain can damage the frame, swingarm, and other parts. To prevent this from occurring, keep the drive chain slack within the specified limits.

# Adjusting the drive chain slack

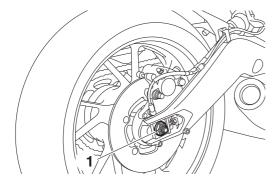
EWA13120



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

#### 1. Loosen:

• Wheel axle nut "1"

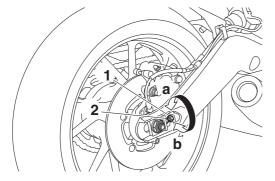


- 2. Adjust:
- Drive chain slack
- a. Loosen both locknuts "1".

~~~~~~~~~~

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

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



#### TIP

- To maintain the proper wheel alignment, adjust both sides evenly.
- There should be no clearance between the adjusting block and adjusting bolt.
- c. Tighten the wheel axle nut to specification.



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

d. Tighten the locknuts to specification.



Chain puller adjusting bolt locknut

16 Nm (1.6 m·kgf, 12 ft·lbf)

EAS30803

# **LUBRICATING THE DRIVE CHAIN**

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

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



Recommended lubricant Chain lubricant suitable for Oring chains

FAS30645

# CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA1312

# **WARNING**

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

TIP

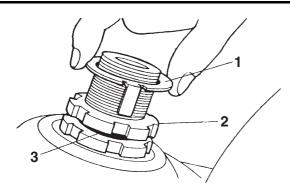
Place the vehicle on a maintenance stand so that the front wheel is elevated.

- 2. Check:
- Steering head

Grasp the bottom of the front fork legs and gently rock the front fork.

Blinding/looseness  $\rightarrow$  Adjust the steering head.

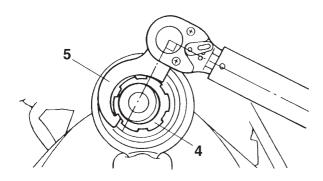
- 3. Remove:
- Upper bracket
- 4. Adjust:
  - Steering head
- a. Remove the lock washer "1", the upper ring nut "2", and the rubber washer "3".



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

### TIP\_

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





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



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

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

# WARNING

Do not overtighten the lower ring nut.



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

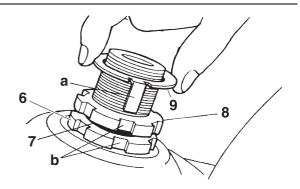
d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.

Refer to "STEERING HEAD" on page 4-76.

- e. Install the rubber washer "7".
- f. Install the upper ring nut "8".
- g. Finger tighten the upper ring nut, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- h. Install the lock washer "9".

#### TIP\_

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



\_\_\_\_

#### 5. Install:

 Upper bracket Refer to "HANDLEBAR" on page 4-60.

EAS30646

# **LUBRICATING THE STEERING HEAD**

- 1. Lubricate:
  - Upper bearing
  - Lower bearing
  - Bearing race



Recommended lubricant Lithium-soap-based grease

EAS31186

# **CHECKING THE CHASSIS FASTENERS**

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

Refer to "CHASSIS TIGHTENING TORQUES" on page 2-13.

EAS30804

# **LUBRICATING THE BRAKE LEVER**

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



Recommended lubricant Silicone grease

EAS30805

# **LUBRICATING THE CLUTCH LEVER**

Lubricate the pivoting point and metal-to-metal

moving parts of the lever.



Recommended lubricant Lithium-soap-based grease

EAS3064

# **LUBRICATING THE PEDAL**

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



Recommended lubricant Lithium-soap-based grease

EAS30851

### **ADJUSTING THE SHIFT PEDAL**

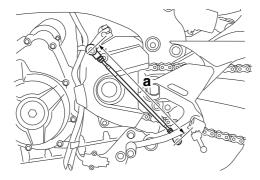
TIE

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

- 1. Measure:
  - Installed shift rod length "a" Incorrect → Adjust.



Installed shift rod length 256.9–258.9 mm (10.11–10.19 in)

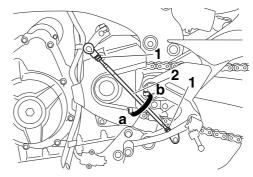


- 2. Adjust:
  - · Installed shift rod length
- a. Loosen both locknuts "1".
- b. Turn the shift rod "2" in direction "a" or "b" to obtain the correct shift pedal position.

Direction "a"

Installed shift rod length increases. Direction "b"

Installed shift rod length decreases.



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

EAS30650

#### **CHECKING THE SIDESTAND**

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

EAS30651

# **LUBRICATING THE SIDESTAND**

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



Recommended lubricant Lithium-soap-based grease

EAS30652

#### CHECKING THE SIDESTAND SWITCH

Refer to "ELECTRICAL COMPONENTS" on page 8-143.

EAS30653

#### CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

EWA13120

# **WARNING**

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

- 2. Check:
  - Inner tube

Damage/scratches  $\rightarrow$  Replace.

Front fork leg

Oil leaks between inner tube and outer tube → Replace the oil seal.

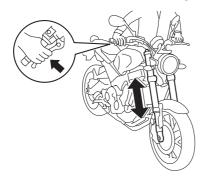
- 3. Hold the vehicle upright and apply the front brake.
- 4. Check:
  - Front fork operation

Push down hard on the handlebar several times and check if the front fork rebounds

smoothly.

Rough movement  $\rightarrow$  Repair.

Refer to "FRONT FORK" on page 4-65.



FAS30806

# ADJUSTING THE FRONT FORK LEGS

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

EWA13120

# **WARNING**

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

Spring preload

WA1704

# **WARNING**

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

ECA13590

# NOTICE

Never go beyond the maximum or minimum adjustment positions.

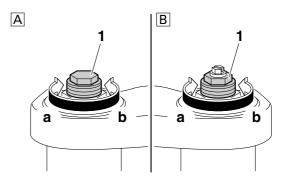
- 1. Adjust:
- Spring preload
- a. Turn the adjusting bolt "1" in direction "a" or "b".

Direction "a"

Spring preload is increased (suspension is harder).

Direction "b"

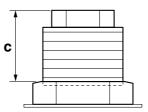
Spring preload is decreased (suspension is softer).



- A. Left side
- B. Right side

#### TIP\_

The spring preload setting is determined by measuring the distance "c" shown in the illustration. The shorter distance "c" is, the higher the spring preload; the longer distance "c" is, the lower the spring preload.





Spring preload
Minimum
19.0 mm (0.75 in)
Standard
16.0 mm (0.63 in)
Maximum
4.0 mm (0.16 in)

Rebound damping (right side only)

CA13590

# NOTICE

Never go beyond the maximum or minimum adjustment positions.

- 1. Adjust:
  - Rebound damping

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

Direction "a"

Rebound damping is increased (suspension is harder).

Direction "b"

Rebound damping is decreased (suspension is softer).



Rebound damping Minimum (soft)

12 click(s) in direction "b"\* Standard

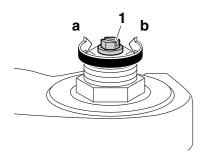
7 click(s) in direction "b"\* Maximum (hard)

1 click(s) in direction "b"\*

\* With the adjusting screw fully turned in direction "a"

# TIP.

Although the total number of clicks of a damping force adjusting mechanism may not exactly match the above specifications due to small differences in production, the actual number of clicks always represents the entire adjusting range. To obtain a precise adjustment, it would be advisable to check the number of clicks of each damping force adjusting mechanism and to modify the specifications as necessary.



# **CHECKING THE REAR SHOCK ABSORBER ASSEMBLY**

Refer to "CHECKING THE REAR SHOCK AB-SORBER ASSEMBLY" on page 4-81.

# ADJUSTING THE REAR SHOCK ABSORBER **ASSEMBLY**



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

# Spring preload

### NOTICE

Never go beyond the maximum or minimum adjustment positions.

- 1. Adjust:
- Spring preload

a. Adjust the spring preload with the special wrench "1" and extension bar "2" included in the owner's tool kit.

- b. Turn the adjusting ring "3" in direction "a" or "b".
- c. Align the desired position on the adjusting ring with the stopper "4".

Direction "a"

Spring preload is increased (suspension is harder).

Direction "b"

Spring preload is decreased (suspension is softer).

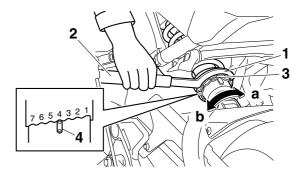


Spring preload

Adjustment value (Soft)

Adjustment value (STD)

Adjustment value (Hard)



#### Rebound damping

ECA13590

# NOTICE

Never go beyond the maximum or minimum adjustment positions.

- 1. Adjust:
- Rebound damping

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

Direction "a"

Rebound damping is increased (suspension is harder).

Direction "b"

Rebound damping is decreased (suspension is softer).



Rebound damping Minimum (soft)

3 turn(s) in direction "b"\*
Standard

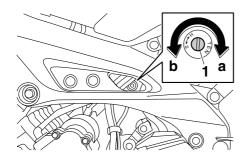
1 1/2 turn(s) in direction "b"\*
Maximum (hard)

Adjusting screw fully turned in direction "a"

\*With the adjusting screw fully turned in direction "a"

TIP.

To obtain a precise adjustment, it is advisable to check the actual total number of turns of the damping force adjusting mechanism. This adjustment range may not exactly match the specifications listed due to small differences in production.



EAS30809

# CHECKING THE CONNECTING ARM AND RELAY ARM

Refer to "CHECKING THE CONNECTING ARM AND RELAY ARM" on page 4-81.

EAS3065

# CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

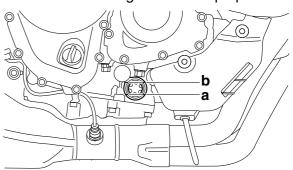
TIP

- Place the vehicle on a maintenance stand.
- Make sure the vehicle is upright.
- 2. Start the engine, warm it up for several minutes, and then turn it off.
- 3. Check:
  - Engine oil level

The engine oil level should be between the

minimum level mark "a" and maximum level mark "b".

Below the minimum level mark  $\rightarrow$  Add the recommended engine oil to the proper level.





Recommended brand YAMALUBE SAE viscosity grades 10W-40

Recommended engine oil grade API service SG type or higher, JASO standard MA

ECA13361

# NOTICE

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

TIP

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

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

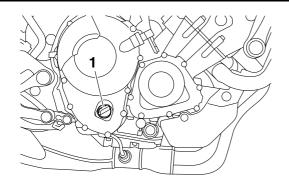
TIP

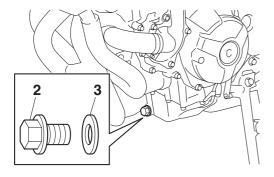
Before checking the engine oil level, wait a few minutes until the oil has settled.

EAS30657

# **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"
- Gasket "3"

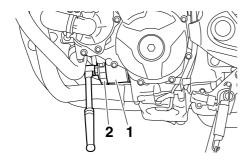




- 4. Drain:
  - Engine oil (completely from the crankcase)
- 5. If the oil filter cartridge is also to be replaced, perform the following procedure.
- a. Remove the oil filter cartridge "1" with an oil filter wrench "2".



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

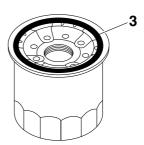


b. Lubricate the O-ring "3" of the new oil filter cartridge with a thin coat of engine oil.

ECA13390

# **NOTICE**

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



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



6. Install:

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

\*\*\*\*\*

 Engine oil drain bolt (along with the gasket New)



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

7. Fill:

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



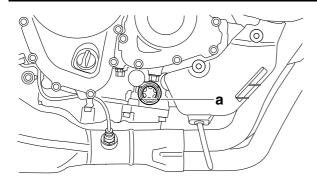
Engine oil quantity
Quantity (disassembled)
3.40 L (3.59 US qt, 2.99 Imp.qt)
Oil change
2.40 L (2.54 US qt, 2.11 Imp.qt)
With oil filter removal
2.70 L (2.85 US qt, 2.38 Imp.qt)

- 8. Install:
  - Engine oil filler cap
     (along with the O-ring New)
- 9. Start the engine, warm it up for several minutes, and then turn it off.
- 10.Check:
  - Engine (for engine oil leaks)
- 11.Check:
  - Engine oil level Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-23.

EAS30810

#### MEASURING THE ENGINE OIL PRESSURE

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



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

ECA13410

### **NOTICE**

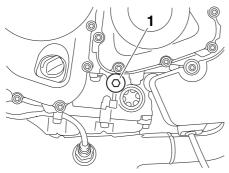
When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

- 3. Remove:
- Main gallery bolt "1"

EWA1298

# **WARNING**

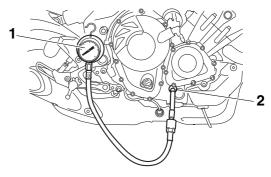
The engine, muffler and engine oil are extremely hot.



- 4. Install:
  - Oil pressure gauge "1"
  - Adapter "2"



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



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



Oil pressure 230.0 kPa/5000 r/min (2.30 kgf/cm²/5000 r/min, 33.4 psi/5000 r/min)

Out of specification  $\rightarrow$  Check.

| Engine oil pressure | Possible causes                                                                                |
|---------------------|------------------------------------------------------------------------------------------------|
| Below specification | Faulty oil pump     Clogged oil filter     Leaking oil passage     Broken or damaged oil seal  |
| Above specification | <ul><li>Leaking oil passage</li><li>Faulty oil filter</li><li>Oil viscosity too high</li></ul> |

- 6. Install:
- Main gallery bolt



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

EAS30811

# CHECKING THE COOLANT LEVEL

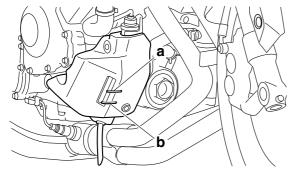
1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on a maintenance stand.
- Make sure the vehicle is upright.
- 2. Check:
  - Coolant level

The coolant level should be between the maximum level mark "a" and minimum level mark "b".

Below the minimum level mark  $\rightarrow$  Add the recommended coolant to the proper level.



ECA21281

# **NOTICE**

- Adding water instead of coolant dilutes the antifreeze concentration of the coolant. If water is used instead of coolant; check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- 3. Start the engine, warm it up for several minutes, and then turn it off.
- 4. Check:
  - Coolant level

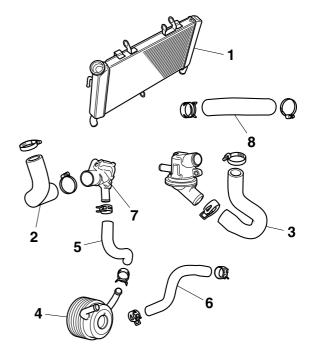
TIP

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

EAS30812

# **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 pump inlet hose "8"
   Cracks/damage → Replace.
   Refer to "RADIATOR" on page 6-1, "OIL
   COOLER" on page 6-4, "THERMOSTAT" on
   page 6-6 and "WATER PUMP" on page 6-8.



EAS30813

# **CHANGING THE COOLANT**

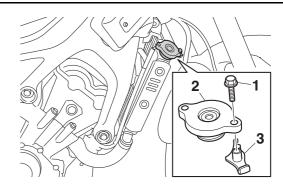
- Remove:
- Radiator cap bolt "1"
- Radiator cap "2"
- Radiator cap stopper "3"

WA13030

# **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:

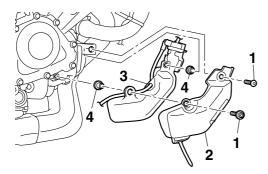
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.



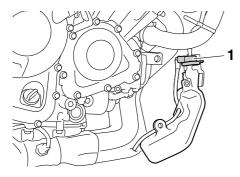
#### 2. Remove:

Coolant reservoir bolt "1"

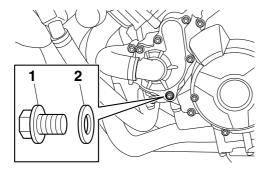
- Coolant reservoir cover "2"
- Coolant reservoir "3"
- Collars "4"



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



- 4. Drain:
- Coolant (from the coolant reservoir)
- 5. Remove:
  - Water pump drain bolt "1"
  - Copper washer "2"



- 6. Drain:
  - Coolant (from the engine and radiator)
- 7. Install:
  - Water pump drain bolt
  - Copper washer New



Water pump drain bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf)

- 8. Install:
  - Collars

- Coolant reservoir
- Coolant reservoir cover
- Coolant reservoir bolt



Coolant reservoir bolt (M5)
0.5 Nm (0.05 m·kgf, 0.36 ft·lbf)
Coolant reservoir bolt (M6)
9 Nm (0.9 m·kgf, 6.5 ft·lbf)

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



Recommended antifreeze
High-quality ethylene glycol antifreeze containing corrosion
inhibitors for aluminum engines
Mixing ratio

1:1 (antifreeze: water)
Radiator (including all routes)
1.93 L (2.04 US qt, 1.70 Imp.qt)
Coolant reservoir (up to the maximum level mark)
0.25 L (0.26 US qt, 0.22 Imp.qt)

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

EWA1304

# **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.

ECA21291

# NOTICE

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

#### 10.Install:

• Radiator cap stopper

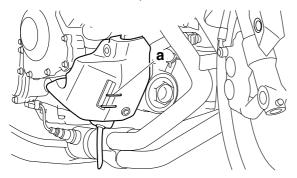
- Radiator cap
- Radiator cap bolt



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

# 11.Fill:

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



#### 12.Install:

- Coolant reservoir cap
- 13. Start the engine, warm it up for several minutes, and then turn it off.

#### 14.Check:

 Coolant level Refer to "CHECKING THE COOLANT LEV-EL" on page 3-25.

#### TIP

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

#### EAS30814

# CHECKING THE FRONT BRAKE LIGHT SWITCH

Refer to "ELECTRICAL COMPONENTS" on page 8-143.

#### EAS3065

# ADJUSTING THE REAR BRAKE LIGHT SWITCH

#### TIP

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

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

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

a. Hold the main body "1" of the rear brake light switch so that it does not rotate and turn the

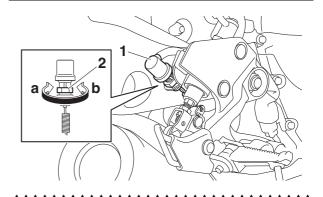
adjusting nut "2" in direction "a" or "b" until the rear brake light comes on at the proper time.

Direction "a"

Brake light comes on sooner.

Direction "b"

Brake light comes on later.



#### EAS3066

# CHECKING AND LUBRICATING THE CABLES

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

# EWA132

# **WARNING**

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

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



Recommended lubricant
Engine oil or a suitable cable lubricant

#### TIP

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

#### EAS30815

# **CHECKING THE THROTTLE GRIP**

- 1. Check:
  - Throttle cables
     Damage/deterioration → Replace.
  - Throttle cable installation Incorrect → Reinstall the throttle cables.

Refer to "HANDLEBAR" on page 4-60.

- 2. Check:
  - Throttle grip movement
     Rough movement → Lubricate or replace the defective part(s).



Recommended lubricant Suitable cable lubricant

# TIP

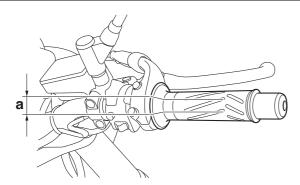
With the engine stopped, turn the throttle grip slowly and release it. Make sure that the throttle grip turns smoothly and returns properly when released.

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

- 3. Check:
  - Throttle grip free play "a"
     Out of specification → Adjust.



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



- 4. Adjust:
  - Throttle grip free play

#### TIP

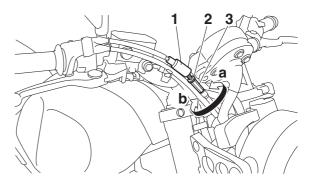
Prior to adjusting the throttle grip free play, throttle body synchronization should be adjusted properly.

- a. Slide back the rubber cover "1".
- b. Loosen the locknut "2".
- c. Turn the adjusting nut "3" in direction "a" or "b" until the specified throttle grip free play is obtained.

Direction "a"

Throttle grip free play is increased. Direction "b"

Throttle grip free play is decreased.



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

### TIP

Make sure that the adjusting nut is covered completely by the rubber cover.

EAS30816

CHECKING AND CHARGING THE BATTERY Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.

EAS3066

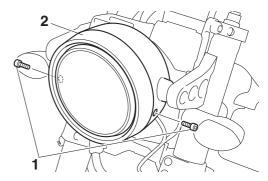
# **CHECKING THE FUSES**

Refer to "CHECKING THE FUSES" on page 8-151.

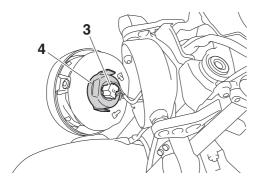
EAS30665

# REPLACING THE HEADLIGHT BULB

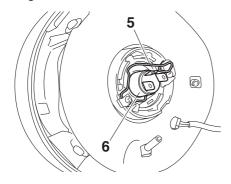
- 1. Remove:
  - Headlight lens unit bolt "1"
  - Headlight lens unit "2"



- 2. Disconnect:
  - Headlight coupler "3"
- 3. Remove:
- Headlight bulb cover "4"



- 4. Detach:
  - Headlight bulb holder "5"
- 5. Remove:
  - Headlight bulb "6"



EWA13320

# **WARNING**

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

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

ECA13690

# **NOTICE**

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

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

# 10.Install:

• Headlight lens unit



Headlight lens unit bolt 3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)

EAS30664

#### ADJUSTING THE HEADLIGHT BEAM

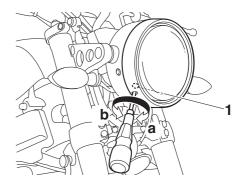
- 1. Adjust:
- Headlight beam (vertically)
- a. Turn the adjusting screw "1" in direction "a" or "b".

Direction "a"

Headlight beam is raised.

Direction "b"

Headlight beam is lowered.

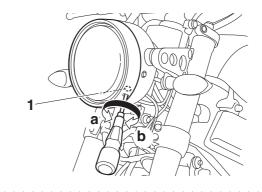


- 2. Adjust:
  - Headlight beam (horizontally)
- a. Turn the adjusting screw "1" in direction "a" or "b".

Direction "a"

Headlight beam moves to the left. Direction "b"

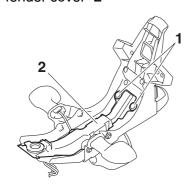
Headlight beam moves to the right.



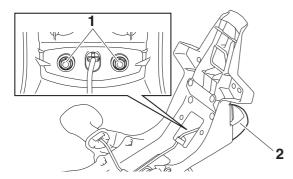
EAS31831

# REPLACING THE LICENSE PLATE LIGHT BULB

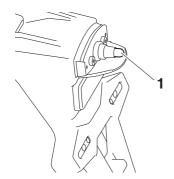
- 1. Remove:
  - Mudguard assembly Refer to "GENERAL CHASSIS (1)" on page 4-1.
- 2. Remove:
  - Quick fastener "1"
  - Lower fender cover "2"



- 3. Remove:
  - License plate light nut "1"
  - Washer
  - License plate light "2"



- 4. Remove:
  - License plate light bulb "1"



- 5. Install:
  - License plate light bulb New
- 6. Install:
  - License plate light
  - Washer
  - License plate light nut



License plate light nut 3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)

- 7. Install:
  - Lower fender cover
  - Quick fastener
- 8. Install:
- Mudguard assembly Refer to "GENERAL CHASSIS (1)" on page 4-1.

# **CHASSIS**

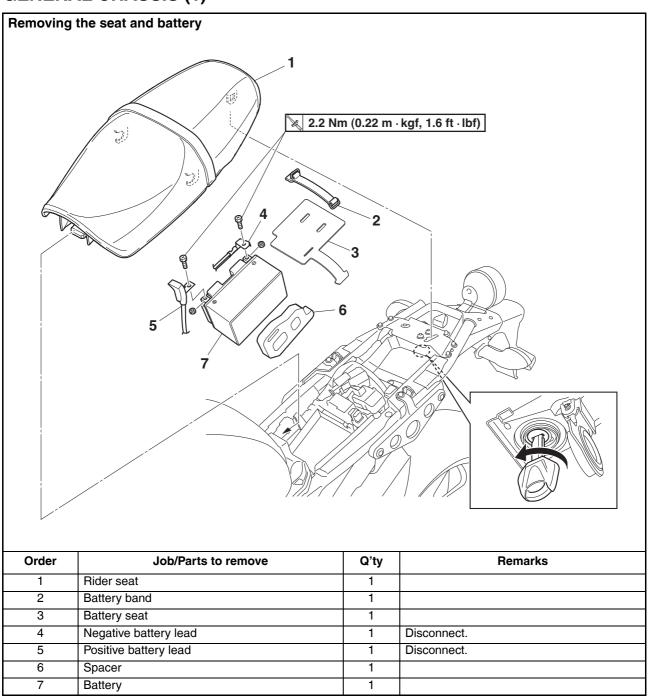
| GENERAL CHASSIS (1)                                    | 4-1          |
|--------------------------------------------------------|--------------|
| GENERAL CHASSIS (2)                                    | 4-3          |
| INSTALLING THE FUEL TANK COVERS                        | 4-9          |
| FRONT WHEEL                                            | <b>4</b> -10 |
| REMOVING THE FRONT WHEEL                               |              |
| DISASSEMBLING THE FRONT WHEEL                          |              |
| CHECKING THE FRONT WHEEL                               |              |
| ASSEMBLING THE FRONT WHEEL                             |              |
| MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR |              |
| ADJUSTING THE FRONT WHEEL STATIC BALANCE               |              |
| INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)         |              |
| DEAD WUEEL                                             | 4 10         |
| REMOVING THE REAR WHEEL                                |              |
| DISASSEMBLING THE REAR WHEEL                           |              |
| CHECKING THE REAR WHEEL                                |              |
| CHECKING THE REAR WHEEL DRIVE HUB                      |              |
| CHECKING AND REPLACING THE REAR WHEEL SPROCKET         |              |
| ASSEMBLING THE REAR WHEEL                              |              |
| MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR        | 1 22         |
| ROTOR                                                  | 4-23         |
| ADJUSTING THE REAR WHEEL STATIC BALANCE                | 4-23         |
| INSTALLING THE REAR WHEEL (REAR BRAKE DISC)            | 4-23         |
| FRONT BRAKE                                            | 4-26         |
| INTRODUCTION                                           |              |
| CHECKING THE FRONT BRAKE DISCS                         | 4-31         |
| REPLACING THE FRONT BRAKE PADS                         |              |
| REMOVING THE FRONT BRAKE CALIPERS                      |              |
| DISASSEMBLING THE FRONT BRAKE CALIPERS                 |              |
| CHECKING THE FRONT BRAKE CALIPERS                      |              |
| ASSEMBLING THE FRONT BRAKE CALIPERS                    |              |
| INSTALLING THE FRONT BRAKE CALIPERS                    |              |
| REMOVING THE FRONT BRAKE MASTER CYLINDER               |              |
| CHECKING THE FRONT BRAKE MASTER CYLINDER               |              |
| ASSEMBLING THE FRONT BRAKE MASTER CYLINDER             |              |
| INSTALLING THE FRONT BRAKE MASTER CYLINDER             | 4-36         |
| REAR BRAKE                                             |              |
| INTRODUCTION                                           |              |
| CHECKING THE REAR BRAKE DISC                           |              |
| REPLACING THE REAR BRAKE PADS                          |              |
| REMOVING THE REAR BRAKE CALIPER                        |              |
| DISASSEMBLING THE REAR BRAKE CALIPER                   | 4-47         |

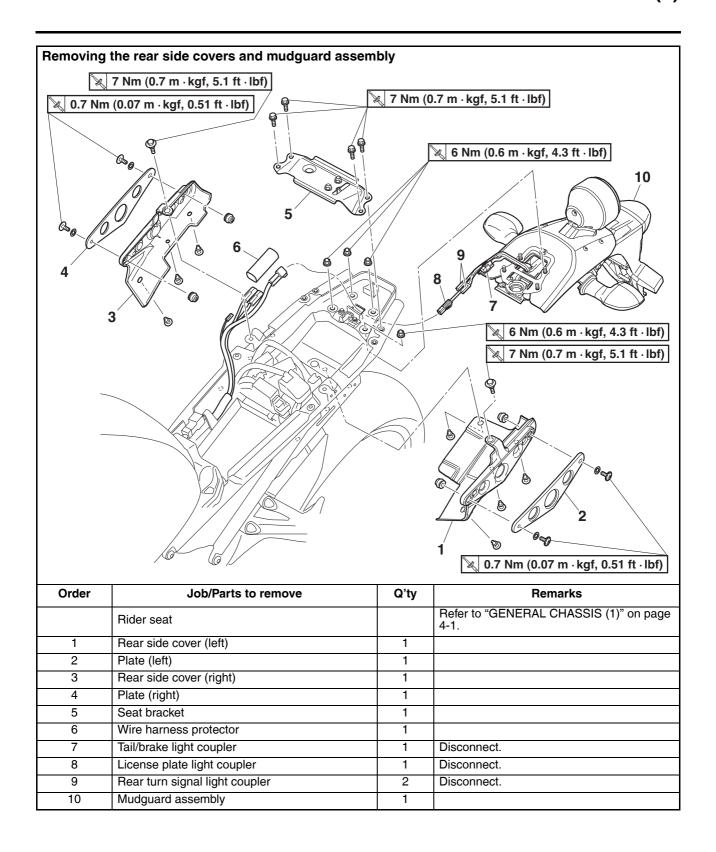
| CHECKING THE REAR BRAKE CALIPER                                                     | 4-47 |
|-------------------------------------------------------------------------------------|------|
| ASSEMBLING THE REAR BRAKE CALIPER                                                   | 4-48 |
| INSTALLING THE REAR BRAKE CALIPER                                                   | 4-48 |
| REMOVING THE REAR BRAKE MASTER CYLINDER                                             |      |
| CHECKING THE REAR BRAKE MASTER CYLINDER                                             | 4-49 |
| ASSEMBLING THE REAR BRAKE MASTER CYLINDER                                           | 4-50 |
| INSTALLING THE REAR BRAKE MASTER CYLINDER                                           | 4-50 |
|                                                                                     |      |
| ABS (ANTI-LOCK BRAKE SYSTEM)                                                        | 1.51 |
| ABS COMPONENTS CHART                                                                |      |
| REMOVING THE HYDRAULIC UNIT ASSEMBLY                                                |      |
| CHECKING THE HYDRAULIC UNIT ASSEMBLY                                                |      |
| INSTALLING THE HYDRAULIC UNIT ASSEMBLY                                              |      |
| HYDRAULIC UNIT OPERATION TESTS                                                      |      |
| CHECKING THE ABS WARNING LIGHT                                                      |      |
| CHECKING THE ABO WARRING EIGHT                                                      | 1 00 |
|                                                                                     |      |
| HANDLEBAR                                                                           |      |
| REMOVING THE HANDLEBAR                                                              |      |
| CHECKING THE HANDLEBAR                                                              |      |
| INSTALLING THE HANDLEBAR                                                            | 4-62 |
|                                                                                     |      |
| FRONT FORK                                                                          | 4-65 |
| REMOVING THE FRONT FORK LEGS                                                        | 4-68 |
| DISASSEMBLING THE FRONT FORK LEGS                                                   | 4-68 |
| CHECKING THE FRONT FORK LEGS                                                        |      |
| ASSEMBLING THE FRONT FORK LEGS                                                      |      |
| INSTALLING THE FRONT FORK LEGS                                                      | 4-75 |
|                                                                                     |      |
| STEERING HEAD                                                                       | 4-76 |
| REMOVING THE LOWER BRACKET                                                          |      |
| CHECKING THE STEERING HEAD                                                          |      |
| INSTALLING THE STEERING HEAD                                                        |      |
|                                                                                     |      |
| REAR SHOCK ABSORBER ASSEMBLY                                                        | 4.00 |
| HANDLING THE REAR SHOCK ABSORBER                                                    |      |
|                                                                                     |      |
| DISPOSING OF A REAR SHOCK ABSORBER<br>REMOVING THE REAR SHOCK ABSORBER ASSEMBLY     |      |
| CHECKING THE REAR SHOCK ABSORBER ASSEMBLY                                           |      |
| CHECKING THE REAR SHOCK ABSORBER ASSEMBLY CHECKING THE CONNECTING ARM AND RELAY ARM |      |
| INSTALLING THE RELAY ARM                                                            | _    |
| INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY                                         |      |
| THE THE HEATT OF TOOK ADOOT DETT ACCEMBET                                           |      |
|                                                                                     |      |
| SWINGARM                                                                            |      |
| REMOVING THE SWINGARM                                                               |      |
| CHECKING THE SWINGARM                                                               |      |
| INSTALLING THE SWINGARM                                                             | 4-86 |
|                                                                                     |      |
| CHAIN DRIVE                                                                         | 4-87 |
| REMOVING THE DRIVE CHAIN                                                            | 4-88 |

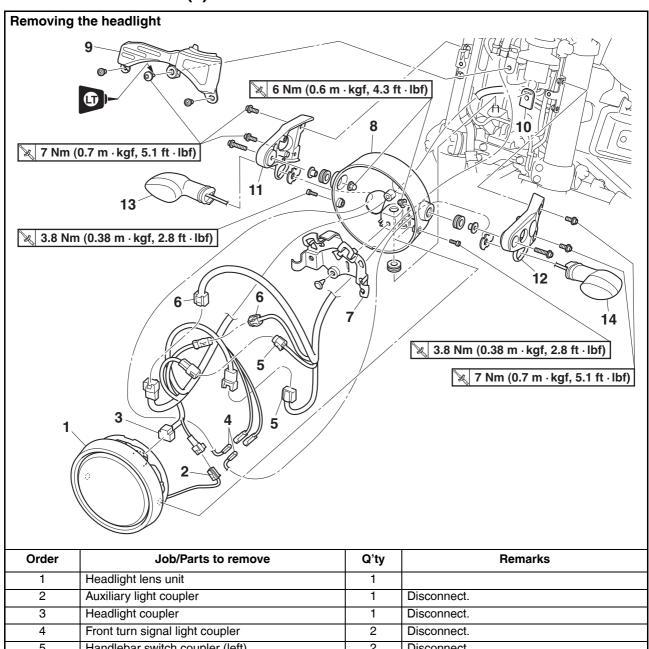
| CHECKING THE DRIVE CHAIN          | 4-88 |
|-----------------------------------|------|
| CHECKING THE DRIVE SPROCKET       | 4-89 |
| CHECKING THE REAR WHEEL SPROCKET  | 4-89 |
| CHECKING THE REAR WHEEL DRIVE HUB | 4-89 |
| INSTALLING THE DRIVE CHAIN        | 4-90 |

EAS2002

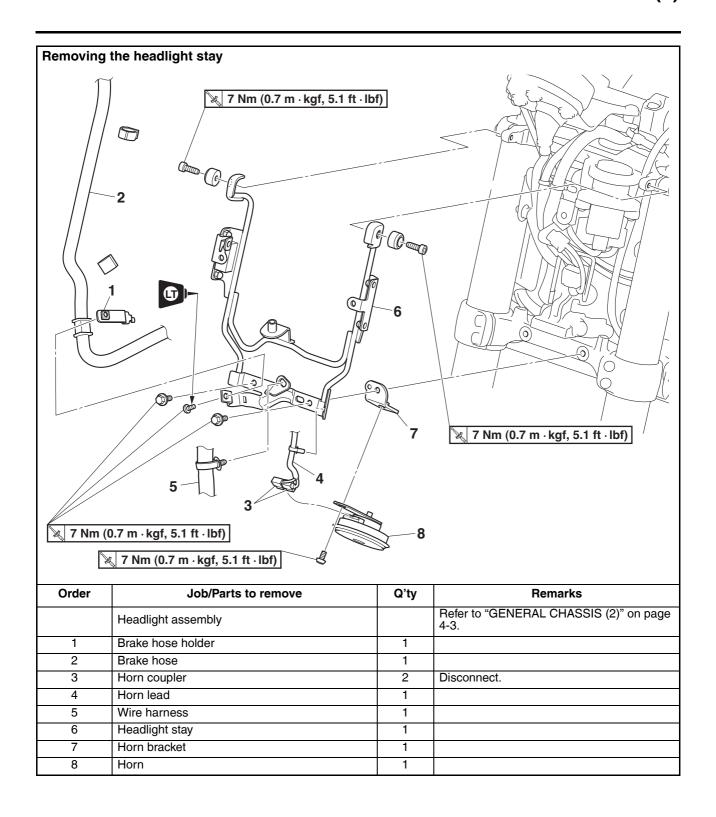
# **GENERAL CHASSIS (1)**

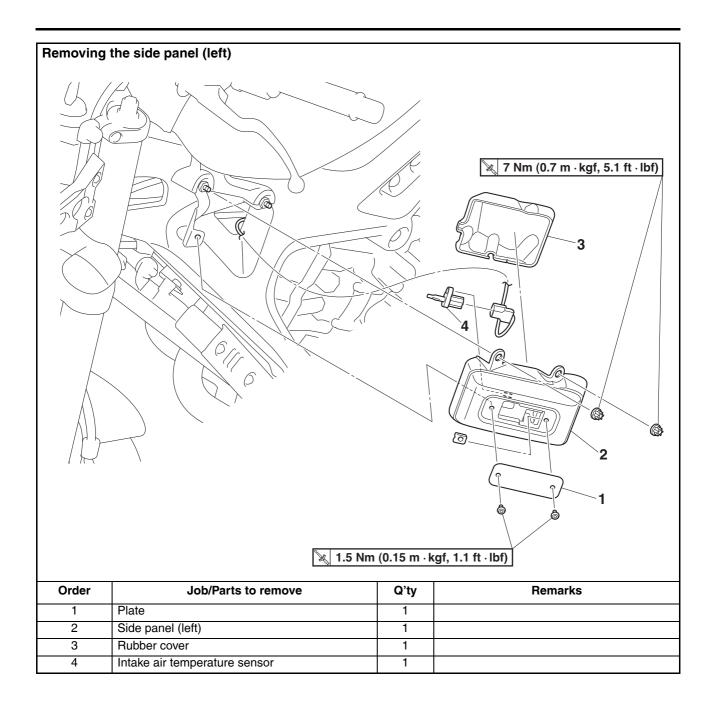


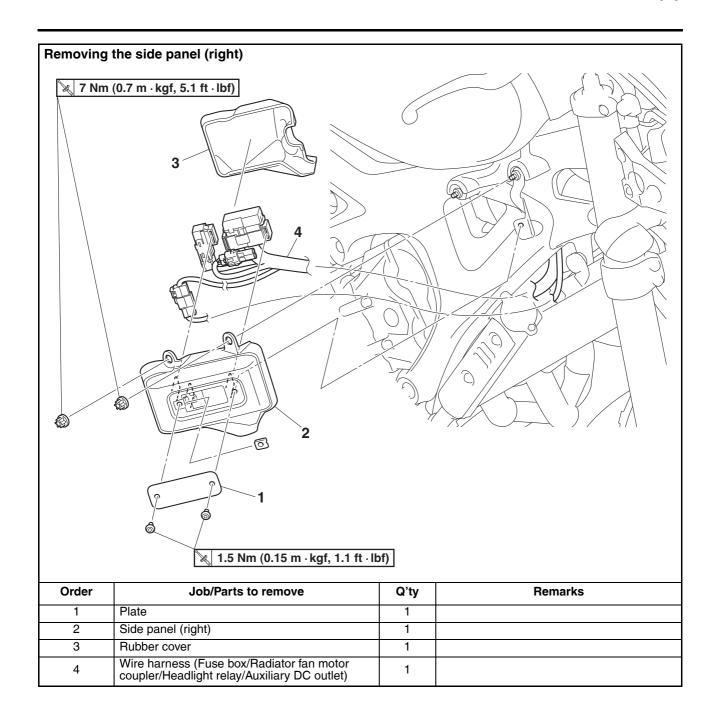


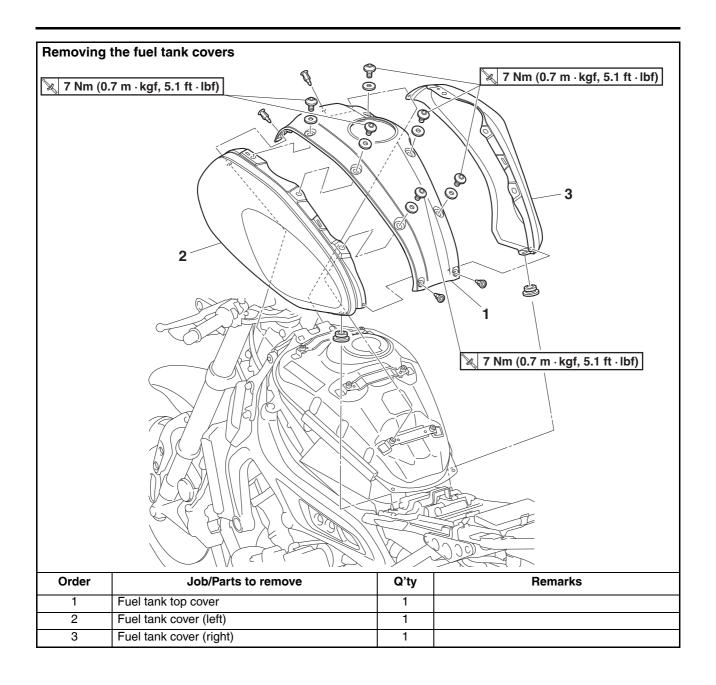


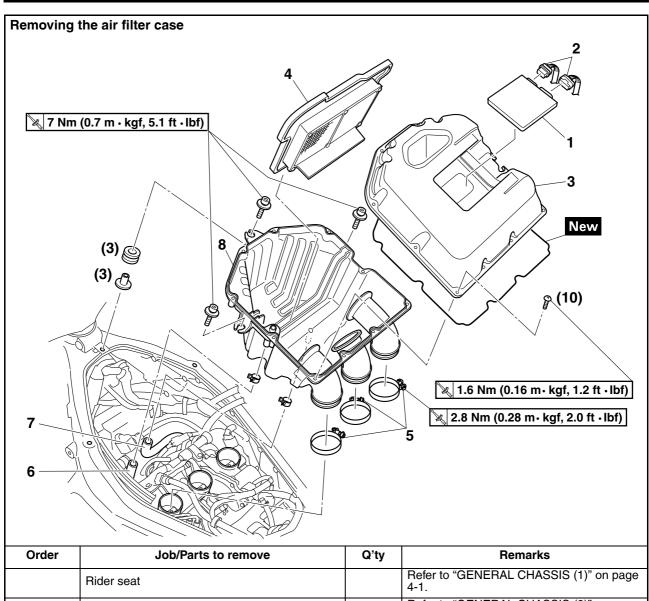
| Order | Job/Farts to remove              | Q ty | neiliaiks   |
|-------|----------------------------------|------|-------------|
| 1     | Headlight lens unit              | 1    |             |
| 2     | Auxiliary light coupler          | 1    | Disconnect. |
| 3     | Headlight coupler                | 1    | Disconnect. |
| 4     | Front turn signal light coupler  | 2    | Disconnect. |
| 5     | Handlebar switch coupler (left)  | 2    | Disconnect. |
| 6     | Handlebar switch coupler (right) | 2    | Disconnect. |
| 7     | Coupler holder                   | 1    |             |
| 8     | Headlight body                   | 1    |             |
| 9     | Main switch cover                | 1    |             |
| 10    | Rubber sheet                     | 1    |             |
| 11    | Headlight bracket (right)        | 1    |             |
| 12    | Headlight bracket (left)         | 1    |             |
| 13    | Front turn signal light (right)  | 1    |             |
| 14    | Front turn signal light (left)   | 1    |             |











| Order | Job/Parts to remove               | Q'ty | Remarks                                     |
|-------|-----------------------------------|------|---------------------------------------------|
|       | Rider seat                        |      | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
|       | Fuel tank cover                   |      | Refer to "GENERAL CHASSIS (2)" on page 4-3. |
|       | Fuel tank                         |      | Refer to "FUEL TANK" on page 7-1.           |
| 1     | ECU (Engine Control Unit)         | 1    |                                             |
| 2     | ECU coupler                       | 2    | Disconnect.                                 |
| 3     | Air filter case cover             | 1    |                                             |
| 4     | Air filter element                | 1    |                                             |
| 5     | Air filter case joint clamp screw | 3    | Loosen.                                     |
| 6     | Air induction system hose         | 1    | Disconnect.                                 |
| 7     | Cylinder head breather hose       | 1    | Disconnect.                                 |
| 8     | Air filter case                   | 1    |                                             |

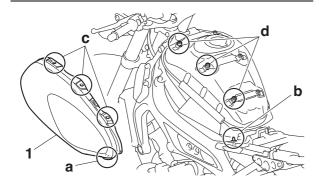
# **INSTALLING THE FUEL TANK COVERS**

The following procedure applies to both of the fuel tank covers.

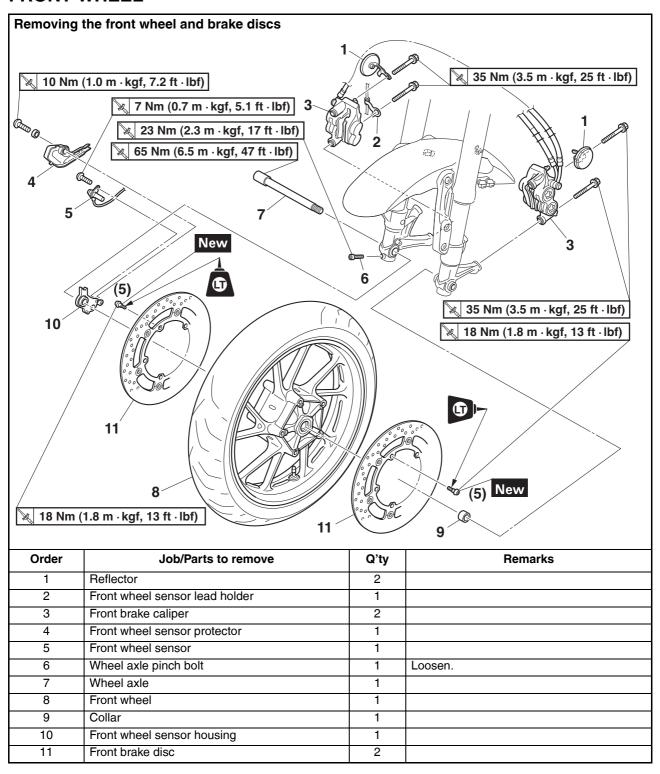
- 1. Install:
  - Fuel tank cover "1"

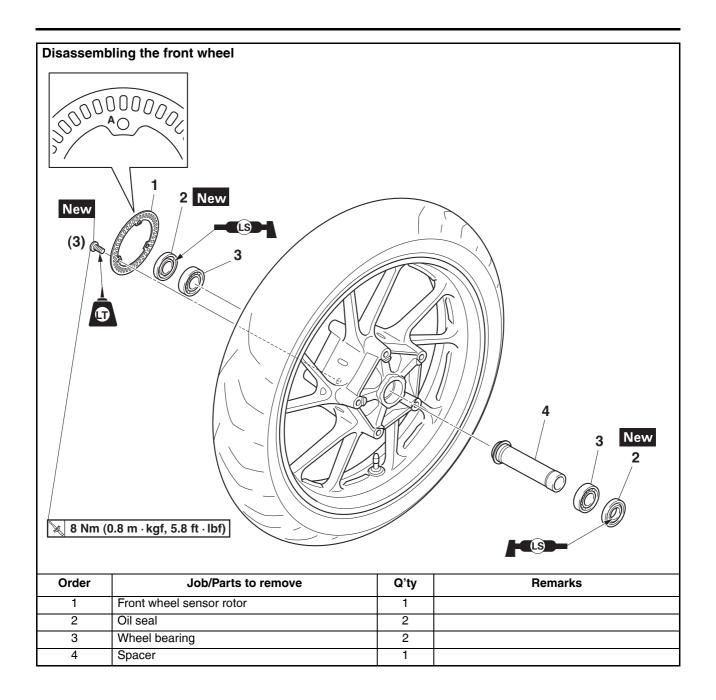
# TIP\_

- Align the hole "a" in the fuel tank cover with the projection "b" on the fuel tank bracket.
- Align the holes "c" in the fuel tank cover with the projections "d" on the fuel tank.



# **FRONT WHEEL**



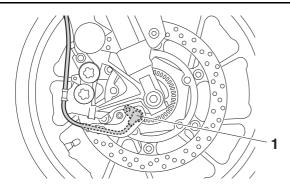


#### REMOVING THE FRONT WHEEL

ECA21380

#### NOTICE

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



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:
  - Brake caliper (left)
  - Brake caliper (right)
  - Front wheel sensor

ECA21440

# NOTICE

- Do not apply the brake lever when removing the brake calipers.
- Be sure not to contact the sensor electrode to any metal part when removing the front wheel sensor from the sensor housing.
- 3. Elevate:
  - Front wheel

TIP

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

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

EAS31149

DISASSEMBLING THE FRONT WHEEL

DISA ECA21340

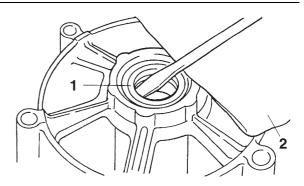
### NOTICE

Do not drop the wheel sensor rotor or subject it to shocks.

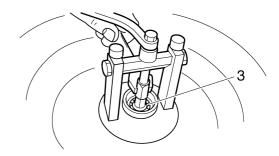
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.
- 1. Remove:
  - Oil seals
  - Wheel bearings
- a. Clean the surface of the front wheel hub.
- a. Clean the surface of the front wheel hub.
- b. Remove the oil seals "1" with a flat-head screwdriver.

TIP

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



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



EAS3014

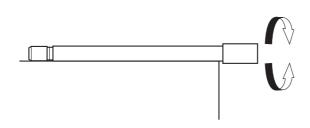
# **CHECKING THE FRONT WHEEL**

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

WA13460

## **WARNING**

Do not attempt to straighten a bent wheel axle.



### 2. Check:

- Tire
- Front wheel

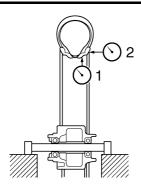
Damage/wear  $\rightarrow$  Replace.

Refer to "CHECKING THE TIRES" on page 3-16 and "CHECKING THE WHEELS" on page 3-15.

- 3. Measure:
- Radial wheel runout "1"
- Lateral wheel runout "2"
   Over the specified limits → Replace.

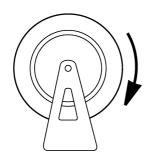


Radial wheel runout limit 1.0 mm (0.04 in) Lateral wheel runout limit 0.5 mm (0.02 in)



#### 4. Check:

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



EAS31150

#### ASSEMBLING THE FRONT WHEEL

CA21340

#### NOTICE

- Do not drop the wheel sensor rotor or subject it to shocks.
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.
- 1. Install:
  - Wheel bearings New
  - Oil seals New

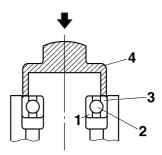
a. Install the new wheel bearing (right side).  $_{\mbox{\tiny ECA18110}}$ 

## NOTICE

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

#### TIP.

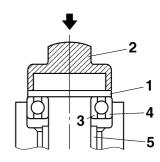
Use a socket "4" that matches the diameter of the wheel bearing outer race.



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

#### TIP

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



d. Install the new oil seals.

## 

- 2. Install:
  - Front wheel sensor rotor



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

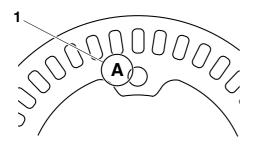
ECA17200

#### NOTICE

Replace the wheel sensor rotor bolts with new ones.

TIP

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



#### 3. Measure:

Wheel sensor rotor runout

Out of specification  $\rightarrow$  Correct the wheel sensor rotor runout or replace the wheel sensor rotor.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.



Wheel sensor rotor runout limit 0.25 mm (0.01 in)

EACO115

# MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

ECA21070

### **NOTICE**

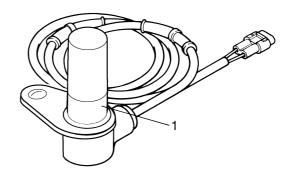
- Handle the ABS components with care since they have been accurately adjusted.
   Keep them away from dirt and do not subject them to shocks.
- The front wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.
- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel sensor or

front wheel sensor rotor.

 Do not drop or shock the wheel sensor or the wheel sensor rotor.

#### 1. Check:

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



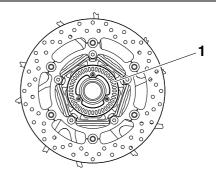
### 2. Check:

Front wheel sensor rotor "1"
 Cracks/damage/scratches → Replace the front wheel sensor rotor.

 Iron powder/dust/solvent → Clean.

#### TIP.

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



### 3. Measure:

• Wheel sensor rotor runout

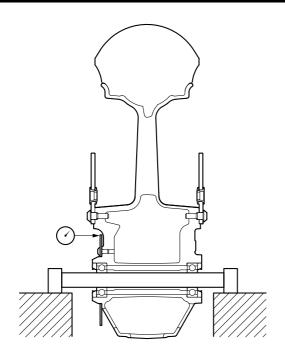
Out of specification  $\rightarrow$  Clean the installation surface of the wheel sensor rotor and correct the wheel sensor rotor runout, or replace the wheel sensor rotor.



Wheel sensor rotor runout limit 0.25 mm (0.01 in)

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

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



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



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

ECA17200

# **NOTICE**

Replace the wheel sensor rotor bolts with new ones.

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

E4S3015

# ADJUSTING THE FRONT WHEEL STATIC BALANCE

TIP\_

- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake disc installed.
- 1. Remove:
- Balancing weight(s)
- 2. Find:
  - Front wheel's heavy spot

TIP

Place the front wheel on a suitable balancing stand.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

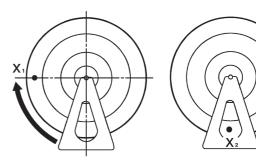
a. Spin the front wheel.

b. When the front wheel stops, put an "X<sub>1</sub>" mark at the bottom of the wheel.





- c. Turn the front wheel 90° so that the "X<sub>1</sub>" mark is positioned as shown.
- d. Release the front wheel.
- e. When the wheel stops, put an "X<sub>2</sub>" mark at the bottom of the wheel.



- f. Repeat steps (c) through (e) several times until all the marks come to rest at the same spot.
- g. The spot where all the marks come to rest is the front wheel's heavy spot "X".

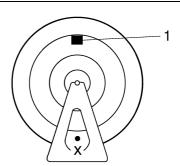
- 3. Adjust:
  - Front wheel static balance

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

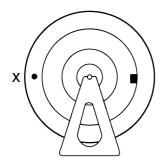
\*\*\*\*\*\*\*\*\*\*

TIP

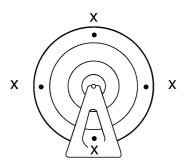
Start with the lightest weight.



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



- c. If the heavy spot does not stay in that position, install a heavier weight.
- d. Repeat steps (b) and (c) until the front wheel is balanced.
- 4. Check:
  - Front wheel static balance
- a. Turn the front wheel and make sure it stays at each position shown.



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

# INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)

- 1. Install:
  - Front brake discs



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

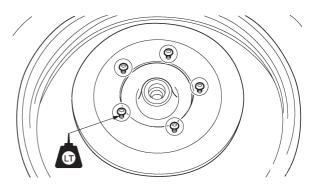
ECA19150

NOTICE

Replace the brake disc bolts with new ones.

TIP

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



- 2. Check:
  - Front brake discs
     Refer to "CHECKING THE FRONT BRAKE
     DISCS" on page 4-31.
- 3. Lubricate:
  - Oil seal lips

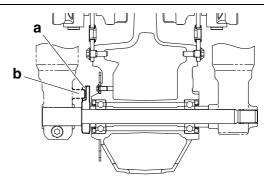


# Recommended lubricant Lithium-soap-based grease

- 4. Install:
  - Collar
  - Front wheel sensor housing
  - Front wheel
  - Wheel axle

#### TIP

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



- 5. Tighten:
  - Front wheel axle
  - Front wheel axle pinch bolt



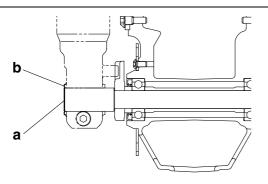
Front wheel axle 65 Nm (6.5 m·kgf, 47 ft·lbf) Front wheel axle pinch bolt 23 Nm (2.3 m·kgf, 17 ft·lbf)

ECA19760

#### NOTICE

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

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



#### 6. Install:

- Front wheel sensor
- Front wheel sensor protector



Front wheel sensor bolt 7 Nm (0.7 m·kgf, 5.1 ft·lbf) Front wheel sensor protector bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf)

ECA21020

#### NOTICE

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

### TIP\_

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

#### 7. Measure:

• Distance "a"

(between the wheel sensor rotor "1" and wheel sensor "2")

Out of specification → Check the wheel bearing for looseness, and the front wheel sensor and sensor rotor installation conditions (warpage caused by overtorque, wrong installation direction, rotor decentering, LOCTITE® on the mounting surface of the rotor, deformation caused by an impact during service and caught foreign materials). If there is any defective part, repair or replace the defective part.



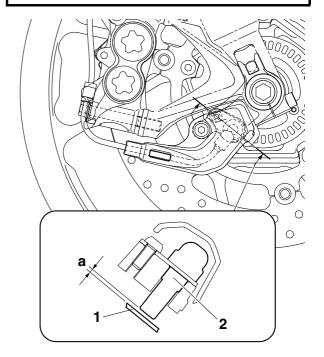
Distance "a" (between the wheel sensor rotor and wheel sensor) 0.9–1.5 mm (0.04–0.06 in)

TIP

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



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



- 8. Install:
- Front brake calipers
- Front wheel sensor lead holder

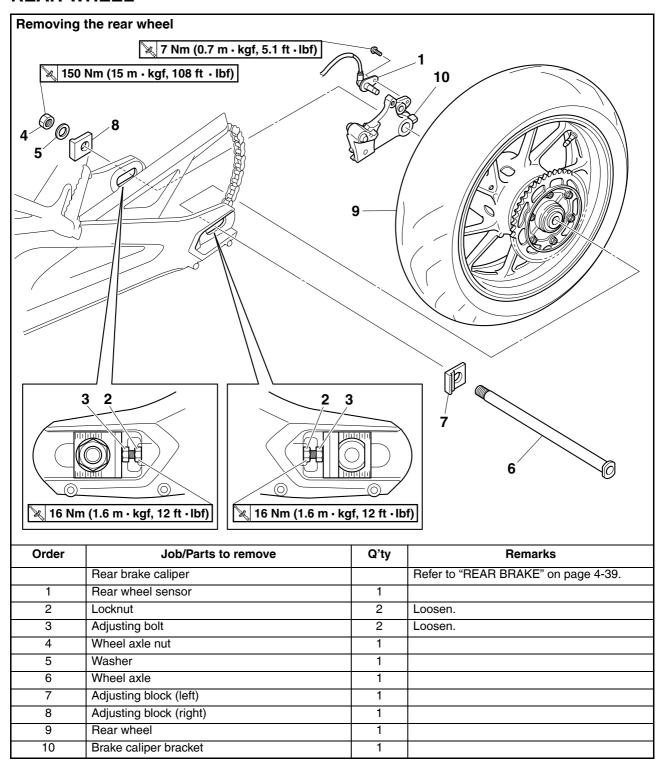


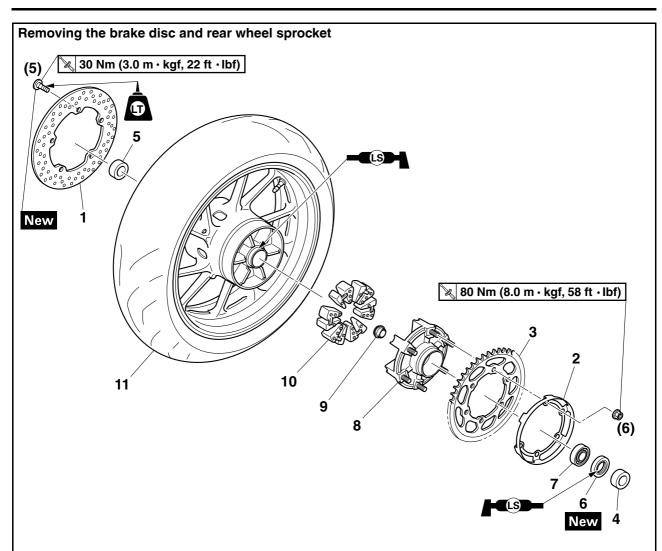
Front brake caliper bolt 35 Nm (3.5 m·kgf, 25 ft·lbf)

WARNING

Make sure the brake hose is routed properly.

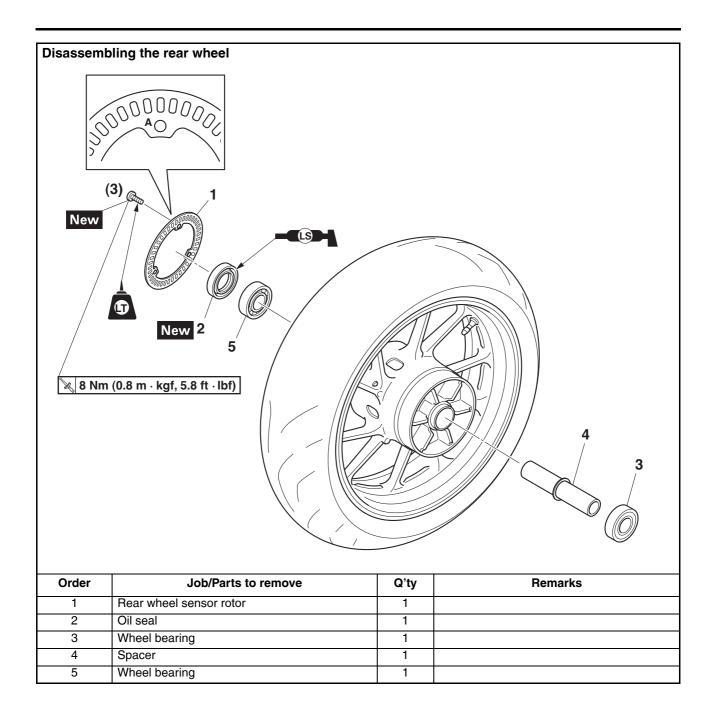
# **REAR WHEEL**





| Order | Job/Parts to remove         | Q'ty | Remarks |
|-------|-----------------------------|------|---------|
| 1     | Rear brake disc             | 1    |         |
| 2     | Bracket                     | 1    |         |
| 3     | Rear wheel sprocket         | 1    |         |
| 4     | Collar                      | 1    |         |
| 5     | Collar                      | 1    |         |
| 6     | Oil seal                    | 1    |         |
| 7     | Bearing                     | 1    |         |
| 8     | Rear wheel drive hub        | 1    |         |
| 9     | Collar                      | 1    |         |
| 10    | Rear wheel drive hub damper | 6    |         |
| 11    | Rear wheel                  | 1    |         |

# **REAR WHEEL**

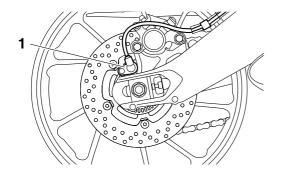


#### **REMOVING THE REAR WHEEL**

ECA21390

#### NOTICE

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



1. Stand the vehicle on a level surface.

EWA13120

# **WARNING**

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

### TIP

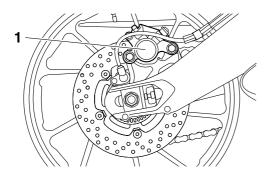
Place the vehicle on a maintenance stand so that the rear wheel is elevated.

- 2. Remove:
  - Rear brake caliper "1"
  - Rear wheel sensor

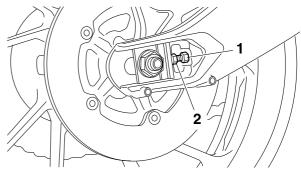
ECA21040

## **NOTICE**

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



- 3. Loosen:
  - Locknuts "1"
  - · Adjusting bolts "2"



- 4. Remove:
  - Wheel axle nut "1"
  - Washer
  - Wheel axle "2"
  - Rear wheel
- Brake caliper bracket

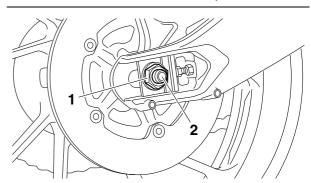
ECA21400

#### NOTICE

Be sure to remove the rear wheel sensor before removing the brake caliper bracket, otherwise the sensor could be damaged.

## TIP

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



EAS31154

### **DISASSEMBLING THE REAR WHEEL**

ECA21340

### NOTICE

- Do not drop the wheel sensor rotor or subject it to shocks.
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.
- 1. Remove:
  - Oil seal
  - Wheel bearings Refer to "DISASSEMBLING THE FRONT WHEEL" on page 4-12.

#### **CHECKING THE REAR WHEEL**

- 1. Check:
  - Wheel axle
  - Wheel bearings
  - Oil seals

Refer to "CHECKING THE FRONT WHEEL" on page 4-12.

- 2. Check:
  - Tire
  - Rear wheel

Damage/wear  $\rightarrow$  Replace.

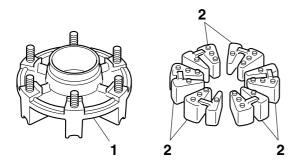
Refer to "CHECKING THE TIRES" on page 3-16 and "CHECKING THE WHEELS" on page 3-15.

- 3. Measure:
  - Radial wheel runout
  - Lateral wheel runout Refer to "CHECKING THE FRONT WHEEL" on page 4-12.

EAS30160

#### 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.



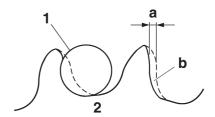
EAS3016

# CHECKING AND REPLACING THE REAR WHEEL SPROCKET

- 1. Check:
- Rear wheel sprocket

More than 1/4 tooth "a" wear  $\rightarrow$  Replace the drive sprocket, the rear wheel sprocket and the drive chain as a set.

Bent teeth  $\rightarrow$  Replace the drive sprocket, the rear wheel sprocket and the drive chain as a set.



- b. Correct
- 1. Drive chain roller
- 2. Rear wheel sprocket
- 2. Replace:
  - Rear wheel sprocket

# 

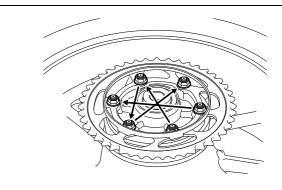
- a. Remove the rear wheel sprocket nuts and the rear wheel sprocket.
- Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
- c. Install the new rear wheel sprocket.



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

#### TIP

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



EAS30163

# **ASSEMBLING THE REAR WHEEL**

ECA21340

#### **NOTICE**

- Do not drop the wheel sensor rotor or subject it to shocks.
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.
- 1. Install:
  - Wheel bearings New

Oil seal New

Refer to "ASSEMBLING THE FRONT WHEEL" on page 4-13.

EAS31156

# MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR

ECA21060

# NOTICE

- Handle the ABS components with care since they have been accurately adjusted.
   Keep them away from dirt and do not subject them to shocks.
- The rear wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.
- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the rear wheel sensor or rear wheel sensor rotor.
- Do not drop or shock the wheel sensor or the wheel sensor rotor.
- 1. Check:
  - Rear wheel sensor Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.
- 2. Check:
  - Rear wheel sensor rotor Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.
- 3. Measure:
  - Wheel sensor rotor runout Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

EAS30164

# ADJUSTING THE REAR WHEEL STATIC BALANCE

TIP -

- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.
- 1. Adjust:
  - Rear wheel static balance Refer to "ADJUSTING THE FRONT WHEEL STATIC BALANCE" on page 4-15.

EAS3115

# INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

- 1. Install:
  - Rear brake disc



Rear brake disc bolt 30 Nm (3.0 m·kgf, 22 ft·lbf) LOCTITE®

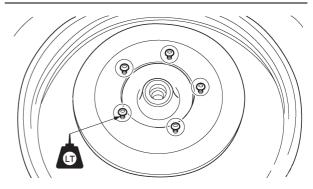
ECA19150

## NOTICE

# Replace the brake disc bolts with new ones.

ΤIΡ

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



- 2. Check:
  - Rear brake disc Refer to "CHECKING THE REAR BRAKE DISC" on page 4-45.
- 3. Lubricate:
  - Oil seal lips

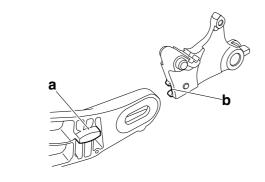


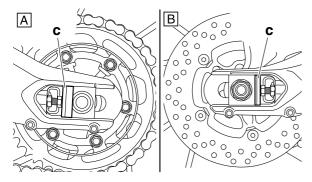
Recommended lubricant Lithium-soap-based grease

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

#### TIP -

- Do not install the brake caliper.
- Align the projection "a" in the swingarm with the slot "b" of the brake caliper bracket.
- Install the adjusting block so that projection "c" faces to the front of the vehicle.





- A. Left side
- B. Right side
- 5. Install:
  - Rear brake caliper
  - Rear brake caliper bolts
- 6. Adjust:
  - Drive chain slack Refer to "Adjusting the drive chain slack" on page 3-18.



**Drive chain slack (Maintenance stand)** 

5.0–15.0 mm (0.20–0.59 in) Drive chain slack (Sidestand) 5.0–15.0 mm (0.20–0.59 in)

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



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

EWA13500

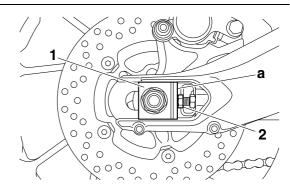
# **WARNING**

Make sure the brake hose is routed properly.

TIP

When tightening the wheel axle nut, there

should be no clearance "a" between the adjusting block "1" and adjusting bolt "2".



- 8. Install:
- Rear wheel sensor



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

ECA21080

# **NOTICE**

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

TIP

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

- 9. Measure:
- Distance "a"

(between the wheel sensor rotor "1" and rear wheel sensor "2")

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



Distance "a" (between the wheel sensor rotor and rear wheel sensor)

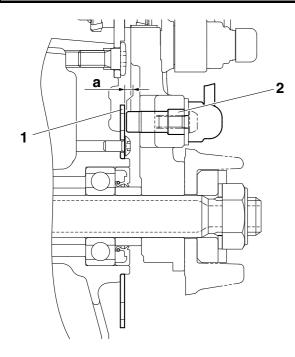
0.7-1.4 mm (0.03-0.05 in)

TIP

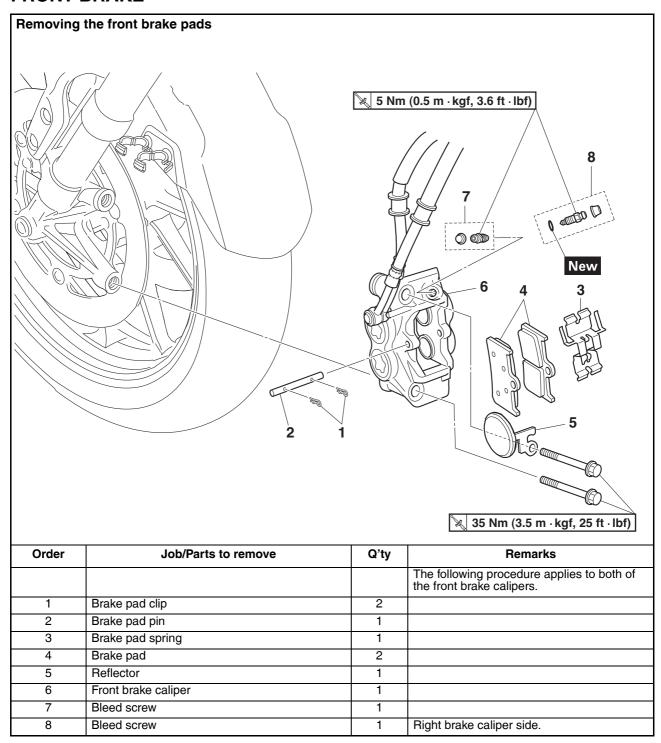
Measure the distance between the rear wheel sensor rotor and rear wheel sensor in several places in one rotation of the rear wheel. Do not turn the rear wheel while the thickness gauge is installed. This may damage the rear wheel sensor rotor and the rear wheel sensor.

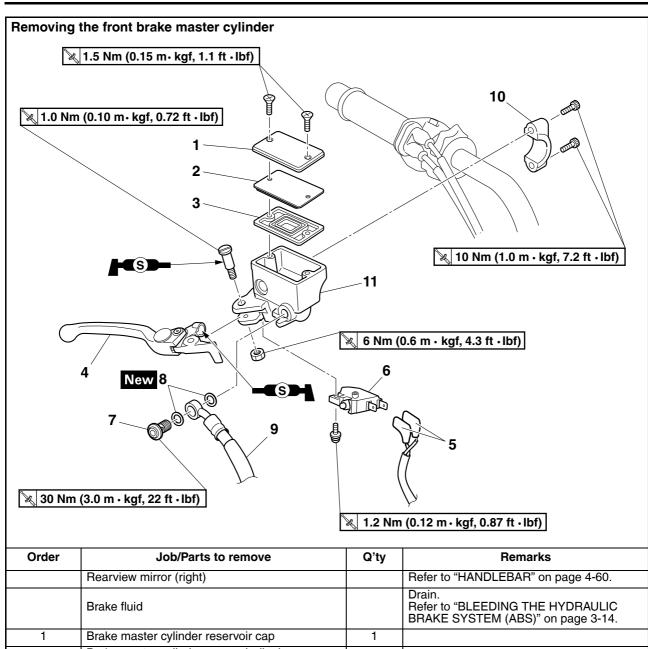


Thickness gauge 90890-03180 Feeler gauge set YU-26900-9



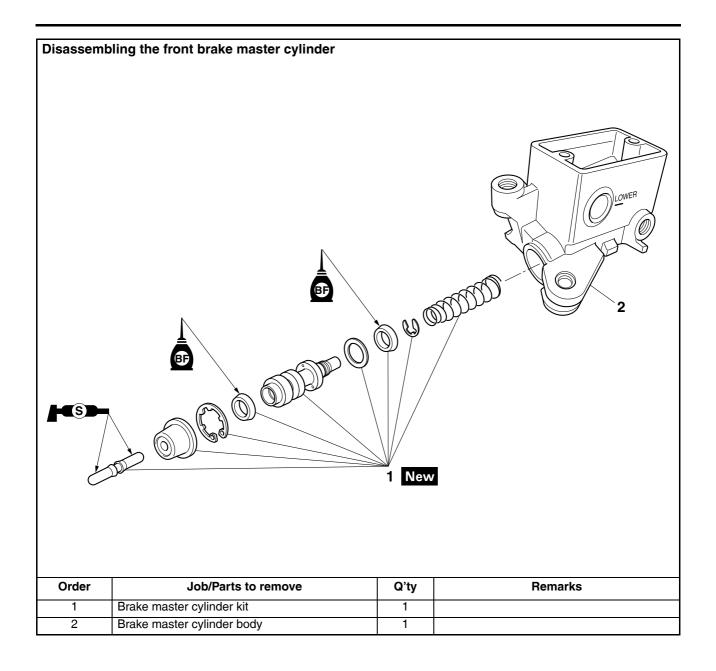
# **FRONT BRAKE**

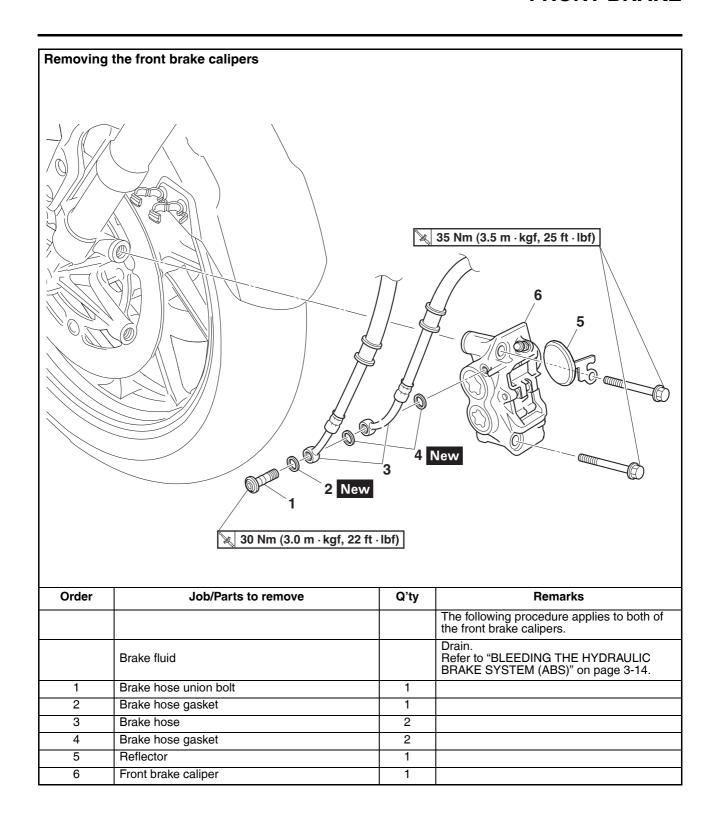


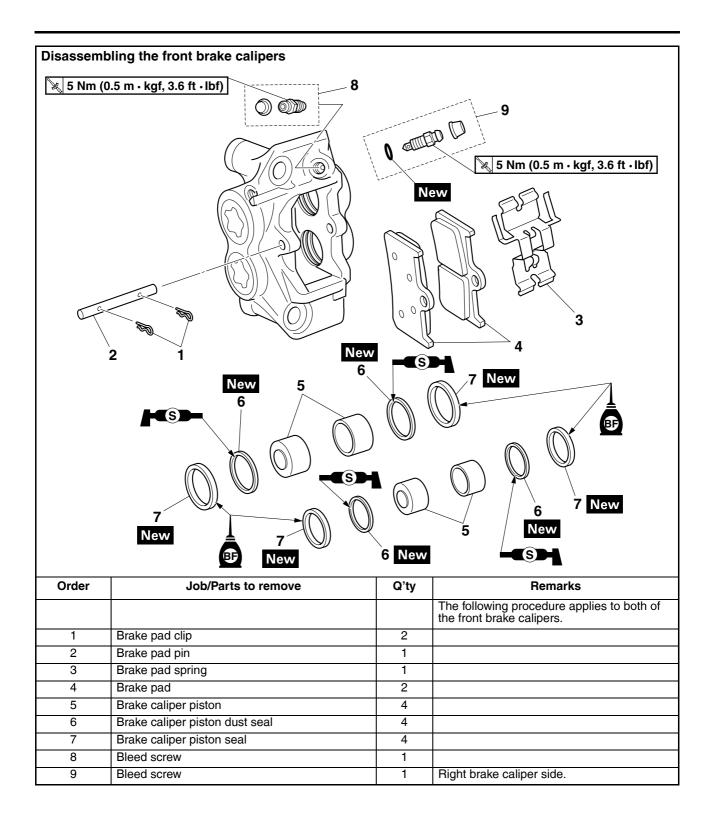


| Order | Job/Parts to remove                              | Q'ty | Remarks                                                                   |
|-------|--------------------------------------------------|------|---------------------------------------------------------------------------|
|       | Rearview mirror (right)                          |      | Refer to "HANDLEBAR" on page 4-60.                                        |
|       | Brake fluid                                      |      | Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14. |
| 1     | Brake master cylinder reservoir cap              | 1    |                                                                           |
| 2     | Brake master cylinder reservoir diaphragm holder | 1    |                                                                           |
| 3     | Brake master cylinder reservoir diaphragm        | 1    |                                                                           |
| 4     | Brake lever                                      | 1    |                                                                           |
| 5     | Front brake light switch lead connector          | 2    | Disconnect.                                                               |
| 6     | Front brake light switch                         | 1    |                                                                           |
| 7     | Brake hose union bolt                            | 1    |                                                                           |
| 8     | Brake hose gasket                                | 2    |                                                                           |
| 9     | Brake hose                                       | 1    |                                                                           |
| 10    | Front brake master cylinder holder               | 1    |                                                                           |
| 11    | Front brake master cylinder assembly             | 1    |                                                                           |

# **FRONT BRAKE**







#### INTRODUCTION

EWA14101

# **WARNING**

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

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

EAS3016

# **CHECKING THE FRONT BRAKE DISCS**

The following procedure applies to both brake discs.

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



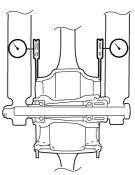
Brake disc runout limit (as measured on wheel)
0.10 mm (0.0039 in)

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

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

- b. Before measuring the brake disc runout, turn the handlebar to the left or right to ensure that the front wheel is stationary.
- c. Remove the brake caliper.

- d. Hold the dial gauge at a right angle against the brake disc surface.
- e. Measure the runout 1.5 mm (0.06 in) below the edge of the brake disc.

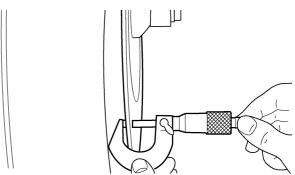


- 4. Measure:
  - Brake disc thickness
     Measure the brake disc thickness at a few different locations.

Out of specification  $\rightarrow$  Replace.



# Brake disc thickness limit 4.0 mm (0.16 in)



- 5. Adjust:
- Brake disc runout
- a. Remove the brake disc.
- b. Rotate the brake disc by one bolt hole.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

c. Install the brake disc.



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

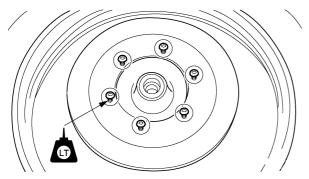
ECA19150

# NOTICE

# Replace the brake disc bolts with new ones.

TIP

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



- d. Measure the brake disc runout.
- e. If out of specification, repeat the adjustment steps until the brake disc runout is within specification.
- f. If the brake disc runout cannot be brought within specification, replace the brake disc.

# 

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

EAS30170

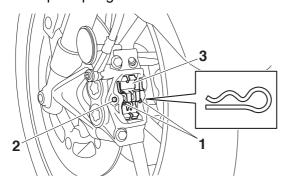
### REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

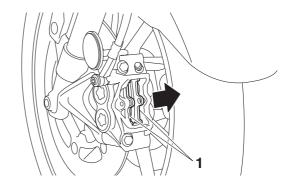
# TIP\_

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

- 1. Remove:
  - Brake pad clip "1"
  - Brake pad pin "2"
  - Brake pad spring "3"



- 2. Remove:
  - Brake pads "1"



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



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

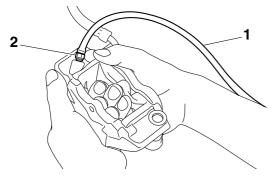


- 4. Remove:
  - Brake caliper bolts
- 5. Install:
  - Brake pads
  - Brake pad spring

#### TID

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

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



c. Tighten the bleed screw.

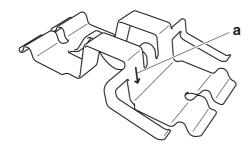


Brake caliper bleed screw 5 Nm (0.5 m·kgf, 3.6 ft·lbf)

 $\mbox{\it d.}$  Install the brake pads and brake pad spring.

TIP

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



### 6. Install:

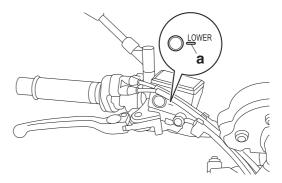
- Brake pad pin
- Brake pad clips
- Front brake caliper



Front brake caliper bolt 35 Nm (3.5 m·kgf, 25 ft·lbf)

# 7. Check:

Brake fluid level
 Below the minimum level mark "a" → Add the
 specified brake fluid to the proper level.
 Refer to "CHECKING THE BRAKE FLUID
 LEVEL" on page 3-12.



### 8. Check:

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

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.

EAS30724

### REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

#### TIP

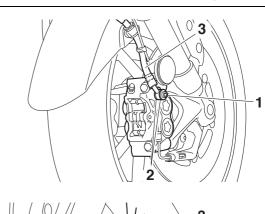
Before removing the brake caliper, drain the brake fluid from the entire brake system.

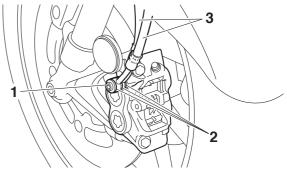
## 1. Remove:

- Brake hose union bolts "1"
- Brake hose gaskets "2"
- Brake hoses "3"

### TIP

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

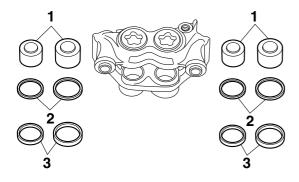




# DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

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

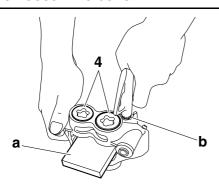


- a. Secure the right side brake caliper pistons with a piece of wood "a".
- Blow compressed air into the brake hose joint opening "b" to force out the left side pistons from the brake caliper.

EWA17060

# **WARNING**

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



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

=AS30173

## **CHECKING THE FRONT BRAKE CALIPERS**

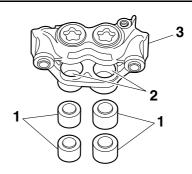
The following procedure applies to both of the brake calipers.

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

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

WARNING

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



EAS30174

# ASSEMBLING THE FRONT BRAKE CALIPERS

EWA1656

# **WARNING**

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

replace the brake caliper piston dust seals and brake caliper piston seals.



Specified brake fluid DOT 4

EAS30175

#### **INSTALLING THE FRONT BRAKE CALIPERS**

The following procedure applies to both of the brake calipers.

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



Front brake caliper bolt 35 Nm (3.5 m·kgf, 25 ft·lbf)

# EWA1353

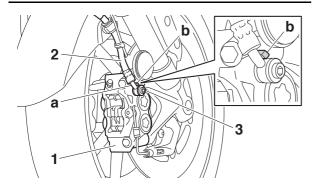
# **WARNING**

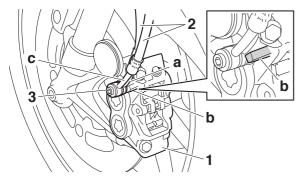
Proper brake hose routing is essential to insure safe vehicle operation.

ECA21410

# NOTICE

- When installing the brake hose onto the brake caliper "1", make sure the brake pipe "a" touches the projection "b" on the brake caliper.
- Install the brake pipe "c" so that it is aligned with the brake pipe "a".





- 2. Remove:
  - Front brake caliper
- 3. Install:
  - Brake pads
  - Brake pad spring
  - Brake pad pin
  - Brake pad clips
- Front brake caliper



Front brake caliper bolt 35 Nm (3.5 m·kgf, 25 ft·lbf)

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

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



Specified brake fluid DOT 4

EWA13090

# **WARNING**

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

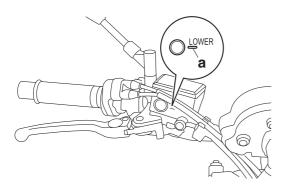
ECA13540

#### NOTICE

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

- 5. Bleed:
  - Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
- 6. Check:
- Brake fluid level

Below the minimum level mark "a" → Add the specified brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-12.



### 7. Check:

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

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.

EAS30179

# REMOVING THE FRONT BRAKE MASTER CYLINDER

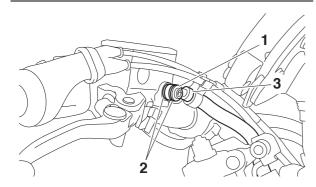
TIP.

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

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

TIP

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



EAS30725

# CHECKING THE FRONT BRAKE MASTER CYLINDER

- 1. Check:
- Brake master cylinder
   Damage/scratches/wear → Replace.
- Brake fluid delivery passages

(brake master cylinder body)

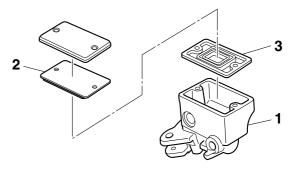
Obstruction  $\rightarrow$  Blow out with compressed air.

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

Cracks/damage  $\rightarrow$  Replace.

 Brake master cylinder reservoir diaphragm "3"

Damage/wear  $\rightarrow$  Replace.



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

EAS30181

# ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

WA12520

# WARNING

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



Specified brake fluid DOT 4

EAS3018

# INSTALLING THE FRONT BRAKE MASTER CYLINDER

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



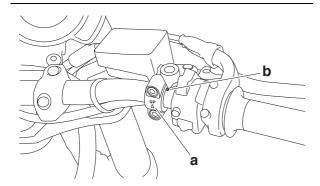
Front brake master cylinder holder bolt

10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

 Install the front brake master cylinder holder with the "UP" mark "a" facing up.

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



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



Front brake caliper bolt 35 Nm (3.5 m·kgf, 25 ft·lbf)

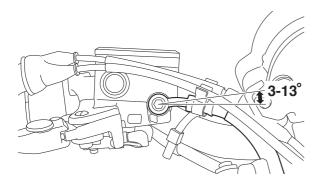
EWA13531

# **WARNING**

Proper brake hose routing is essential to insure safe vehicle operation.

TIP

- Attach the brake hose so that its angle is 3° to 13° against the straight line in parallel with the ceiling plane of the master cylinder.
- While holding the brake hose, tighten the union bolt as shown.
- Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



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



Specified brake fluid DOT 4

EWA13540

# **WARNING**

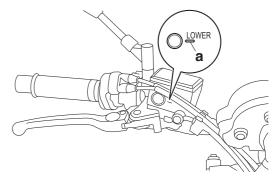
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

ECA13540

## **NOTICE**

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

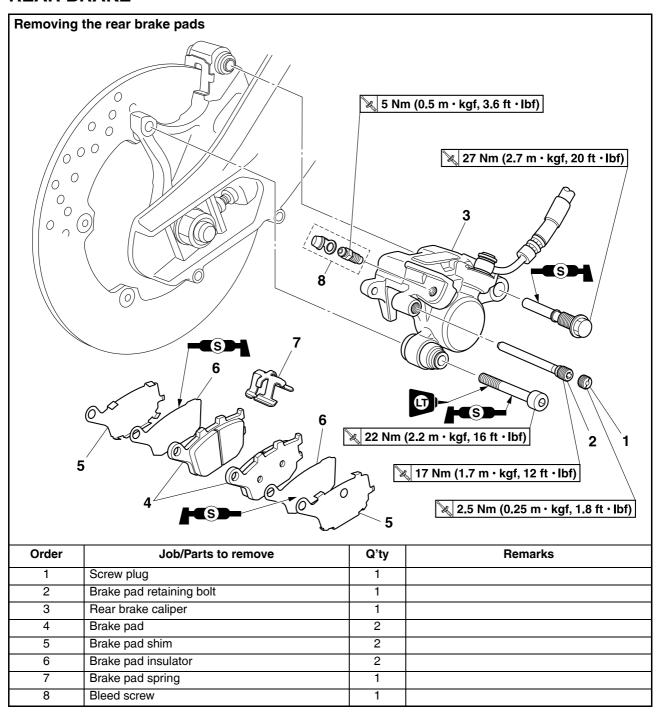
- 4. Bleed:
  - Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
- 5. Check:
  - Brake fluid level
     Below the minimum level mark "a" → Add the
     specified brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID
     LEVEL" on page 3-12.

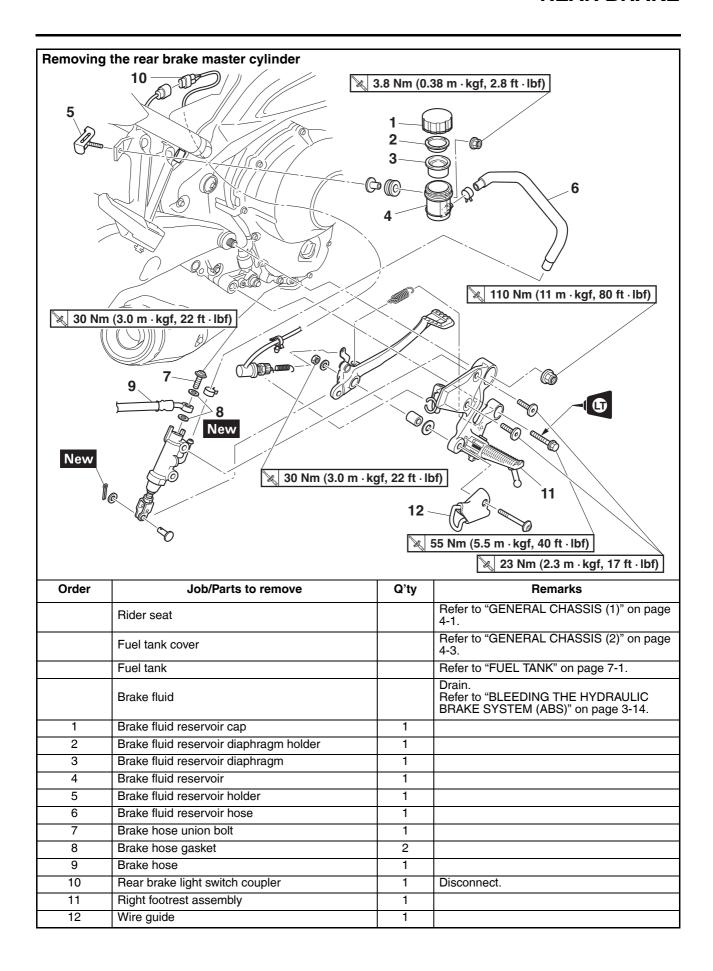


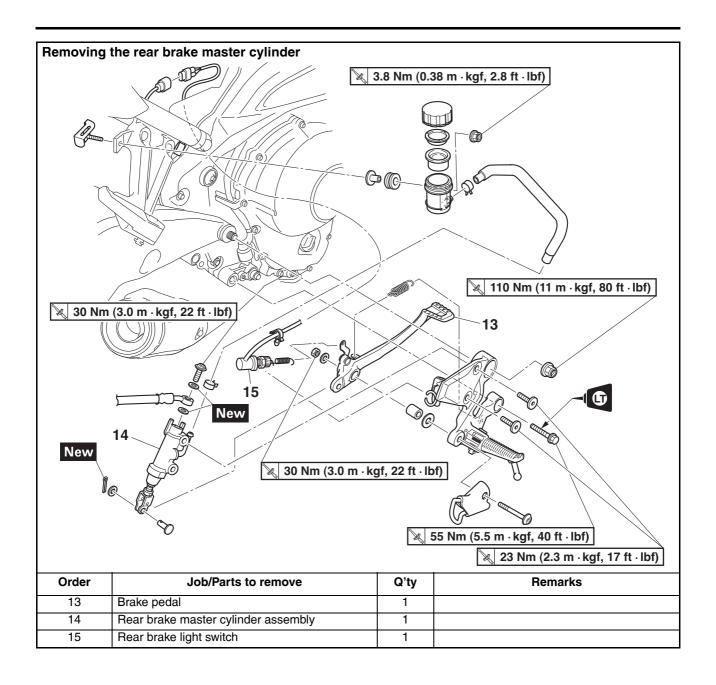
- 6. Check:
  - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.

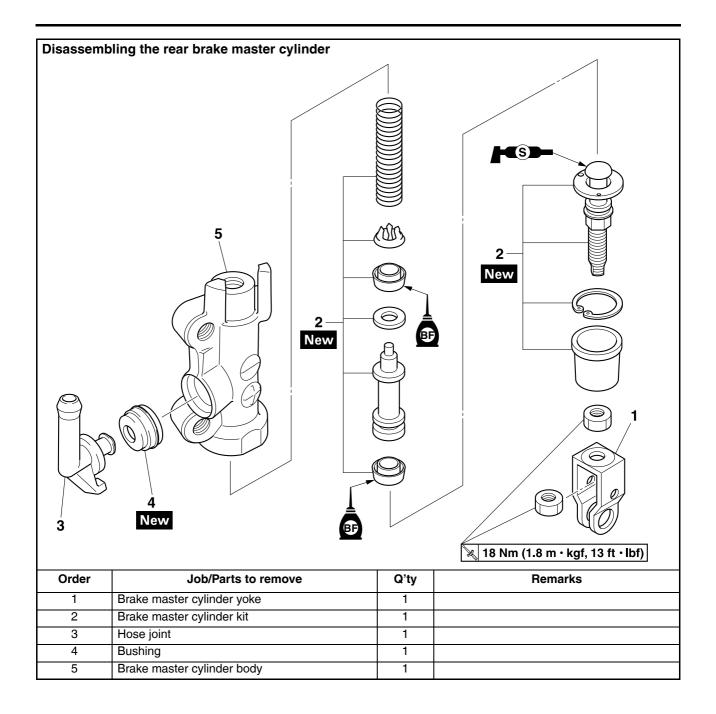
Refer to "BLEEDING THE HYDRAULIC

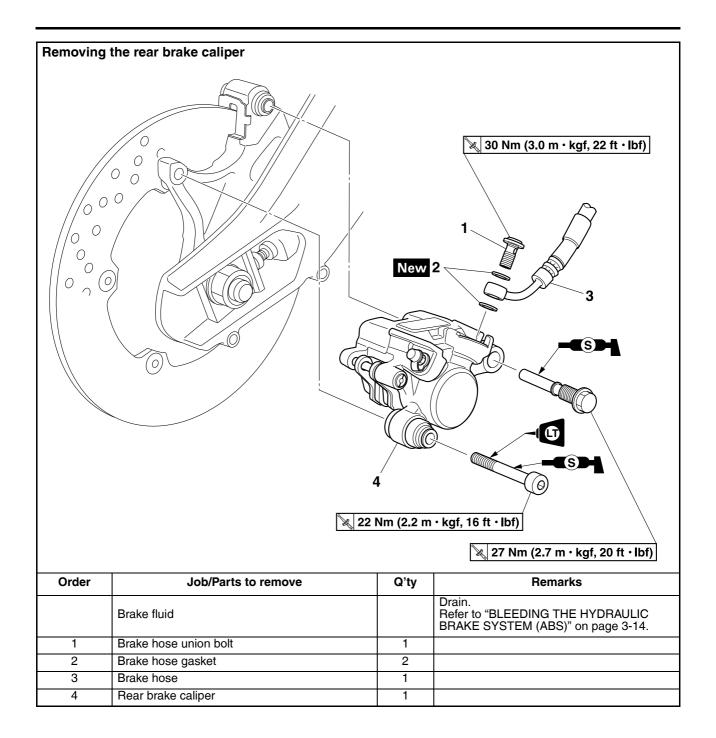
BRAKE SYSTEM (ABS)" on page 3-14.

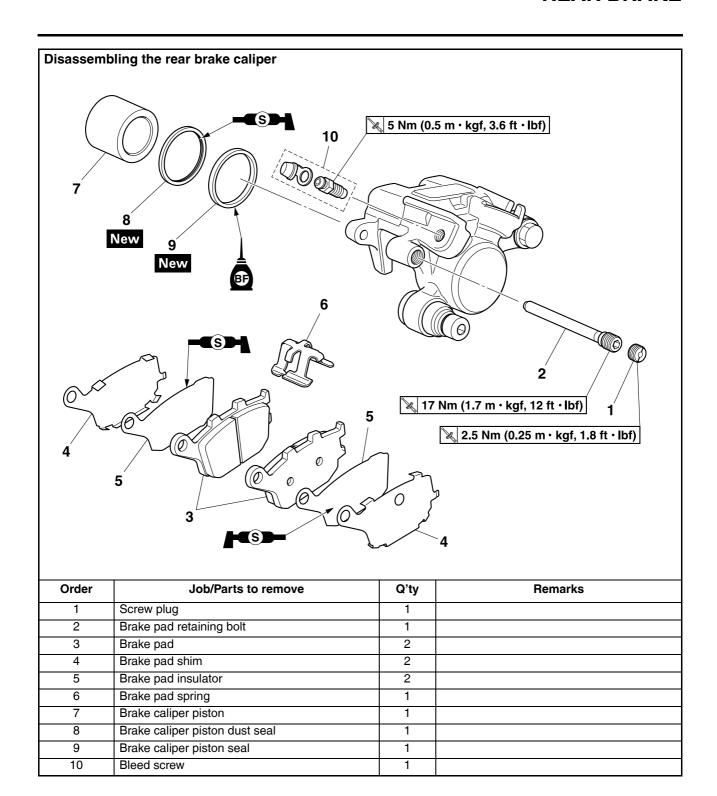












#### INTRODUCTION

EWA14101

# **WARNING**

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

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

EAS3018

## CHECKING THE REAR BRAKE DISC

- 1. Remove:
- Rear wheel Refer to "REAR WHEEL" on page 4-18.
- 2. Check:
  - Rear brake disc
     Damage/galling → Replace.
- 3. Measure:
  - Brake disc runout

Out of specification  $\rightarrow$  Correct the brake disc runout or replace the brake disc.

Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-31.



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

# 4. Measure:

Brake disc thickness

Measure the brake disc thickness at a few different locations.

Out of specification  $\rightarrow$  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 runout Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-31.



Rear brake disc bolt 30 Nm (3.0 m·kgf, 22 ft·lbf) LOCTITE®

#### 6. Install:

 Rear wheel Refer to "REAR WHEEL" on page 4-18.

EAS30185

#### REPLACING THE REAR BRAKE PADS

TIE

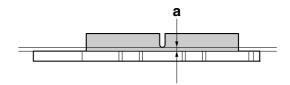
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

# 1. Measure:

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



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



#### 2. Install:

- Brake pad insulators
- Brake pad shims (onto the brake pads)
- Brake pad spring (into the rear brake caliper)
- Brake pads

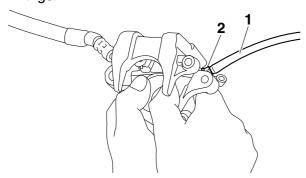
TIP

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

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

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

 Loosen the bleed screw and push the brake caliper piston into the brake caliper with your finger.



c. Tighten the bleed screw.



Brake caliper bleed screw 5 Nm (0.5 m·kgf, 3.6 ft·lbf)

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

TIP

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

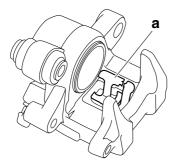
ECA14150

#### NOTICE

- Do not allow grease to contact the brake pads.
- Remove any excess grease.
- e. Install the brake pads and brake pad spring.

TIP\_

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



- 3. Lubricate:
  - Rear brake caliper bolts



Recommended lubricant Silicone grease

ECA14150

#### NOTICE

- Do not allow grease to contact the brake pads.
- Remove any excess grease.
- 4. Install:
  - Rear brake caliper
  - Brake pad retaining bolts
  - Screw plug



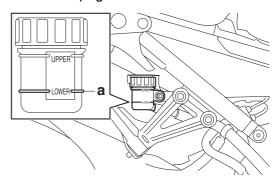
Rear brake caliper bolt (front) 27 Nm (2.7 m·kgf, 20 ft·lbf) Rear brake caliper bolt (rear) 22 Nm (2.2 m·kgf, 16 ft·lbf) LOCTITE®

Rear brake pad retaining bolt 17 Nm (1.7 m·kgf, 12 ft·lbf) Rear brake caliper screw plug 2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)

- 5. Check:
  - Brake fluid level

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

Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-12.



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

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.

EAS30186

## REMOVING THE REAR BRAKE CALIPER

TIP

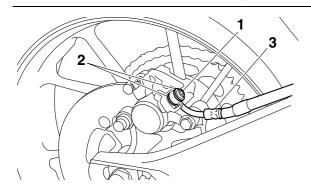
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

- 1. Remove:
  - Brake hose union bolt "1"

- Brake hose gaskets "2"
- Brake hose "3"

#### TIP\_

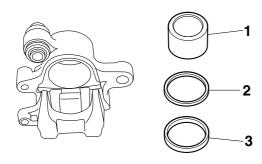
Put the end of the brake hose into a container and pump out the brake fluid carefully.



EAS30187

# DISASSEMBLING THE REAR BRAKE CALIPER

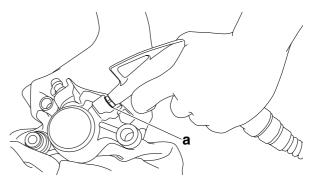
- 1. Remove:
- Brake caliper piston "1"
- Brake caliper piston dust seal "2"
- Brake caliper piston seal "3"



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

# WARNING

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



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

EAS30188

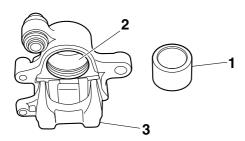
# **CHECKING THE REAR BRAKE CALIPER**

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

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

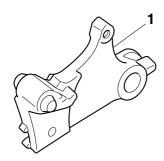
**WARNING** 

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



#### 2. Check:

Rear brake caliper bracket "1"
 Cracks/damage → Replace.
 Refer to "REAR WHEEL" on page 4-18.



EAS30189

## **ASSEMBLING THE REAR BRAKE CALIPER**

EWA17080

## **WARNING**

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



Specified brake fluid DOT 4

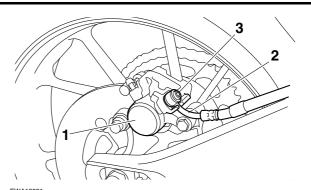
EAS30190

# **INSTALLING THE REAR BRAKE CALIPER**

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



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



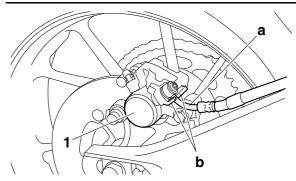
WARNING

Proper brake hose routing is essential to insure safe vehicle operation.

ECA19080

#### NOTICE

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



- 2. Remove:
  - Rear brake caliper
- 3. Install:
  - Brake pad insulators
  - Brake pad shims (onto the brake pads)
  - Brake pad spring (into the rear brake caliper)
  - Brake pads
  - Rear brake caliper Refer to "REPLACING THE REAR BRAKE PADS" on page 4-45.



Rear brake caliper bolt (front) 27 Nm (2.7 m·kgf, 20 ft·lbf) Rear brake caliper bolt (rear) 22 Nm (2.2 m·kgf, 16 ft·lbf) LOCTITE®

Rear brake pad retaining bolt 17 Nm (1.7 m·kgf, 12 ft·lbf) Rear brake caliper screw plug 2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)

## 4. Fill:

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



Specified brake fluid DOT 4

EWA13090

# **WARNING**

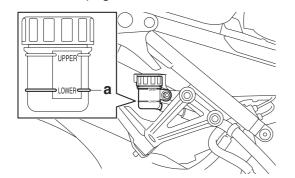
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

ECA13540

#### NOTICE

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

- 5. Bleed:
  - Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
- 6. Check:
  - Brake fluid level
     Below the minimum level mark "a" → Add the
     specified brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID
     LEVEL" on page 3-12.



#### 7. Check:

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

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.

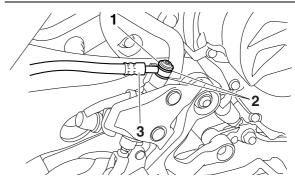
EAS30193

# REMOVING THE REAR BRAKE MASTER CYLINDER

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

TIP.

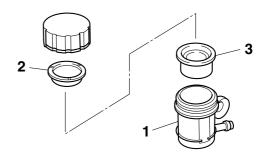
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



EAS30194

# CHECKING THE REAR BRAKE MASTER CYLINDER

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



- 4. Check:
  - Brake hose
  - Brake fluid reservoir hose Cracks/damage/wear → Replace.

# ASSEMBLING THE REAR BRAKE MASTER **CYLINDER**

EWA13520

# **WARNING**

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



Specified brake fluid DOT 4

- 1. Install:
- Brake master cylinder kit New

# INSTALLING THE REAR BRAKE MASTER **CYLINDER**

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



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

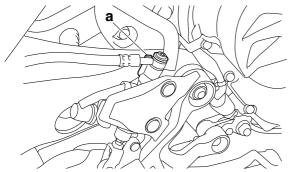
# **WARNING**

Proper brake hose routing is essential to insure safe vehicle operation.

FCA14160

# **NOTICE**

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



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



Specified brake fluid DOT 4

# **WARNING**

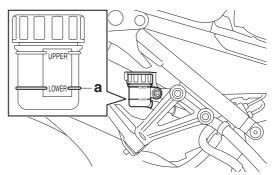
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

EC413540

## NOTICE

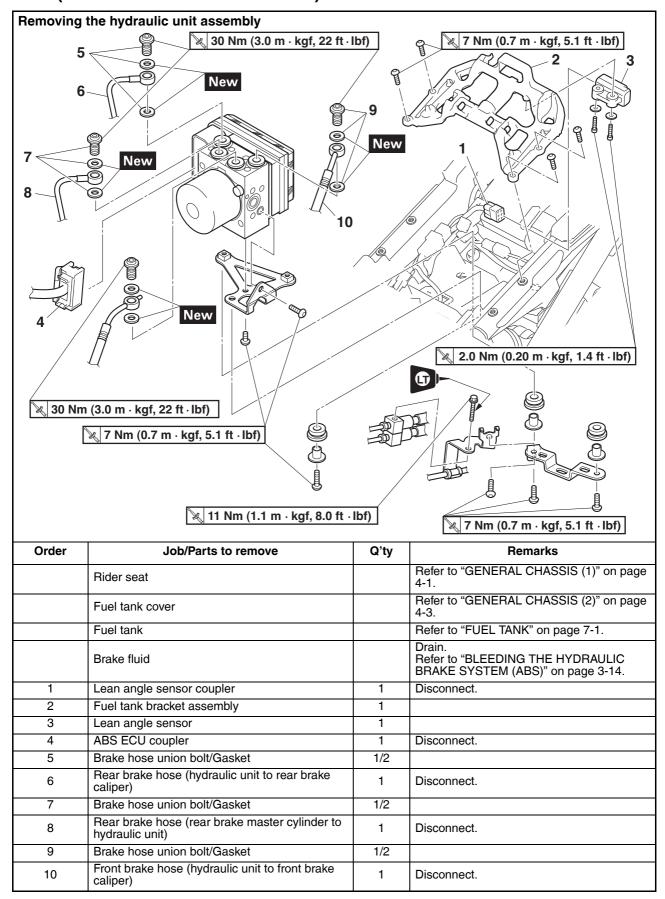
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

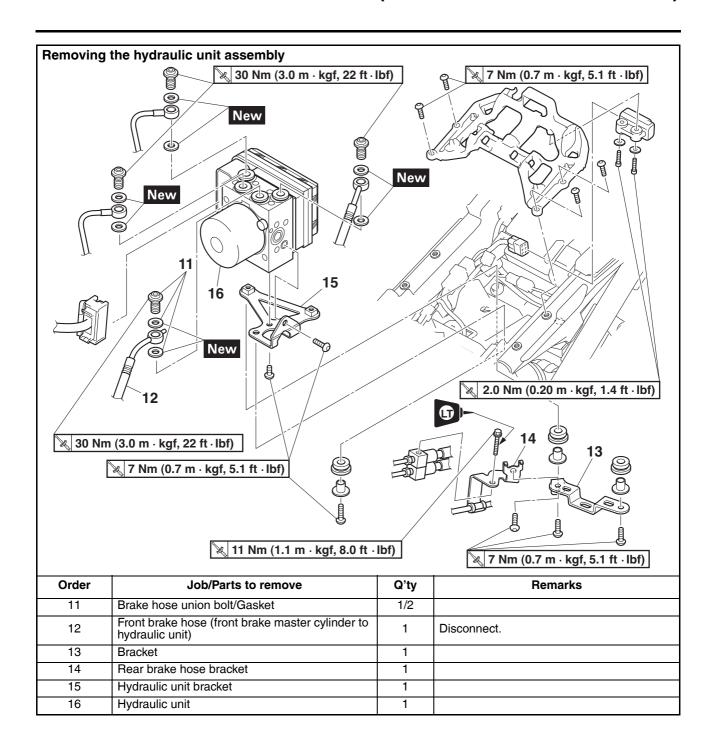
- 3. Bleed:
  - Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
- 4. Check:
  - Brake fluid level Below the minimum level mark "a" → Add the specified brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-12.



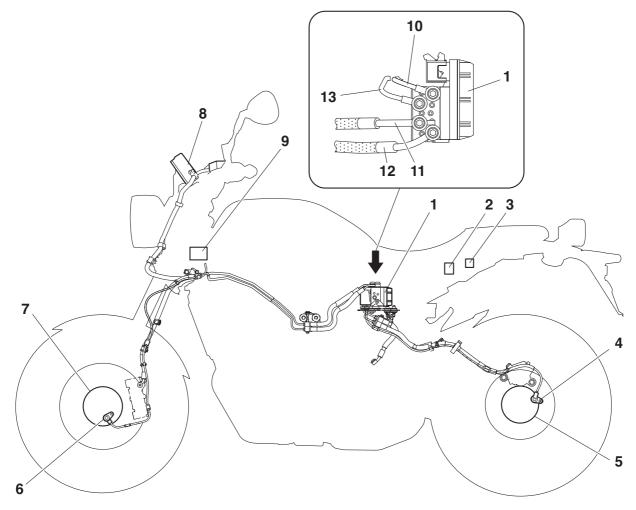
- 5. Adjust:
  - Brake pedal position Refer to "ADJUSTING THE REAR DISC BRAKE" on page 3-13.
- 6. Adjust:
- Rear brake light operation timing Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-28.

# **ABS (ANTI-LOCK BRAKE SYSTEM)**





## **ABS COMPONENTS CHART**



- 1. Hydraulic unit assembly
- 2. Fuse box 2
- 3. Yamaha diagnostic tool coupler
- 4. Rear wheel sensor
- 5. Rear wheel sensor rotor
- 6. Front wheel sensor
- 7. Front wheel sensor rotor
- 8. ABS warning light
- 9. Fuse box 1
- 10.Rear brake hose (hydraulic unit to rear brake caliper)
- 11.Front brake hose (front brake master cylinder to hydraulic unit)
- 12. Front brake hose (hydraulic unit to front brake caliper)
- 13.Rear brake hose (rear brake master cylinder to hydraulic unit)

EAS30197

# REMOVING THE HYDRAULIC UNIT ASSEMBLY

ECA21091

#### NOTICE

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

EWA13930

# WARNING

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

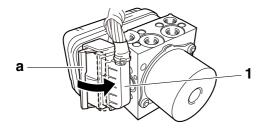
ECA18241

# NOTICE

- Handle the ABS components with care since they have been accurately adjusted.
   Keep them away from dirt and do not subject them to shocks.
- Do not turn the main switch to "ON" when removing the hydraulic unit assembly.
- Do not clean with compressed air.
- Do not reuse the brake fluid.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Do not allow any brake fluid to contact the couplers. Brake fluid may damage the couplers and cause bad contacts.
- If the union bolts for the hydraulic unit assembly have been removed, be sure to tighten them to the specified torque and bleed the brake system.
- 1. Disconnect:
  - ABS ECU coupler "1"

TIP

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



- 2. Remove:
  - Brake hoses

#### TIP

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

CA1825

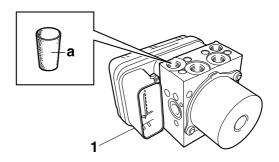
## NOTICE

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

- 3. Remove:
  - Hydraulic unit assembly "1"

TIP

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



EAS30198

# CHECKING THE HYDRAULIC UNIT ASSEMBLY

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

AS30200

# INSTALLING THE HYDRAULIC UNIT ASSEMBLY

- 1. Install:
- Hydraulic unit assembly

ECA21371

#### NOTICE

Do not remove the rubber plugs or bolts  $(M10 \times 1.0)$  installed in the brake hose union bolt holes before installing the hydraulic unit assembly.

#### TIP

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

- 2. Remove:
  - Rubber plugs or bolts (M10 × 1.0)
- 3. Install:
  - Front brake hose (front brake master cylinder to hydraulic unit) "1"
  - Front brake hose (hydraulic unit to front brake caliper) "2"
  - Rear brake hose (rear brake master cylinder to hydraulic unit) "3"
  - Rear brake hose (hydraulic unit to rear brake caliper) "4"
  - Gasket New
  - Brake hose union bolts



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

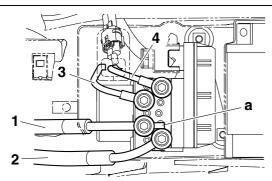
ECA21121

#### **NOTICE**

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

#### TIP

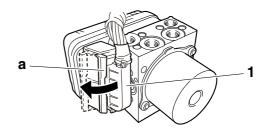
When installing the brake hose (front brake master cylinder to hydraulic unit), make sure that the stopper "a" on the hose contacts the brake hose (hydraulic unit to front brake caliper).

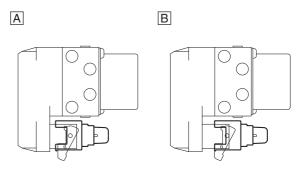


- 4. Connect:
  - ABS ECU coupler "1"

#### TIP

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





- A. The ABS ECU coupler is connected correctly.
- B. The ABS ECU coupler is not connected.

#### 5. Fill:

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



Specified brake fluid DOT 4

#### EWA13090

# **WARNING**

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

# ECA13540

# NOTICE

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

- 6. Bleed:
- Brake system

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.

7. Check the operation of the hydraulic unit according to the brake lever and the brake pedal response. (Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-56.)

ECA14770

#### NOTICE

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

- 8. Delete the fault codes. (Refer to "[B-3] DE-LETING THE FAULT CODES" on page 8-141.)
- 9. Perform a trial run. (Refer to "CHECKING THE ABS WARNING LIGHT" on page 4-59.)

EAS3093

#### **HYDRAULIC UNIT OPERATION TESTS**

The reaction-force pulsating action generated in the brake lever and brake pedal when the ABS is activated can be tested when the vehicle is stopped.

The hydraulic unit operation can be tested using the following two methods.

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

**Brake line routing confirmation** 

EWA13120

# **WARNING**

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

TIP

- For the brake line routing confirmation, use the diagnosis of function of the Yamaha diagnostic tool.
- Before performing the brake line routing confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.
- 1. Place the vehicle on a maintenance stand.
- 2. Turn the main switch to "OFF".
- 3. Remove:
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.
- 4. Check:
  - Battery voltage

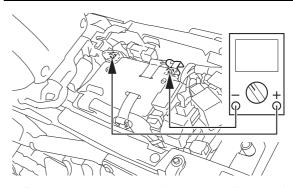
Lower than 12.8  $V \rightarrow$  Charge or replace the batterv.



Battery voltage Higher than 12.8 V

TIP

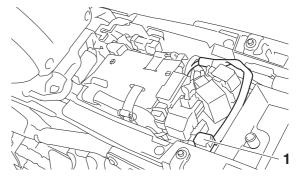
If the battery voltage is lower than 12.8 V, charge the battery, and then perform brake line routing confirmation.



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



Yamaha diagnostic tool 90890-03250



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

TIP

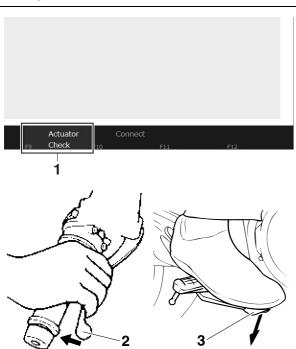
- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.

On: The hydraulic unit is operating.

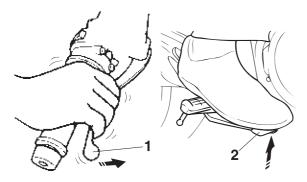
Flashing: The conditions for operating the hy-

draulic unit have not been met.

Off: The brake lever and brake pedal are not being operated.



- 9. Check:
  - Hydraulic unit operation
     Click "Actuator Check", a single pulse will be generated in the brake lever "1", brake pedal "2", and again in the brake lever "1", in this order.



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

ECA17371

## **NOTICE**

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

 If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.

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

**ABS** reaction-force confirmation

EWA13120

# **WARNING**

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

#### TIP

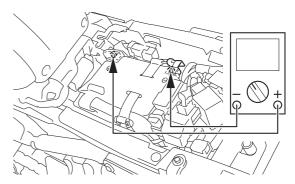
- For the ABS reaction-force confirmation, use the diagnosis of function of the Yamaha diagnostic tool. For more information, refer to the operation manual of the Yamaha diagnostic tool.
- Before performing the ABS reaction-force confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.
- 1. Place the vehicle on a maintenance stand.
- 2. Turn the main switch to "OFF".
- 3. Remove:
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.
- 4. Check:
  - Battery voltage
     Lower than 12.8 V → Charge or replace the battery.



# Battery voltage Higher than 12.8 V

## TIP

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

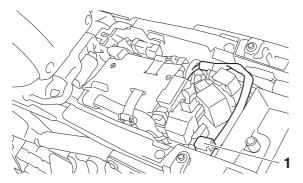


5. Removing the protective cap "1", and then connect the Yamaha diagnostic tool to the

Yamaha diagnostic tool coupler (4P).



# Yamaha diagnostic tool 90890-03250



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

#### TIP -

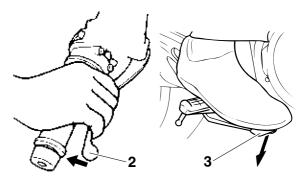
- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.

On: The hydraulic unit is operating.

Flashing: The conditions for operating the hydraulic unit have not been met.

Off: The brake lever and brake pedal are not being operated.





A reaction-force pulsating action is generated in the brake lever "1" and continues for a few seconds.

## TIP -

- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.
- "ON" and "OFF" on the tool screen indicate when the brakes are being applied and released respectively.



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

#### TIP

- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.
- "ON" and "OFF" on the tool screen indicate when the brakes are being applied and released respectively.



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

#### TIP

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

ECA17371

#### NOTICE

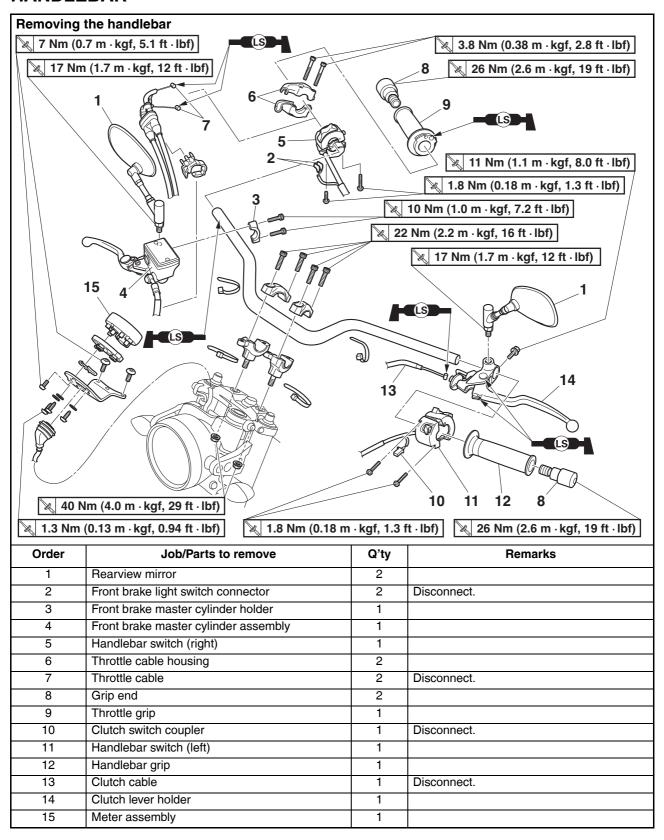
- Check that the pulse is felt in the brake lever, brake pedal, and again in the brake lever, in this order.
- If the pulse is felt in the brake pedal before it is felt in the brake lever, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.
- If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.
- 12. Turn the main switch to "OFF".
- 13.Remove the Yamaha diagnostic tool from the Yamaha diagnostic tool coupler, and then install the protective cap.
- 14. Turn the main switch to "ON".
- 15. Set the start/engine stop switch to " $\bigcirc$ ".
- 16.Check for brake fluid leakage around the hydraulic unit.
  - Brake fluid leakage → Replace the hydraulic unit, brake pipes, and related parts as a set.
- 17. If the operation of the hydraulic unit is normal, delete all of the fault codes.

EAS3020

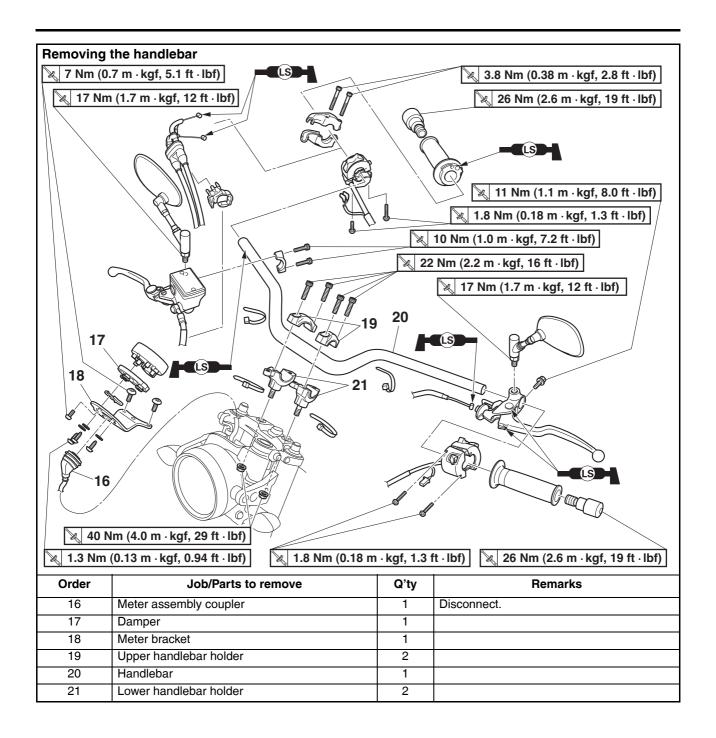
## **CHECKING THE ABS WARNING LIGHT**

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

# **HANDLEBAR**



# **HANDLEBAR**



## **REMOVING THE HANDLEBAR**

1. Stand the vehicle on a level surface.

EWA13120

# **WARNING**

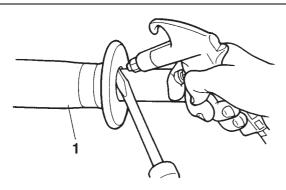
Securely support the vehicle so that there is no danger of it falling over.

## 2. Remove:

• Handlebar grip "1"

TIP

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

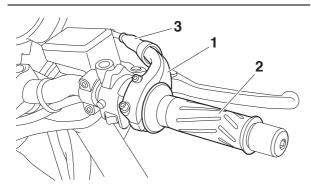


#### 3. Remove:

- Throttle cable housings "1"
- Throttle grip "2"

TIP

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



EAS30204

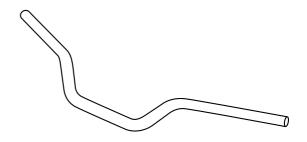
## **CHECKING THE HANDLEBAR**

- 1. Check:
- Handlebar Bends/cracks/damage → Replace.

EWA13690

# **WARNING**

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



EAS30205

## **INSTALLING THE HANDLEBAR**

1. Stand the vehicle on a level surface.

WA13120

# **WARNING**

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

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



Upper handlebar holder bolt 22 Nm (2.2 m·kgf, 16 ft·lbf)

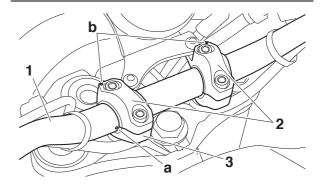
ECA19130

#### NOTICE

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

TIP

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



- 3. Tighten:
  - Lower handlebar holder nuts



Lower handlebar holder nut 40 Nm (4.0 m·kgf, 29 ft·lbf)

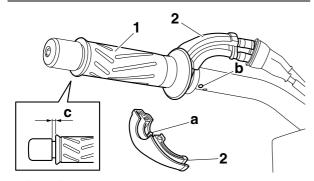
- 4. Install:
- Throttle grip "1"
- Throttle cables
- Throttle cable housings "2"
- Grip end



Grip end 26 Nm (2.6 m·kgf, 19 ft·lbf)

#### **TIP**

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



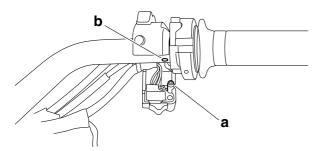
- 5. Install:
  - Handlebar switch screw (right)



Handlebar switch screw 1.8 Nm (0.18 m·kgf, 1.3 ft·lbf)

#### TIP

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



- 6. Install:
  - Front brake master cylinder assembly Refer to "INSTALLING THE FRONT BRAKE MASTER CYLINDER" on page 4-36.

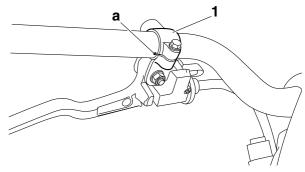
- 7. Install:
  - Clutch lever holder "1"
  - Clutch cable



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

#### TIP

Align the center of slit on the clutch lever holder with the punch mark "a" on the handlebar.



- 8. Install:
  - Handlebar grip "1"
- Grip end "2"



Grip end 26 Nm (2.6 m·kgf, 19 ft·lbf)

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

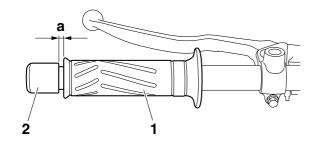
EWA13700

# **WARNING**

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

#### TIP

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



#### 0 1--4-11

# 9. Install:

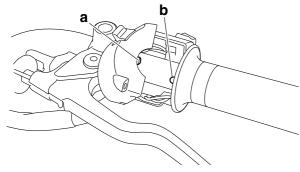
• Handlebar switch screw (left)



Handlebar switch screw 1.8 Nm (0.18 m·kgf, 1.3 ft·lbf)

# TIP -

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



# 10.Adjust:

 Throttle grip free play Refer to "CHECKING THE THROTTLE GRIP" on page 3-28.



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

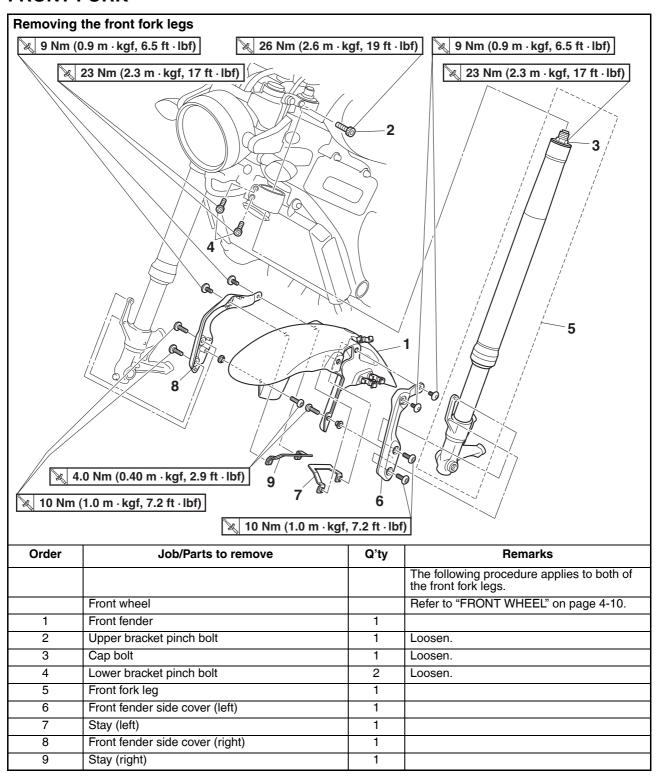
# 11.Adjust:

 Clutch lever free play Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-11.

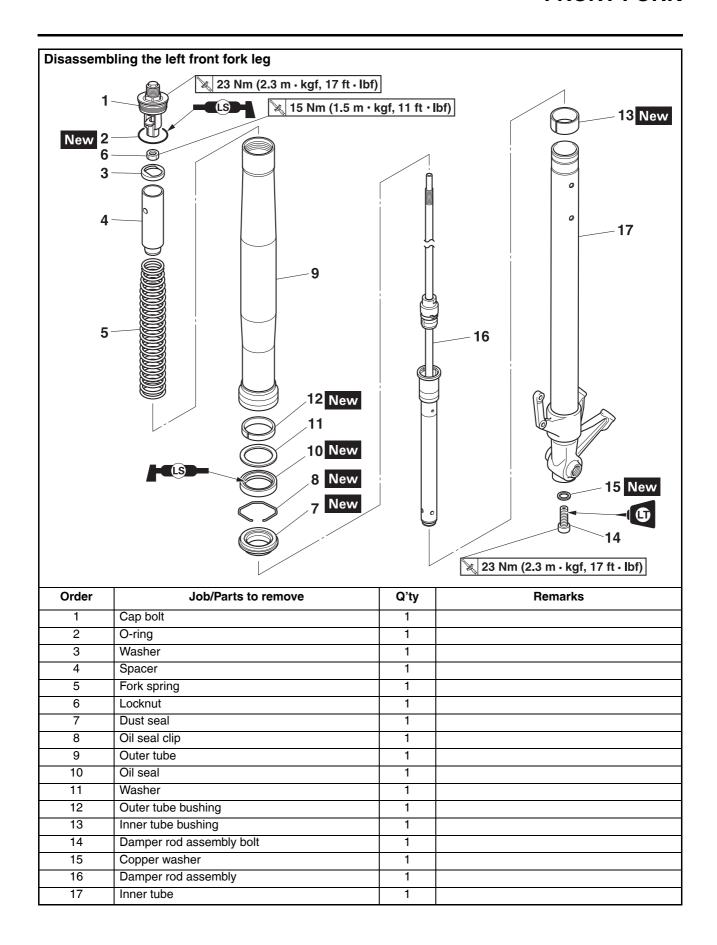


Clutch lever free play 10.0–15.0 mm (0.39–0.59 in)

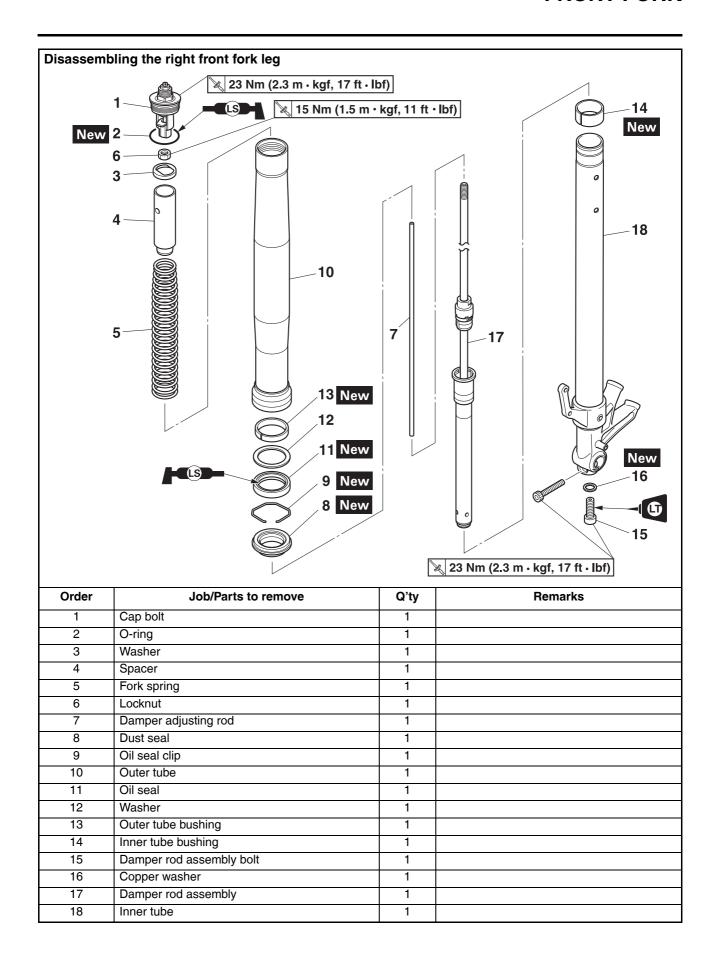
# **FRONT FORK**



# **FRONT FORK**



# **FRONT FORK**



# **REMOVING THE FRONT FORK LEGS**

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

TIP .

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. 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.

TIP .

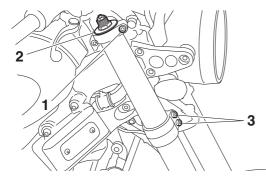
Place the vehicle on a maintenance stand so that the front wheel is elevated.

- 2. Remove:
  - Front brake caliper Refer to "FRONT BRAKE" on page 4-26.
- Front wheel Refer to "FRONT WHEEL" on page 4-10.
- 3. Loosen:
  - Upper bracket pinch bolt "1"
  - Cap bolt "2"
  - Lower bracket pinch bolts "3"

WA13640

# **WARNING**

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



- 4. Remove:
  - Front fork leg

EAS30207

# **DISASSEMBLING THE FRONT FORK LEGS**

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

- 1. Remove:
- Cap bolt "1" (from the damper rod assembly)
- Washer "2"
- Spacer "3"

• Locknut "4"

\*\*\*\*\*\*\*\*\*\*\*\*

a. Press down on the spacer with the fork spring compressor "5".

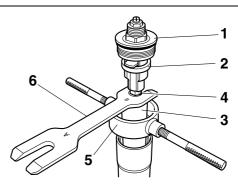
b. Install the rod holder "6" between the locknut "4" and the spacer "3".



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

TIP.

Use the side of the rod holder that is marked "B".



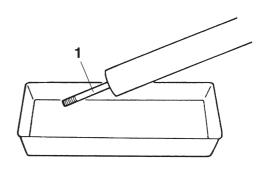
- c. Hold the cap bolt and loosen the locknut.
- d. Remove the cap bolt and washer.
- e. Remove the rod holder and fork spring compressor.
- f. Remove the spacer and locknut.

# 

- 2. Drain:
  - Fork oil

TIP

Stroke the damper rod assembly "1" several times while draining the fork oil.



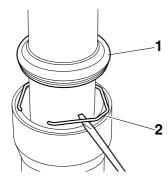
- 3. Remove:
  - Dust seal "1"

 Oil seal clip "2" (with a flat-head screwdriver)

ECA19100

**NOTICE** 

Do not scratch the outer tube.



- 4. Remove:
  - Outer tube

a. Hold the front fork leg horizontally.

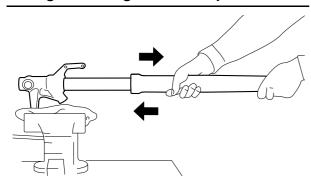
\*\*\*\*\*\*\*\*\*\*\*\*

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

ECA1988

NOTICE

Excessive force will damage the bushings. Damaged bushings must be replaced.



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

ECA21330

**NOTICE** 

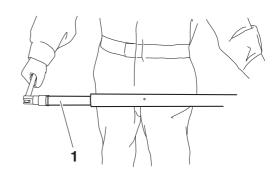
For the damper rod assembly, the right side is used for the rebound operation. Pay attention not to mistake the right and left.

TIP

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



Damper rod holder (ø27) 90890-01582 Damper rod holder YM-01582



EAS30208

#### **CHECKING THE FRONT FORK LEGS**

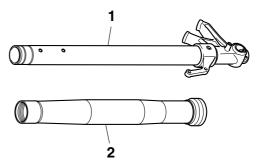
The following procedure applies to both of the front fork legs.

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

EWA136

# **WARNING**

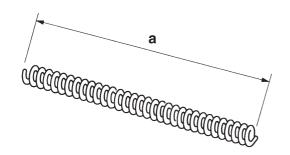
Do not attempt to straighten a bent inner tube as this may dangerously weaken it.



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



Fork spring free length 305.3 mm (12.02 in) Limit 299.1 mm (11.78 in)



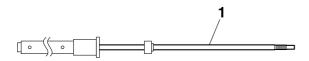
## 3. Check:

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

ECA19110

## NOTICE

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



EAS3020

#### ASSEMBLING THE FRONT FORK LEGS

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

EWA17090

## **WARNING**

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

TIP

- When assembling the front fork leg, be sure to replace the following parts:
  - -Inner tube bushing
  - -Outer tube bushing

- -Oil seal
- -Oil seal clip
- -Dust seal
- -Copper washer
- -O-ring
- Before assembling the front fork leg, make sure all of the components are clean.
- 1. Install:
- Damper rod assembly "1"

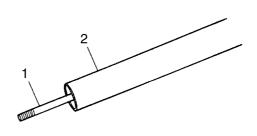
ECA19120

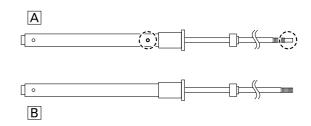
# NOTICE

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

TIP

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





- A. Left side
- B. Right side
- 2. Tighten:
  - Damper rod assembly bolt (along with the copper washer New)



Front fork damper rod assembly bolt

23 Nm (2.3 m·kgf, 17 ft·lbf) LOCTITE®

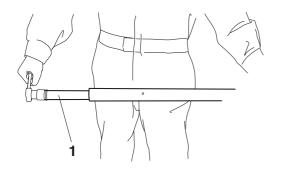
TIP

While holding the damper rod assembly with the

damper rod holder "1", tighten the damper rod assembly bolt.



Damper rod holder (ø27) 90890-01582 Damper rod holder YM-01582



- 3. Lubricate:
  - Inner tube's outer surface



Recommended oil Yamaha Suspension Oil G10

- 4. Install:
- Dust seal "1" NewOil seal clip "2" New
- Oil seal "3" New
- Washer "4"
- Outer tube bushing "5" New
- Inner tube bushing "6" New

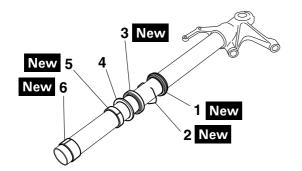


NOTICE

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

# TIP\_

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

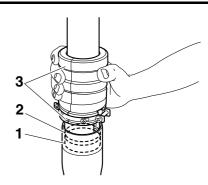




- 5. Install:
  - Outer tube (to the inner tube)
- 6. Install:
  - Outer tube bushing "1"
  - Washer "2" (with the fork seal driver "3")



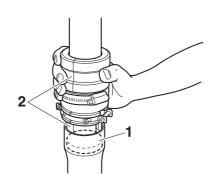
Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442



- 7. Install:
  - Oil seal "1" (with the fork seal driver "2")



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

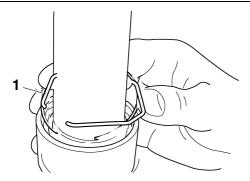


#### 8. Install:

• Oil seal clip "1"

#### TIP

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

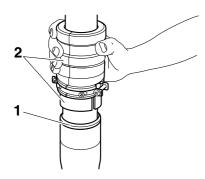


#### 9. Install:

 Dust seal "1" (with the fork seal driver "2")



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

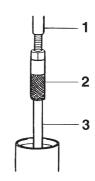


## 10.Install:

- Rod puller "1"
- Rod puller attachment (M10 long) "2" (onto the damper rod "3")



Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703 Rod puller attachment (M10 long) 90890-01578 Universal damping rod bleeding tool set YM-A8703



## 11.Fill:

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



Recommended oil Yamaha Suspension Oil G10 Quantity (left) 444.0 cm³ (15.01 US oz, 15.66 Imp.oz) Quantity (right) 431.0 cm³ (14.57 US oz, 15.20 Imp.oz)

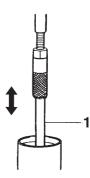
#### ECA14230

## NOTICE

- Be sure to use the recommended fork oil.
   Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.
- 12. After filling the front fork leg, slowly stroke the damper rod "1" up and down (at least ten times) to distribute the fork oil.

#### TIP\_

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



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

TIP

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

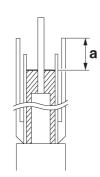
## 14.Measure:

 Front fork leg oil level "a" (from the top of the outer tube, with the outer tube fully compressed and without the fork spring)

Out of specification  $\rightarrow$  Correct.

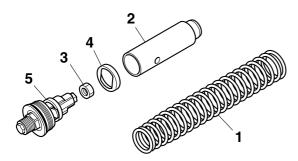


Level (left) 174 mm (6.9 in) Level (right) 175 mm (6.9 in)



#### 15.Install:

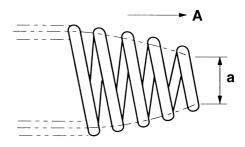
- Fork spring (left side) "1"
- Spacer (left side) "2"
- Locknut (left side) "3"
- Washer (left side) "4"
- Cap bolt (left side) "5" (along with the O-ring New )



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

TIP

Install the fork spring with the smaller diameter "a" facing up "A".



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



Rod puller 90890-01437

Universal damping rod bleeding tool set

YM-A8703

Rod puller attachment (M10 long) 90890-01578

Universal damping rod bleeding tool set

YM-A8703

Fork spring compressor 90890-01441

Fork spring compressor

YM-01441

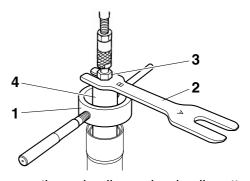
Rod holder

90890-01434

Damper rod holder double ended YM-01434

TIP

Use the side of the rod holder that is marked "B".



i. Remove the rod puller and rod puller attach-

ment.

 Install the washer and cap bolt, and then finger tighten the cap bolt.

EWA1

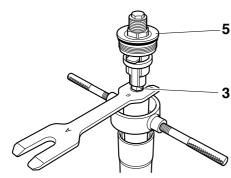
# **WARNING**

# Always use a new cap bolt O-ring.

k. Hold the cap bolt "5" and tighten the locknut "3" to specification.



Front fork cap bolt locknut 15 Nm (1.5 m·kgf, 11 ft·lbf)

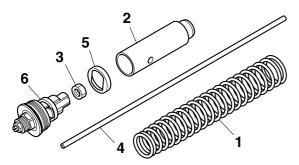


 Remove the rod holder and fork spring compressor.

# 

#### 16.Install:

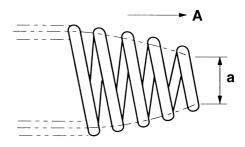
- Fork spring (right side) "1"
- Spacer (right side) "2"
- Locknut (right side) "3"
- Damper adjusting rod "4"
- Washer (right side) "5"
- Cap bolt (right side) "6" (along with the O-ring New)



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

TIP

Install the fork spring with the smaller diameter "a" facing up "A".



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



Rod puller 90890-01437

Universal damping rod bleeding tool set

YM-A8703

Rod puller attachment (M10 long) 90890-01578

Universal damping rod bleeding tool set

YM-A8703

Fork spring compressor 90890-01441

Fork spring compressor YM-01441

1111 V 1771 "ablad ba

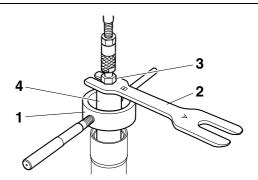
Rod holder

90890-01434

Damper rod holder double ended YM-01434

TIP

Use the side of the rod holder that is marked "B".



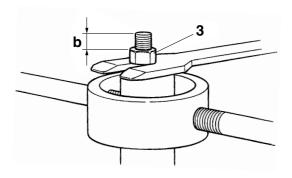
i. Remove the rod puller and rod puller attach-

ment.

j. Position the locknut "3" as specified "b".



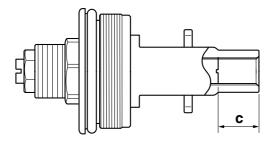
Distance "b" 12 mm (0.47 in)



k. Set the cap bolt distance "c" to specification.



Distance "c" 13 mm (0.51 in)



I. Install the damper adjusting rod, washer and cap bolt, and then finger tighten the cap bolt.

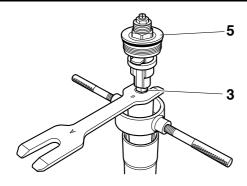
# WARNING

### Always use a new cap bolt O-ring.

m. Hold the cap bolt "5" and tighten the locknut "3" to specification.



Front fork cap bolt locknut 15 Nm (1.5 m·kgf, 11 ft·lbf)



n. Remove the rod holder and fork spring compressor.

17.Install:

 Cap bolt (to the outer tube)

#### TIP

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

FAS30210

### **INSTALLING THE FRONT FORK LEGS**

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

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

# TIP

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

- 2. Tighten:
- Lower bracket pinch bolts "1"



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

• Cap bolt "2"



Front fork cap bolt 23 Nm (2.3 m·kgf, 17 ft·lbf)

• Upper bracket pinch bolt "3"

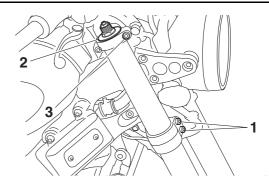


Upper bracket pinch bolt 26 Nm (2.6 m·kgf, 19 ft·lbf)

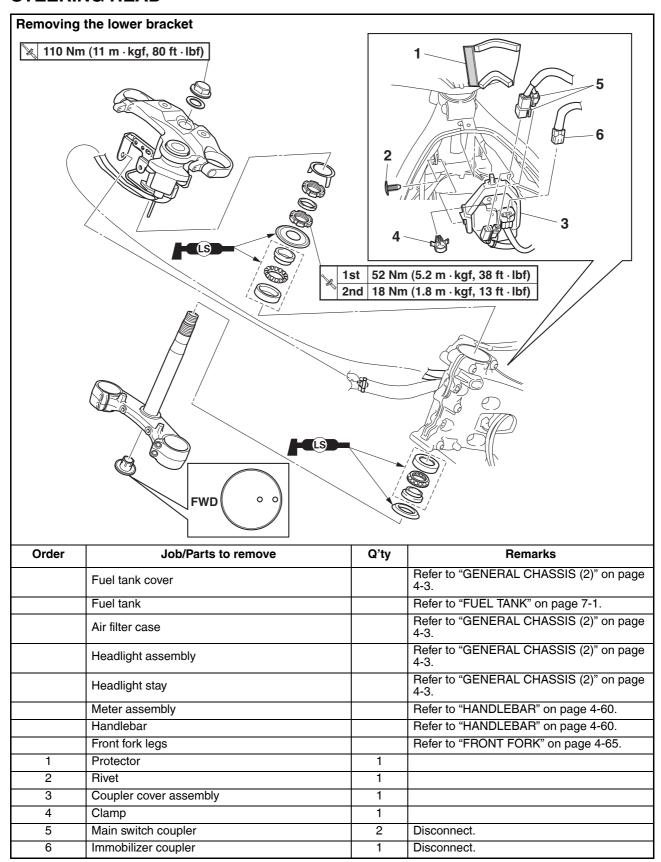
EWA13680

# **WARNING**

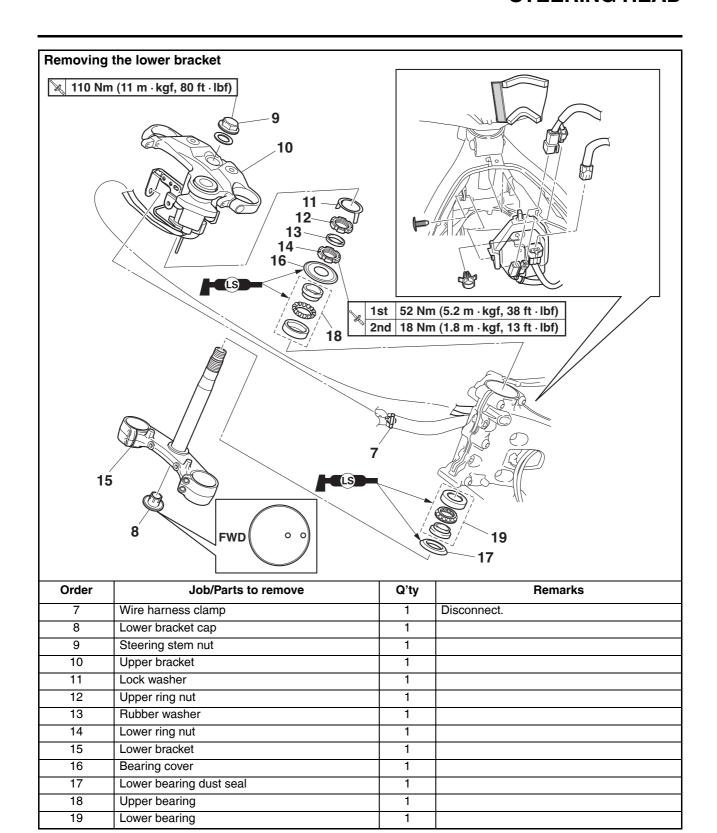
Make sure the brake hoses are routed properly.



# STEERING HEAD



# **STEERING HEAD**



### REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

EWA1312

# **WARNING**

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

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

EWA13730

# **WARNING**

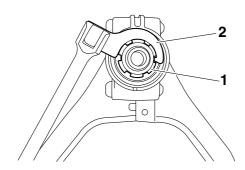
Securely support the lower bracket so that there is no danger of it falling.

TIP

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



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



EAS30214

# **CHECKING THE STEERING HEAD**

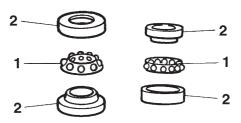
- 1. Wash:
  - Bearing
  - Bearing race



Recommended cleaning solvent Kerosene

- 2. Check:
- Bearing "1"
- Bearing race "2"

Damage/pitting → Replace the bearings and bearing races as a set.



- 3. Replace:
  - Bearing
  - Bearing race
- a. Remove the bearing races from the steering head pipe "1" with a long rod "2" and hammer.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

- b. Remove the bearing race "3" from the lower bracket with a floor chisel "4" and hammer.
- c. Install a new dust seal and new bearing races.

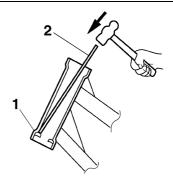
ECA14270

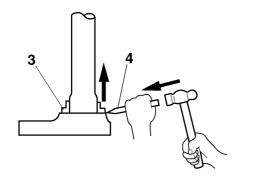
# NOTICE

If the bearing race is not installed properly, the steering head pipe could be damaged.

TIP

- Always replace the bearings and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.





pinch bolts.

- 5. Tighten:
  - Steering stem nut



Steering stem nut 110 Nm (11 m·kgf, 80 ft·lbf)

4. Check:

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

EAS30216

### **INSTALLING THE STEERING HEAD**

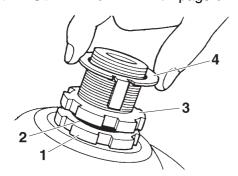
- 1. Lubricate:
  - Upper bearing
  - Lower bearing



Recommended lubricant Lithium-soap-based grease

- 2. Install:
  - Lower ring nut "1"
  - Rubber washer "2"
  - Upper ring nut "3"
  - Lock washer "4"

Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-18.



- 3. Install:
  - Upper bracket
  - Steering stem nut

TIP

Temporarily tighten the steering stem nut.

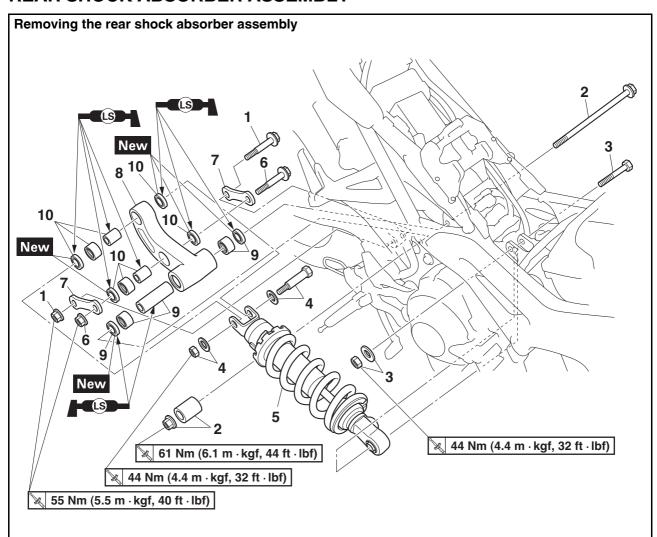
- 4. Install:
  - Front fork legs Refer to "FRONT FORK" on page 4-65.

TIP

Temporarily tighten the upper and lower bracket

FAS2003

# **REAR SHOCK ABSORBER ASSEMBLY**



| Order | Job/Parts to remove                                | Q'ty  | Remarks                                     |
|-------|----------------------------------------------------|-------|---------------------------------------------|
|       | Rider seat                                         |       | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
|       | Fuel tank cover                                    |       | Refer to "GENERAL CHASSIS (2)" on page 4-3. |
|       | Fuel tank                                          |       | Refer to "FUEL TANK" on page 7-1.           |
|       | Canister                                           |       | Refer to "FUEL TANK" on page 7-1.           |
|       | Muffler assembly                                   |       | Refer to "ENGINE REMOVAL" on page 5-3.      |
| 1     | Connecting arm lower nut/Bolt                      | 1/1   |                                             |
| 2     | Relay arm nut/Collar/Bolt                          | 1/1/1 |                                             |
| 3     | Rear shock absorber assembly upper nut/Washer/Bolt | 1/1/1 |                                             |
| 4     | Rear shock absorber assembly upper nut/Washer/Bolt | 1/2/1 |                                             |
| 5     | Rear shock absorber assembly                       | 1     |                                             |
| 6     | Connecting arm upper nut/Bolt                      | 1/1   |                                             |
| 7     | Connecting arm                                     | 2     |                                             |
| 8     | Relay arm                                          | 1     |                                             |
| 9     | Collar/Oil seal/Bearing                            | 1/2/2 |                                             |
| 10    | Collar/Oil seal/Bearing                            | 2/4/2 |                                             |

# REAR SHOCK ABSORBER ASSEMBLY

EAS30826

# 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.

EAS30729

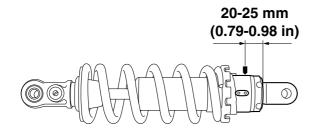
# **DISPOSING OF A REAR SHOCK ABSORBER**

Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3 mm (0.08–0.12 in) hole through the rear shock absorber at a point 20–25 mm (0.79–0.98 in) from its end as shown.

EWA13760

### **WARNING**

Wear eye protection to prevent eye damage from released gas or metal chips.



EAS30219

# REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120

# **⚠** WARNING

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

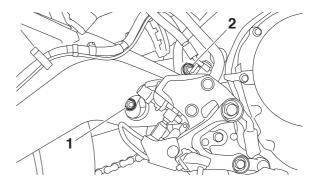
TIP\_

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

- 2. Remove:
  - Connecting arm lower nut "1"
  - Connecting arm lower bolt
  - Relay arm nut "2"
  - Relay arm bolt

TIP

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



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

TIP

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

EAS3022

# CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Check:
  - Rear shock absorber rod Bends/damage → Replace the rear shock absorber assembly.
  - Rear shock absorber assembly
     Gas leaks/oil leaks → Replace the rear shock absorber assembly.
  - Spring
- Bushings

Damage/wear  $\rightarrow$  Replace the rear shock absorber assembly.

 Bolts Bends/damage/wear → Replace.

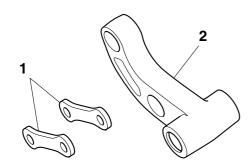
EAS30221

# CHECKING THE CONNECTING ARM AND RELAY ARM

- 1. Check:
- Connecting arms "1"
- Relay arm "2"

# REAR SHOCK ABSORBER ASSEMBLY

# Damage/wear $\rightarrow$ Replace.



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

EAS30222

#### **INSTALLING THE RELAY ARM**

- 1. Lubricate:
  - Collars
  - Oil seals



Recommended lubricant Lithium-soap-based grease

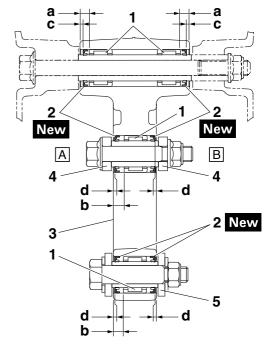
- 2. Install:
  - Bearing "1" (to the relay arm)
  - Oil seals "2" New (to the relay arm)



Installed depth "a"
6.0 mm (0.24 in)
Installed depth "b"
7.0 mm (0.28 in)
Installed depth "c"
1.5–2.5 mm (0.06–0.10 in)
Installed depth "d"
1.0–2.0 mm (0.04–0.08 in)

#### TID

- When installing the oil seals "2" to the relay arm, face the character stamp of the oil seals outside.
- When installing the connecting arms "4" to the relay arm, face the 1RC mark of the connecting arms outside.



- 3. Relay arm
- 4. Connecting arm
- 5. Rear shock absorber assembly
- A. Left side
- B. Right side

EAS30225

# INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Install:
- Rear shock absorber assembly
- Rear shock absorber assembly upper bolt
- Rear shock absorber assembly upper nut
- Relay arm bolt
- Relay arm nut
- Connecting arm lower bolt
- Connecting arm lower nut

TIP.

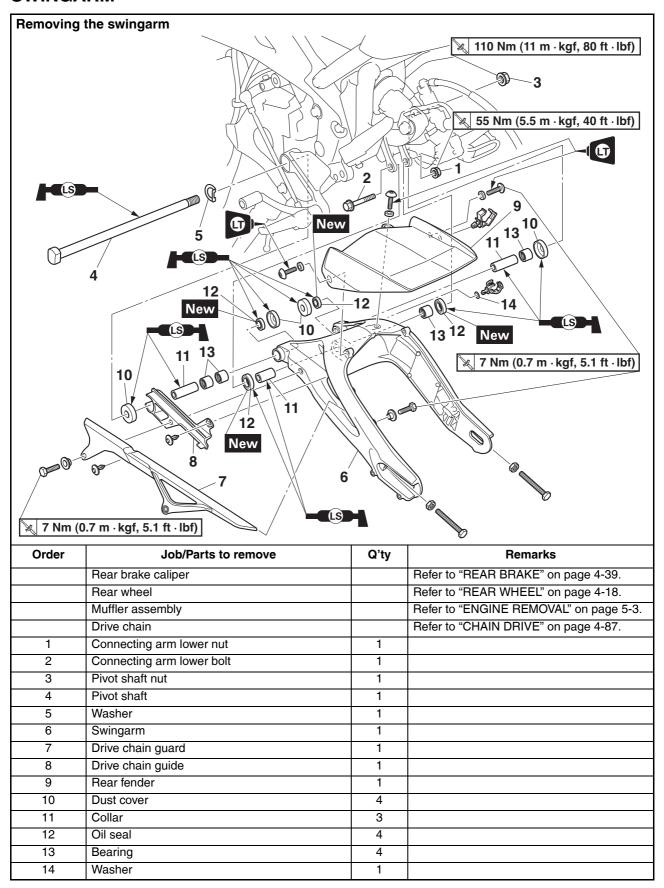
- Install the rear shock absorber assembly upper bolt, relay arm bolt and connecting arm lower bolt from the left.
- When installing the rear shock absorber assembly, lift up the swingarm.
- Install the rear shock absorber assembly with the rebound damping adjusting screw facing the left side of the vehicle.
- 2. Tighten:
- Rear shock absorber assembly upper nut
- Relay arm nut
- Connecting arm lower nut

# **REAR SHOCK ABSORBER ASSEMBLY**



Rear shock absorber assembly nut (upper)
44 Nm (4.4 m·kgf, 32 ft·lbf)
Relay arm nut
61 Nm (6.1 m·kgf, 44 ft·lbf)
Connecting arm lower nut
55 Nm (5.5 m·kgf, 40 ft·lbf)

# **SWINGARM**



### **REMOVING THE SWINGARM**

1. Stand the vehicle on a level surface.

EWA1312

# **WARNING**

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

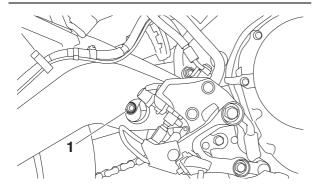
TIP

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

- 2. Remove:
  - Connecting arm lower nut "1"
  - Connecting arm lower bolt

TIP

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

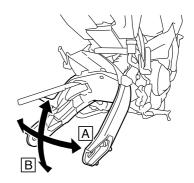


- 3. Measure:
- Swingarm side play
- Swingarm vertical movement
- a. Measure the tightening torque of the pivot shaft nut.



# Pivot shaft nut 110 Nm (11 m·kgf, 80 ft·lbf)

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



4. Remove:

- Drive chain Refer to "REMOVING THE DRIVE CHAIN" on page 4-88.
- Swingarm

EAS3022

### **CHECKING THE SWINGARM**

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

WA13770

# **WARNING**

Do not attempt to straighten a bent pivot shaft.



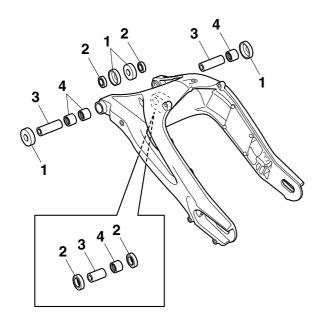
- 3. Wash:
  - Pivot shaft
  - Dust covers
  - Collars
  - Washer



Recommended cleaning solvent Kerosene

- 4. Check:
  - Dust covers "1"
  - Oil seals "2"
     Damage/wear → Replace.

- Collars "3" Damage/scratches → Replace.
- Bearing "4"
   Damage/pitting → Replace.



#### **INSTALLING THE SWINGARM**

- 1. Lubricate:
  - Dust covers
  - Pivot shaft
  - Oil seals
  - Collars



Recommended lubricant Lithium-soap-based grease

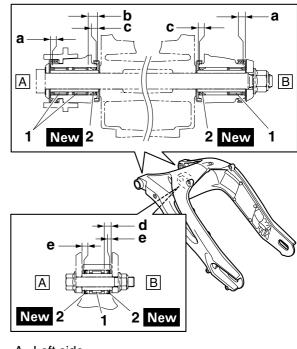
- 2. Install:
  - Bearing "1" (to the swingarm)
  - Oil seals "2" New (to the swingarm)



Installed depth "a"
2.0 mm (0.08 in)
Installed depth "b"
9.0 mm (0.35 in)
Installed depth "c"
0.5-1.5 mm (0.02-0.06 in)
Installed depth "d"
7.0 mm (0.28 in)
Installed depth "e"
1.5-2.5 mm (0.06-0.10 in)

TIP

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



- A. Left side
- B. Right side
- 3. Install:
  - Swingarm
  - Pivot shaft



Pivot shaft nut 110 Nm (11 m·kgf, 80 ft·lbf)

- 4. Install:
  - Drive chain Refer to "INSTALLING THE DRIVE CHAIN" on page 4-90.
  - Connecting arm lower bolt
- Connecting arm lower nut



Connecting arm lower nut 55 Nm (5.5 m·kgf, 40 ft·lbf)

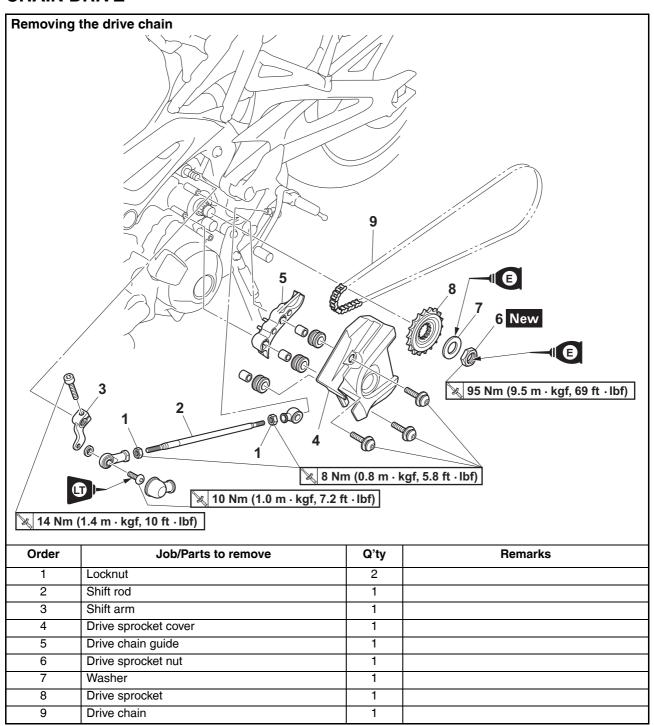
- Rear wheel Refer to "REAR SHOCK ABSORBER AS-SEMBLY" on page 4-80 and "REAR WHEEL" on page 4-18.
- 5. Adjust:
  - Drive chain slack Refer to "DRIVE CHAIN SLACK" on page 3-17.



**Drive chain slack (Maintenance stand)** 

5.0–15.0 mm (0.20–0.59 in) Drive chain slack (Sidestand) 5.0–15.0 mm (0.20–0.59 in)

# **CHAIN DRIVE**



### REMOVING THE DRIVE CHAIN

1. Stand the vehicle on a level surface.

EWA13120

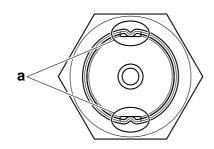
# **WARNING**

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

TIP

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

2. Straighten the drive sprocket nut rib "a".



- 3. Remove:
  - Drive chain

ECA17410

# NOTICE

Be sure to put on safety goggles when working.

TIP

Cut the drive chain with the drive chain cut & rivet tool.



Drive chain cut & rivet tool 90890-01550 Drive chain cut & rivet tool YM-01550

E & C 20220

#### **CHECKING THE DRIVE CHAIN**

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



15-link length limit 239.3 mm (9.42 in)

a. Measure the length "b" between the inner sides of the pins and the length "c" between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.

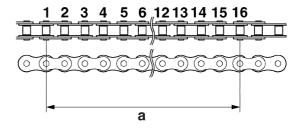
\*\*\*\*\*\*\*\*\*\*\*\*

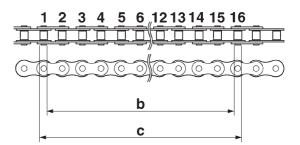
b. Calculate the length "a" of the 15-link section of the drive chain using the following formula.

Drive chain 15-link section length "a" = (length "b" between pin inner sides + length "c" between pin outer sides)/2

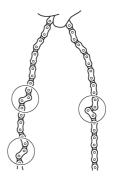
TIP

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





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

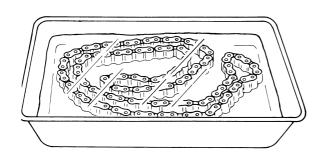


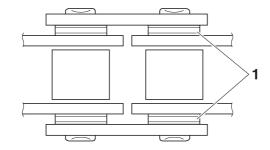
- 3. Clean:
- Drive chain
- a. Wipe the drive chain with a clean cloth.
- b. Put the drive chain in kerosene and remove any remaining dirt.
- c. Remove the drive chain from the kerosene and completely dry it.

ECA19090

### NOTICE

- This vehicle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.
- Do not soak the drive chain in kerosene for more than ten minutes, otherwise the Orings can be damaged.

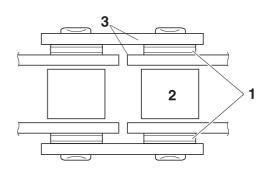




- 4. Check:
  - O-rings "1"

Damage → Replace the drive chain.

- Drive chain rollers "2"
   Damage/wear → Replace the drive chain.
- Drive chain side plates "3"
   Damage/wear/cracks → Replace the drive chain.



- 5. Lubricate:
  - Drive chain



Recommended lubricant Chain lubricant suitable for Oring chains

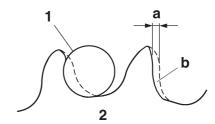
EAS30231

# **CHECKING THE DRIVE SPROCKET**

- 1. Check:
- Drive sprocket

More than 1/4 tooth "a" wear  $\rightarrow$  Replace the drive sprocket, the rear wheel sprocket and the drive chain as a set.

Bent teeth  $\rightarrow$  Replace the drive sprocket, the rear wheel sprocket and the drive chain as a set.



- b. Correct
- 1. Drive chain roller
- 2. Drive sprocket

EAS30232

CHECKING THE REAR WHEEL SPROCKET Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-22.

EAS30233

CHECKING THE REAR WHEEL DRIVE HUB
Refer to "CHECKING THE REAR WHEEL
DRIVE HUB" on page 4-22.

#### **INSTALLING THE DRIVE CHAIN**

- 1. Install:
- Drive chain

ECA17410

# NOTICE

Be sure to put on safety goggles when working.

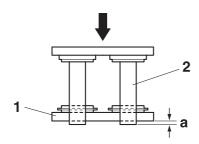
TIP\_

Install the drive chain joint with the drive chain cut & rivet tool.

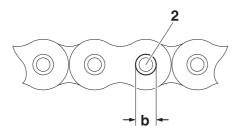


Drive chain cut & rivet tool 90890-01550 Drive chain cut & rivet tool YM-01550

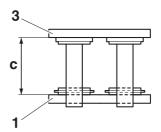
a. When press fitting the connecting plate "1", make sure the space "a" between the end of the connecting pin "2" and the connecting plate is 1.2–1.4 mm (0.05–0.06 in).



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



c. After riveting, make sure the space "c", which is inside of the connecting link "3" and inside of the connecting plate "1", is 14.1–14.3 mm (0.555–0.562 in).



2. Lubricate:

Drive chain



Recommended lubricant Chain lubricant suitable for Oring chains

3. Install:

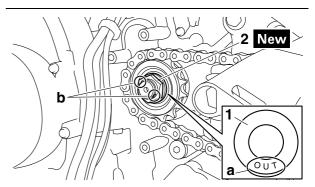
- Drive sprocket
- Washer "1"
- Drive sprocket nut "2" New



Drive sprocket nut 95 Nm (9.5 m·kgf, 69 ft·lbf)

### TIP.

- While applying the rear brake, tighten the drive sprocket nut.
- Install washer "1" with the "OUT" mark "a" facing out.
- Stake the drive sprocket nut "2" at cutouts "b" in the drive axle.



4. Install:

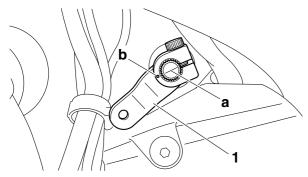
• Shift arm "1"

#### TIP -

Before installing, make sure to align the mark "a" of the shift shaft with the punch mark "b" of the shift arm.



Shift arm bolt 14 Nm (1.4 m·kgf, 10 ft·lbf)



# 5. Adjust:

 Drive chain slack
 Refer to "Adjusting the drive chain slack" on page 3-18.



**Drive chain slack (Maintenance stand)** 

5.0–15.0 mm (0.20–0.59 in) Drive chain slack (Sidestand) 5.0–15.0 mm (0.20–0.59 in)

ECA13550

# NOTICE

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

# **ENGINE**

| ENGINE INSPECTION                               | 5-1  |
|-------------------------------------------------|------|
| MEASURE THE COMPRESSION PRESSURE                | 5-1  |
| ENGINE REMOVAL                                  | 5-3  |
| REMOVING THE ENGINE                             |      |
| INSTALLING THE ENGINE                           |      |
| INOTALLING THE LINGING                          | 5-7  |
| CAMSHAFTS                                       |      |
| REMOVING THE CAMSHAFTS                          |      |
| CHECKING THE CAMSHAFTS                          |      |
| CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET |      |
| CHECKING THE TIMING CHAIN GUIDES                |      |
| CHECKING THE TIMING CHAIN TENSIONER             |      |
| INSTALLING THE CAMSHAFTS                        | 5-14 |
| CYLINDER HEAD                                   |      |
| REMOVING THE CYLINDER HEAD                      |      |
| CHECKING THE TIMING CHAIN GUIDE (EXHAUST SIDE)  |      |
| CHECKING THE CYLINDER HEAD                      |      |
| INSTALLING THE CYLINDER HEAD                    | 5-21 |
| VALVES AND VALVE SPRINGS                        | 5-22 |
| REMOVING THE VALVES                             |      |
| CHECKING THE VALVES AND VALVE GUIDES            |      |
| CHECKING THE VALVE SEATS                        |      |
| CHECKING THE VALVE SPRINGS                      |      |
| CHECKING THE VALVE LIFTERS                      | 5-27 |
| INSTALLING THE VALVES                           | 5-27 |
| GENERATOR AND STARTER CLUTCH                    | 5-29 |
| REMOVING THE GENERATOR                          | 5-31 |
| REMOVING THE STARTER CLUTCH                     | 5-31 |
| CHECKING THE STARTER CLUTCH                     | 5-31 |
| INSTALLING THE STARTER CLUTCH                   | 5-32 |
| INSTALLING THE GENERATOR                        | 5-32 |
| ELECTRIC STARTER                                | 5-34 |
| CHECKING THE STARTER MOTOR                      | 5-36 |
| ASSEMBLING THE STARTER MOTOR                    | 5-37 |
| INSTALLING THE STARTER MOTOR                    | 5-37 |
| CLUTCH                                          | 5-38 |
| REMOVING THE CLUTCH                             |      |
| CHECKING THE FRICTION PLATES                    |      |
| CHECKING THE CLUTCH PLATES                      |      |
| CHECKING THE CLUTCH SPRINGS                     |      |

| CHECKING THE CLUTCH HOUSING                       | 5-44 |
|---------------------------------------------------|------|
| CHECKING THE CLUTCH BOSS                          | 5-45 |
| CHECKING THE PRESSURE PLATE                       |      |
| CHECKING THE PRIMARY DRIVE GEAR                   |      |
| CHECKING THE PRIMARY DRIVEN GEAR                  |      |
| CHECKING THE PULL LEVER SHAFT AND PULL ROD        |      |
| INSTALLING THE CLUTCH                             |      |
| INSTALLING THE CLUTCH                             | 5-46 |
|                                                   |      |
| SHIFT SHAFT                                       | 5-49 |
| CHECKING THE SHIFT SHAFT                          |      |
| CHECKING THE STOPPER LEVER                        |      |
| INSTALLING THE SHIFT SHAFT                        |      |
| INSTALLING THE SHIFT SHAFT                        | 5-50 |
|                                                   |      |
| OIL PUMP                                          | 5-51 |
| CHECKING THE SPROCKET AND CHAIN                   | 5-53 |
| CHECKING THE OIL PUMP                             | 5-53 |
| CHECKING THE RELIEF VALVE                         |      |
| ASSEMBLING THE OIL PUMP                           |      |
| INSTALLING THE OIL PUMP                           |      |
| INOTALLING THE OIL FOWN                           |      |
|                                                   |      |
| OIL PAN                                           | 5-55 |
| REMOVING THE OIL PAN                              | 5-56 |
| CHECKING THE OIL STRAINER                         |      |
| INSTALLING THE OIL PAN                            |      |
|                                                   |      |
|                                                   |      |
| CRANKCASE                                         |      |
| DISASSEMBLING THE CRANKCASE                       |      |
| CHECKING THE CRANKCASE                            |      |
| ASSEMBLING THE CRANKCASE                          | 5-58 |
|                                                   |      |
| CONNECTING DODG AND DICTORG                       | F 01 |
| CONNECTING RODS AND PISTONS                       |      |
| REMOVING THE CONNECTING RODS AND PISTONS          |      |
| CHECKING THE CYLINDER AND PISTON                  |      |
| CHECKING THE PISTON RINGS                         |      |
| CHECKING THE PISTON PIN                           |      |
| CHECKING THE CONNECTING RODS                      |      |
| INSTALLING THE CONNECTING ROD AND PISTON          | 5-67 |
|                                                   |      |
| CRANKSHAFT AND BALANCER SHAFT                     | E 71 |
| REMOVING THE CRANKSHAFT AND BALANCER SHAFT        |      |
|                                                   | _    |
| CHECKING THE OIL NOZZLES                          |      |
| CHECKING THE CRANKSHAFT                           |      |
| CHECKING THE BALANCER SHAFT                       |      |
| INSTALLING THE CRANKSHAFT                         |      |
| INSTALLING THE BALANCER ASSEMBLY                  | 5-76 |
|                                                   |      |
| TRANSMISSION                                      | r 77 |
| TRANSMISSION                                      |      |
| REMOVING THE TRANSMISSIONCHECKING THE SHIFT FORKS |      |
| CULCVINC THE CHIET ECONO                          | 5-81 |

| CHECKING THE SHIFT DRUM ASSEMBLY        | 5-82 |
|-----------------------------------------|------|
| CHECKING THE TRANSMISSION               | 5-82 |
| ASSEMBLING THE MAIN AXLE AND DRIVE AXLE | 5-82 |
| INSTALLING THE TRANSMISSION             | 5-83 |

# **ENGINE INSPECTION**

EAS30249

### **MEASURE THE COMPRESSION PRESSURE**

The following procedure applies to all of the cylinders.

TIP

Insufficient compression pressure will result in a loss of performance.

- 1. Measure:
  - Valve clearance
     Out of specification → Adjust.
     Refer to "ADJUSTING THE VALVE CLEAR-ANCE" on page 3-5.
- 2. Start the engine, warm it up for several minutes, and then turn it off.
- 3. Remove:
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.
  - Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
  - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
  - Air filter case Refer to "GENERAL CHASSIS (2)" on page 4-3.
  - Air cut-off valve Refer to "AIR INDUCTION SYSTEM" on page 7-15.
  - Ignition coils
  - Spark plugs Refer to "CAMSHAFTS" on page 5-9.

ECA13340

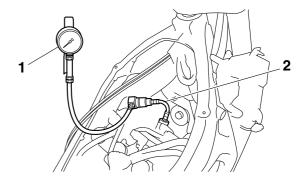
### **NOTICE**

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

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



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



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



Compression pressure 1331–1713 kPa/680 r/min (13.3– 17.1 kgf/cm²/680 r/min, 189.3– 243.7 psi/680 r/min)

- a. Set the main switch to "ON".
- b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

# WARNING

To prevent sparking the plug, remove all ignition coil couplers and fuel injector cou-

plers before cranking the engine.

TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 15 psi).

- c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
  - Carbon deposits → Eliminate.
- d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.

Refer to the following table.

| Compression pressure (with oil applied into the cylinder) |                                                                   |  |
|-----------------------------------------------------------|-------------------------------------------------------------------|--|
| Reading                                                   | Diagnosis                                                         |  |
| Higher than without oil                                   | Piston ring(s) wear or damage $\rightarrow$ Repair.               |  |
| Same as without oil                                       | Piston, valves, cylinder head gasket possibly defective → Repair. |  |

#### 

### 6. Install:

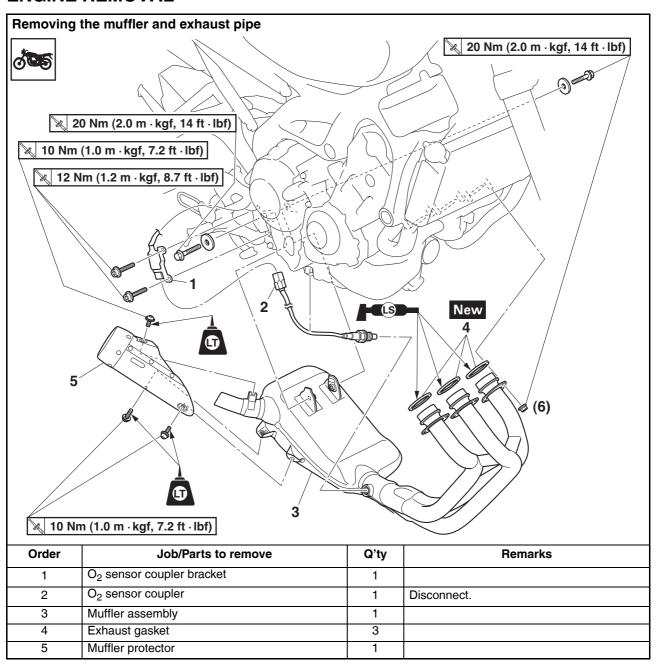
Spark plugs

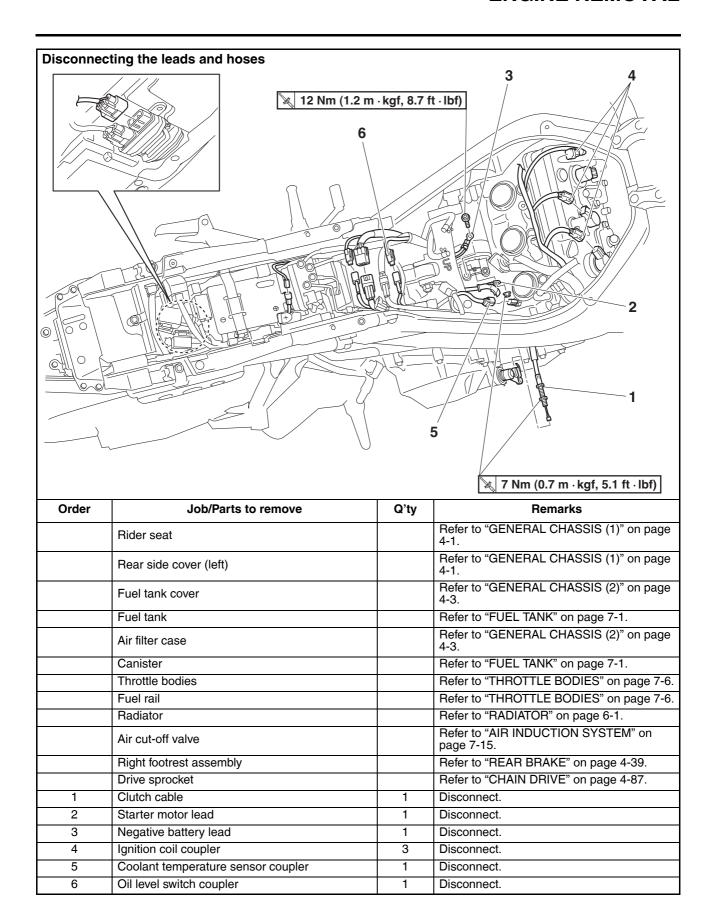


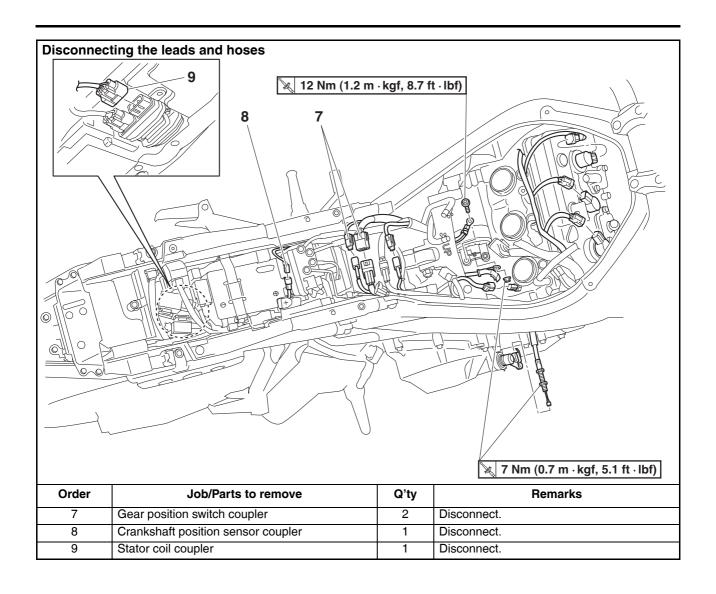
# Spark plug 13 Nm (1.3 m·kgf, 9.4 ft·lbf)

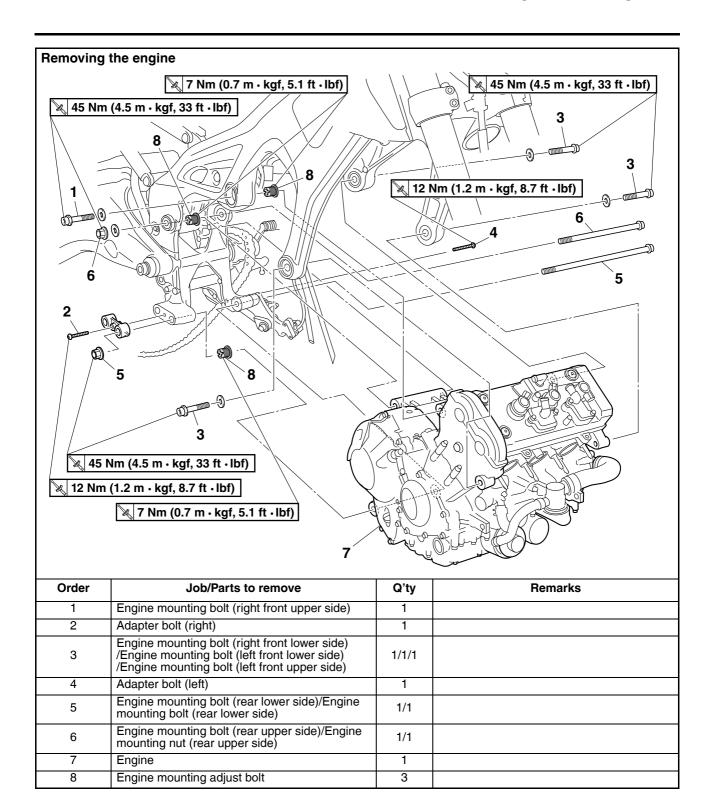
# 7. Install:

- Ignition coils Refer to "CAMSHAFTS" on page 5-9.
- Air cut-off valve Refer to "AIR INDUCTION SYSTEM" on page 7-15.
- Air filter case Refer to "GENERAL CHASSIS (2)" on page 4-3.
- Fuel tank Refer to "FUEL TANK" on page 7-1.
- Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
- Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.









#### **REMOVING THE ENGINE**

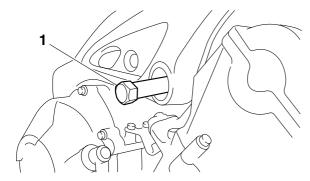
- 1. Loosen:
- Engine mounting adjust bolt (front)

TIP

Loosen the engine mounting adjust bolt with the pivot shaft wrench "1".



Pivot shaft wrench 90890-01485 Frame mount insert wrench YM-01485



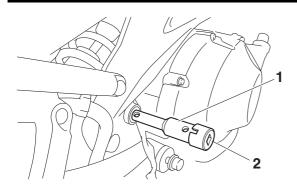
- 2. Loosen:
  - Engine mounting adjust bolts (rear)

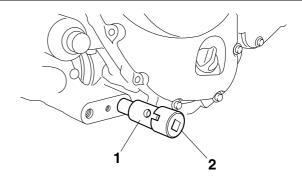
TIP

Loosen the engine mounting adjust bolts with the pivot shaft wrench "1" and pivot shaft wrench adapter "2".



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





EAS30251

#### **INSTALLING THE ENGINE**

- 1. Install:
- Engine mounting adjust bolt (front) "1" (temporarily tighten)
- Engine mounting adjust bolts (rear) "2" (temporarily tighten)
- 2. Install:
  - Engine
- 3. Install:
- Engine mounting bolt (rear upper side) "3"
- Engine mounting bolt (rear lower side) "4"
- 4. Install:
  - Adapter bolt (left) "5" (temporarily tighten)
- 5. Install:
  - Engine mounting bolt (left front upper side) "6"
- Engine mounting bolt (left front lower side) "7"
- Engine mounting bolt (right front lower side) "8"

TIP

Temporarily tighten the engine mounting bolts "6"-"8".

- 6. Tighten:
- Engine mounting adjust bolt (front) "1"

TIP

- Tighten the engine mounting adjust bolt to specification with the pivot shaft wrench.
- Make sure that the flange on the engine mounting adjust bolt contacts the engine.



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



Pivot shaft wrench 90890-01485 Frame mount insert wrench YM-01485

### 7. Tighten:

• Engine mounting adjust bolts (rear) "2"

#### TIP

- Tighten the engine mounting adjust bolts to specification with the pivot shaft wrench and pivot shaft wrench adapter.
- Make sure that the flange on the engine mounting adjust bolt contacts the engine.



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



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

- 8. Install:
  - Adapter bolt (right) "9" (temporarily tighten)
- 9. Install:
  - Engine mounting bolt (right front upper side)
     "10"

# 10.Tighten:

- Engine mounting nut (rear lower side) "11"
- Engine mounting nut (rear upper side) "12"



Engine mounting nut (rear lower) 45 Nm (4.5 m·kgf, 33 ft·lbf) Engine mounting nut (rear upper) 45 Nm (4.5 m·kgf, 33 ft·lbf)

#### 11. Tighten:

- Engine mounting bolt (right front upper side)
   "10"
- Engine mounting bolt (left front upper side) "6"
- Engine mounting bolt (left front lower side) "7"
- Engine mounting bolt (right front lower side)
   "8"



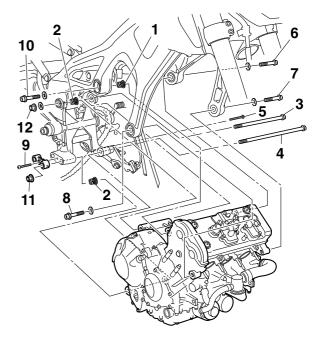
Engine mounting bolt (front upper and front lower)
45 Nm (4.5 m·kgf, 33 ft·lbf)

# 12. Tighten:

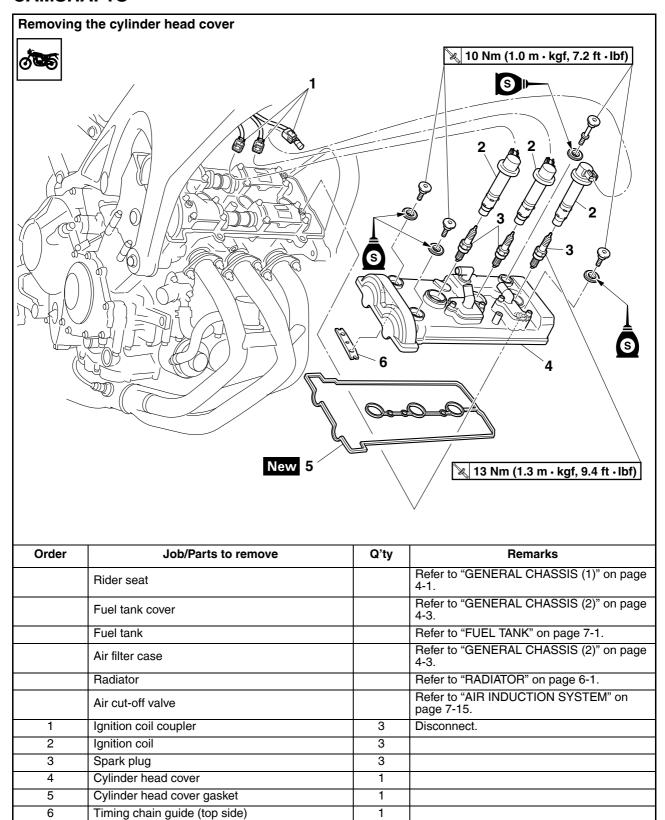
- Adapter bolt (left) "5"
- Adapter bolt (right) "9"

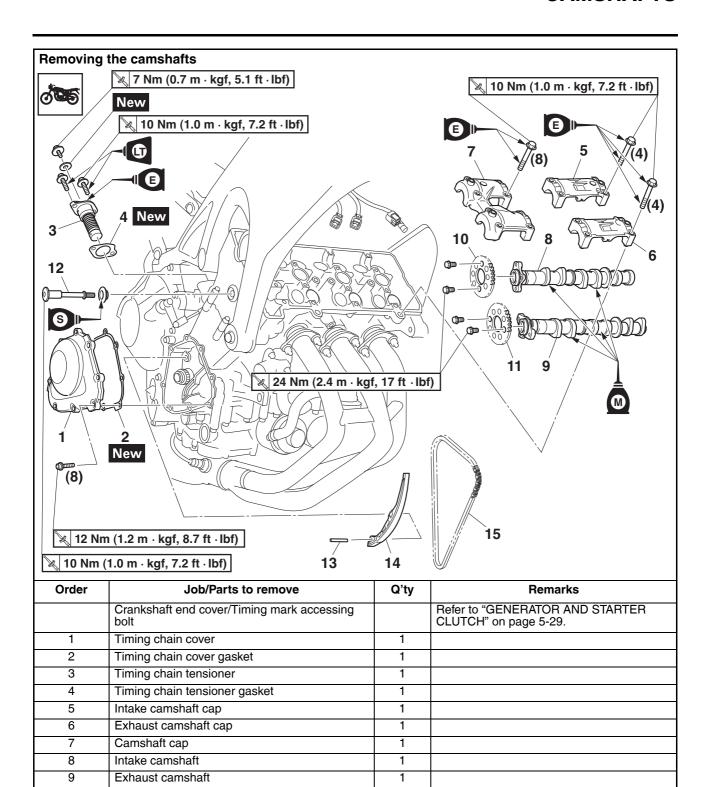


Adapter bolt (left/right) 12 Nm (1.2 m·kgf, 8.7 ft·lbf)



# **CAMSHAFTS**





|             | 4 | 4 | • |  |
|-------------|---|---|---|--|
| <b>'n</b> - | 7 |   |   |  |

Intake camshaft sprocket

Timing chain bolt

Dowel pin

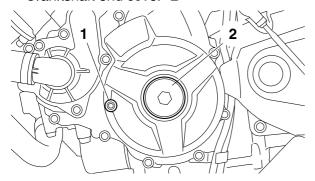
Timing chain

Exhaust camshaft sprocket

Timing chain guide (intake side)

#### **REMOVING THE CAMSHAFTS**

- 1. Remove:
- Timing mark accessing bolt "1"
- Crankshaft end cover "2"



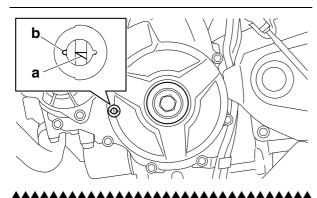
- 2. Align:
  - Mark "a" on the generator rotor (with the generator rotor cover mark "b")
- a. Turn the crankshaft counterclockwise.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

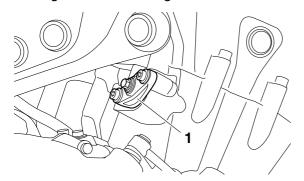
b. When piston #1 is at BTDC125° on the compression stroke, align the BTDC125° mark "a" on the generator rotor with the generator rotor cover mark "b".

TIP.

BTDC125° on the compression stroke can be found when the camshaft lobes are turned away from each other.



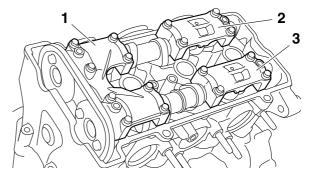
- 3. Remove:
- Timing chain tensioner "1"
- Timing chain tensioner gasket



- 4. Remove:
  - Camshaft cap "1"
- Intake camshaft cap "2"
- Exhaust camshaft cap "3"

NOTICE

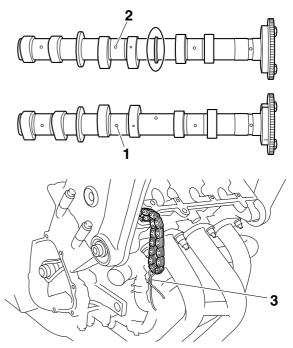
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a crisscross pattern, working from the outside in.



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

TIP

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



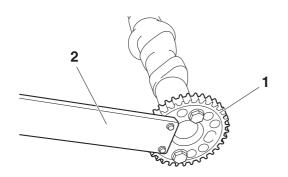
- 6. Remove:
- Camshaft sprocket "1"

TIP

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



Camshaft wrench 90890-04162 Camshaft wrench YM-04162



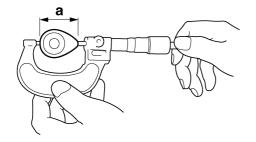
EAS30257

#### **CHECKING THE CAMSHAFTS**

- 1. Check:
- Camshaft lobes
   Blue discoloration/pitting/scratches → Replace the camshaft.
- 2. Measure:
  - Camshaft lobe dimensions "a"
     Out of specification → Replace the camshaft.



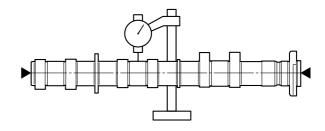
Camshaft lobe dimensions
Lobe height (Intake)
36.290–36.390 mm (1.4287–
1.4327 in)
Limit
36.190 mm (1.4248 in)
Lobe height (Exhaust)
35.720–35.820 mm (1.4063–
1.4102 in)
Limit
35.620 mm (1.4024 in)



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



Camshaft runout limit 0.030 mm (0.0012 in)

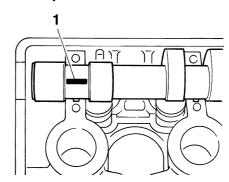


- 4. Measure:
- Camshaft-journal-to-camshaft-cap clearance Out of specification → Measure the camshaft journal diameter.



Camshaft-journal-to-camshaftcap clearance 0.028-0.062 mm (0.0011-0.0024 in) Limit 0.080 mm (0.0032 in)

- a. Install the camshaft into the cylinder head (without the camshaft caps).
- b. Position strip of Plastigauge® "1" onto the camshaft journal as shown.



c. Install the dowel pins and camshaft caps.

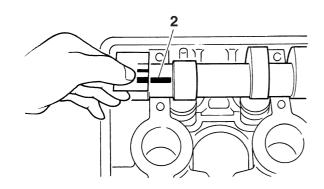
#### TIP

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.



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

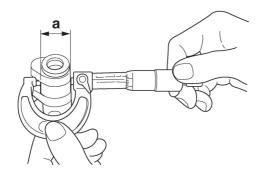
d. Remove the camshaft caps and then measure the width of the Plastigauge® "2".



- 5. Measure:
  - Camshaft journal diameter "a"
     Out of specification → Replace the camshaft.
     Within specification → Replace the cylinder head and the camshaft caps as a set.



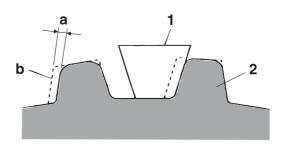
Camshaft journal diameter 24.459-24.472 mm (0.9630-0.9635 in)



EAS30258

# CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET

- 1. Check:
- Timing chain
   Damage/stiffness → Replace the timing chain and camshaft and camshaft sprocket as a set.
- 2. Check:
  - Camshaft sprocket
     More than 1/4 tooth wear "a" → Replace the
     camshaft sprockets and the timing chain as a
     set.



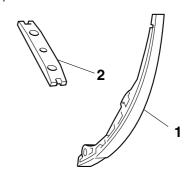
- a. 1/4 tooth
- b. Correct
- 1. Timing chain
- 2. Camshaft sprocket

EAS3026

# **CHECKING THE TIMING CHAIN GUIDES**

The following procedure applies to all of the camshaft sprockets and timing chain guides.

- 1. Check:
- Timing chain guide (intake side) "1"
- Timing chain guide (top side) "2"
   Damage/wear → Replace the defective part(s).



EAS30266

# **CHECKING THE TIMING CHAIN TENSIONER**

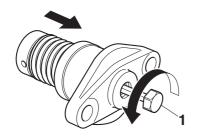
- 1. Check:
  - Timing chain tensioner
     Cracks/damage/rough movement → Replace.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

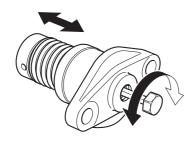
 a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

TIP

While pressing the timing chain tensioner rod, wind it counterclockwise with a hexagon wrench "1" (Parts No.: 1RC-12228-00) until it stops.



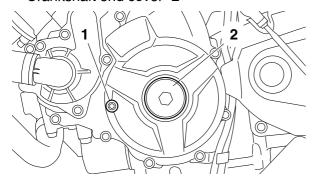
b. Make sure that the timing chain tensioner rod moves in and out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.



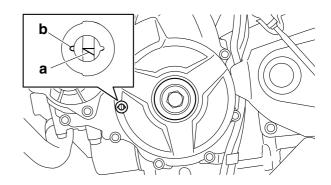
EAS30269

### **INSTALLING THE CAMSHAFTS**

- 1. Remove:
- Timing mark accessing bolt "1"
- Crankshaft end cover "2"



- 2. Align:
  - Mark "a" on the generator rotor (with the generator rotor cover mark "b")
- a. Turn the crankshaft counterclockwise.
- b. When piston #1 is at BTDC125°, align the mark "a" on the generator rotor with the generator rotor cover mark "b".



3. Install:

- Intake camshaft sprocket "1"
- Exhaust camshaft sprocket "2"



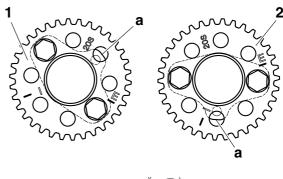
Camshaft sprocket bolt 24 Nm (2.4 m·kgf, 17 ft·lbf)

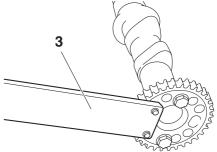
TIP

- Install the camshaft projection "a" at the position shown in the illustration.
- Tighten the camshaft sprocket bolt with the camshaft wrench "3".



Camshaft wrench 90890-04162 Camshaft wrench YM-04162





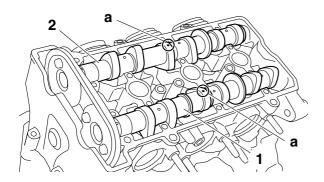
- 4. Install:
  - Exhaust camshaft "1"
- Intake camshaft "2"

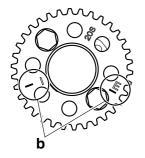
TIP

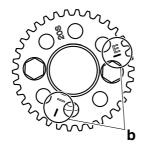
• Make sure the punch mark "a" on each cam-

shaft faces up.

• When installing the camshaft, no need to align the mark "b" on the camshaft sprocket.







#### 5. Install:

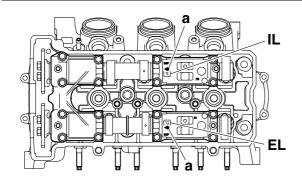
- Camshaft cap
- Intake camshaft cap
- Exhaust camshaft cap

### TIP.

 Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:

"IL": Intake left side camshaft cap mark "EL": Exhaust left side camshaft cap mark

 Make sure the arrow mark "a" on each camshaft points toward the right side of the engine.



# 6. Tighten:

• Camshaft cap bolts



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

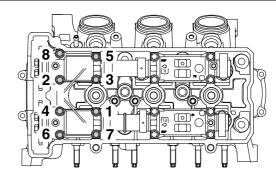
#### TIP

Tighten the camshaft cap bolts in the tightening sequence as shown.

ECA17430

#### **NOTICE**

- Lubricate the camshaft cap bolts with the engine oil.
- The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.
- Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.



### 7. Tighten:

• Camshaft cap bolts "1"



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

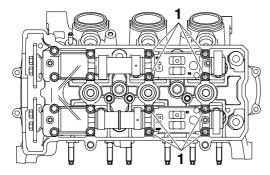
#### TIP

Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

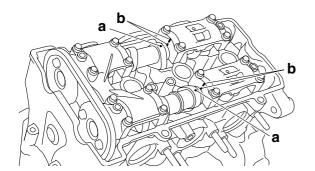
ECA17430

# NOTICE

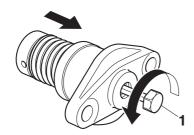
- Lubricate the camshaft cap bolts with the engine oil.
- The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.
- Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.



- 8. Check:
  - Camshaft punch mark "a"
     Make sure the punch mark "a" on the camshaft is aligned with the camshaft cap alignment mark "b".



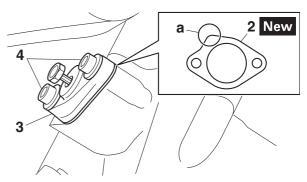
- 9. Install:
  - Timing chain tensioner
  - Timing chain tensioner gasket New
- a. While lightly pressing the timing chain tensioner rod by hand, turn the timing chain tensioner rod fully counterclockwise with a hexagon wrench "1" (Parts No.: 1RC-12228-00).



b. Install the timing chain tensioner gasket "2", the timing chain tensioner "3", and the timing chain tensioner bolts "4" on the cylinder block.

TIP\_

Face the section "a" of the gasket inward.



c. Tighten the timing chain tensioner bolts to the specified torque.

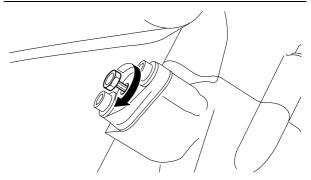


Timing chain tensioner bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf) LOCTITE®

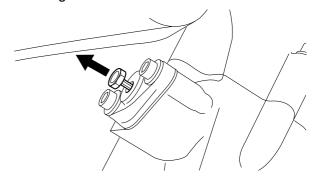
d. Screw the hexagon wrench by hand until the timing chain tensioner rod touches the timing chain guide, and then tighten 1/4 turn by tool.

TIP

The timing chain tensioner rod is extended by turning the hexagon wrench clockwise.



e. Remove the hexagon wrench, and check the timing chain tension.



f. Install the timing chain tensioner cap bolt and gasket, and then tighten the timing chain tensioner cap bolt to the specified torque.



Timing chain tensioner cap bolt 7 Nm (0.7 m·kgf, 5.1 ft·lbf)

### 10.Turn:

 Crankshaft (several turns counterclockwise)

### 11.Check:

• Mark "a"

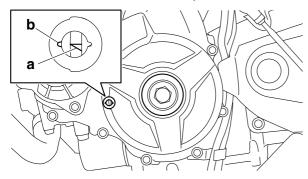
Make sure the mark "a" on the generator rotor is aligned with the generator rotor cover mark "b".

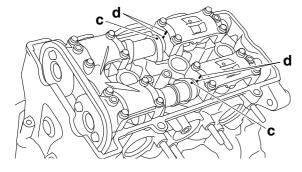
• Camshaft punch mark "c"

Make sure the punch mark "c" on the camshaft is aligned with the camshaft cap alignment mark "d".

Out of alignment  $\rightarrow$  Adjust.

Refer to the installation steps above.





### 12.Measure:

Valve clearance
 Out of specification → Adjust.
 Refer to "ADJUSTING THE VALVE CLEAR-ANCE" on page 3-5.

### 13.Install:

Timing mark accessing bolt "1"

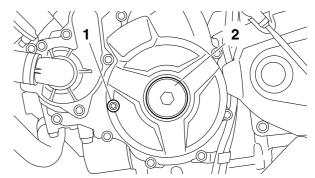


Timing mark accessing bolt 15 Nm (1.5 m·kgf, 11 ft·lbf)

• Crankshaft end cover "2"



Crankshaft end cover 10 Nm (1.0 m·kgf, 7.2 ft·lbf)



## 14.Install:

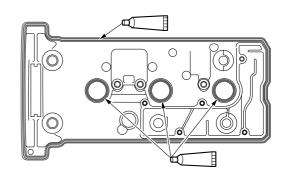
- Timing chain guide (top side)
- Cylinder head cover gasket "1" New
- Cylinder head cover

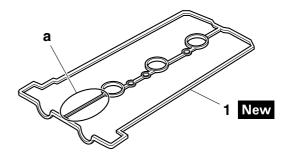


Cylinder head cover bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf)

### TIP

- Apply Three Bond No.1541C® onto the mating surfaces of the cylinder head cover and cylinder head cover gasket.
- After installing the cylinder head cover gasket "1" to the cylinder head cover, cut off the "a" section.





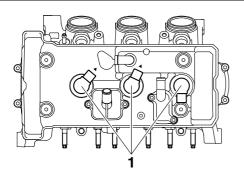
### 15.Install:

- Spark plugs
- Ignition coils "1"

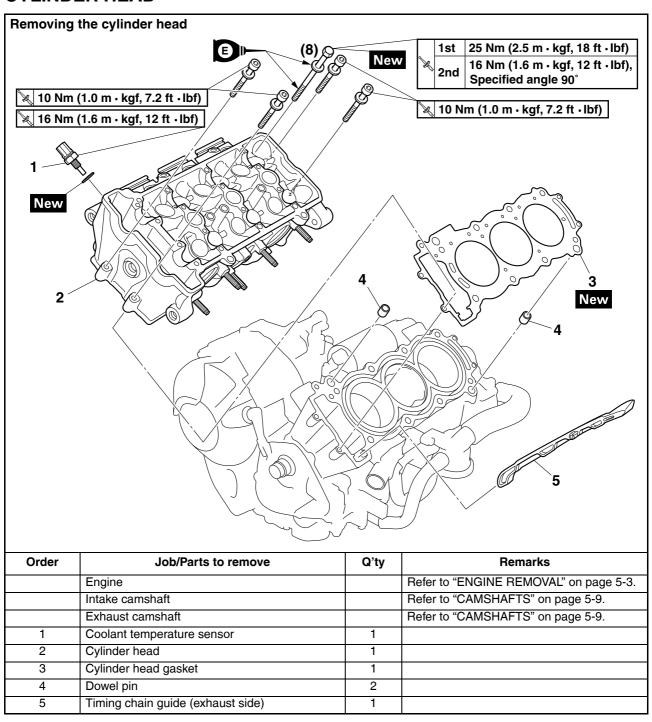


Spark plug 13 Nm (1.3 m·kgf, 9.4 ft·lbf)

TIP \_\_\_\_\_\_ Install the ignition coils "1" in the direction shown in the illustration.



# **CYLINDER HEAD**

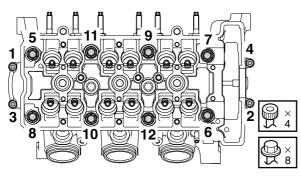


### REMOVING THE CYLINDER HEAD

- 1. Remove:
  - Intake camshaft
- Exhaust camshaft Refer to "REMOVING THE CAMSHAFTS" on page 5-11.
- 2. Remove:
  - Cylinder head bolt (M6) (×4)
  - Cylinder head bolt (M9) (×8)

### TIP

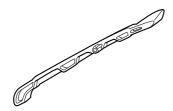
- Loosen the bolts in the proper sequence as shown.
- Loosen each bolt 1/2 of a turn at a time. After all of the bolts are fully loosened, remove them.



EAS3027

# CHECKING THE TIMING CHAIN GUIDE (EXHAUST SIDE)

- 1. Check:
  - Timing chain guide (exhaust side)
     Damage/wear → Replace.



EAS3027

# **CHECKING THE CYLINDER HEAD**

- 1. Eliminate:
  - Combustion chamber carbon deposits (with a rounded scraper)

### TIP

Do not use a sharp instrument to avoid damaging or scratching:

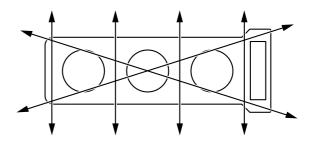
- Spark plug bore threads
- Valve seats
- 2. Check:
  - Cylinder head

Damage/scratches  $\rightarrow$  Replace.

- Cylinder head water jacket
   Mineral deposits/rust → Eliminate.
- 3. Measure:
  - Cylinder head warpage
     Out of specification → Resurface the cylinder
     head



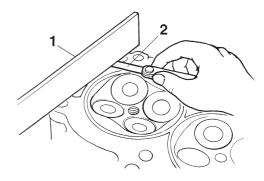
Warpage limit 0.10 mm (0.0039 in)



a. Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



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



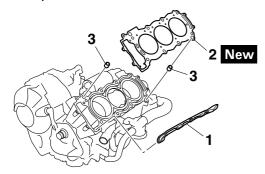
- b. Measure the warpage.
- If the limit is exceeded, resurface the cylinder head as follows.
- d. Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

### TIP -

To ensure an even surface, rotate the cylinder head several times.

### **INSTALLING THE CYLINDER HEAD**

- 1. Install:
- Timing chain guide (exhaust side) "1"
- Cylinder head gasket "2" New
- Dowel pins "3"



### 2. Install:

- Cylinder head
- Cylinder head bolt (M6) (×4)
- Cylinder head bolt (M9) (×8) New

### TIF

- Pass the timing chain through the timing chain cavity.
- Lubricate the cylinder head bolt (M9) thread and mating surface with engine oil.

### 3. Tighten:

- Cylinder head bolts "1"-"8"
- Cylinder head bolts "9"-"12"



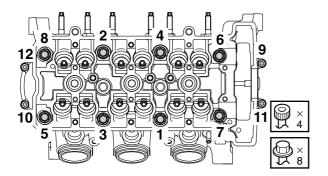
Cylinder head bolt "1"-"8"
1st: 25 Nm (2.5 m·kgf, 18 ft·lbf)
\*2nd: 16 Nm (1.6 m·kgf, 12 ft·lbf)
+90°

Cylinder head bolt "9"-"12" 10 Nm (1.0 m·kgf, 7.2 ft·lbf)

\* Following the tightening order, loosen the bolt one by one and then retighten it to the specific torque and the specific angle.

### TIP.

Tighten the cylinder head bolts "1"—"8" in the tightening sequence as shown and torque them in 2 stages.

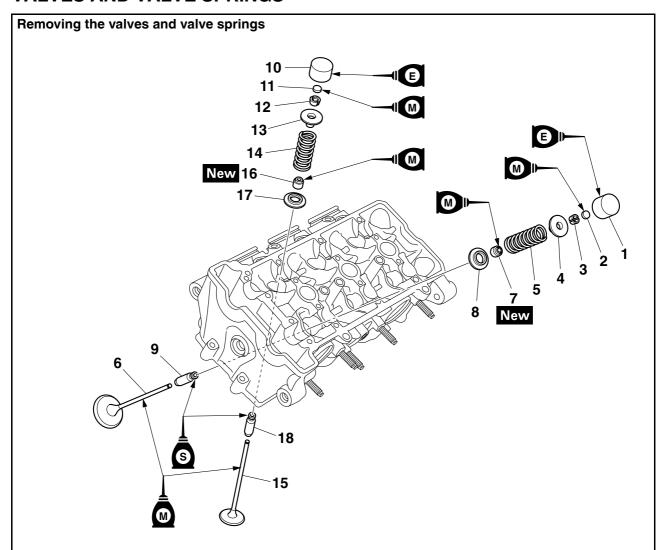


### 4. Install:

- Exhaust camshaft
- Intake camshaft Refer to "INSTALLING THE CAMSHAFTS" on page 5-14.

FAS2004

# **VALVES AND VALVE SPRINGS**



| Order | Job/Parts to remove           | Q'ty | Remarks                                |
|-------|-------------------------------|------|----------------------------------------|
|       | Cylinder head                 |      | Refer to "CYLINDER HEAD" on page 5-19. |
| 1     | Intake valve lifter           | 6    |                                        |
| 2     | Intake valve pad              | 6    |                                        |
| 3     | Intake valve cotter           | 12   |                                        |
| 4     | Intake valve spring retainer  | 6    |                                        |
| 5     | Intake valve spring           | 6    |                                        |
| 6     | Intake valve                  | 6    |                                        |
| 7     | Intake valve stem seal        | 6    |                                        |
| 8     | Intake valve spring seat      | 6    |                                        |
| 9     | Intake valve guide            | 6    |                                        |
| 10    | Exhaust valve lifter          | 6    |                                        |
| 11    | Exhaust valve pad             | 6    |                                        |
| 12    | Exhaust valve cotter          | 12   |                                        |
| 13    | Exhaust valve spring retainer | 6    |                                        |
| 14    | Exhaust valve spring          | 6    |                                        |
| 15    | Exhaust valve                 | 6    |                                        |
| 16    | Exhaust valve stem seal       | 6    |                                        |
| 17    | Exhaust valve spring seat     | 6    |                                        |
| 18    | Exhaust valve guide           | 6    |                                        |

EAS30283

### **REMOVING THE VALVES**

The following procedure applies to all of the valves and related components.

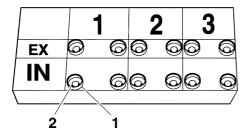
#### TIP

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

- 1. Remove:
  - Valve lifter "1"
  - Valve pad "2"

### TIP .

Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.



### 2. Check:

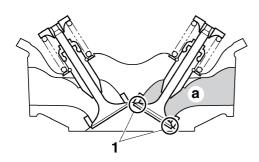
 Valve sealing Leakage at the valve seat → Check the valve face, valve seat, and valve seat width. Refer to "CHECKING THE VALVE SEATS" on page 5-25.

# \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

- a. Pour a clean solvent "a" into the intake and exhaust ports.
- b. Check that the valves properly seal.

### TIP

There should be no leakage at the valve seat "1".



### 3. Remove:

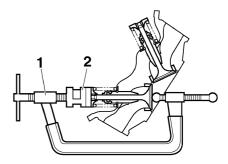
Valve cotters

### TIP\_

Remove the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".



Valve spring compressor 90890-04019 Valve spring compressor YM-04019 Valve spring compressor attachment 90890-04179 Valve spring compressor adapter 23 mm YM-04179

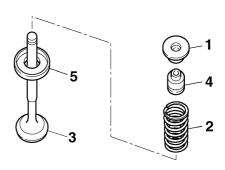


## 4. Remove:

- Valve spring retainer "1"
- Valve spring "2"
- Valve "3"
- Valve stem seal "4"
- Valve spring seat "5"

### TIP

Identify the position of each part very carefully so that it can be reinstalled in its original place.



### EAS30284

# CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

- 1. Measure:
  - Valve-stem-to-valve-guide clearance
     Out of specification → Replace the valve guide.
- Valve-stem-to-valve-guide clearance = Valve guide inside diameter "a" -Valve stem diameter "b"



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

0.010–0.037 mm (0.0004–0.0015

in)

Limit

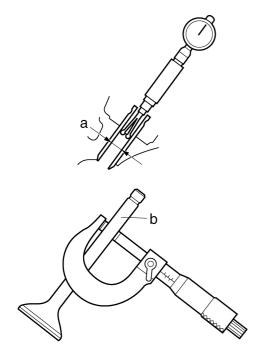
0.080 mm (0.0032 in)

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

0.025-0.052 mm (0.0010-0.0020 in)

Limit

0.100 mm (0.0039 in)

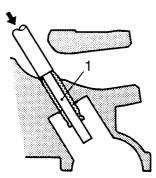


- 2. Replace:
  - Valve guide

### TIP

To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

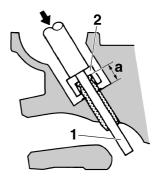
a. Remove the valve guide with the valve guide remover "1".



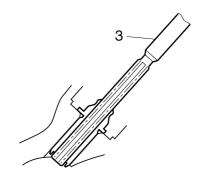
b. Install the new valve guide with the valve guide installer "2" and valve guide remover "1".



Valve guide position 13.3-13.7 mm (0.52-0.54 in)



- a. Valve guide position
- c. After installing the valve guide, bore the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.



After replacing the valve guide, reface the valve seat.



Valve guide remover (ø4.5) 90890-04116

Valve guide remover (4.5 mm) YM-04116

Valve guide installer (ø4.5) 90890-04117

Valve guide installer (4.5 mm)

YM-04117

Valve guide reamer (ø4.5) 90890-04118

Valve guide reamer (4.5 mm) YM-04118

# 

- 3. Eliminate:
  - Carbon deposits
     (from the valve face and valve seat)
- 4. Check:
- Valve face

Pitting/wear  $\rightarrow$  Grind the valve face.

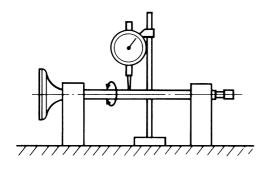
- Valve stem end Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
- 5. Measure:
  - Valve stem runout
     Out of specification → Replace the valve.

### TIP

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.



Valve stem runout 0.010 mm (0.0004 in)



EAS30285

### **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 contact width "a"
     Out of specification → Replace the cylinder head

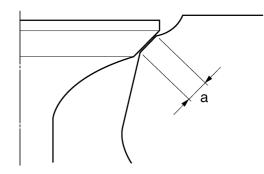


Valve seat contact width (intake) 0.90–1.10 mm (0.0354–0.0433 in) Limit

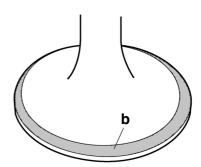
1.60 mm (0.06 in)
Valve seat contact width (exhaust)

1.10-1.30 mm (0.0433-0.0512 in) Limit

1.80 mm (0.07 in)



a. Apply blue layout fluid "b" onto the valve face.



- b. Install the valve into the cylinder head.
- c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- d. Measure the valve seat contact width.

### TIP

Where the valve seat and valve face contacted one another, the blue layout fluid will have been removed.

- 4. Lap:
  - Valve face
  - Valve seat

### TIP

After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

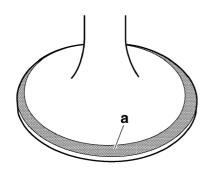
a Apply a coarse langing compound "a" to the

 a. Apply a coarse lapping compound "a" to the valve face.

ECA13790

### NOTICE

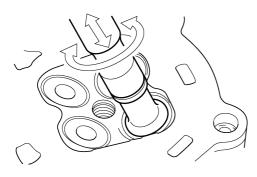
Do not let the lapping compound enter the gap between the valve stem and the valve guide.



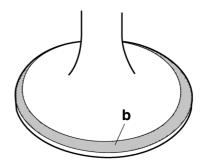
- Apply molybdenum disulfide oil onto the valve stem.
- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

### TIP

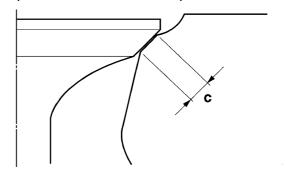
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply blue layout fluid "b" onto the valve face.



- h. Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat contact width "c" again. If the valve seat contact width is out of specification, reface and lap the valve seat.



EAS30286

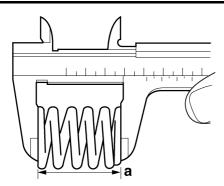
### **CHECKING THE VALVE SPRINGS**

The following procedure applies to all of the valve springs.

- 1. Measure:
  - Valve spring free length "a"
     Out of specification → Replace the valve spring.



Free length (intake)
39.31 mm (1.55 in)
Limit
37.34 mm (1.47 in)
Free length (exhaust)
37.78 mm (1.49 in)
Limit
35.89 mm (1.41 in)

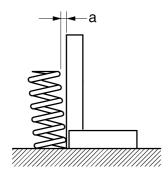


### 2. Measure:

Valve spring tilt "a"
 Out of specification → Replace the valve spring.



Spring tilt (intake) 1.7 mm (0.07 in) Spring tilt (exhaust) 1.6 mm (0.06 in)

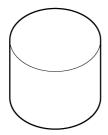


EAS30287

### **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.

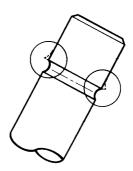


EAS30288

### **INSTALLING THE VALVES**

The following procedure applies to all of the valves and related components.

- 1. Deburr:
  - Valve stem end (with an oil stone)

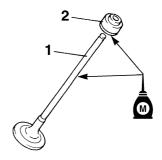


### 2. Lubricate:

- Valve stem "1"
- Valve stem seal "2" (with the recommended lubricant)



Recommended lubricant Molybdenum disulfide oil

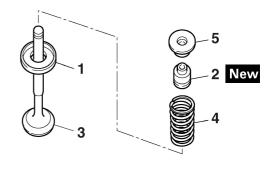


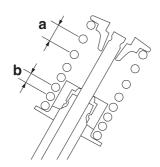
### 3. Install:

- Valve spring seat "1"
- Valve stem seal "2" New
- Valve "3"
- Valve spring "4"
- Valve spring retainer "5" (into the cylinder head)

### TIP

- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch "a" facing up.





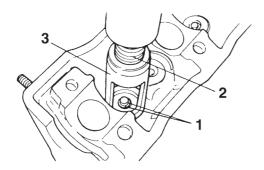
- b. Smaller pitch
- 4. Install:
  - Valve cotters "1"

TIP\_

Install the valve cotters by compressing the valve spring with the valve spring compressor "2" and the valve spring compressor attachment "3".



Valve spring compressor 90890-04019 Valve spring compressor YM-04019 Valve spring compressor attachment 90890-04179 Valve spring compressor adapter 23 mm YM-04179

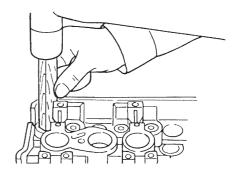


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

### NOTICE

Hitting the valve tip with excessive force could damage the valve.



- 6. Lubricate:
  - Valve pad (with the recommended lubricant)



Recommended lubricant Molybdenum disulfide oil

 Valve lifter (with the recommended lubricant)



Recommended lubricant Engine oil

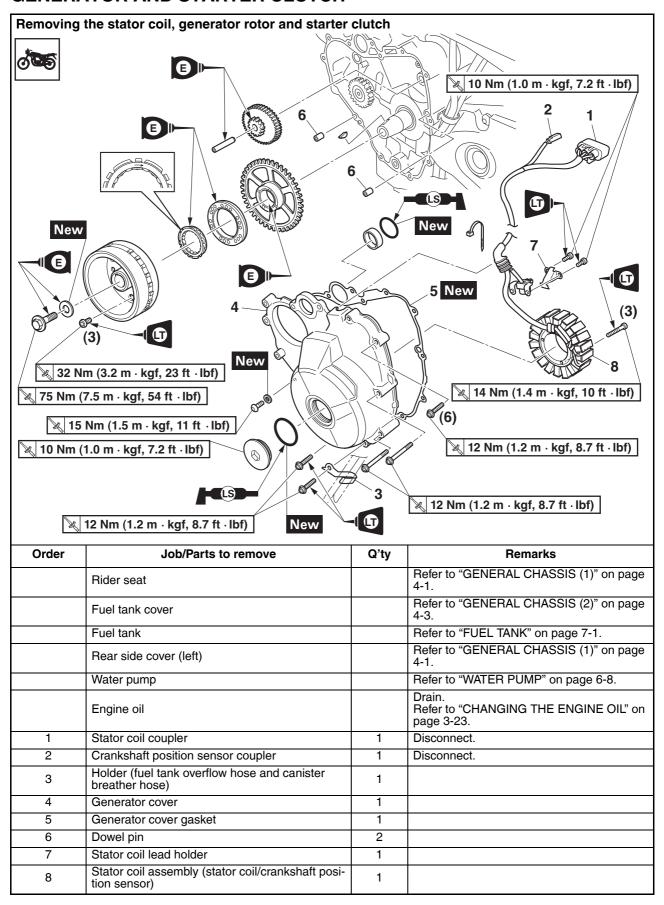
- 7. Install:
- Valve pad
- Valve lifter

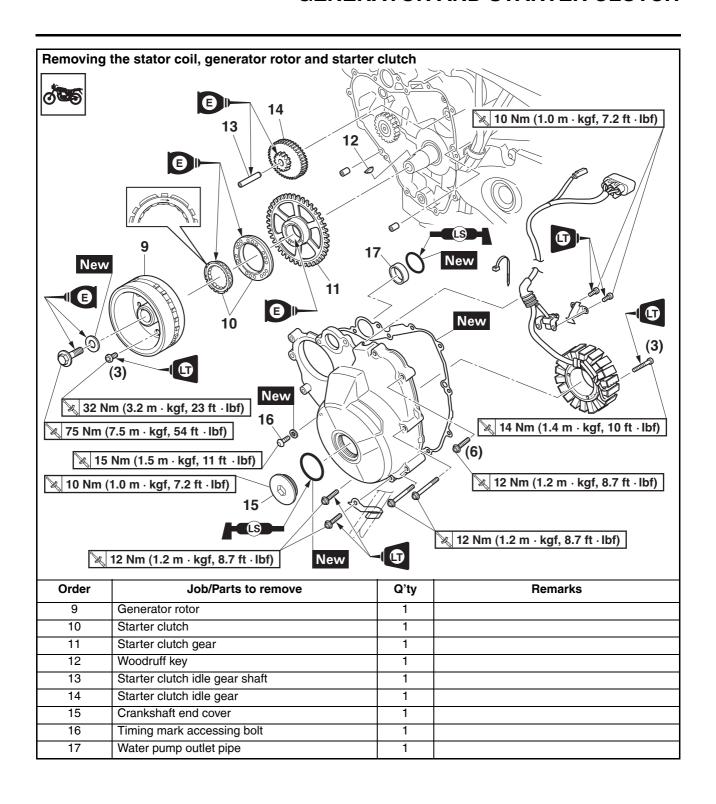
#### TIP

- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

FAS2014

### **GENERATOR AND STARTER CLUTCH**





EAS30867

### **REMOVING THE GENERATOR**

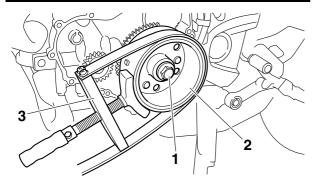
- 1. Remove:
- Generator rotor bolt "1"
- Washer

TIP\_

While holding the generator rotor "2" with the sheave holder "3", loosen the generator rotor bolt.



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



- 2. Remove:
  - Generator rotor "1" (with the flywheel puller "2")
  - Woodruff key

ECA13880

### NOTICE

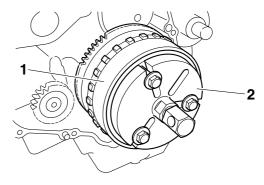
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set center bolt and the crankshaft.

TIP

- Install the flywheel puller bolts to the threaded holes of the starter clutch.
- Make sure the flywheel puller is centered over the generator rotor.



Flywheel puller 90890-01362 Heavy duty puller YU-33270-B



EAS30868

### REMOVING THE STARTER CLUTCH

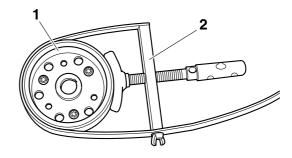
- 1. Remove:
- Starter clutch bolts
- Starter clutch

TIP

While holding the generator rotor "1" with the sheave holder "2", loosen the starter clutch bolts.



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



EAS30869

### **CHECKING THE STARTER CLUTCH**

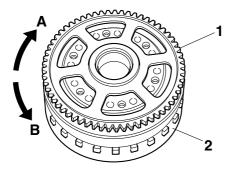
- 1. Check:
- Starter clutch rollers
  Damage/wear → Replace.
- 2. Check:
  - Starter clutch idle gear
  - Starter clutch gear Burrs/chips/roughness/wear → Replace the defective part(s).
- 3. Check:
  - Starter clutch gear contact surfaces
     Damage/pitting/wear → Replace the starter clutch gear.
- 4. Check:
- Starter clutch operation

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

a. Install the starter clutch gear "1" onto the gen-

erator rotor "2" and hold the generator rotor.

- b. When turning the starter clutch gear clockwise "A", the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
- c. When turning the starter clutch gear counterclockwise "B", it should turn freely, otherwise the starter clutch is faulty and must be replaced.



FAS30871

### INSTALLING THE STARTER CLUTCH

- 1. Install:
  - Starter clutch "1"



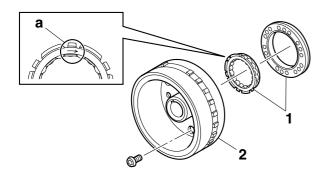
Starter clutch bolt 32 Nm (3.2 m·kgf, 23 ft·lbf) LOCTITE®

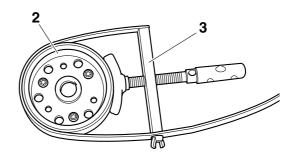
TIP

- Install the starter clutch so that the side of the starter clutch roller assembly with the arrow mark "a" is toward the generator rotor "2".
- While holding the generator rotor with the sheave holder "3", tighten the starter clutch bolts.



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





EAS30872

### **INSTALLING THE GENERATOR**

- 1. Install:
- Woodruff key
- Generator rotor
- Washer New
- Generator rotor bolt

TIP

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- When installing the generator rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.
- Lubricate the washer with engine oil.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.
- 2. Tighten:
  - Generator rotor bolt "1"



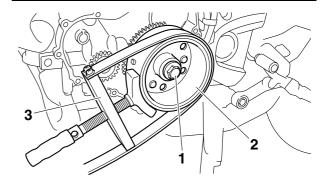
Generator rotor bolt 75 Nm (7.5 m·kgf, 54 ft·lbf)

TIP -

While holding the generator rotor "2" with the sheave holder "3", tighten the generator rotor bolt.



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



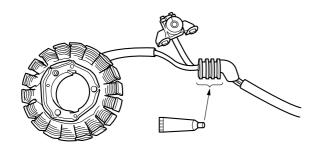
## 3. Apply:

Sealant

(onto the stator coil assembly lead grommet)



Yamaha bond No. 1215 90890-85505 (Three bond No.1215®)



### 4. Install:

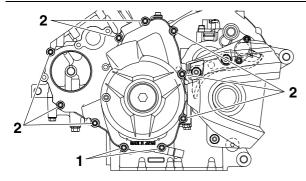
- Generator cover gasket New
- Generator cover



Generator cover bolt "1"
12 Nm (1.2 m·kgf, 8.7 ft·lbf)
LOCTITE®
Generator cover bolt "2"
12 Nm (1.2 m·kgf, 8.7 ft·lbf)

### TIP.

Tighten the generator cover bolts in stages and in a crisscross pattern.



# 5. Connect:

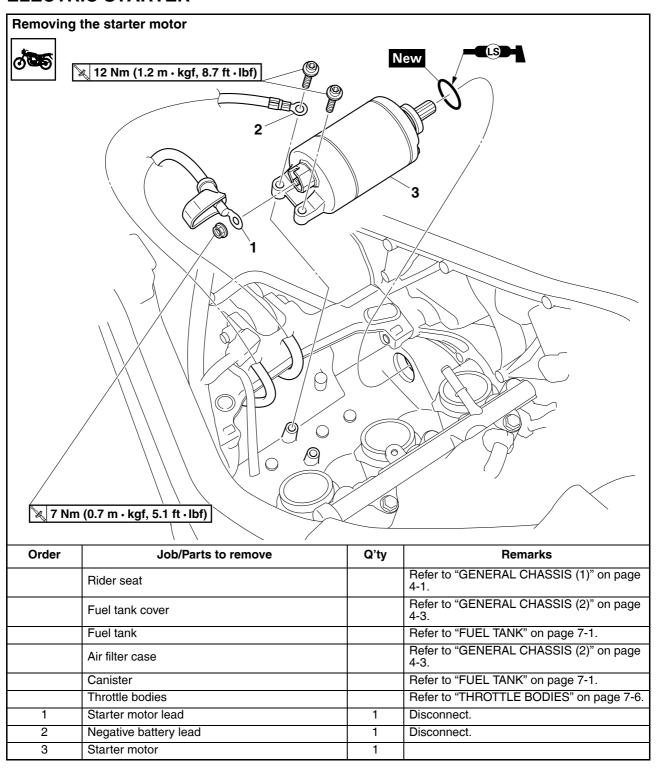
- Stator coil coupler
- Crankshaft position sensor coupler

### TIP -

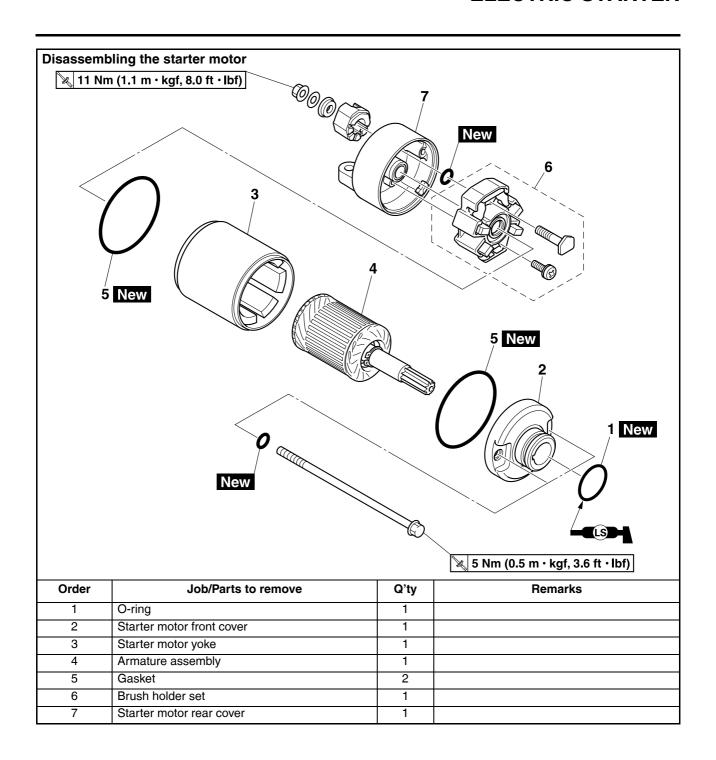
To route the stator coil lead, refer to "CABLE ROUTING" on page 2-35.

FAS2005

# **ELECTRIC STARTER**



# **ELECTRIC STARTER**



### **CHECKING THE STARTER MOTOR**

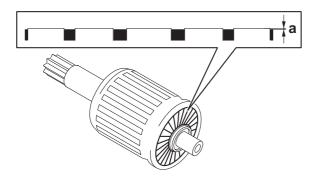
- 1. Check:
- Commutator
   Dirt → Clean with 600 grit sandpaper.
- 2. Measure:
  - Mica undercut "a"
     Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



Mica undercut (depth) 0.70 mm (0.03 in)

### TIP

The mica of the commutator must be undercut to ensure proper operation of the commutator.



- 3. Measure:
  - Armature assembly resistances (commutator and insulation)

Out of specification  $\rightarrow$  Replace the starter motor.

a. Measure the armature assembly resistances with the digital circuit tester.

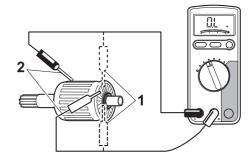


Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927



Armature coil resistance 0.0050–0.0150  $\Omega$  Insulation resistance Above 1 M $\Omega$  at 20 °C (68 °F)

b. If any resistance is out of specification, replace the starter motor.



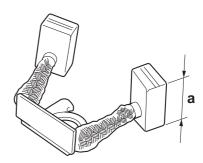
- 1. Commutator resistance
- 2. Insulation resistance

### 4. Measure:

Brush length "a"
 Out of specification → Replace the brush holder set.



Brush overall length 12.0 mm (0.47 in) Limit 6.50 mm (0.26 in)



### 5. Measure:

Brush spring force
 Out of specification → Replace the brush
 holder set.



Brush spring force 6.03–6.52 N (615–665 gf, 21.71– 23.47 oz)



# **ELECTRIC STARTER**

- 6. Check:
  - Gear teeth

 $Damage/wear \rightarrow Replace$  the starter motor.

- 7. Check:
  - Bearing
  - Oil seal

Damage/wear  $\rightarrow$  Replace the starter motor.

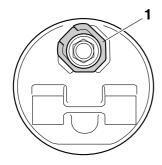
EAS3032

### **ASSEMBLING THE STARTER MOTOR**

- 1. Install:
  - Brush holder set
  - Insulator "1"

TIP\_

Install the insulator as shown in the illustration.

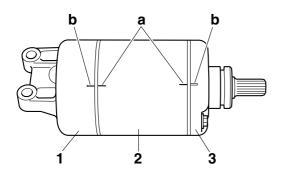


### 2. Install:

- Starter motor rear cover "1"
- Starter motor yoke "2"
- Starter motor front cover "3"

TIP

Align the match marks "a" on the starter motor yoke with the match marks "b" on the front and rear cover.



EAS30327

# **INSTALLING THE STARTER MOTOR**

- 1. Install:
  - Starter motor "1"
  - Negative battery lead "2"
  - Starter motor bolts "3"

TID

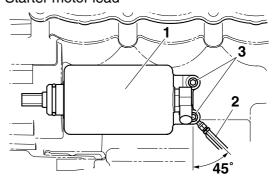
Install the negative battery lead as shown in the illustration.

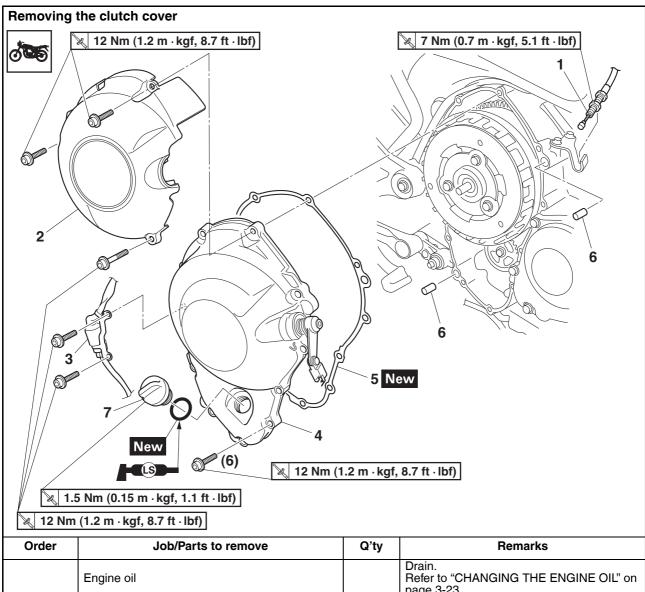


# Starter motor bolt 12 Nm (1.2 m·kgf, 8.7 ft·lbf)

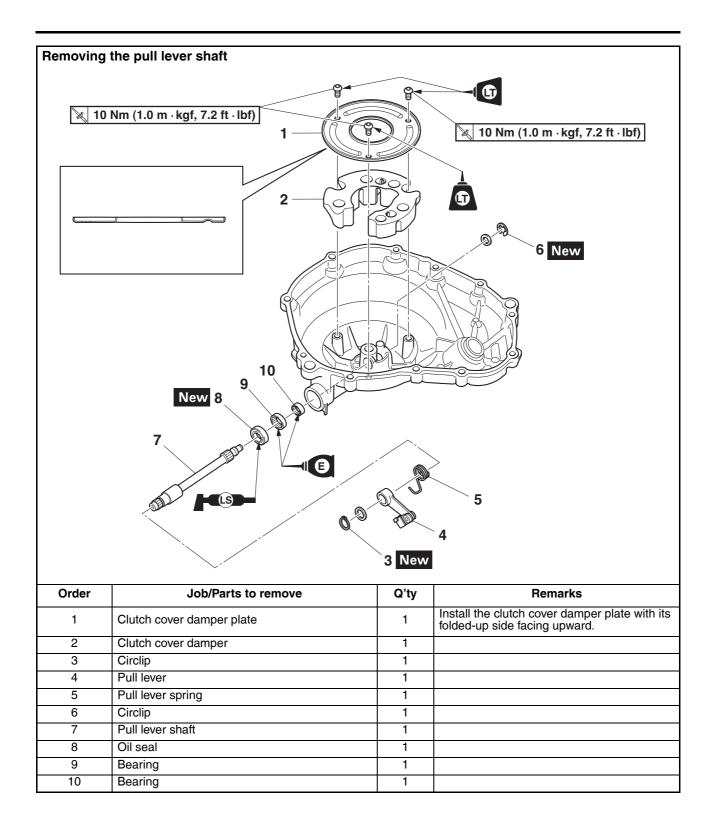
### 2. Connect:

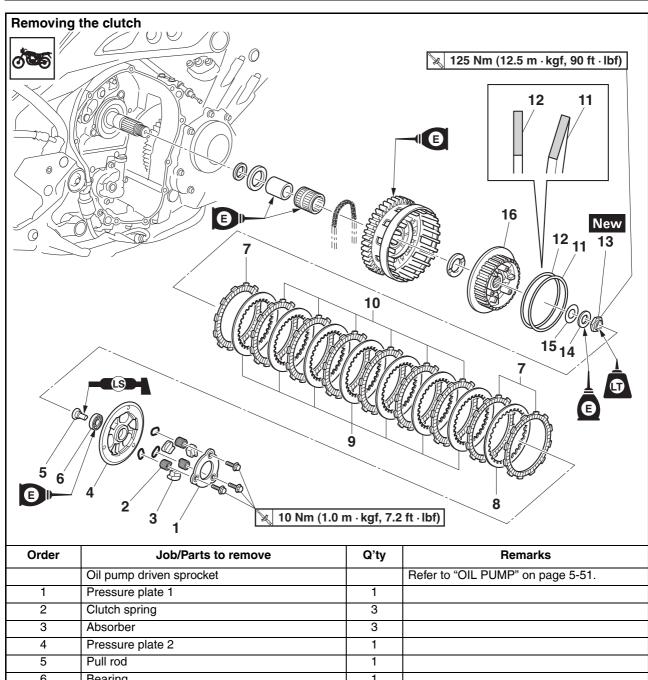
• Starter motor lead





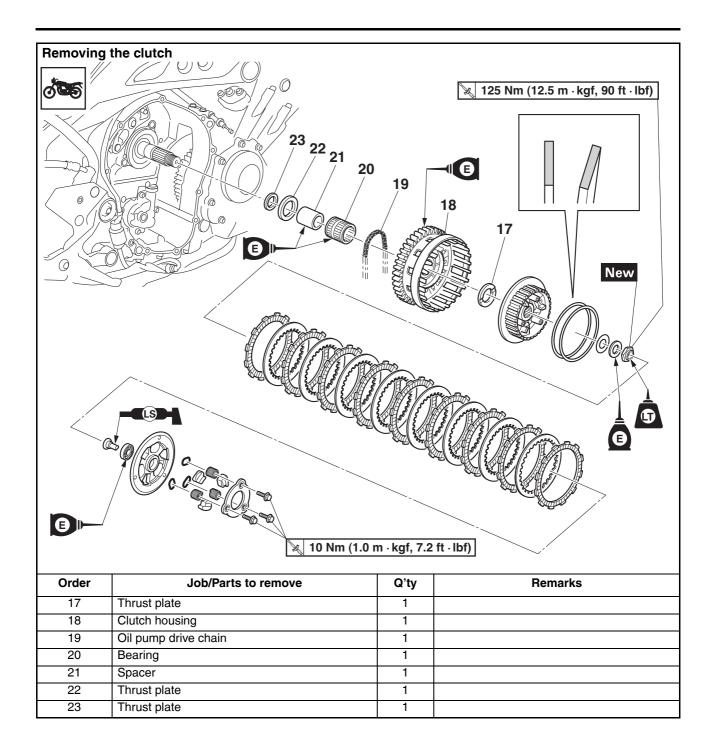
| Order | Job/Parts to remove                   | Q'ty | Remarks                                                 |
|-------|---------------------------------------|------|---------------------------------------------------------|
|       | Engine oil                            |      | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-23. |
| 1     | Clutch cable                          | 1    | Disconnect.                                             |
| 2     | Cover                                 | 1    |                                                         |
| 3     | O <sub>2</sub> sensor coupler bracket | 1    |                                                         |
| 4     | Clutch cover                          | 1    |                                                         |
| 5     | Clutch cover gasket                   | 1    |                                                         |
| 6     | Dowel pin                             | 2    |                                                         |
| 7     | Oil filler cap                        | 1    |                                                         |





| Order | Job/Parts to remove       | Q'ty | Remarks                           |
|-------|---------------------------|------|-----------------------------------|
|       | Oil pump driven sprocket  |      | Refer to "OIL PUMP" on page 5-51. |
| 1     | Pressure plate 1          | 1    |                                   |
| 2     | Clutch spring             | 3    |                                   |
| 3     | Absorber                  | 3    |                                   |
| 4     | Pressure plate 2          | 1    |                                   |
| 5     | Pull rod                  | 1    |                                   |
| 6     | Bearing                   | 1    |                                   |
| 7     | Friction plate 1          | 3    | Inside diameter: 126 mm (4.96 in) |
| 8     | Clutch plate 1            | 1    | Inside diameter: 116 mm (4.57 in) |
| 9     | Clutch plate 2            | 7    | Inside diameter: 105 mm (4.13 in) |
| 10    | Friction plate 2          | 6    | Inside diameter: 119 mm (4.69 in) |
| 11    | Clutch damper spring      | 1    |                                   |
| 12    | Clutch damper spring seat | 1    |                                   |
| 13    | Clutch boss nut           | 1    |                                   |
| 14    | Conical spring washer     | 1    |                                   |
| 15    | Washer                    | 1    |                                   |
| 16    | Clutch boss               | 1    |                                   |

# **CLUTCH**



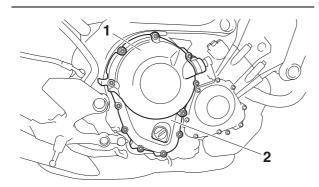
### **REMOVING THE CLUTCH**

- 1. Remove:
  - Cover "1"
- Clutch cover "2"
- Gasket

### TIP\_

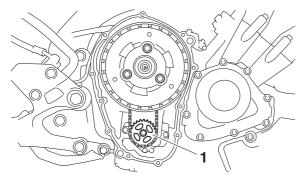
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.

After all of the bolts are fully loosened, remove them.



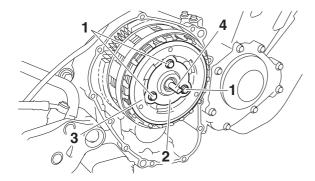
### 2. Remove:

• Oil pump driven sprocket "1" Refer to "OIL PUMP" on page 5-51.



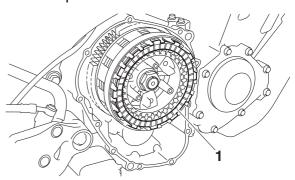
### 3. Remove:

- Clutch spring bolts "1"
- Pressure plate 1 "2"
- Clutch springs
- Pressure plate 2 "3"
- Pull rod "4"



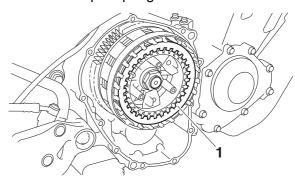
### 4. Remove:

• Friction plates 1 "1"

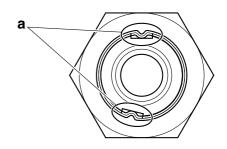


### 5. Remove:

- Clutch plate 1 "1"
- Clutch plates 2
- Friction plates 2
- Clutch damper spring
- Clutch damper spring seat



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



### 7. Loosen:

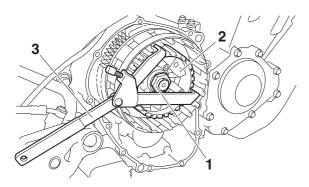
• Clutch boss nut "1"

### TIP

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



Universal clutch holder 90890-04086 Universal clutch holder YM-91042



- 8. Remove:
  - Clutch boss nut
  - Conical spring washer
  - Washer
  - Clutch boss
  - Thrust plate
  - Clutch housing
  - Oil pump drive chain

### **CHECKING THE FRICTION PLATES**

The following procedure applies to all of the friction plates.

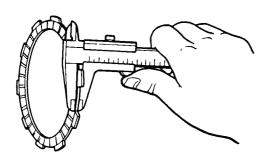
- 1. Check:
  - Friction plate 1, 2
     Damage/wear → Replace the friction plates as a set.
- 2. Measure:
  - Friction plate 1, 2 thickness
     Out of specification → Replace the friction
     plates as a set.

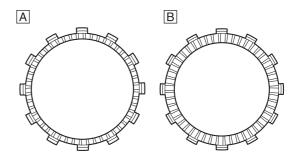
### TIP

Measure the friction plate at four places.



Friction plate 1 thickness 2.92–3.08 mm (0.115–0.121 in) Wear limit 2.82 mm (0.111 in) Friction plate 2 thickness 2.92–3.08 mm (0.115–0.121 in) Wear limit 2.82 mm (0.111 in)





- A. Friction plate 1
- B. Friction plate 2

#### EAS3034

### **CHECKING THE CLUTCH PLATES**

The following procedure applies to all of the clutch plates.

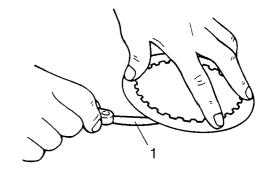
- 1. Check:
- Clutch plate
   Damage → Replace the clutch plates as a set.
- 2. Measure:
  - Clutch plate thickness
     (with a surface plate and thickness gauge "1")
     Out of specification → Replace the clutch plates as a set.



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



Clutch plate 1 thickness 2.20–2.40 mm (0.087–0.094 in) Warpage limit 0.10 mm (0.004 in) Clutch plate 2 thickness 1.90–2.10 mm (0.075–0.083 in) Warpage limit 0.10 mm (0.004 in)



- 3. Measure:
  - Assembly width "a" of the friction plates and clutch plates

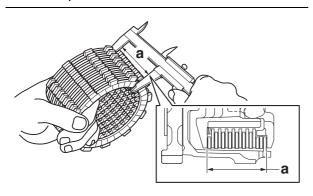
Out of specification  $\rightarrow$  Adjust.



Assembly width 42.7–43.5 mm (1.68–1.71 in)

### TIP.

- Perform the thickness measurement without applying the oil.
- This step should be performed only if the friction plates and clutch plates were replaced.
- To measure the total width of the friction plates and clutch plates, combine 9 friction plates and 8 clutch plates as shown.



- a. Assembly width adjusted by clutch plate "1" and "2".
- b. Select the clutch plate from the following table.

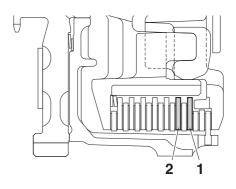
| Clutch plate "1" |                   |     |  |
|------------------|-------------------|-----|--|
| 4B1-16324-00     | 1.6 mm (0.063 in) |     |  |
| 5VY-16325-00     | 2.0 mm (0.079 in) | STD |  |
| 4B1-16325-00     | 2.3 mm (0.091 in) |     |  |

| Clutch plate "2" |                   |     |  |
|------------------|-------------------|-----|--|
| 4B1-16324-00     | 1.6 mm (0.063 in) |     |  |
| 5VY-16325-00     | 2.0 mm (0.079 in) | STD |  |
| 4B1-16325-00     | 2.3 mm (0.091 in) |     |  |

### TIP

When adjusting the clutch assembly width [by replacing the clutch plate(s)], be sure to replace the clutch plate "1" fast.

After replacing the clutch plate "1", if specifications cannot be met, replace the clutch plate "2".



EAS3035

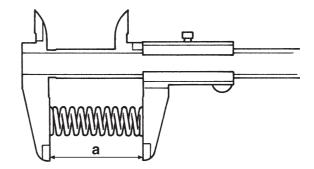
### **CHECKING THE CLUTCH SPRINGS**

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 45.23 mm (1.78 in) Limit 42.97 mm (1.69 in)



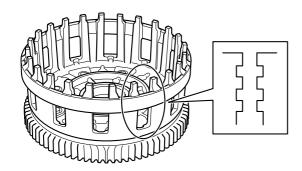
EAS30352

# **CHECKING THE CLUTCH HOUSING**

- 1. Check:
  - Clutch housing dogs
     Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

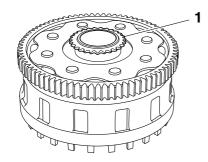
### TIP

Pitting on the clutch housing dogs will cause erratic clutch operation.



### 2. Check:

 Oil pump drive sprocket "1" Cracks/damage/wear → Replace.



### 3. Check:

Bearing
 Damage/wear → Replace the bearing and clutch housing.

### EAS30353

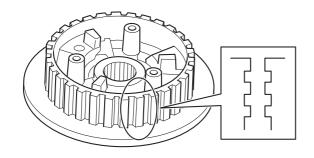
# **CHECKING THE CLUTCH BOSS**

1. Check:

Clutch boss splines
 Damage/pitting/wear → Replace the clutch boss.

### TIP

Pitting on the clutch boss splines will cause erratic clutch operation.



### EAS30354

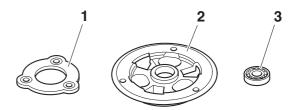
### **CHECKING THE PRESSURE PLATE**

1. Check:

- Pressure plate 1 "1"
- Pressure plate 2 "2"

Cracks/damage → Replace.

Bearing "3"
 Damage/wear → Replace.



#### EAS30356

### **CHECKING THE PRIMARY DRIVE GEAR**

1. Check:

Primary drive gear

Damage/wear  $\rightarrow$  Replace the crankshaft and clutch housing as a set.

Excessive noise during operation  $\rightarrow$  Replace the crankshaft and clutch housing as a set.

#### EAS3035

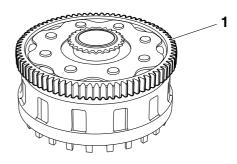
### **CHECKING THE PRIMARY DRIVEN GEAR**

1. Check:

• Primary driven gear "1"

Damage/wear  $\rightarrow$  Replace the clutch housing and crankshaft as a set.

Excessive noise during operation  $\rightarrow$  Replace the clutch housing and crankshaft as a set.



### EAS3035

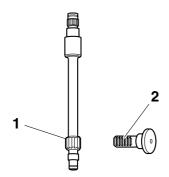
# CHECKING THE PULL LEVER SHAFT AND PULL ROD

1. Check:

• Pull lever shaft pinion gear teeth "1"

• Pull rod teeth "2"

Damage/wear  $\rightarrow$  Replace the pull rod and pull lever shaft as a set.



### 2. Check:

 Pull rod bearing Damage/wear → Replace.

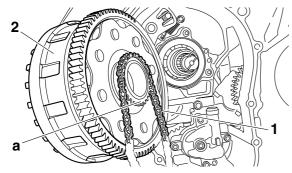
EAS30363

### **INSTALLING THE CLUTCH**

- 1. Install:
  - Oil pump drive chain "1"
  - Clutch housing "2"

TIP

Install the oil pump drive chain onto the oil pump drive sprocket "a".



# 2. Install:

- Thrust plate
- Clutch boss "1"
- Washer
- Conical spring washer "2"
- Clutch boss nut "3" New



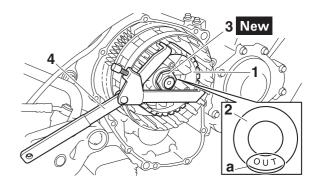
Clutch boss nut 125 Nm (12.5 m·kgf, 90 ft·lbf) LOCTITE®

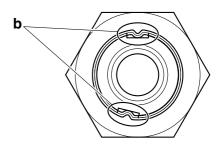
### TIP

- Install the conical spring washer on the main axle with the "OUT" mark "a" facing away from the vehicle.
- While holding the clutch boss "1" with the universal clutch holder "4", tighten the clutch boss nut.
- Stake the clutch boss nut at cutouts "b" in the main axle.



Universal clutch holder 90890-04086 Universal clutch holder YM-91042



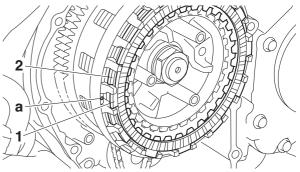


### 3. Install:

- Clutch damper spring seat
- Clutch damper spring
- Friction plates 1
- Clutch plates 2
- Friction plates 2
- Clutch plate 1

### TIP.

- First, install a friction plate and then alternate between a clutch plate and a friction plate.
- Install the last friction plate "1" offset from the other friction plates "2", making sure to align a projection on the friction plate with the punch mark "a" on the clutch housing.



- 4. Install:
  - Pull rod
  - Pressure plate 2

- Clutch springs
- Pressure plate 1
- Clutch spring bolts "1"



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

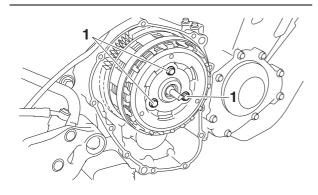
• Oil pump driven sprocket "2"

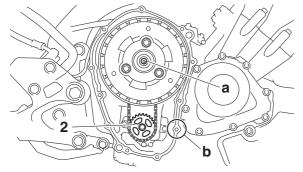


Oil pump driven sprocket bolt 15 Nm (1.5 m·kgf, 11 ft·lbf) LOCTITE®

### TIP

- Tighten the clutch spring bolts in stages and in a crisscross pattern.
- Apply lithium-soap-based grease onto the pull rod.
- Position the pull rod so that the teeth "a" face towards the hole "b". Then, install the clutch cover.





- 5. Install:
  - Dowel pins
  - Clutch cover gasket New
  - Clutch cover
  - Cover



Clutch cover bolt 12 Nm (1.2 m·kgf, 8.7 ft·lbf)

## TIP

- Apply engine oil onto the bearing.
- Tighten the clutch cover bolts in stages and in

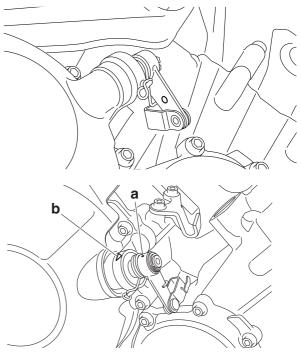
a crisscross pattern.

### 6. Install:

• Pull lever

#### TIP

- Install the pull lever with the "O" mark facing toward lower side.
- When installing the pull lever, push the pull lever and check that the punch mark "a" on the pull lever aligns with the mark "b" on the clutch cover. Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.

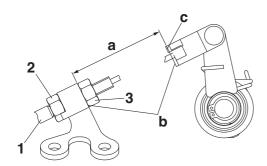


### 7. Connect:

• Clutch cable "1"

### TIP

- For the clutch cable "1", turn the nut "2" in fully and then adjust the length "a" by using the nut "3" so that the cable length is 47.1–54.8 mm (1.85–2.16 in).
- Measure the length while keeping the measuring surface "b" parallel.
- After installing the clutch cable, bend the projection "c" on the pull lever.

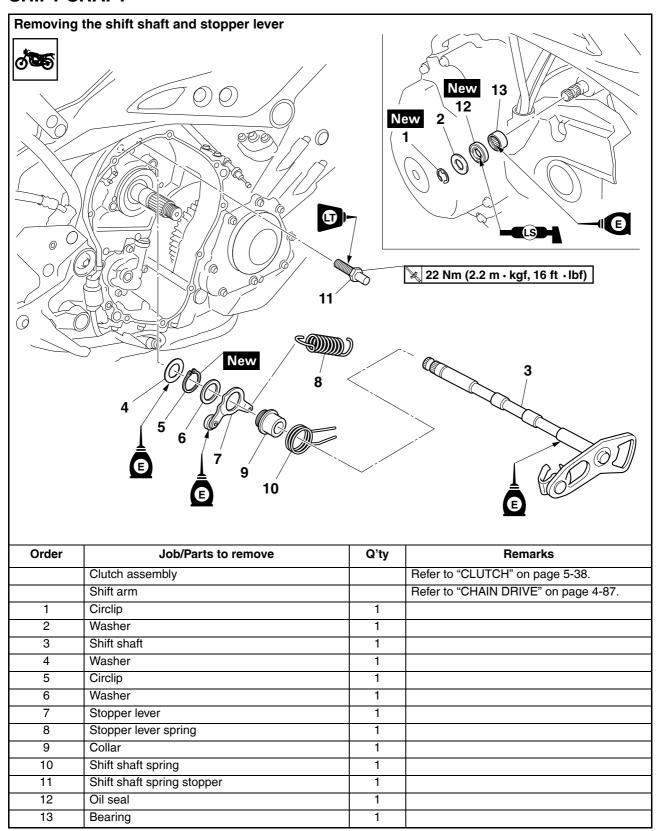


- 8. Adjust:
  - Clutch lever free play Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-11.



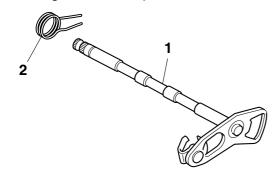
Clutch lever free play 10.0–15.0 mm (0.39–0.59 in)

# SHIFT SHAFT



### **CHECKING THE SHIFT SHAFT**

- 1. Check:
- Shift shaft "1" Bends/damage/wear → Replace.
- Shift shaft spring "2"
- Collar Damage/wear → Replace.



EAS30378

### **CHECKING THE STOPPER LEVER**

- 1. Check:
- Stopper lever "1"
   Bends/damage → Replace.
   Roller turns roughly → Replace the stopper lever.



EAS3038

# **INSTALLING THE SHIFT SHAFT**

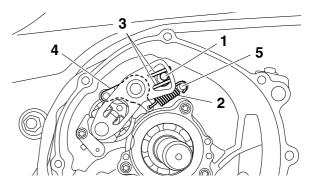
- 1. Install:
  - Shift shaft spring stopper "1"
  - · Shift shaft assembly
  - Stopper lever spring "2"



Shift shaft spring stopper 22 Nm (2.2 m·kgf, 16 ft·lbf) LOCTITE®

### TIP

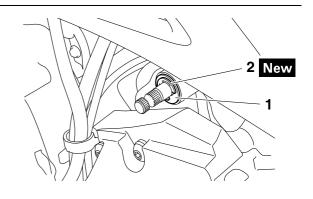
- Hook the end of the shift shaft spring "3" onto the shift shaft spring stopper "1".
- Hook the ends of the stopper lever spring "2" onto the stopper lever "4" and the crankcase boss "5".
- Mesh the stopper lever with the shift drum segment assembly.



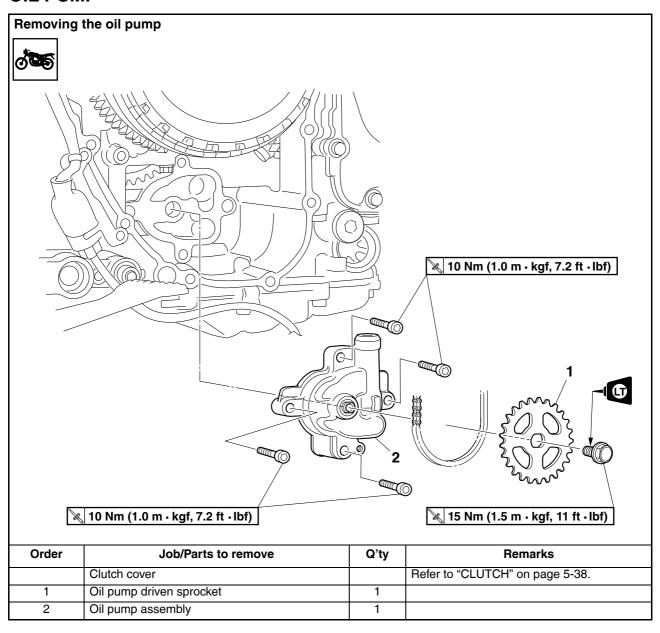
- 2. Install:
  - Bearing
  - Oil seal New
  - Washer "1"
  - Circlip "2" New

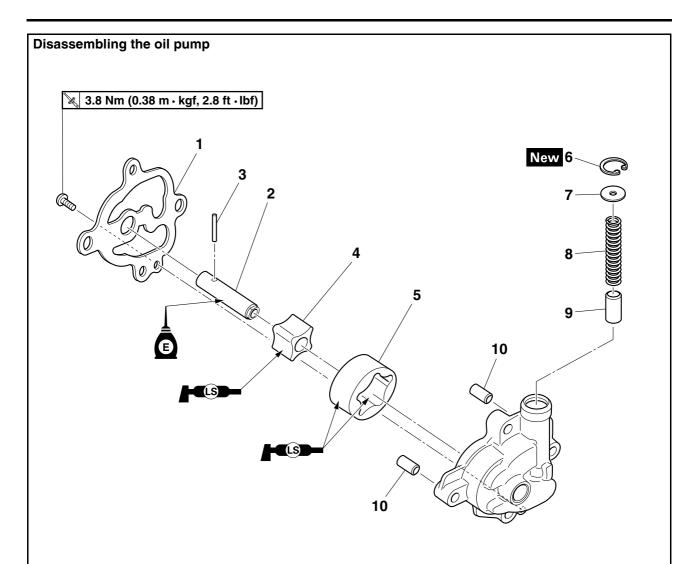
TIP

- Lubricate the oil seal lips with lithium-soapbased grease.
- Lubricate the outer periphery of the oil seal with the silicone fluid.



# **OIL PUMP**





| Order | Job/Parts to remove  | Q'ty | Remarks                                         |
|-------|----------------------|------|-------------------------------------------------|
| 1     | Oil pump cover       | 1    |                                                 |
| 2     | Oil pump shaft       | 1    |                                                 |
| 3     | Pin                  | 1    |                                                 |
| 4     | Oil pump inner rotor | 1    |                                                 |
| 5     | Oil pump outer rotor | 1    |                                                 |
| 6     | Circlip              | 1    | Hold down the washer when removing the circlip. |
| 7     | Washer               | 1    |                                                 |
| 8     | Spring               | 1    |                                                 |
| 9     | Relief valve         | 1    |                                                 |
| 10    | Dowel pin            | 2    |                                                 |

#### CHECKING THE SPROCKET AND CHAIN

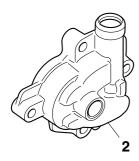
- 1. Check:
  - Oil pump drive sprocket Refer to "CHECKING THE CLUTCH HOUS-ING" on page 5-44.
- 2. Check:
  - Oil pump drive chain "1"
     Damage/stiffness → Replace the oil pump drive chain and oil pump drive sprocket (clutch housing) as a set.

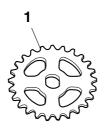


#### FAS30337

#### **CHECKING THE OIL PUMP**

- 1. Check:
- Oil pump driven sprocket "1"
- Oil pump housing "2"
   Cracks/damage/wear → Replace the defective part(s).





#### 2. Measure:

- Inner-rotor-to-outer-rotor-tip clearance "a"
- Outer-rotor-to-oil-pump-housing clearance "b"

Out of specification  $\rightarrow$  Replace the defective part(s).



Inner-rotor-to-outer-rotor-tip clearance

Less than 0.120 mm (0.0047 in) Limit

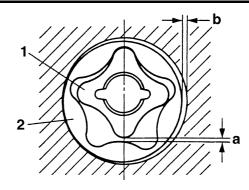
0.200 mm (0.0079 in)

Outer-rotor-to-oil-pump-housing clearance

0.09–0.19 mm (0.0035–0.0075 in)

Limit

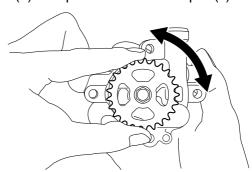
0.210 mm (0.0083 in)



- 1. Inner rotor
- 2. Outer rotor

#### 3. Check:

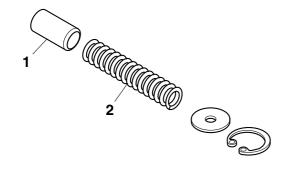
Oil pump operation
 Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



#### EAS3033

#### **CHECKING THE RELIEF VALVE**

- 1. Check:
  - Relief valve "1"
  - Spring "2"
     Damage/wear → Replace the oil pump assembly.



#### **ASSEMBLING THE OIL PUMP**

- 1. Lubricate:
  - Inner rotor
  - Outer rotor
  - Oil pump shaft (with the recommended lubricant)



# Recommended lubricant Engine oil

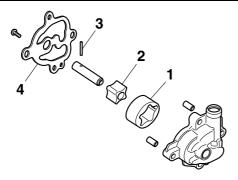
- 2. Install:
  - Outer rotor "1"
  - Inner rotor "2"
  - Pin "3"
  - Oil pump cover "4"
  - Oil pump cover screw



Oil pump cover screw 3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)

#### TIP

Align the pin "3" in the oil pump shaft with the groove in the inner rotor "2".



- 3. Check:
  - Oil pump operation Refer to "CHECKING THE OIL PUMP" on page 5-53.

EAS30343

#### **INSTALLING THE OIL PUMP**

- 1. Install:
  - Oil pump "1"
- Oil pump bolts "2"



# Oil pump bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf)

• Oil pump driven sprocket "3"



Oil pump driven sprocket bolt 15 Nm (1.5 m·kgf, 11 ft·lbf) LOCTITE®

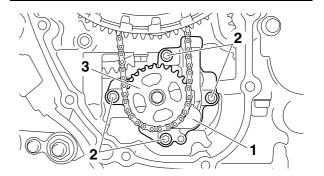
ECA20940

### NOTICE

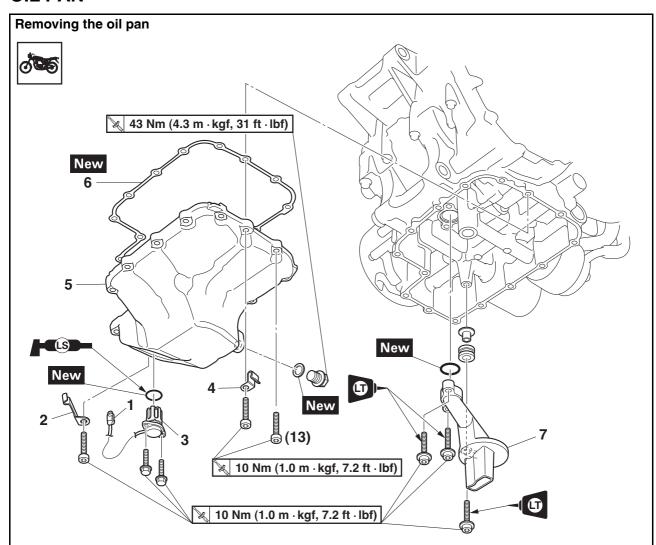
After installing the oil pump drive chain and driven sprocket, make sure the oil pump turns smoothly.

TIP.

- 1RC mark of the oil pump driven sprocket is installed at oil pump side.
- Install the oil pump drive chain onto the oil pump driven sprocket.



# **OIL PAN**



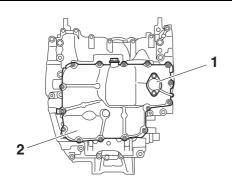
| Order | Job/Parts to remove               | Q'ty | Remarks                                                 |
|-------|-----------------------------------|------|---------------------------------------------------------|
|       | Rider seat                        |      | Refer to "GENERAL CHASSIS (1)" on page 4-1.             |
|       | Fuel tank cover                   |      | Refer to "GENERAL CHASSIS (2)" on page 4-3.             |
|       | Fuel tank                         |      | Refer to "FUEL TANK" on page 7-1.                       |
|       | Muffler assembly                  |      | Refer to "ENGINE REMOVAL" on page 5-3.                  |
|       | Engine oil                        |      | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-23. |
| 1     | Oil level switch coupler          | 1    | Disconnect.                                             |
| 2     | Oil level switch lead holder      | 1    |                                                         |
| 3     | Oil level switch                  | 1    |                                                         |
| 4     | O <sub>2</sub> sensor lead holder | 1    |                                                         |
| 5     | Oil pan                           | 1    |                                                         |
| 6     | Oil pan gasket                    | 1    |                                                         |
| 7     | Oil strainer                      | 1    |                                                         |

#### **REMOVING THE OIL PAN**

- 1. Remove:
- Oil level switch "1"
- Oil pan "2"
- Oil pan gasket

TIP -

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



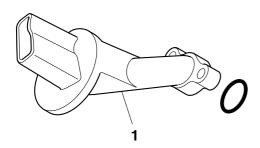
EAS31069

#### **CHECKING THE OIL STRAINER**

- 1. Check:
- Oil strainer "1"

Damage → Replace.

Contaminants → Clean with solvent.



EAS31070

#### **INSTALLING THE OIL PAN**

- 1. Install:
  - Oil pan gasket New
  - Oil pan "1"



Oil pan bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf)

• Oil level switch "2"



Oil level switch bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf)

• Engine oil drain bolt "3"

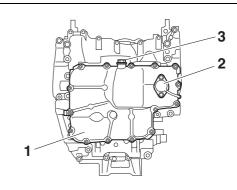


Engine oil drain bolt 43 Nm (4.3 m·kgf, 31 ft·lbf) EWA12820

#### **WARNING**

#### Always use new copper washers.

- Tighten the oil pan bolts in stages and in a crisscross pattern.
- Lubricate the oil level switch O-ring with lithium-soap-based grease.



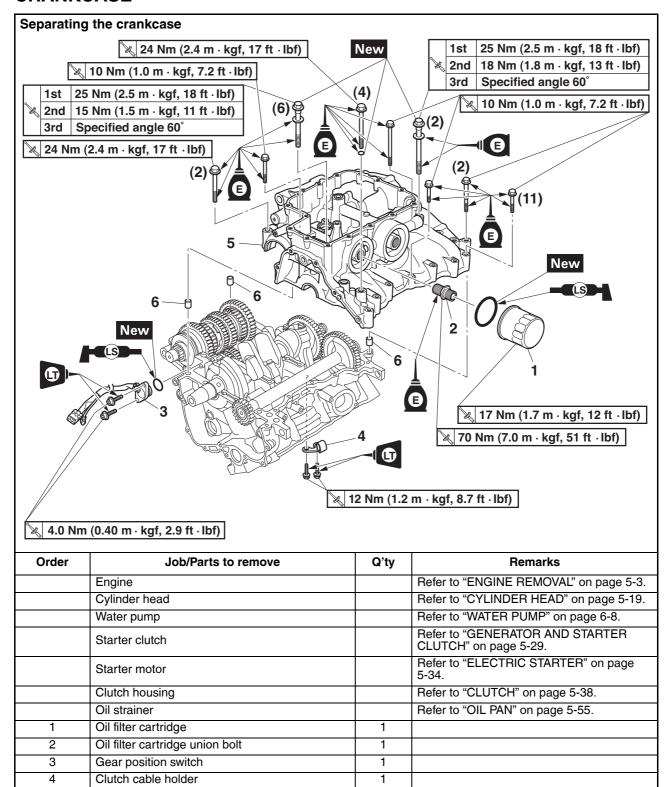
# **CRANKCASE**

5

6

Lower crankcase

Dowel pin



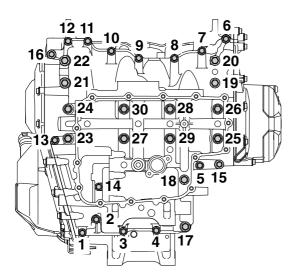
3

#### DISASSEMBLING THE CRANKCASE

- 1. Place the engine upside down.
- 2. Remove:
- Crankcase bolt (×30)

TIP\_

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in the proper sequence as
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.





- 3. Remove:
  - Lower crankcase

ECA13900

#### NOTICE

Tap on one side of the crankcase with a softface 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
  - Balancer shaft journal bearing (from the lower crankcase)

TIP

Identify the position of each part very carefully so that it can be reinstalled in its original place.

EAS30390

#### **CHECKING THE CRANKCASE**

- 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.

EAS30397

#### **ASSEMBLING THE CRANKCASE**

- 1. Lubricate:
- Crankshaft journal bearing inner surface (with the recommended lubricant)



# Recommended lubricant Engine oil

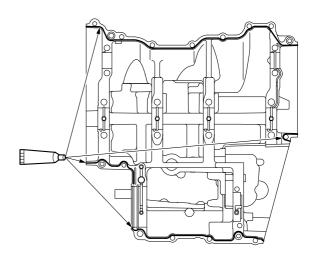
- 2. Apply:
  - Sealant (onto the crankcase mating surfaces)



Yamaha bond No. 1215 90890-85505 (Three bond No.1215®)

TIP

Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings, or balancer shaft journal bearings.



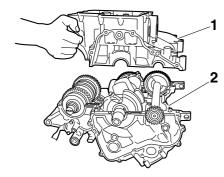
- 3. Install:
- Dowel pins

- 4. Set the shift drum assembly and transmission gears in the neutral position.
- 5. Install:
  - Lower crankcase "1" (onto the upper crankcase "2")

ECA1398

#### NOTICE

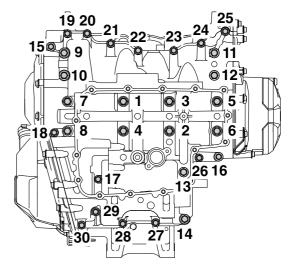
Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.



- 6. Install:
  - Crankcase bolt (×30)

TIP

- Lubricate the bolts "1"-"8" thread, mating surfaces and washers with engine oil.
- Lubricate the bolts "9"—"12" thread, mating surfaces and O-rings with engine oil.
- Lubricate the bolts "13"—"30" thread and mating surfaces with engine oil.
  - M8  $\times$  100 mm (3.94 in) bolts with washers: "7", "8" New
  - M8 × 85 mm (3.35 in) bolts with washers: "1"—
    "6" New
  - M8  $\times$  78 mm (3.07 in) bolts with new O-rings: "9"–"12"
  - M8 × 60 mm (2.36 in) bolts: "13", "14"
  - M6 × 85 mm (3.35 in) bolt: "18"
  - M6 × 65 mm (2.56 in) bolts: "15", "16"
  - M6 × 65 mm (2.56 in) bolt: "26"
  - M6 × 50 mm (1.97 in) bolts: "17", "19"—"21", "23"—"25", "27"—"30"
  - M6 × 40 mm (1.57 in) bolt: "22"





- 7. Tighten:
- Crankcase bolts "1"-"8"



Crankcase bolts "1"-"6"
1st: 25 Nm (2.5 m·kgf, 18 ft·lbf)

\*2nd: 15 Nm (1.5 m·kgf, 11 ft·lbf) 3rd: +60°

Crankcase bolts "7"-"8"

1st: 25 Nm (2.5 m·kgf, 18 ft·lbf) \*2nd: 18 Nm (1.8 m·kgf, 13 ft·lbf)

3rd: +60°

\* Following the tightening order, loosen the bolt one by one and then retighten it to the specific torque.



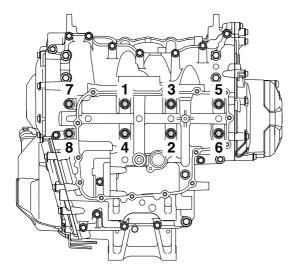
If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.



Do not use a torque wrench to tighten the bolt to the specified angle.

#### TIP

Tighten the bolts in the tightening sequence cast on the crankcase.





# 8. Tighten:

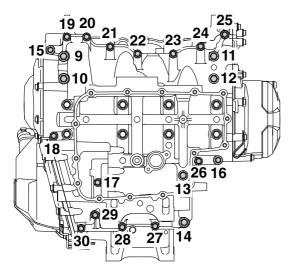
• Crankcase bolts "9"-"30"



Crankcase bolts "9"-"14"
24 Nm (2.4 m·kgf, 17 ft·lbf)
Crankcase bolts "15"-"30"
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

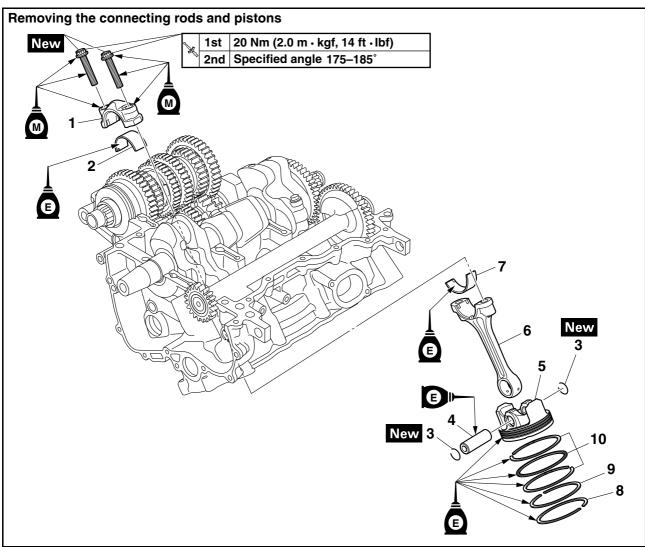
# TIP

Tighten the bolts in the tightening sequence cast on the crankcase.





# **CONNECTING RODS AND PISTONS**



| Order | Job/Parts to remove   | Q'ty | Remarks                            |
|-------|-----------------------|------|------------------------------------|
|       | Lower crankcase       |      | Refer to "CRANKCASE" on page 5-57. |
| 1     | Connecting rod cap    | 3    |                                    |
| 2     | Big end lower bearing | 3    |                                    |
| 3     | Piston pin clip       | 6    |                                    |
| 4     | Piston pin            | 3    |                                    |
| 5     | Piston                | 3    |                                    |
| 6     | Connecting rod        | 3    |                                    |
| 7     | Big end upper bearing | 3    |                                    |
| 8     | Top ring              | 3    |                                    |
| 9     | 2nd ring              | 3    |                                    |
| 10    | Oil ring              | 3    |                                    |

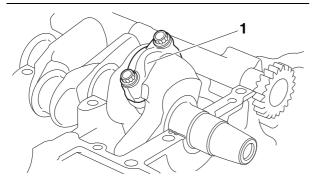
EAS30745

### REMOVING THE CONNECTING RODS AND **PISTONS**

The following procedure applies to all of the connecting rods and pistons.

- 1. Remove:
  - Connecting rod cap "1"
- Connecting rod
- Big end bearings

- Identify the position of each big end bearing so that it can be reinstalled in its original place.
- After removing the connecting rods and connecting rod caps, care should be taken not to damage the mating surfaces of the connecting rods and connecting rod caps.



- 2. Remove:
  - Piston pin clips "1"
  - Piston pin "2"
  - Piston "3"

ECA13810

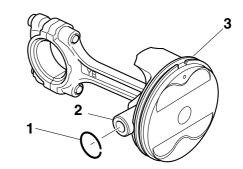
## NOTICE

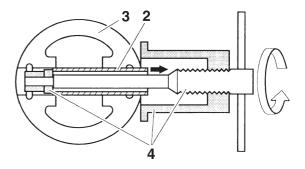
### Do not use a hammer to drive the piston pin out.

- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set "4".



Piston pin puller set 90890-01304 Piston pin puller YU-01304

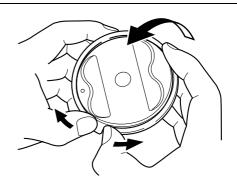




- 3. Remove:
  - Top ring
  - 2nd ring
  - Oil ring

#### TIP -

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EAS30747

### **CHECKING THE CYLINDER AND PISTON**

- 1. Check:
- Piston wall
- Cylinder wall Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.
- 2. Measure:
  - Piston-to-cylinder clearance

# \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* a. Measure cylinder bore "C" with the cylinder

bore gauge.

#### TIP

Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder.



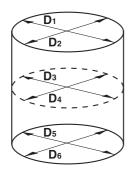
Bore 78.000-78.010 mm (3.0709-3.0713 in) Taper limit 0.050 mm (0.0020 in) Out of round limit 0.050 mm (0.0020 in)

"C" = maximum of  $D_1$ ,  $D_2$ ,  $D_3$ ,  $D_4$ ,  $D_5$ ,  $D_6$ 

Taper (front-to-back) = maximum difference between  $D_1$ ,  $D_3$ ,  $D_5$ Taper (side-to-side) = maximum difference between  $D_2$ ,  $D_4$ ,  $D_6$ 

Out of round (top) = difference between  $D_1$ ,  $D_2$ Out of round (middle) = difference between  $D_3$ ,  $D_4$ 

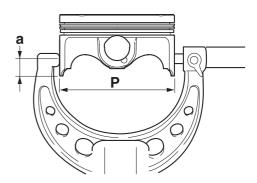
Out of round (bottom) = difference between  $D_5$ ,  $D_6$ 



- b. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.
- c. Measure piston skirt diameter "P" with the micrometer.



Piston Diameter 77.975–77.990 mm (3.0699– 3.0705 in)



- a. 12.0 mm (0.47 in) from the bottom edge of the piston
- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance = Cylinder bore "C" - Piston skirt diameter "P"



Piston-to-cylinder clearance 0.010–0.035 mm (0.0004–0.0014 in) Limit

0.150 mm (0.0059 in)

 If out of specification, replace the cylinder, and replace the piston and piston rings as a set.

EAS30748

#### **CHECKING THE PISTON RINGS**

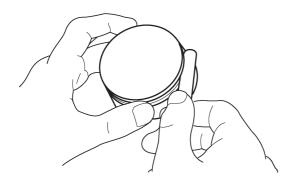
- 1. Measure:
  - Piston ring side clearance
     Out of specification → Replace the piston and piston rings as a set.

#### TIP

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.



Piston ring
Top ring
Ring side clearance
0.030–0.065 mm (0.0012–0.0026
in)
Side clearance limit
0.115 mm (0.0045 in)
2nd ring
Ring side clearance
0.020–0.055 mm (0.0008–0.0022
in)



Side clearance limit 0.115 mm (0.0045 in)

#### 2. Install:

 Piston ring (into the cylinder)

#### TIP

Use the piston crown to level the piston ring near bottom of cylinder "a", where cylinder wear is lowest.

#### 3. Measure:

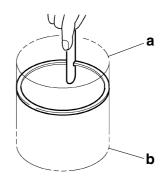
Piston ring end gap
 Out of specification → Replace the piston ring.

#### TIP -

The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.



Top ring
 End gap (installed)
 0.15-0.25 mm (0.0059-0.0098 in)
 End gap limit
 0.50 mm (0.0197 in)
2nd ring
 End gap (installed)
 0.30-0.45 mm (0.0118-0.0177 in)
 End gap limit
 0.80 mm (0.0315 in)



b. Upper of cylinder

EAS30749

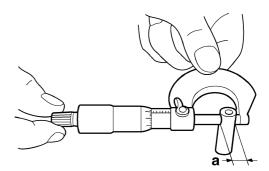
#### **CHECKING THE PISTON PIN**

The following procedure applies to all of the piston pins.

- 1. Check:
  - Piston pin Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
- 2. Measure:
  - Piston pin outside diameter "a"
     Out of specification → Replace the piston pin.



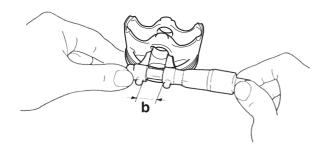
Piston pin outside diameter 16.990–16.995 mm (0.6689– 0.6691 in) Limit 16.970 mm (0.6681 in)



- 3. Measure:
  - Piston pin bore inside diameter "b"
     Out of specification → Replace the piston.



Piston pin bore inside diameter 17.002–17.013 mm (0.6694– 0.6698 in) Limit 17.043 mm (0.6710 in)



#### 4. Calculate:

Piston-pin-to-piston-pin-bore clearance
 Out of specification → Replace the piston pin and piston as a set.

Piston-pin-to-piston-pin-bore clearance = Piston pin bore inside diameter "b" - Piston pin outside diameter "a"



Piston-pin-to-piston-pin-bore clearance 0.007-0.023 mm (0.0003-0.0009 in)

EAS30750

#### CHECKING THE CONNECTING RODS

- 1. Measure:
- Crankshaft-pin-to-big-end-bearing clearance Out of specification → Replace the big end bearings.



Oil clearance 0.027-0.051 mm (0.0011-0.0020 in)

The following procedure applies to all of the connecting rods.

ECA13930

#### **NOTICE**

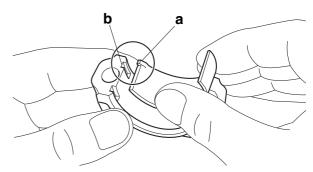
Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

- a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
- b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

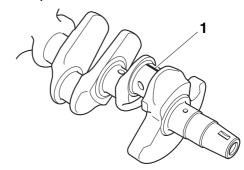
#### TIP

Align the projections "a" on the big end bearings with the notches "b" in the connecting rod and

connecting rod cap.



c. Put a piece of Plastigauge® "1" on the crankshaft pin.



d. Assemble the connecting rod halves.

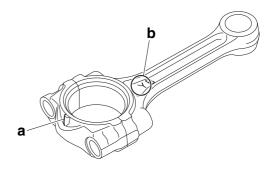
ECA18390

#### NOTICE

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

#### TIP

- Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
- Make sure that the projection "a" on the connecting rod cap faces the same direction as the "Y" mark "b" on the connecting rod.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.



TIP

Install by carrying out the following procedures in

order to assemble in the most suitable condition.

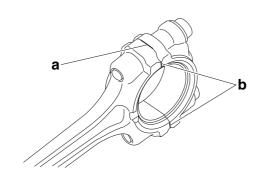
e. Tighten the connecting rod bolt while checking that the sections shown "a" and "b" are flush with each other by touching the surface.



Connecting rod bolt 30 Nm (3.0 m·kgf, 22 ft·lbf)

#### TIP

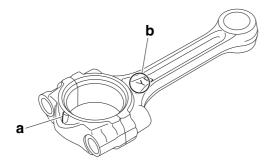
To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



- a. Side machined face
- b. Thrusting faces
- f. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

#### TIP

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Make sure that the projection "a" on the connecting rod cap faces the same direction as the "Y" mark "b" on the connecting rod.
- Make sure the "Y" marks "b" on the connecting rods face towards the left side of the crankshaft.

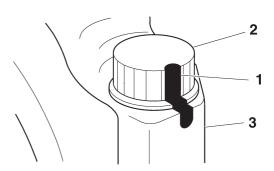


g. Tighten the connecting rod bolts with a torque wrench.



Connecting rod bolt (1st) 20 Nm (2.0 m·kgf, 14 ft·lbf)

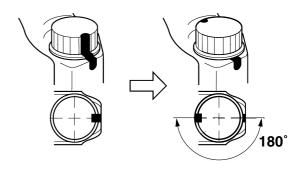
h. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".



i. Tighten the connecting rod bolts further to reach the specified angle 175°–185°.



Connecting rod bolt (final) Specified angle 175°–185°



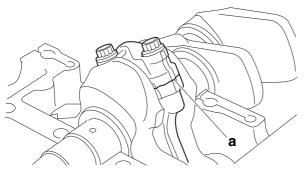
WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

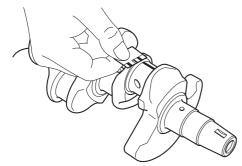
ECA20890
NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.

 After the installation, check that the section shown "a" is flush with each other by touching the surface.



- k. Remove the connecting rod and big end bearings.
- Measure the compressed Plastigauge® width on the crankshaft pin. If the crankshaftpin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



- 2. Select:
  - Big end bearings (P<sub>1</sub>–P<sub>3</sub>)

#### TIP

- The numbers "A" stamped into the crankshaft web and the numbers "1" on the connecting rods are used to determine the replacement big end bearings sizes.
- "P<sub>1</sub>"-"P<sub>3</sub>" 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)



Bearing color code

Code 1

Blue

Code 2

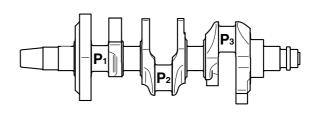
Black

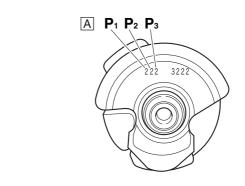
Code 3

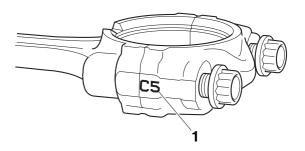
**Brown** 

Code 4

Green







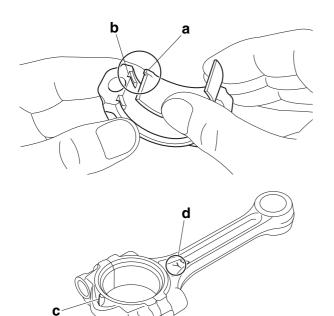
EAS30751

# INSTALLING THE CONNECTING ROD AND PISTON

The following procedure applies to all of the connecting rods and pistons.

- 1. Install:
  - Big end bearings
  - Connecting rod cap (onto the connecting rod)

- Be sure to reinstall each big end bearing in its original place.
- Align the projections "a" on the big end bearings with the notches "b" in the connecting rods and connecting rod caps.
- Make sure that the projection "c" on the connecting rod cap faces the same direction as the "Y" mark "d" on the connecting rod.



- 2. Tighten:
- Connecting rod bolts New

CA18390

# NOTICE

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

Install by carrying out the following procedures in order to assemble in the most suitable condition.

# 

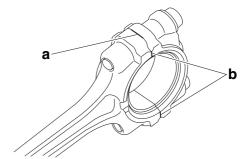
- a. Replace the connecting rod bolts with new ones.
- b. Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
- c. After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.
- d. Tighten the connecting rod bolt while checking that the sections shown "a" and "b" are flush with each other by touching the surface.



Connecting rod bolt 30 Nm (3.0 m·kgf, 22 ft·lbf)

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



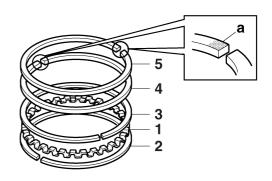
- a. Side machined face
- b. Thrusting faces
- e. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

#### 

- 3. Install:
- Oil ring expander "1"
- Lower oil ring rail "2"
- Upper oil ring rail "3"
- 2nd ring "4"
- Top ring "5" (into the piston)

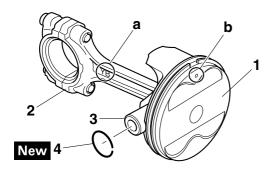
TIP

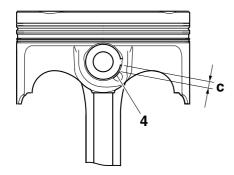
Be sure to install the piston rings so that the manufacturer's marks or numbers "a" face up.



- 4. Install:
  - Piston "1" (onto the respective connecting rod "2")
  - Piston pin "3"
  - Piston pin clips "4" New

- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark "a" on the connecting rod faces left when the punch mark "b" on the piston is pointing up as shown.
- Install the piston pin clips, so that the clip ends are 3 mm (0.12 in) "c" or more from the cutout in the piston.
- Reinstall each piston into its original cylinder.



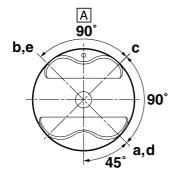


- 5. Lubricate:
  - Piston
  - Piston rings
  - Cylinder (with the recommended lubricant)



# Recommended lubricant Engine oil

- 6. Offset:
  - Piston ring end gaps



- a. Top ring
- b. 2nd ring
- c. Upper oil ring rail
- d. Oil ring expander
- e. Lower oil ring rail
- A. Exhaust side
- 7. Lubricate:
  - Crankshaft pins
  - Connecting rod big end bearing inner surface (with the recommended lubricant)



### Recommended lubricant Engine oil

- 8. Install:
  - Piston assemblies "1" (into the cylinder "2" and onto the crankshaft pin)



Piston installing tool 90890-04161 Piston installing tool YM-04161

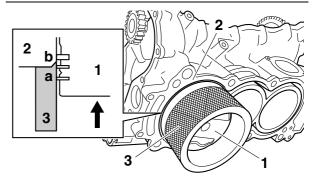
ECA21490

#### NOTICE

If the projection "a" of the piston installing tool damages, you cannot use it. Please handle with care.

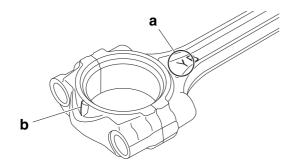
#### TIP

Fit the projection "a" of the piston installing tool "3" and blunt-edged part "b" of the cylinder, fix the position of the piston installing tool, and then push the piston up to the cylinder.



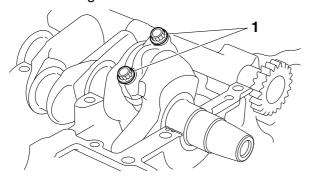
- 9. Install:
- Connecting rod caps
- Connecting rod bolts

- Make sure the "Y" marks "a" on the connecting rods face towards the left side of the crankshaft.
- Make sure that the projection "b" on the connecting rod cap faces the same direction as the "Y" mark "a" on the connecting rod.
- Apply Molybdenum disulfide oil to the bolt threads and seats.



# 10.Tighten:

• Connecting rod bolts "1"



# TIP

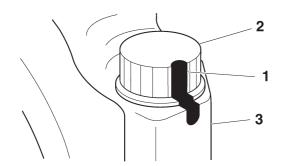
Tighten the connecting rod bolts using the following procedure.

a. Tighten the connecting rod bolts with a torque wrench.



## Connecting rod bolt (1st) 20 Nm (2.0 m·kgf, 14 ft·lbf)

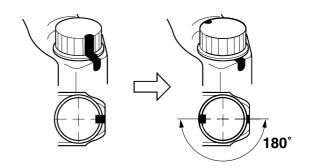
b. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".



c. Tighten the connecting rod bolts further to reach the specified angle 175°–185°.



Connecting rod bolt (final) Specified angle 175°–185°



# WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

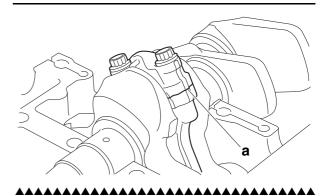
# ECA20890 NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.

d. After the installation, check that the section shown "a" is flush with each other by touching the surface.

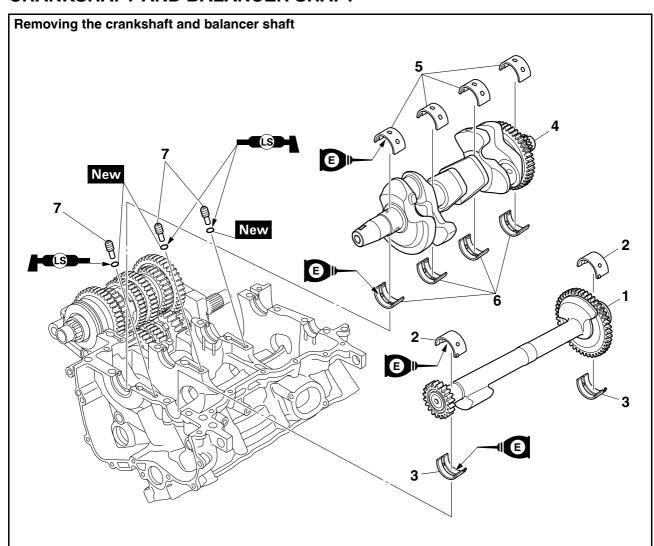
# WARNING

If the connecting rod and cap are not flush with each other, remove the connecting rod bolts and big end bearing and restart from step (1). In this case, make sure to replace the connecting rod bolts.



FAS2017

# **CRANKSHAFT AND BALANCER SHAFT**



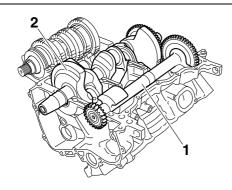
| Order | Job/Parts to remove                  | Q'ty | Remarks                                                           |
|-------|--------------------------------------|------|-------------------------------------------------------------------|
|       | Lower crankcase                      |      | Refer to "CRANKCASE" on page 5-57.                                |
|       | Connecting rod                       |      | Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-62. |
| 1     | Balancer shaft                       | 1    |                                                                   |
| 2     | Balancer shaft journal lower bearing | 2    |                                                                   |
| 3     | Balancer shaft journal upper bearing | 2    |                                                                   |
| 4     | Crankshaft                           | 1    |                                                                   |
| 5     | Crankshaft journal lower bearing     | 4    |                                                                   |
| 6     | Crankshaft journal upper bearing     | 4    |                                                                   |
| 7     | Oil nozzle                           | 3    |                                                                   |

# REMOVING THE CRANKSHAFT AND BALANCER SHAFT

- 1. Remove:
- Balancer shaft "1"
- · Balancer shaft journal bearing
- Crankshaft assembly "2"
- Crankshaft journal bearings

TIF

Identify the position of each balancer shaft journal bearings and crankshaft journal bearings so that it can be reinstalled in its original place.



EAS31174

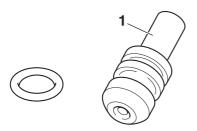
# **CHECKING THE OIL NOZZLES**

The following procedure applies to all of the oil nozzles.

- 1. Check:
  - Oil nozzle "1"

 $\label{eq:Damage/wear} \mbox{Damage/wear} \rightarrow \mbox{Replace the oil nozzle}.$ 

Oil passage
 Obstruction → Blow out with compressed air.



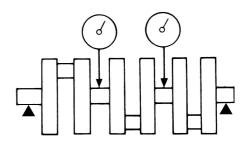
EAS31075

#### **CHECKING THE CRANKSHAFT**

- 1. Measure:
  - Crankshaft runout
     Out of specification → Replace the crankshaft.



Runout limit 0.030 mm (0.0012 in)



- 2. Check:
- Crankshaft journal surfaces
- Crankshaft pin surfaces
- Bearing surfaces
   Scratches/wear → Replace the crankshaft.
- 3. Measure:
  - Crankshaft-journal-to-crankshaft-journalbearing clearance
     Out of specification → Replace the crankshaft journal bearings.



Journal oil clearance 0.014–0.038 mm (0.0006–0.0015 in)

ECA13920

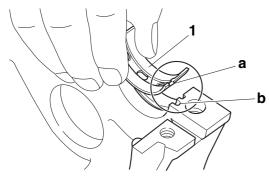
#### NOTICE

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

- a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
- b. Place the upper crankcase upside down on a bench.
- c. Install the crankshaft journal upper bearings "1" and the crankshaft into the upper crankcase.

#### TIP

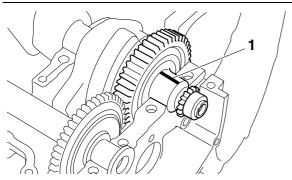
Align the projections "a" on the crankshaft journal upper bearings with the notches "b" in the upper crankcase.



d. Put a piece of Plastigauge® "1" on each crankshaft journal.

TIP

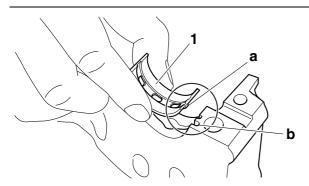
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



e. Install the crankshaft journal lower bearings "1" into the lower crankcase and assemble the crankcase halves.

TIP

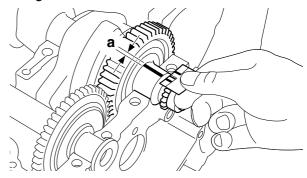
- Align the projections "a" of the crankshaft journal lower bearings with the notches "b" in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



- f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.
   Refer to "CRANKCASE" on page 5-57.
- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- h. Measure the compressed Plastigauge® width "a" on each crankshaft journal.

  If the crankshaft-journal-to-cra

nal-bearing clearance is out of specification, select replacement crankshaft journal bearings.



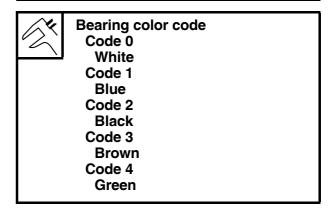
- 4. Select:
- Crankshaft journal bearings (J<sub>1</sub>–J<sub>4</sub>)

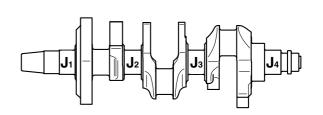
TIP

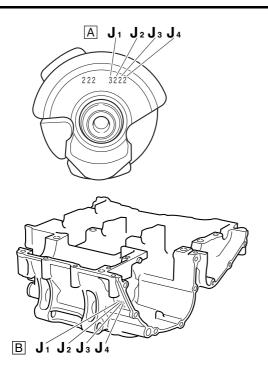
- The numbers "A" stamped into the crankshaft web and the numbers "B" stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- "J<sub>1</sub>"-"J<sub>4</sub>" refer to the bearings shown in the crankshaft and lower crankcase illustration.

For example, if the crankcase " $J_1$ " and crankshaft web " $J_1$ " numbers are 7 and 2 respectively, then the bearing size for " $J_1$ " is:

" $J_1$ " (crankcase) - " $J_1$ " (crankshaft web) -1 = 7 - 2 - 1 = 4 (green)







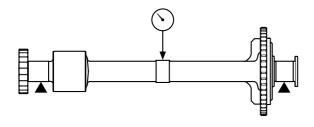
EAS31076

#### **CHECKING THE BALANCER SHAFT**

- Measure:
  - Balancer shaft runout
     Out of specification → Replace the balancer shaft.



Balancer shaft runout limit 0.030 mm (0.0012 in)



- 2. Check:
  - Balancer shaft journal surfaces
  - Bearing surfaces
     Scratches/wear → Replace the balancer shaft.
- 3. Measure:
  - Balancer shaft journal-to-balancer shaft journal bearing clearance
     Out of specification → Replace the balancer shaft journal bearings.



Balancer shaft journal to balancer shaft bearing clearance 0.024–0.048 mm (0.0009–0.0019 in)

ECA18400

#### NOTICE

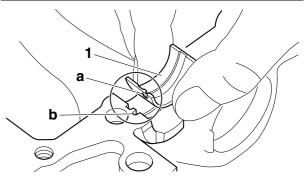
Do not interchange the balancer shaft journal bearings. To obtain the correct balancer shaft-journal-to-balancer shaft-journal-bearing clearance and prevent engine damage, the balancer shaft journal bearings must be installed in their original positions.

#### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

- a. Clean the balancer shaft journal bearings, balancer shaft journals, and bearing portions of the crankcase.
- b. Place the upper crankcase upside down on a bench.
- c. Install the balancer shaft journal upper bearings "1" and the balancer shaft into the upper crankcase.

#### TIP.

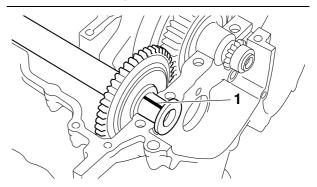
Align the projections "a" on the balancer shaft journal upper bearings with the notches "b" in the upper crankcase.



d. Put a piece of Plastigauge® "1" on each balancer shaft journal.

#### TIP

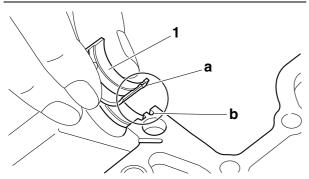
Do not put the Plastigauge® over the oil hole in the balancer shaft journal.



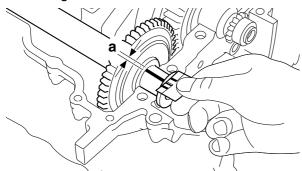
e. Install the balancer shaft journal lower bearings "1" into the lower crankcase and assemble the crankcase halves.

TIP

- Align the projections "a" of the balancer shaft journal lower bearings with the notches "b" in the crankcase.
- Do not move the balancer shaft until the clearance measurement has been completed.



- f. Tighten the bolts to specification in the tightening sequence cast on the crankcase. Refer to "CRANKCASE" on page 5-57.
- g. Remove the lower crankcase and the balancer shaft journal lower bearings.
- h. Measure the compressed Plastigauge® width "a" on each balancer shaft journal. If the balancer shaft-journal-to-balancer shaft-journal-bearing clearance is out of specification, select replacement balancer shaft journal bearings.



- 4. Select:
  - Balancer shaft journal bearing (J<sub>1</sub>–J<sub>2</sub>)

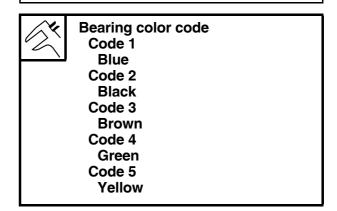
TIF

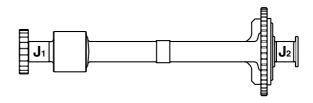
- The numbers "A" stamped into the balancer shaft web and the numbers "B" stamped into the lower crankcase are used to determine the replacement balancer shaft journal bearing sizes
- "J<sub>1</sub>"-"J<sub>2</sub>" refer to the bearings shown in the balancer shaft and lower crankcase illustration.

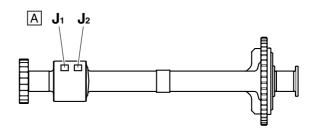
For example, if the crankcase "J1" and bal-

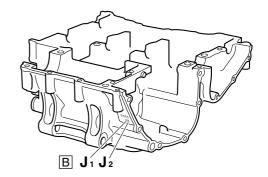
ancer shaft web "J<sub>1</sub>" numbers are 5 and 2 respectively, then the bearing size for "J<sub>1</sub>" is:

"J<sub>1</sub>" (crankcase) - "J<sub>1</sub>" (balancer shaft web) = 5 - 2 = 3 (brown)









EAS31077

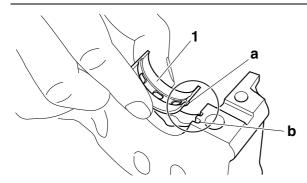
#### **INSTALLING THE CRANKSHAFT**

- 1. Install:
  - Crankshaft journal upper bearings (into the upper crankcase)

- Crankshaft journal lower bearings (into the lower crankcase)
- Crankshaft

### TIP -

- Align the projections "a" on the crankshaft journal bearings "1" with the notches "b" in the crankcase.
- Be sure to install each crankshaft journal bearings in its original place.



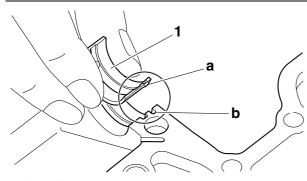
#### EAS31172

#### **INSTALLING THE BALANCER ASSEMBLY**

- 1. Install:
  - Balancer shaft journal upper bearings (into the upper crankcase)
  - Balancer shaft journal lower bearings (into the lower crankcase)

#### TIP

- Align the projections "a" on the balancer shaft journal bearings "1" with the notches "b" in the crankcases.
- Be sure to install each balancer journal bearing in its original place.

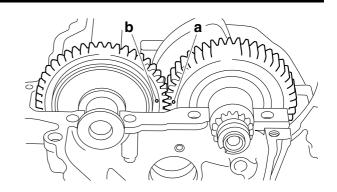


### 2. Install:

• Balancer shaft

#### TIF

Install by aligning the crankshaft match mark "a" and the balancer shaft match mark "b".



# **TRANSMISSION**

Shift fork-R

Shift fork-C

Bearing

Shift drum assembly

Main axle assembly

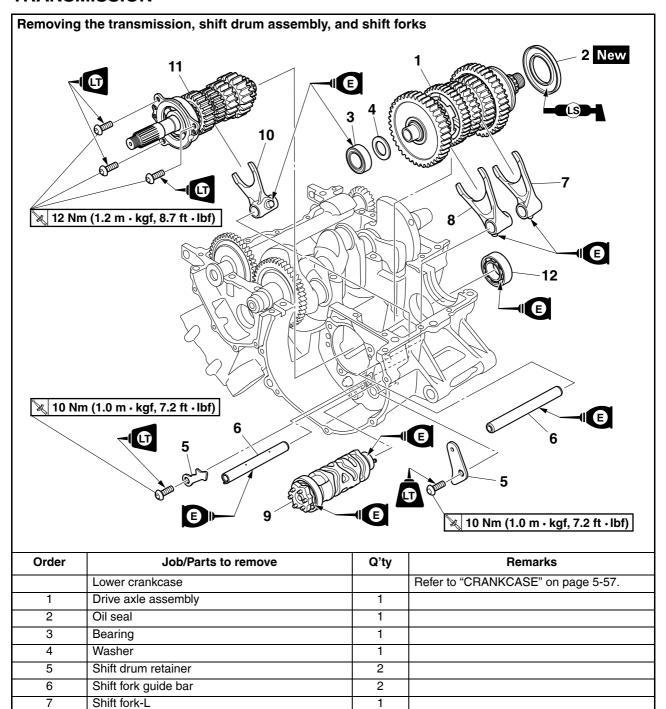
8

9

10

11

12

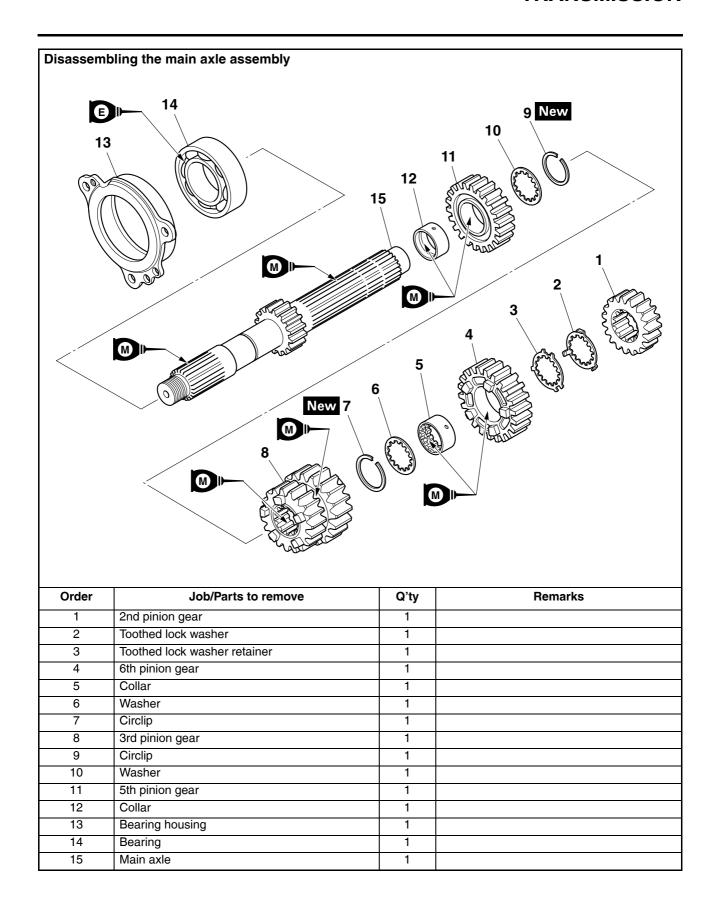


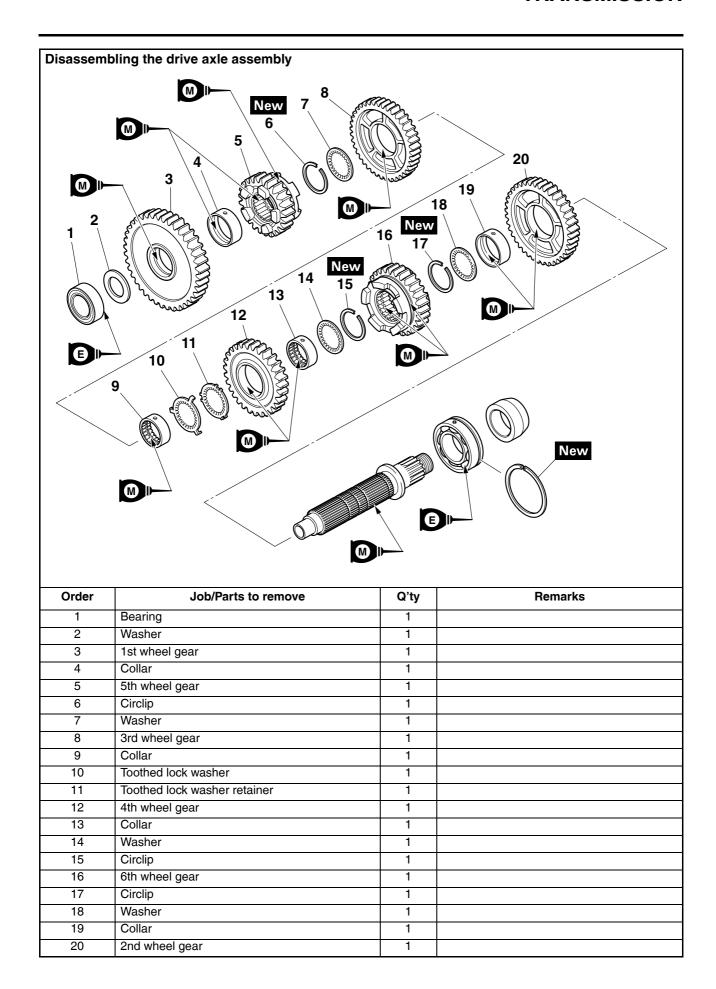
1

1

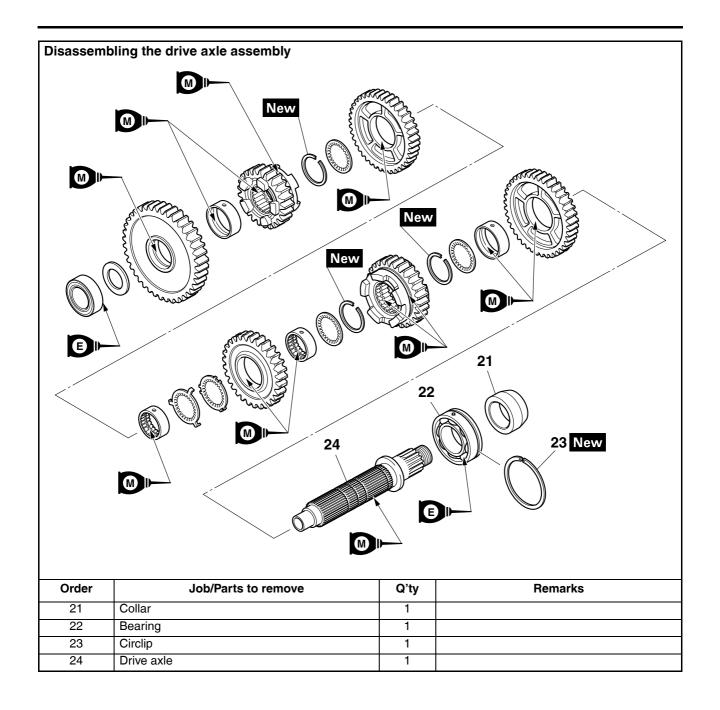
1

1



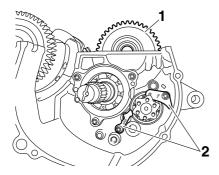


# **TRANSMISSION**

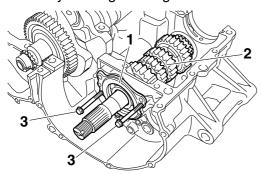


#### REMOVING THE TRANSMISSION

- 1. Remove:
- Drive axle assembly "1"
- Shift drum retainers "2"
- Shift fork guide bars
- Shift fork-L
- Shift fork-R
- Shift drum assembly
- Shift fork-C

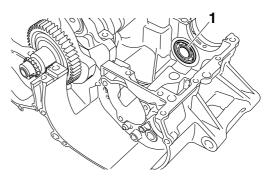


- 2. Remove:
  - Bearing housing "1"
  - Main axle assembly "2"
- a. Insert two bolts "3" of the proper size, as shown in the illustration, into the main axle assembly bearing housing.



- 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:
  - Bearing "1"

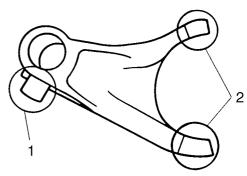


EAS30431

#### **CHECKING THE SHIFT FORKS**

The following procedure applies to all of the shift forks.

- 1. Check:
- Shift fork cam follower "1"
- Shift fork pawl "2" Bends/damage/scoring/wear → Replace the shift fork.

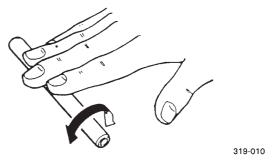


- 2. Check:
  - Shift fork guide bar
     Roll the shift fork guide bar on a flat surface.
     Bends → Replace.

EWA128

# **WARNING**

Do not attempt to straighten a bent shift fork guide bar.



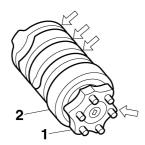
- 3. Check:
  - Shift fork movement

     (along the shift fork guide bar)
     Rough movement → Replace the shift forks and shift fork guide bar as a set.



#### **CHECKING THE SHIFT DRUM ASSEMBLY**

- 1. Check:
- Shift drum groove
   Damage/scratches/wear → Replace the shift
   drum assembly.
- Shift drum segment "1"
   Damage/wear → Replace the shift drum assembly.
- Shift drum bearing "2"
   Damage/pitting → Replace the shift drum assembly.



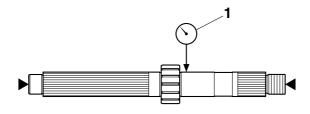
FAS30433

#### **CHECKING THE TRANSMISSION**

- 1. Measure:
  - Main axle runout (with a centering device and dial gauge "1")
     Out of specification → Replace the main axle.



Main axle runout limit 0.08 mm (0.0032 in)

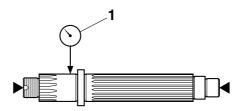


# 2. Measure:

 Drive axle runout (with a centering device and dial gauge "1") Out of specification  $\rightarrow$  Replace the drive axle.

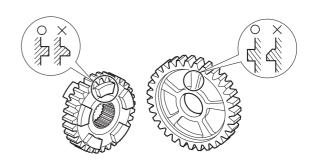


Drive axle runout limit 0.08 mm (0.0032 in)



#### 3. Check:

- Transmission gears
   Blue discoloration/pitting/wear → Replace
   the defective gear(s).
- Transmission gear dogs
   Cracks/damage/rounded edges → Replace the defective gear(s).



#### 4. Check:

- Transmission gear engagement (each pinion gear to its respective wheel gear)
- Incorrect  $\rightarrow$  Reassemble the transmission axle assemblies.
- 5. Check:
  - Transmission gear movement
     Rough movement → Replace the defective part(s).
- 6. Check:
- Circlips
   Bends/damage/looseness → Replace.

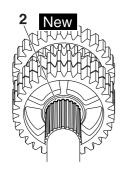
EAS3043

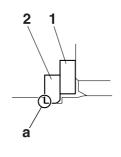
# ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

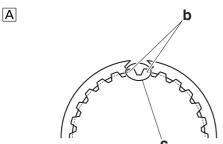
- 1. Install:
  - Toothed washer "1"
  - Circlip "2" New

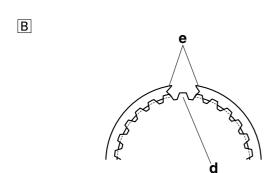
#### TIP

- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the toothed washer and gear.
- Align the opening between the ends "b" of the circlip with a groove "c" in the axle.
- Install the circlip so that a spline "d" is in the center of the gap between the circlip ends "e" as shown.









- A. Main axle
- B. Drive axle

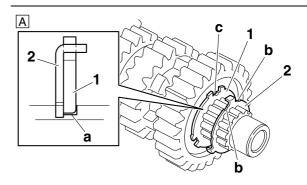
#### 2. Install:

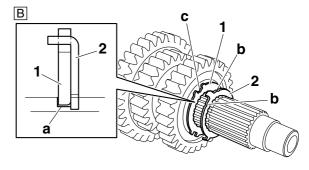
- Toothed lock washer retainer "1"
- Toothed lock washer "2"

#### TIP -

- With the toothed lock washer retainer in the groove "a" in the axle, align the projection on the retainer with an axle spline, and then install the toothed lock washer.
- Be sure to align the projection on the toothed lock washer that is between the alignment marks "b" with the alignment mark "c" on the re-

#### tainer.





- A. Main axle
- B. Drive axle

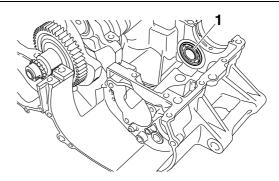
#### EAS30438

#### **INSTALLING THE TRANSMISSION**

- 1. Install:
  - Bearing "1"

#### TIP\_

Face the seal side of bearing to the outside.

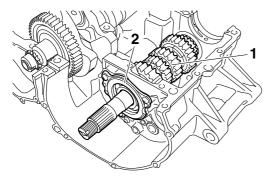


- 2. Install:
- Main axle assembly "1"
- Bearing housing "2"



Main axle bearing housing bolt 12 Nm (1.2 m·kgf, 8.7 ft·lbf) LOCTITE®

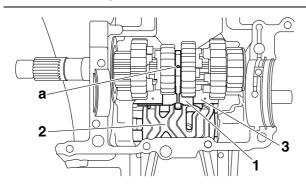
# **TRANSMISSION**



- 3. Install:
  - Shift fork-C "1"
  - Shift drum assembly "2"
  - Shift fork guide bar "3"

#### TIP\_

- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: "R", "C", "L".
- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork-C into the groove "a" in the 3rd and 4th pinion gear on the main axle.



- 4. Install:
  - Shift fork-R "1"
  - Shift fork-L "2"
  - Shift fork guide bar
  - Shift drum retainers "3"
  - Bearing
  - Oil seal New
  - Circlip "4" New
  - Drive axle assembly "5"

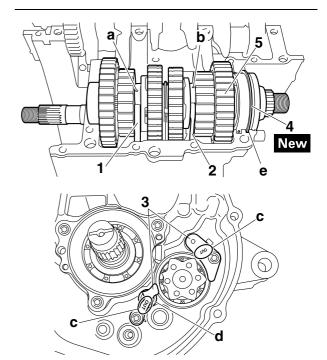


Shift drum retainer bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf) LOCTITE®

#### TIP

- Install shift fork-R into the groove "a" in the 5th wheel gear and shift fork-L into the groove "b" in the 6th wheel gear on the drive axle.
- Install the shift drum retainer with its "OUT" mark "c" facing outward.

- Touch the protrusion "d" on the shift fork guide bar to the side of the shift drum retainer.
- Make sure that the drive axle bearing circlip "4" is inserted into the grooves "e" in the upper crankcase.



#### 5. Check:

Transmission
 Rough movement → Repair.

#### TIP

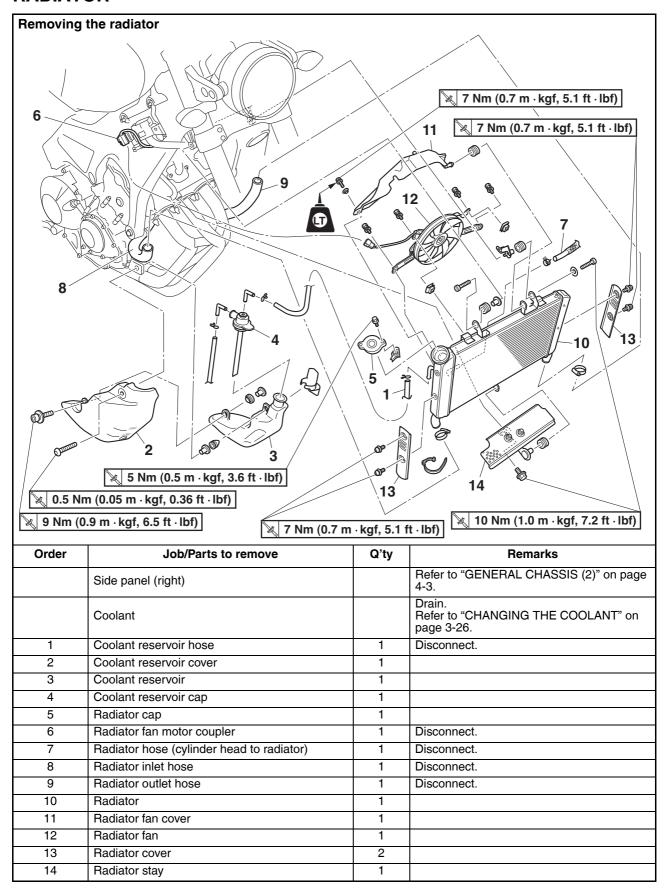
Oil each gear, shaft, and bearing thoroughly.

# 6

# **COOLING SYSTEM**

| RADIATOR                           | 6-1  |
|------------------------------------|------|
| CHECKING THE RADIATOR              | 6-2  |
| INSTALLING THE RADIATOR            |      |
| OIL COOLER                         | 6-4  |
| CHECKING THE OIL COOLER            | 6-5  |
| INSTALLING THE OIL COOLER          | 6-5  |
| THERMOSTAT                         |      |
| CHECKING THE THERMOSTAT            |      |
| INSTALLING THE THERMOSTAT ASSEMBLY | 6-7  |
| WATER PUMP                         | 6-8  |
| DISASSEMBLING THE WATER PUMP       | 6-10 |
| CHECKING THE WATER PUMP            | 6-10 |
| ASSEMBLING THE WATER PUMP          |      |

# **RADIATOR**



#### CHECKING THE RADIATOR

- 1. Check:
- Radiator fins

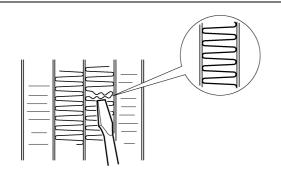
Obstruction  $\rightarrow$  Clean.

Apply compressed air to the rear of the radiator.

Damage → Repair or replace.

TIP

Straighten any flattened fins with a thin, flat-head screwdriver.



- 2. Check:
  - Radiator hoses
  - Radiator pipes
     Cracks/damage → Replace.
- 3. Measure:
  - Radiator cap valve opening pressure Below the specified pressure → Replace the radiator cap.



Radiator cap valve opening pressure

93.3-122.7 kPa (0.93-1.23 kgf/cm², 13.5-17.8 psi)

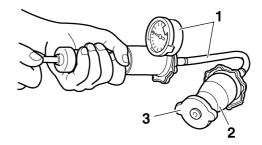
a. Install the radiator cap tester "1" and radiator cap tester adapter "2" to the radiator cap "3".

YU-33984

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A Radiator cap tester adapter 90890-01352 Pressure tester adapter



b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

#### 

- 4. Check:
  - Radiator fan
     Damage → Replace.
     Malfunction → Check and repair.
     Refer to "COOLING SYSTEM" on page 8-29.

EAS30440

#### **INSTALLING THE RADIATOR**

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

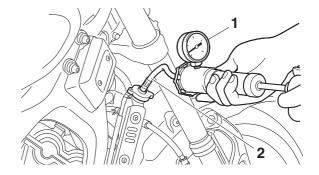
     Refer to "CHANGING THE COOLANT" on page 3-26.
- 2. Check:
  - Cooling system
     Leaks → Repair or replace any faulty part.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

a. Attach the radiator cap tester "1" and radiator cap tester adapter "2" to the radiator.



Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984



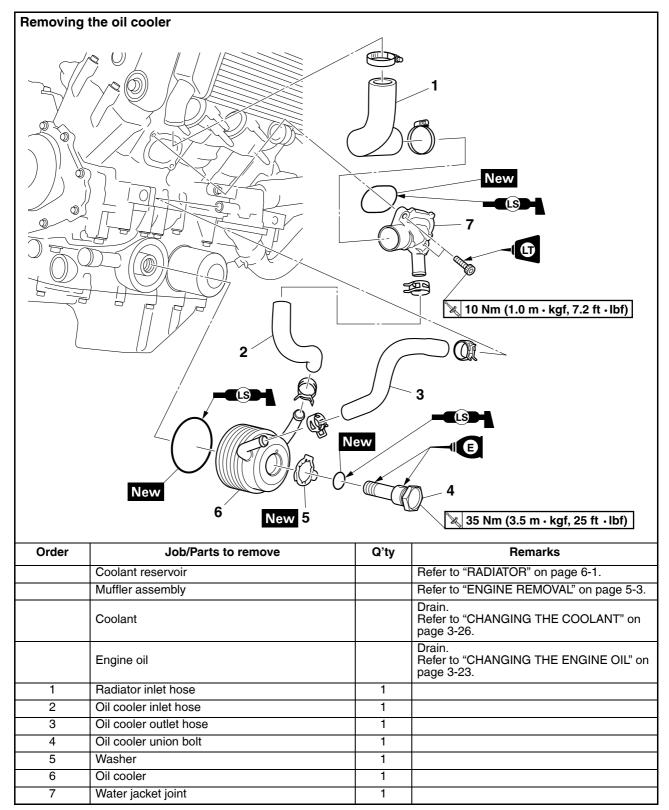
- Apply 122.7 kPa (1.23 kgf/cm², 17.8 psi) of pressure.
- c. Measure the indicated pressure with the gauge.

## 

- 3. Measure:
  - $\bullet$  Radiator cap valve opening pressure Below the specified pressure  $\to$  Replace the radiator cap.

Refer to "CHECKING THE RADIATOR" on page 6-2.

# **OIL COOLER**



#### **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.

FAS30442

#### **INSTALLING THE OIL COOLER**

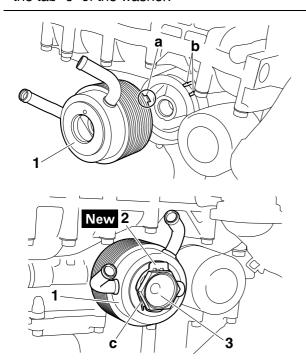
- 1. Clean:
  - Mating surfaces of the oil cooler and the crankcase (with a cloth dampened with lacquer thinner)
- 2. Install:
  - O-ring New
  - Oil cooler "1"
  - Washer "2" New
  - Oil cooler union bolt "3"



Oil cooler union bolt 35 Nm (3.5 m·kgf, 25 ft·lbf)

#### TIP

- Before installing the oil cooler, apply engine oil lightly to the oil cooler union bolt and apply lithium-soap-based grease to the O-ring.
- Make sure the O-ring is positioned properly.
- Align the projection "a" on the oil cooler with the slot "b" in the crankcase.
- After installing the oil cooler union bolt, bend the tab "c" of the washer.



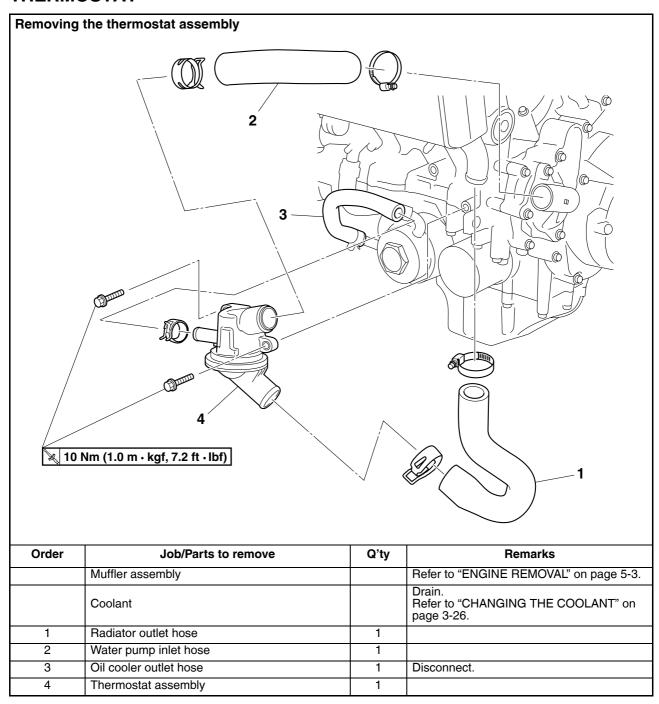
- 3. Fill:
- Cooling system (with the specified amount of the recommended coolant)
  - Refer to "CHANGING THE COOLANT" on page 3-26.
- Crankcase
   (with the specified amount of the recommended engine oil)

   Refer to "CHANGING THE ENGINE OIL" on page 3-23.
- 4. Check:
  - Cooling system
     Leaks → Repair or replace any faulty part.
     Refer to "INSTALLING THE RADIATOR" on page 6-2.
- 5. Measure:

page 6-2.

Radiator cap valve opening pressure
 Below the specified pressure → Replace the
 radiator cap.
 Refer to "CHECKING THE RADIATOR" on

# **THERMOSTAT**



FAS30443

#### **CHECKING THE THERMOSTAT**

- 1. Check:
  - Thermostat assembly "1" Cracks/damage → Replace.



EAS30445

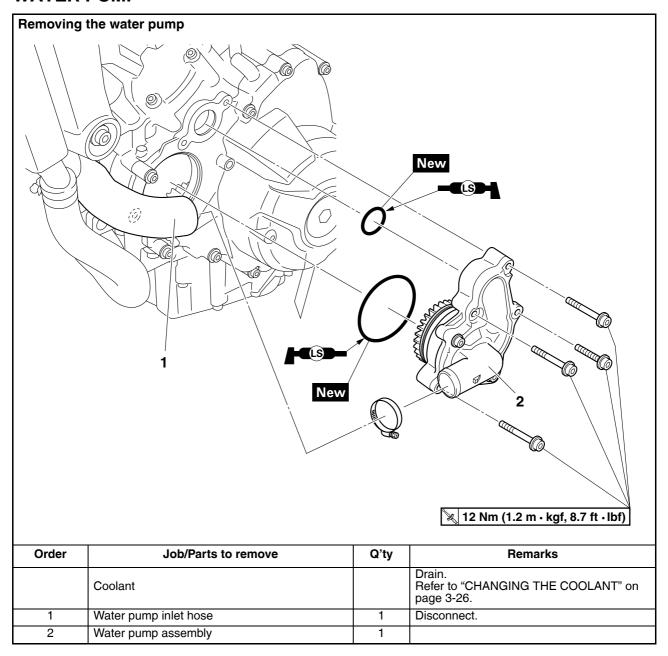
# INSTALLING THE THERMOSTAT ASSEMBLY

- 1. Install:
  - Thermostat assembly
- 2. Fill:
  - Cooling system (with the specified amount of the recommended coolant)
     Refer to "CHANGING THE COOLANT" on
  - page 3-26.

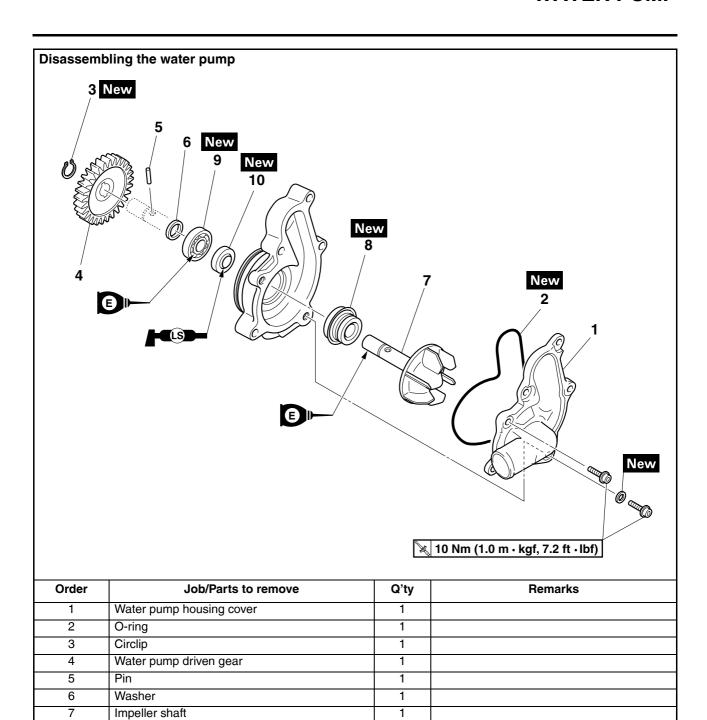
3. Check:

- Cooling system
   Leaks → Repair or replace any faulty part.
   Refer to "INSTALLING THE RADIATOR" on page 6-2.
- 4. Measure:
  - Radiator cap valve opening pressure
     Below the specified pressure → Replace the
     radiator cap.
     Refer to "CHECKING THE RADIATOR" on
     page 6-2.

# **WATER PUMP**



# **WATER PUMP**



1

1

1

8

9

10

Mechanical seal

Bearing

Oil seal

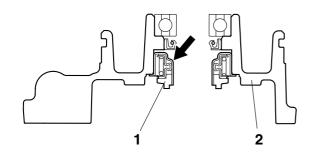
FAS30446

#### **DISASSEMBLING THE WATER PUMP**

- 1. Remove:
  - Mechanical seal (housing side) "1"

TIP -

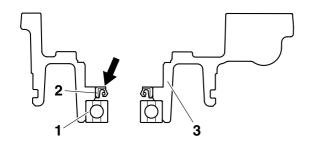
Remove the mechanical seal (housing side) from the inside of the water pump housing "2".



- 2. Remove:
  - Bearing "1"
  - Oil seal "2"

TIP\_

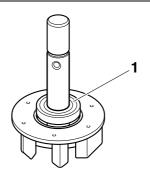
Remove the oil seal and bearing from the outside of the water pump housing "3".



- 3. Remove:
  - Mechanical seal (impeller side) "1" (from the impeller, with a thin, flat-head screwdriver)

TIP .

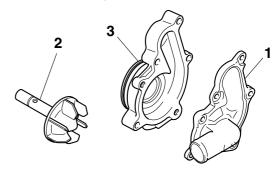
Do not scratch the impeller shaft.



FAS30447

#### **CHECKING THE WATER PUMP**

- 1. Check:
- Water pump housing cover "1"
- Impeller shaft "2" Cracks/damage/wear → Replace.
- Water pump housing "3" Cracks/damage/wear → Replace the water pump assembly.



- 2. Check:
  - Bearing Rough movement  $\rightarrow$  Replace.
- 3. Check:
  - Water pump inlet hose Cracks/damage/wear → Replace.

### **ASSEMBLING THE WATER PUMP**

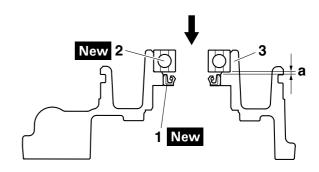
- 1. Install:
- Oil seal "1" New
- Bearing "2" New (into the water pump housing "3")



Installed depth "a" 0.5-1.0 mm (0.02-0.04 in)

TIP

Install the oil seal with a socket that matches its outside diameter.



- 2. Install:
  - Mechanical seal (housing side) "1" New

#### ECA20330

### NOTICE

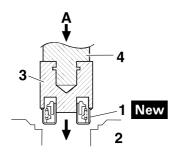
Never lubricate the mechanical seal (housing side) surface with oil or grease.

#### TIP

Use the special tools and a press to press the mechanical seal (housing side) straight in until it touches the water pump housing.



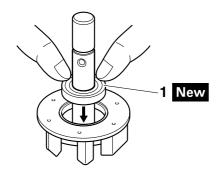
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058



- 2. Water pump housing
- 3. Mechanical seal installer
- 4. Middle driven shaft bearing driver
- A. Push down
- 3. Install:
  - Mechanical seal (impeller side) "1" New

#### TIP

- Before installing the mechanical seal (impeller side), apply tap water or coolant onto its outer surface.
- If the top of the mechanical seal is dirty, clean it.



#### 4. Measure:

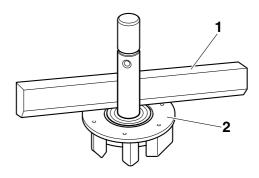
Impeller shaft tilt
 Out of specification → Repeat steps (3) and
 (4).
 ECA20340

# NOTICE

Make sure the mechanical seal (impeller side) is flush with the impeller.



Impeller shaft tilt limit 0.15 mm (0.006 in)

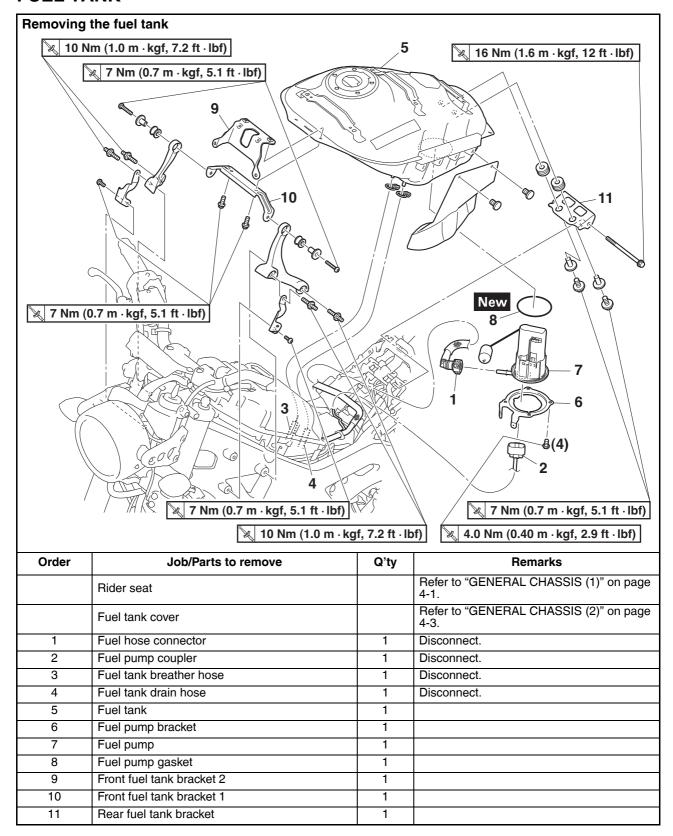


- 1. Straightedge
- 2. Impeller

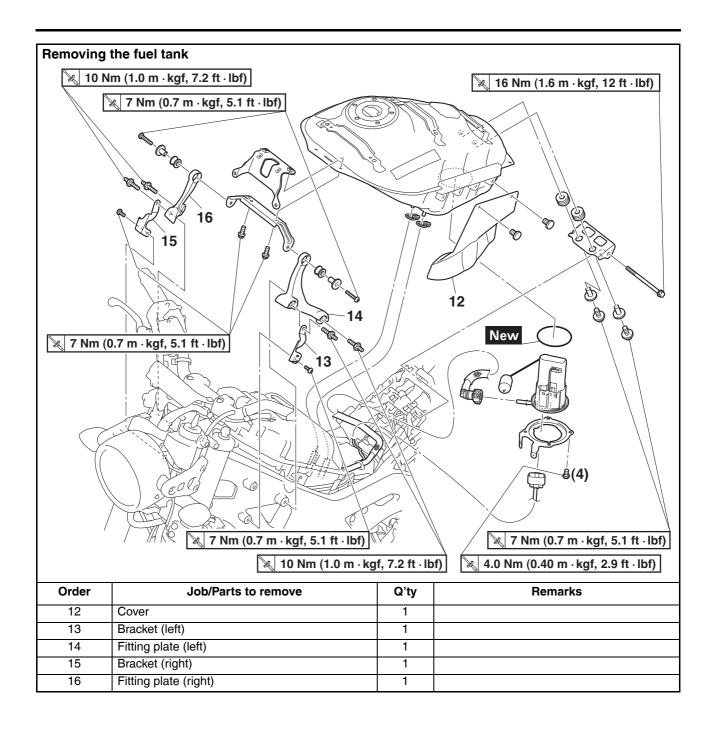
# **FUEL SYSTEM**

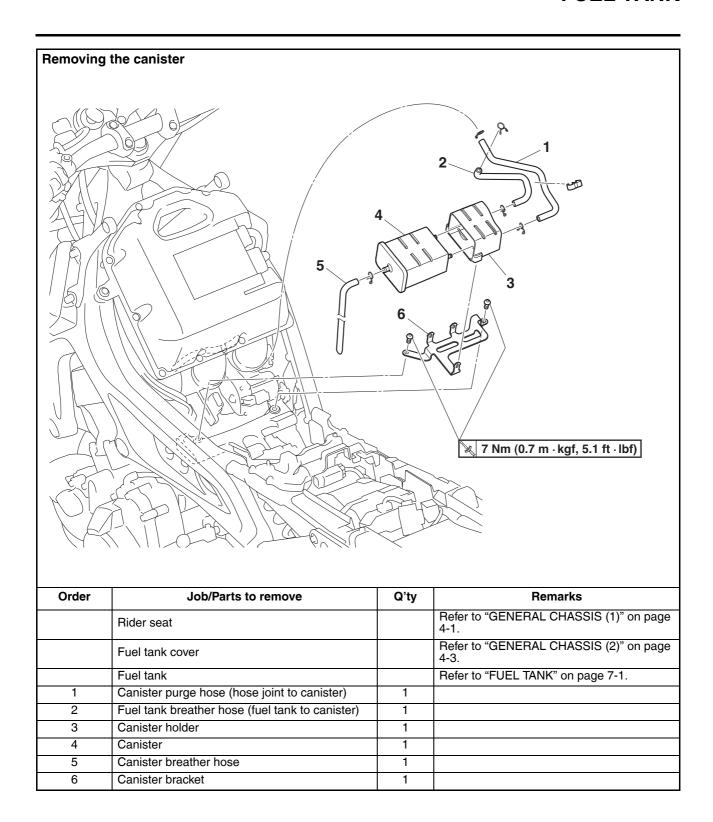
| FUEL TANK                                 | 7-1  |
|-------------------------------------------|------|
| REMOVING THE FUEL TANK                    | 7-4  |
| REMOVING THE FUEL PUMP                    | 7-4  |
| CHECKING THE FUEL PUMP BODY               |      |
| CHECKING THE FUEL PUMP OPERATION          | 7-4  |
| INSTALLING THE FUEL PUMP                  | 7-5  |
| INSTALLING THE FUEL TANK                  | 7-5  |
| THROTTLE BODIES                           | 7-6  |
| CHECKING THE INJECTORS (BEFORE REMOVING)  |      |
| REMOVING THE FUEL HOSE (FUEL RAIL SIDE)   |      |
| REMOVING THE INJECTORS                    |      |
| CHECKING THE INJECTORS                    |      |
| CHECKING AND CLEANING THE THROTTLE BODIES | 7-9  |
| REPLACING THE THROTTLE BODIES             |      |
| INSTALLING THE INJECTORS                  | 7-11 |
| CHECKING THE INJECTOR PRESSURE            |      |
| CHECKING THE FUEL PRESSURE                |      |
| INSTALLING THE FUEL HOSE (FUEL RAIL SIDE) |      |
| ADJUSTING THE THROTTLE POSITION SENSOR    | 7-13 |
| ADJUSTING THE ACCELERATOR POSITION SENSOR | 7-14 |
| AIR INDUCTION SYSTEM                      | 7-15 |
| CHECKING THE AIR INDUCTION SYSTEM         |      |
| INSTALLING THE AIR INDUCTION SYSTEM       | 7-18 |

# **FUEL TANK**



# **FUEL TANK**





#### REMOVING THE FUEL TANK

- 1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
- 2. Remove:
  - Rider seat
  - Fuel tank cover Refer to "GENERAL CHASSIS (2)" on page 4-3.
- 3. Disconnect:
  - Fuel hose (fuel tank side)
  - Fuel pump coupler
  - Fuel tank drain hose
  - Fuel tank breather hose

WA17320

### **WARNING**

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

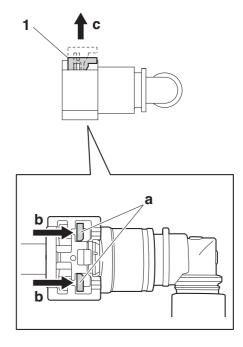
ECA17490

### NOTICE

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.

TIP.

- While pushing the ends "a" of the fuel hose connector cover "1" in direction "b", slide the fuel hose connector cover in direction "c", and then remove the hose from the fuel pump.
- Before removing the hose, place a few rags in the area under where it will be removed.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



- 4. Remove:
  - Fuel tank

#### TIP

Do not set the fuel tank down so that the installation surface of the fuel pump is directly under the tank. Be sure to lean the fuel tank in an upright position.

EAS30451

### **REMOVING THE FUEL PUMP**

- 1. Remove:
- Fuel pump

ECA14721

## NOTICE

- Do not drop the fuel pump or give it a strong shock.
- Do not touch the base section of the fuel sender.

EAS30454

### **CHECKING THE FUEL PUMP BODY**

- 1. Check:
- Fuel pump body
   Obstruction → Clean.
   Cracks/damage → Replace fuel pump assembly.

EAS30455

#### CHECKING THE FUEL PUMP OPERATION

- 1. Check:
- Fuel pump operation Refer to "CHECKING THE FUEL PRES-SURE" on page 7-12.

#### **INSTALLING THE FUEL PUMP**

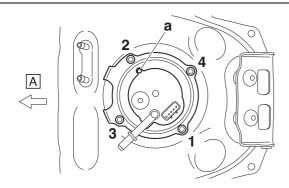
- 1. Install:
  - Fuel pump gasket New
  - Fuel pump
  - Fuel pump bracket
  - Fuel pump bolts



Fuel pump bolt 4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)

#### TIP -

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump gasket so that the lip side turns to the inside of the fuel tank.
- Install the fuel pump as shown in the illustration.
- Align the projection "a" on the fuel pump with the slot in the fuel pump bracket.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



A. Forward

#### EAS30457

#### **INSTALLING THE FUEL TANK**

- 1. Connect:
  - Fuel hose (fuel tank side)

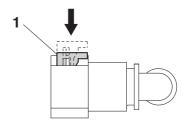
ECA17500

#### NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

#### TIP

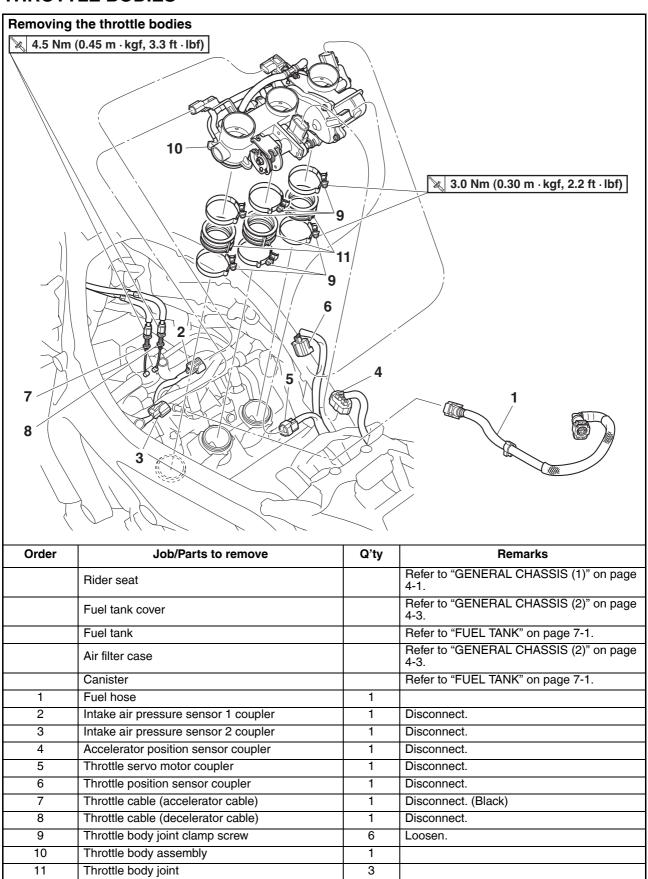
- Install the fuel hose onto the fuel pump securely, and slide the fuel hose connector cover "1" in the direction shown in the illustration.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



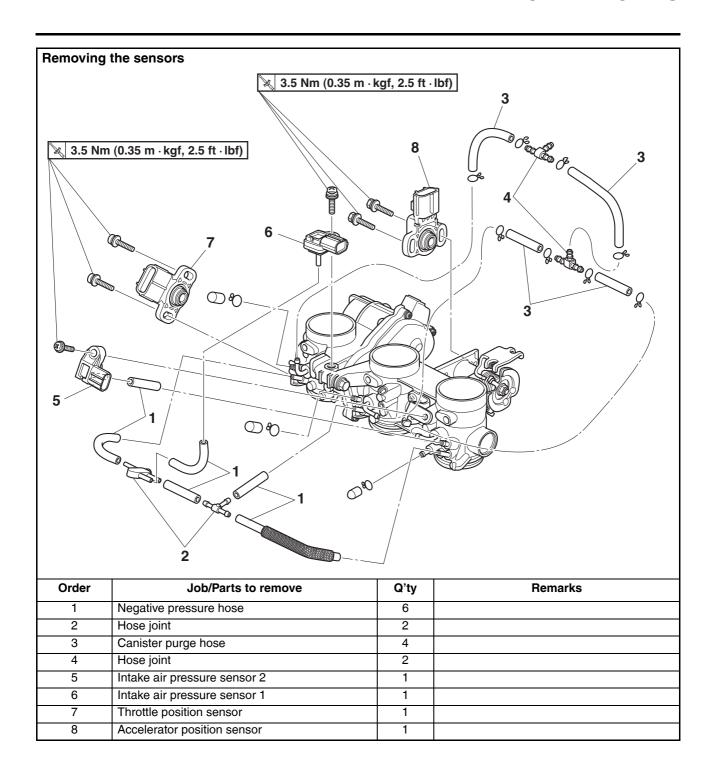
### 2. Connect:

- Fuel tank breather hose
- Fuel tank drain hose
- Fuel pump coupler

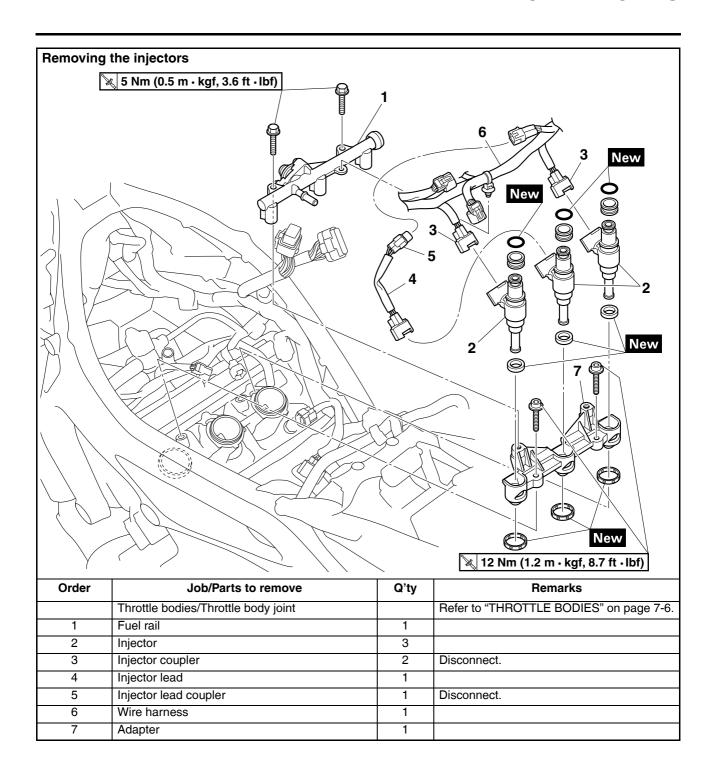
## THROTTLE BODIES



# **THROTTLE BODIES**



# **THROTTLE BODIES**



# CHECKING THE INJECTORS (BEFORE REMOVING)

1. Check:

9-5.

Injectors
 Use the diagnostic code numbers "36"—"38".

 Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page

EAS31158

# REMOVING THE FUEL HOSE (FUEL RAIL SIDE)

- 1. Remove:
  - Fuel tank
     Refer to "REMOVING THE FUEL TANK" on
    page 7-4.
- 2. Remove:
- Fuel hose (fuel rail side)

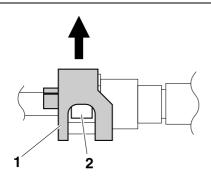
ECA17490

#### NOTICE

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.

TIP.

- To remove the fuel hose from the fuel rail joint, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, press the two buttons "2" on the sides of the connector, and then remove the hose.
- Before removing the hose, place a few rags in the area under where it will be removed.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



EAS30476

#### **REMOVING THE INJECTORS**

EWA1

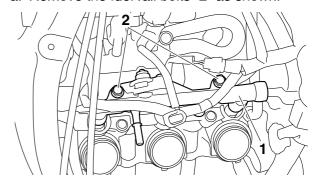
## **WARNING**

- Check the injectors in a well-ventilated area free of combustible materials. Make sure that there is no smoking or use of electric tools in the vicinity of the injectors.
- Be careful when disconnecting the fuel hose. Any remaining pressure in the fuel

hose may cause the fuel to spray out. Place a container or rag under the hose to catch any fuel that spills. Always clean up any spilt fuel immediately.

- Turn the main switch to "OFF" and disconnect the negative battery lead from the battery terminal before removing the injectors.
- 1. Remove:
  - Throttle bodies
  - Fuel rail "1"

a. Remove the fuel rail bolts "2" as shown.



EAS3047

#### **CHECKING THE INJECTORS**

- 1. Check:
- Injectors

Obstruction  $\rightarrow$  Replace and check the fuel pump/fuel supply system.

Deposit  $\rightarrow$  Replace.

Damage  $\rightarrow$  Replace.

- 2. Check:
  - Injector resistance Refer to "CHECKING THE FUEL INJEC-TORS" on page 8-168.

EAS30769

# CHECKING AND CLEANING THE THROTTLE BODIES

TIP

Clean the throttle bodies only if they cannot be synchronized using the bypass air screws. Before cleaning the throttle bodies, check the following items:

- Valve clearance
- Spark plugs
- Air filter element
- Throttle body joints
- Fuel hose
- Exhaust system
- Cylinder head breather hose

EWA17340

# **WARNING**

If the throttle bodies are subjected to strong shocks or dropped during cleaning, replace them as a set.

- 1. Check:
  - Throttle bodies
     Cracks/damage → Replace the throttle bodies as a set.
- 2. Clean:
- Throttle bodies

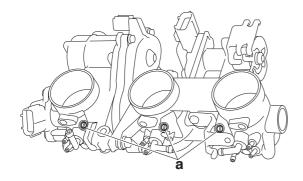
CA21540

#### NOTICE

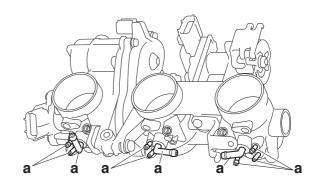
- Observe the following precautions; otherwise, the throttle bodies may not operate properly.
- Do not subject the throttle bodies to excessive force.
- Clean the throttle bodies in the recommended cleaning solvent.
- Do not use any caustic carburetor cleaning solution.
- Do not apply cleaning solvent directly to any plastic parts, sensors, or seals.
- Be careful not to remove the white paint mark that identifies the standard throttle body.
- Do not turn the bypass air screws "a"; otherwise, the throttle body synchronization will be affected.

**—**1

Recommended cleaning solvent Yamaha Oil & Brake Cleaner



- a. Place the throttle bodies on a flat surface with the air filter case side facing up.
- b. Install the caps (895-14169-00) onto the hose fittings "a".



c. Hold the throttle valves in the open position.

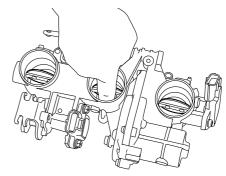
# MARNING

When cleaning the throttle bodies, be careful not to injure yourself on the throttle valves or other components of the throttle bodies.

ECA20380

### NOTICE

- Do not open the throttle valves by supplying electrical power to the throttle bodies.
- Do not use tools to open the throttle valves or to keep them in the open position.
- Do not open the throttle valves quickly.



d. Apply the recommended cleaning solvent to the throttle valves and the inside of the throttle bodies to remove any carbon deposits.

TIP

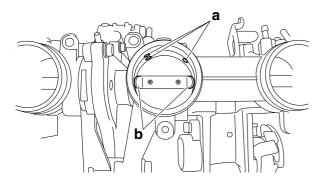
- Do not allow any cleaning solvent to enter the opening for the injectors.
- Do not apply any cleaning solvent to the portions of the throttle valve shafts between the throttle bodies.
- Remove the carbon deposits from the inside of each throttle body in a downward direction, from the air filter case side of the throttle body to the engine side.

ECA17590

#### NOTICE

 Do not use a tool, such as a wire brush, to remove the carbon deposits; otherwise, the inside of the throttle bodies may be damaged.

- Do not allow carbon deposits or other foreign materials to enter any of the passages in each throttle body or in the space between the throttle valve shaft and the throttle body.
- f. After removing the carbon deposits, clean the inside of the throttle bodies with the recommended cleaning solvent, and then dry the throttle bodies using compressed air.
- g. Make sure that there are no carbon deposits or other foreign materials in any of the passages "a" in each throttle body or in the space "b" between the throttle valve shaft and the throttle body.



- 3. Install the throttle bodies.
- 4. Reset:
  - ISC (idle speed control) learning values
     Use the diagnostic code number "67".

     Refer to "SELF-DIAGNOSTIC FUNCTION
     AND DIAGNOSTIC CODE TABLE" on page 9-5.
- 5. Adjust:
  - Throttle bodies synchronizing
     Out of specification → Replace the throttle
     bodies.

Refer to "SYNCHRONIZING THE THROTTLE BODIES" on page 3-8.

EAC21160

#### REPLACING THE THROTTLE BODIES

- 1. Remove the throttle bodies from the vehicle.
- 2. Install a new throttle bodies to the vehicle.
- 3. Reset:
  - ISC (idle speed control) learning values
     Use the diagnostic code number "67".

     Refer to "SELF-DIAGNOSTIC FUNCTION
     AND DIAGNOSTIC CODE TABLE" on page 9-5.
- 4. Adjust:
  - Throttle bodies synchronizing Refer to "SYNCHRONIZING THE THROT-TLE BODIES" on page 3-8.

- 5. Place the vehicle on a maintenance stand so that the rear wheel is elevated.
- 6. Check:
  - Engine idling speed
     Start the engine, warm it up, and then measure the engine idling speed.



Engine idling speed 1100–1300 r/min

AS30480

#### **INSTALLING THE INJECTORS**

ECA21550

## NOTICE

- Always use new O-rings.
- When installing the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rails, or O-rings.
- Be careful not to twist or pinch the O-rings when installing the injectors.
- When installing the injector, install it at the same position as the removed cylinder.
- If an injector is subject to strong shocks or excessive force, replace it.
- If installing the original fuel rail and bolts, remove the white paint marks using a cleaning solvent. Otherwise, paint chips on the bolt seats could prevent the bolts from being tightened to the specified torque.
- Install a new seal onto the end of each injector.
- 2. Install the injectors to the fuel rail, making sure to install them in the correct direction.
- 3. Install the injector assemblies to the adapter.



# Fuel rail bolt 5 Nm (0.5 m·kgf, 3.6 ft·lbf)

4. Check the injector pressure after the injectors are installed.

Refer to "CHECKING THE INJECTOR PRESSURE" on page 7-11.

EAS30481

### **CHECKING THE INJECTOR PRESSURE**

#### TIP

- After installing the injectors, perform the following steps to check the injector pressure.
- Do not allow any foreign materials to enter the fuel lines.
- 1. Check:
- Injector pressure

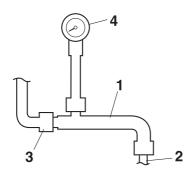
a. Connect the fuel injector pressure adapter "1"

to the fuel rail joint "2", and then connect an air compressor "3" to the adapter.

b. Connect the pressure gauge "4" to the fuel injector pressure adapter "1".



Pressure gauge 90890-03153 Pressure gauge YU-03153 Fuel injector pressure adapter 90890-03210 Fuel injector pressure adapter YU-03210



- c. Close the valve on the fuel injector pressure adapter.
- d. Apply air pressure with the air compressor.
- e. Open the valve on the fuel injector pressure adapter until the specified pressure is reached.



Specified air pressure 490 kPa (5.0 kgf/cm<sup>2</sup>, 71.1 psi)

ECA17600

#### NOTICE

Never exceed the specified air pressure or damage could occur.

- f. Close the valve on the fuel injector pressure adapter.
- g. Check that the specified air pressure is held at least one minute.

Pressure drops  $\rightarrow$  Check the pressure gauge and adapter.

Check the seals and O-rings and then reinstall.

Out of specification  $\rightarrow$  Replace the fuel injectors.

EAS3048

#### **CHECKING THE FUEL PRESSURE**

- 1. Check:
  - Fuel pressure

#### \*\*\*\*\*\*\*\*\*\*\*

- a. Remove the rider seat and fuel tank cover.
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
- b. Remove the fuel tank bolt and hold up the fuel tank.
- c. Disconnect the fuel hose "1" from the fuel pump.

Refer to "REMOVING THE FUEL TANK" on page 7-4.

EWA17320

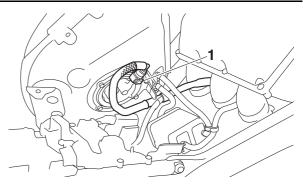
## **⚠** WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

# ECA17490

#### NOTICE

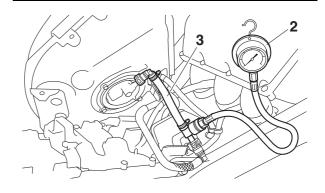
Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.



d. Connect the pressure gauge "2" and fuel pressure adapter "3" to the fuel hose.



Pressure gauge 90890-03153 Pressure gauge YU-03153 Fuel pressure adapter 90890-03176 Fuel pressure adapter YM-03176



- e. Start the engine.
- f. Measure the fuel pressure. Faulty  $\rightarrow$  Replace the fuel pump.



Fuel line pressure (at idle) 300.0-390.0 kPa (3.00-3.90 kgf/cm², 43.5-56.6 psi)

EAS31159

# INSTALLING THE FUEL HOSE (FUEL RAIL SIDE)

- 1. Connect:
  - Fuel hose (fuel rail side)

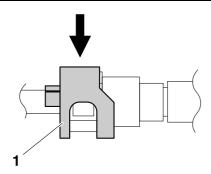
ECA17500

NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

TIP

- Install the fuel hose securely onto the fuel rail joint until a distinct "click" is heard.
- To install the fuel hose onto the fuel rail joint, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown
- It is prohibited to wear the cotton work gloves or equivalent coverings.



EAS3048

# ADJUSTING THE THROTTLE POSITION SENSOR

ECA17540

NOTICE

- Handle the throttle position sensor with special care.
- Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.
- 1. Check:
  - Throttle position sensor

Refer to "CHECKING THE THROTTLE PO-SITION SENSOR" on page 8-164.

- 2. Adjust:
  - Throttle position sensor angle

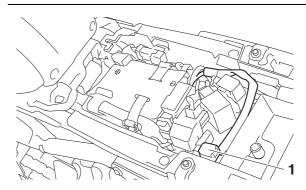
TIP

Before adjusting the throttle position sensor, the throttle bodies must be removed.

- a. Temporary tighten the throttle position sensor
- b. Check that the throttle valves are fully closed.
- c. Connect the throttle position sensor to the wire harness.
- d. Remove the protective cap "1", and then connect the Yamaha diagnostic tool to coupler.

TIP

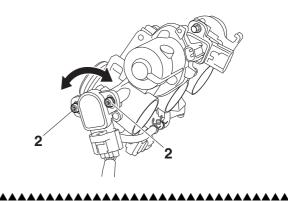
For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



- e. Diagnostic code number "01" is selected.
- f. Adjust the position of the throttle position sensor angle so that 11–21 can appear in the Yamaha diagnostic tool screen.
- g. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws "2".



Throttle position sensor screw 3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)



# ADJUSTING THE ACCELERATOR POSITION SENSOR

EWA15960

# **WARNING**

- Handle the accelerator position sensor with special care.
- Never subject the accelerator position sensor to strong shocks. If the accelerator position sensor is dropped, replace it.
- 1. Check:
  - Accelerator position sensor Refer to "CHECKING THE ACCELERATOR POSITION SENSOR" on page 8-165.
- 2. Adjust:
  - Accelerator position sensor angle

TIP

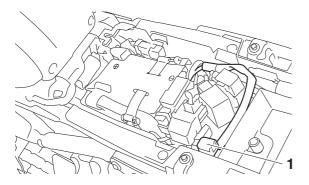
Before adjusting the accelerator position sensor, the throttle bodies must be removed.

a Temporary tighten the accelerator position

- a. Temporary tighten the accelerator position sensor bolts.
- b. Check that the throttle valves are fully closed.
- c. Connect the accelerator position sensor to the wire harness.
- d. Connect the throttle cables to the throttle bodies
- e. Remove the protective cap "1", and then connect the Yamaha diagnostic tool to coupler.

TIP

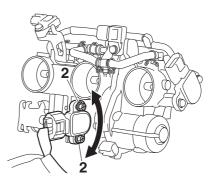
For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



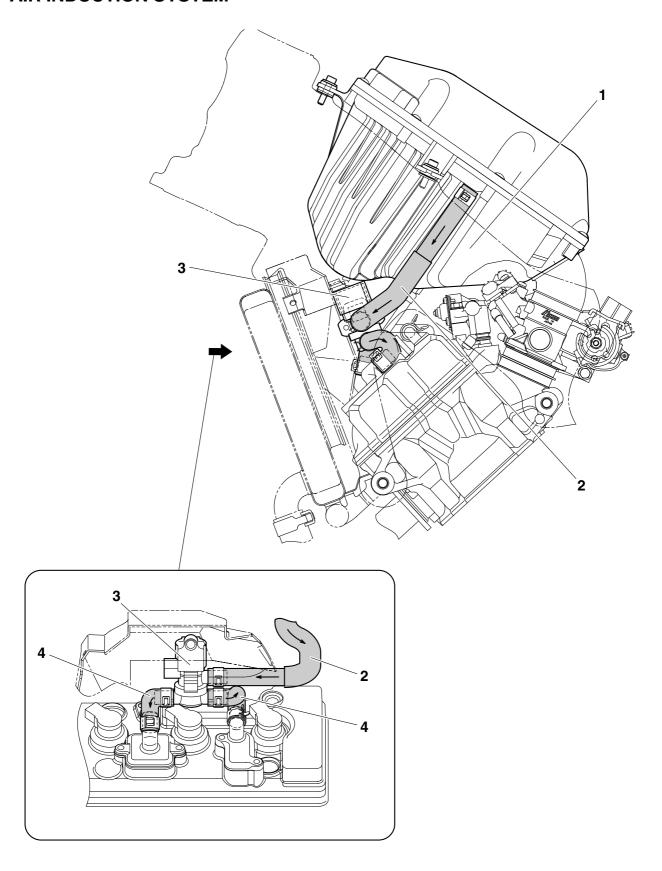
- f. Diagnostic code number "14" is selected.
- g. Turn the throttle grip to the fully closed position.
- h. Adjust the position of the accelerator position sensor angle so that 12–22 can appear in the Yamaha diagnostic tool screen.
- After adjusting the accelerator position sensor angle, tighten the accelerator position sensor bolts "2".



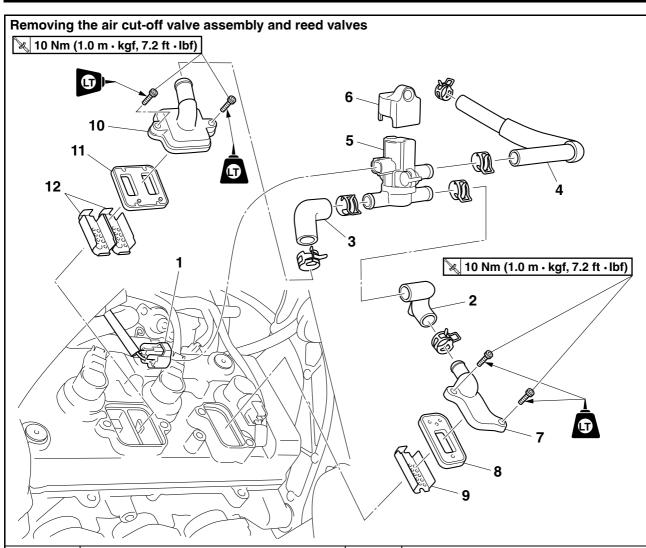
Accelerator position sensor bolt 3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)



- j. Turn the throttle grip to the fully open position.
- k. Check the Yamaha diagnostic tool screen value. If the Yamaha diagnostic tool screen value is not 97–107, adjust the accelerator position sensor angle.
- I. Select the diagnostic code number "15".
- m. Turn the throttle grip to the fully closed position.
- n. Check the Yamaha diagnostic tool screen value. If the Yamaha diagnostic tool screen value is not 10–24, adjust the accelerator position sensor angle.
- o. Turn the throttle grip to the fully open position.
- p. Check the Yamaha diagnostic tool screen value. If the Yamaha diagnostic tool screen value is not 95–109, adjust the accelerator position sensor angle.
- q. Repeat steps (f) to (p) until the Yamaha diagnostic tool screen values are within the specified ranges.
- r. If the Yamaha diagnostic tool screen values are not within the specified ranges after repeating steps (f) to (p) several times, replace the accelerator position sensor.



- 1. Air filter case
- 2. Air induction system hose (air filter case to air cut-off valve)
- 3. Air cut-off valve
- 4. Air induction system hose (air cut-off valve to reed valve cover)



| Order | Job/Parts to remove                                               | Q'ty | Remarks                                     |
|-------|-------------------------------------------------------------------|------|---------------------------------------------|
|       | Rider seat                                                        |      | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
|       | Fuel tank cover                                                   |      | Refer to "GENERAL CHASSIS (2)" on page 4-3. |
|       | Fuel tank                                                         |      | Refer to "FUEL TANK" on page 7-1.           |
|       | Air filter case                                                   |      | Refer to "GENERAL CHASSIS (2)" on page 4-3. |
|       | Radiator                                                          |      | Refer to "RADIATOR" on page 6-1.            |
| 1     | Air cut-off valve coupler                                         | 1    | Disconnect.                                 |
| 2     | Air induction system hose (air cut-off valve to reed valve cover) | 1    |                                             |
| 3     | Air induction system hose (air cut-off valve to reed valve cover) | 1    |                                             |
| 4     | Air induction system hose (air filter case to air cut-off valve)  | 1    |                                             |
| 5     | Air cut-off valve                                                 | 1    |                                             |
| 6     | Air cut-off valve holder                                          | 1    |                                             |
| 7     | Reed valve cover                                                  | 1    |                                             |
| 8     | Reed valve assembly 1                                             | 1    |                                             |
| 9     | Reed valve plate                                                  | 1    |                                             |
| 10    | Reed valve cover                                                  | 1    |                                             |
| 11    | Reed valve assembly 2                                             | 1    |                                             |
| 12    | Reed valve plate                                                  | 2    |                                             |

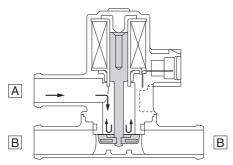
EAS30488

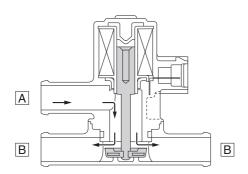
# **CHECKING THE AIR INDUCTION SYSTEM Air injection**

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons. When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700 °C (1112 to 1292 °F).

#### Air cut-off valve

The air cut-off valve is controlled by the signals from the ECU in accordance with the combustion conditions. Ordinarily, the air cut-off valve opens to allow the air to flow during idle and closes to cut-off the flow when the vehicle is being driven. However, if the coolant temperature is below the specified value, the air cut-off valve remains open and allows the air to flow into the exhaust pipe until the temperature becomes higher than the specified value.





- A. From the air filter case
- B. To the cylinder head
- 1. Check:
  - Hoses
     Loose connections → Connect properly.
     Cracks/damage → Replace.
- 2. Check:
  - Reed valve
  - Reed valve stopper
  - Reed valve seat

Cracks/damage  $\rightarrow$  Replace the reed valve assembly.

- 3. Measure:
  - Reed valve bending limit "a"
     Out of specification → Replace the reed valve assembly.



Reed valve bending limit 0.4 mm (0.02 in)



- 4. Check:
  - Air cut-off valve
     Cracks/damage → Replace.
- 5. Check:
  - Air induction system solenoid Refer to "CHECKING THE AIR INDUCTION SYSTEM SOLENOID" on page 8-166.

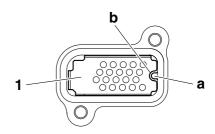
EAS30489

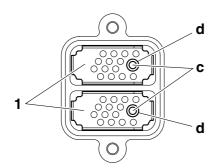
#### **INSTALLING THE AIR INDUCTION SYSTEM**

- 1. Install:
  - Reed valve plate "1"

#### TIP

- Align the projection "a" on the cylinder head cover with the notch "b" in the reed valve plate "1".
- Align the projection "c" on the cylinder head cover with the hole "d" in the reed valve plate "1".





- 2. Install:
  - Reed valve assembly 1
  - Reed valve assembly 2

#### TIF

- Install the reed valve assembly 1 so that the open side turns to the exhaust side of the engine.
- Install the reed valve assembly 2 so that the open side turns to the intake side of the engine.





В



- A. Reed valve assembly 1
- B. Reed valve assembly 2
- C. Exhaust side
- 3. Install:
  - Reed valve cover



Reed valve cover bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf) LOCTITE®

# **ELECTRICAL SYSTEM**

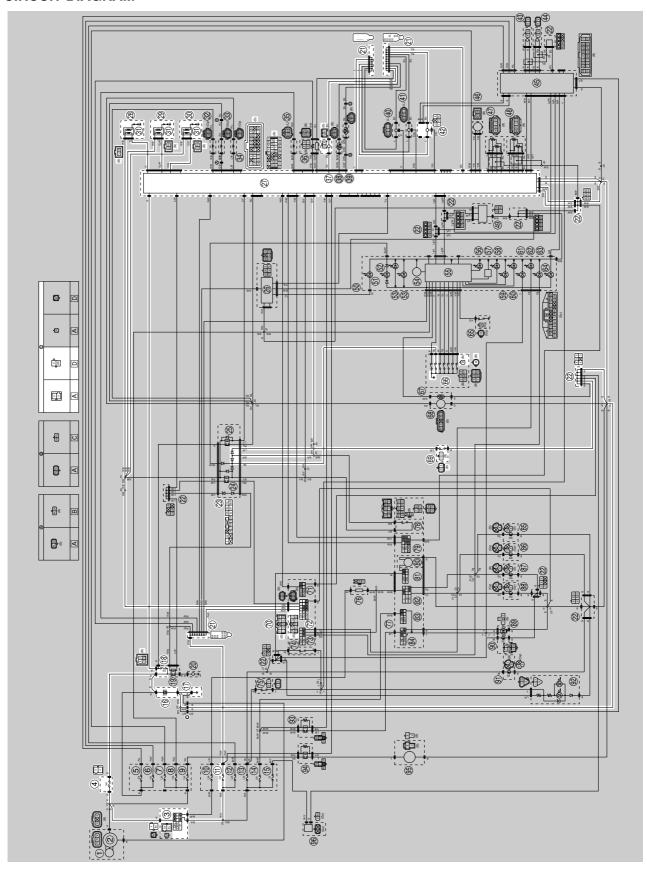
| CIRCUIT DIAGRAM ENGINE STOPPING DUE TO SIDESTAND OPERATION TROUBLESHOOTING  ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM STARTING CIRCUIT CUT-OFF SYSTEM OPERATION TROUBLESHOOTING  CHARGING SYSTEM CIRCUIT DIAGRAM TROUBLESHOOTING  ELECTRIC STARTING SYSTEM STARTING CIRCUIT CUT-OFF SYSTEM OPERATION TROUBLESHOOTING  ELIGHTING SYSTEM STARTING | .8-3<br>.8-4<br>.8-7<br>.8-7 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| TROUBLESHOOTING  ELECTRIC STARTING SYSTEM  CIRCUIT DIAGRAM  STARTING CIRCUIT CUT-OFF SYSTEM OPERATION  TROUBLESHOOTING  ELIGHTING SYSTEM  CIRCUIT DIAGRAM  TROUBLESHOOTING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | .8-4<br>.8-7<br>.8-7         |
| ELECTRIC STARTING SYSTEM  CIRCUIT DIAGRAM  STARTING CIRCUIT CUT-OFF SYSTEM OPERATION  TROUBLESHOOTING  CHARGING SYSTEM  CIRCUIT DIAGRAM  TROUBLESHOOTING  ELIGHTING SYSTEM  CIRCUIT DIAGRAM  TROUBLESHOOTING  SIGNALING SYSTEM  ERCUIT DIAGRAM  TROUBLESHOOTING  SIGNALING SYSTEM  ERCUIT DIAGRAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | .8-7<br>.8-7<br>.8-9         |
| CIRCUIT DIAGRAM STARTING CIRCUIT CUT-OFF SYSTEM OPERATION TROUBLESHOOTING  CHARGING SYSTEM CIRCUIT DIAGRAM TROUBLESHOOTING  ELIGHTING SYSTEM CIRCUIT DIAGRAM TROUBLESHOOTING  SIGNALING SYSTEM CIRCUIT DIAGRAM TROUBLESHOOTING  SIGNALING SYSTEM CIRCUIT DIAGRAM CIRCUIT DIAGRAM SIGNALING SYSTEM CIRCUIT DIAGRAM SIGNALING SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | .8-7<br>.8-9                 |
| STARTING CIRCUIT CUT-OFF SYSTEM OPERATION TROUBLESHOOTING  CHARGING SYSTEM CIRCUIT DIAGRAM TROUBLESHOOTING  LIGHTING SYSTEM CIRCUIT DIAGRAM TROUBLESHOOTING  SIGNALING SYSTEM CIRCUIT DIAGRAM TROUBLESHOOTING  SIGNALING SYSTEM CIRCUIT DIAGRAM CIRCUIT DIAGRAM SIGNALING SYSTEM CIRCUIT DIAGRAM SIGNALING SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | .8-9                         |
| TROUBLESHOOTING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| CHARGING SYSTEM  CIRCUIT DIAGRAM  TROUBLESHOOTING  LIGHTING SYSTEM  CIRCUIT DIAGRAM  TROUBLESHOOTING  SIGNALING SYSTEM  CIRCUIT DIAGRAM  E  CIRCUIT DIAGRAM  E  CIRCUIT DIAGRAM  E  SIGNALING SYSTEM  CIRCUIT DIAGRAM  E  CIRCUIT DIAGRAM  E  CIRCUIT DIAGRAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |
| CIRCUIT DIAGRAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3-11                         |
| TROUBLESHOOTING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3-13                         |
| LIGHTING SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3-13                         |
| CIRCUIT DIAGRAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3-15                         |
| SIGNALING SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3-17                         |
| SIGNALING SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |
| CIRCUIT DIAGRAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3-19                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| TROUBLESHOOTING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3-23                         |
| COOLING SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |
| CIRCUIT DIAGRAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| TROUBLESHOOTING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3-31                         |
| FUEL INJECTION SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |
| CIRCUIT DIAGRAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| ECU SELF-DIAGNOSTIC FUNCTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |
| YAMAHA DIAGNOSTIC TOOL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |
| TROUBLESHOOTING DETAILS (FAULT CODE)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |
| TROUBLESHOOTING DETAILS (FAULT CODE)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |
| FUEL PUMP SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3-97                         |
| CIRCUIT DIAGRAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| TROUBLESHOOTING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
| IMMOBILIZER SYSTEM8-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 101                          |
| CIRCUIT DIAGRAM8-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 101                          |
| GENERAL INFORMATION8-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 103                          |
| PARTS REPLACEMENT AND KEY CODE REGISTRATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                              |
| REQUIREMENTS8-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 100                          |
| TROUBLESHOOTING8-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |

| ABS (ANTI-LOCK BRAKE SYSTEM)                                                            | .8-111   |
|-----------------------------------------------------------------------------------------|----------|
| CIRCUIT DIAGRAM                                                                         | .8-111   |
| ABS COMPONENTS CHART                                                                    | .8-113   |
| ABS COUPLER LOCATION CHART                                                              | .8-115   |
| MAINTENANCE OF THE ABS ECU                                                              |          |
| ABS TROUBLESHOOTING OUTLINE                                                             |          |
| BASIC INSTRUCTIONS FOR TROUBLESHOOTING                                                  | .8-118   |
| BASIC PROCESS FOR TROUBLESHOOTING                                                       |          |
| [A] CHECKING THE ABS WARNING LIGHT                                                      | .8-120   |
| [A-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON                                       |          |
| [A-2] THE ABS WARNING LIGHT AND OTHER INDICATOR LIGHTS                                  |          |
| FAIL TO COME ON                                                                         |          |
| [A-3] THE ABS WARNING LIGHT COMES ON                                                    |          |
| [A-4] ONLY THE ABS ECU FAILS TO COMMUNICATE[A-5] ABS ECU AND FI ECU FAIL TO COMMUNICATE |          |
| [B-1] MALFUNCTION ARE CURRENTLY DETECTED                                                |          |
| [B-2] DIAGNOSIS USING THE FAULT CODES                                                   |          |
| [B-3] DELETING THE FAULT CODES                                                          |          |
| [C-1] FINAL CHECK                                                                       |          |
| [0-1] I INAL OFFLOR                                                                     | .0-141   |
|                                                                                         |          |
| ELECTRICAL COMPONENTS                                                                   |          |
| CHECKING THE SWITCHES                                                                   |          |
| CHECKING THE BULBS AND BULB SOCKETS                                                     |          |
| CHECKING THE FUSES                                                                      |          |
| REPLACING THE ECU (Engine Control Unit) CHECKING AND CHARGING THE BATTERY               |          |
| CHECKING THE RELAYS                                                                     |          |
| CHECKING THE RELATS                                                                     |          |
| CHECKING THE TOTAL SIGNAL PROPERTY CHECKING THE RELAY UNIT (DIODE)                      |          |
| CHECKING THE IGNITION COILS                                                             |          |
| CHECKING THE IGNITION SPARK GAP                                                         |          |
| CHECKING THE CRANKSHAFT POSITION SENSOR                                                 |          |
| CHECKING THE LEAN ANGLE SENSOR                                                          |          |
| CHECKING THE STARTER MOTOR OPERATION                                                    |          |
| CHECKING THE STATOR COIL                                                                |          |
| CHECKING THE RECTIFIER/REGULATOR                                                        | .8-161   |
| CHECKING THE HORN                                                                       | .8-162   |
| CHECKING THE ENGINE OIL LEVEL SWITCH                                                    | .8-162   |
| CHECKING THE FUEL SENDER                                                                |          |
| CHECKING THE FUEL METER/FUEL LEVEL WARNING LIGHT                                        | .8-163   |
| CHECKING THE OIL LEVEL WARNING LIGHT                                                    | .8-163   |
| CHECKING THE RADIATOR FAN MOTOR                                                         |          |
| CHECKING THE COOLANT TEMPERATURE SENSOR                                                 |          |
| CHECKING THE THROTTLE POSITION SENSOR                                                   |          |
| CHECKING THE ACCELERATOR POSITION SENSOR                                                |          |
| CHECKING THE THROTTLE SERVO MOTOR                                                       |          |
| CHECKING THE AIR INDUCTION SYSTEM SOLENOID                                              |          |
| CHECKING THE INTAKE AIR PRESSURE SENSOR                                                 |          |
| CHECKING THE INTAKE AIR TEMPERATURE SENSOR                                              |          |
| CHECKING THE GEAR POSITION SWITCH                                                       |          |
| CHECKING THE FUEL INJECTORS                                                             | . ช- 168 |

# **IGNITION SYSTEM**

EAS30490

## **CIRCUIT DIAGRAM**



# **IGNITION SYSTEM**

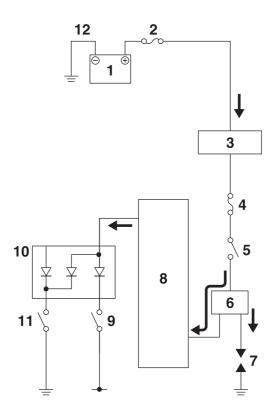
- 3. Main switch
- 4. Main fuse
- 11.Ignition fuse
- 16.Battery
- 17. Engine ground
- 18. Fuel injection system fuse
- 21. Joint connector
- 22. Joint coupler
- 23.Relay unit
- 27.ECU (Engine Control Unit)
- 28.Ignition coil #1
- 29.Ignition coil #2
- 30.Ignition coil #3
- 31.Spark plug
- 37. Crankshaft position sensor
- 42.Lean angle sensor
- 66.Gear position switch
- 69. Sidestand switch
- 70. Handlebar switch (right)
- 72. Start/engine stop switch
- A. Wire harness
- D. Negative battery sub-wire harness

FAS30491

### **ENGINE STOPPING DUE TO SIDESTAND OPERATION**

When the engine is running and the transmission is in gear, the engine will stop if the sidestand is moved down. This is because the electric current from the ignition coils does not flow to the ECU when both the gear position switch (neutral circuit) and sidestand switch are set to "OFF", thereby preventing the spark plugs from producing a spark. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral circuit of the gear position switch is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral circuit of the gear position switch is closed) and the sidestand is down (the sidestand switch circuit is open).



- 1. Battery
- 2. Main fuse
- 3. Main switch
- 4. Ignition fuse
- 5. Start/engine stop switch
- 6. Ignition coil
- 7. Spark plug
- 8. ECU (Engine Control Unit)
- 9. Sidestand switch
- 10. Relay unit (diode)
- 11. Gear position switch (neutral circuit)
- 12. Battery negative lead

### **TROUBLESHOOTING**

The ignition system fails to operate (no spark or intermittent spark).

TIP

- Before troubleshooting, remove the following part(s):
- 1. Rider seat
- 2. Fuel tank cover
- 3. Fuel tank
- 4. Air filter case
- Check the fuses.
   (Main, ignition and fuel injection system)
   Refer to "CHECKING THE FUSES" on page 8-151.

 $NG \rightarrow$ 

Replace the fuse(s).

OK↓

2. Check the battery.
Refer to "CHECKING AND
CHARGING THE BATTERY" on
page 8-152.

NG→

- Clean the battery terminals.
- $G \rightarrow$  Recharge or replace the battery.

OK↓

3. Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-4.

 $NG \rightarrow$ 

Re-gap or replace the spark plugs.

OK↓

 Check the ignition spark gap.
 Refer to "CHECKING THE IGNI-TION SPARK GAP" on page 8-158.

 $\mathsf{OK} \!\! \to \!\!$ 

Ignition system is OK.

NG↓

5. Check the ignition coils.
Refer to "CHECKING THE IGNITION COILS" on page 8-158.

NG→

Replace the ignition coils.

OK↓

Check the crankshaft position sensor.
 Refer to "CHECKING THE CRANK-SHAFT POSITION SENSOR" on page 8-159.

 $NG \rightarrow$ 

Replace the crankshaft position sensor.

OK↓

7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-147.

 $NG \rightarrow$ 

Replace the main switch/immobilizer unit.

OK↓

8. Check the start/engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-147.

 $NG \rightarrow$ 

Replace the right handlebar switch.

OK↓

# **IGNITION SYSTEM**

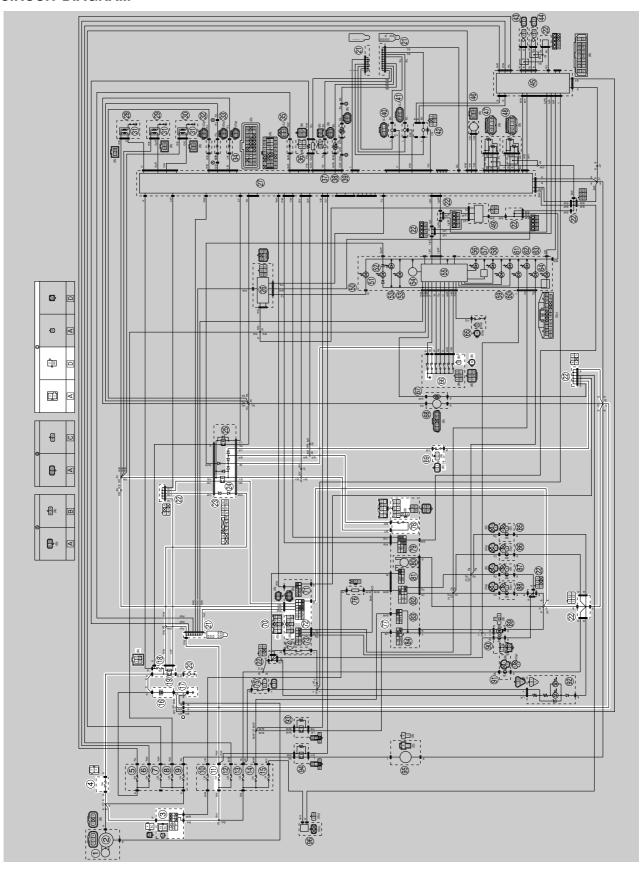
| 9. Check the gear position switch. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-167. | $NG{\rightarrow}$ | Replace the gear position switch.                        |
|------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------|
| OK↓                                                                                            |                   |                                                          |
| 10.Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-147.                 | $NG \rightarrow$  | Replace the sidestand switch.                            |
| OK↓                                                                                            |                   |                                                          |
| 11.Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-157.     | $NG \rightarrow$  | Replace the relay unit.                                  |
| OK↓                                                                                            |                   |                                                          |
| 12.Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-159.       | $NG \rightarrow$  | Replace the lean angle sensor.                           |
| ОК↓                                                                                            |                   |                                                          |
| 13.Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-1.          | $NG{\rightarrow}$ | Properly connect or repair the ignition system's wiring. |
| OK↓                                                                                            |                   |                                                          |
| Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.             |                   |                                                          |

# **IGNITION SYSTEM**

## **ELECTRIC STARTING SYSTEM**

EAS30493

## **CIRCUIT DIAGRAM**



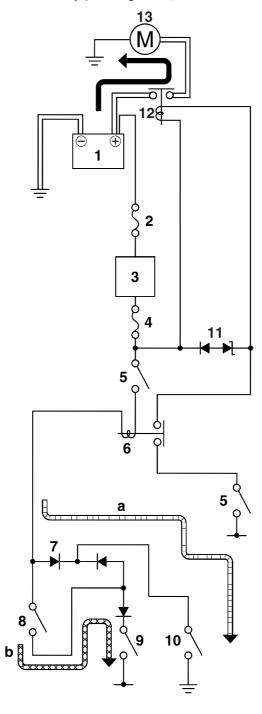
- 3. Main switch
- 4. Main fuse
- 11.Ignition fuse
- 16.Battery
- 17. Engine ground
- 18. Fuel injection system fuse
- 19.Starter relay
- 20.Starter motor
- 21. Joint connector
- 22. Joint coupler
- 23.Relay unit
- 24. Starting circuit cut-off relay
- 66.Gear position switch
- 69. Sidestand switch
- 70. Handlebar switch (right)
- 72. Start/engine stop switch
- 77. Handlebar switch (left)
- 78. Clutch switch
- A. Wire harness
- D. Negative battery sub-wire harness

FAS30494

### STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is turned to "ON" and the "(s)" side of the start/engine stop switch is pushed, the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral circuit of the gear position switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).



- 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. Start/engine stop switch
- 6. Starting circuit cut-off relay
- 7. Diode
- 8. Clutch switch
- 9. Sidestand switch
- 10.Gear position switch (neutral circuit)
- 11.Diode
- 12.Starter relay
- 13.Starter motor

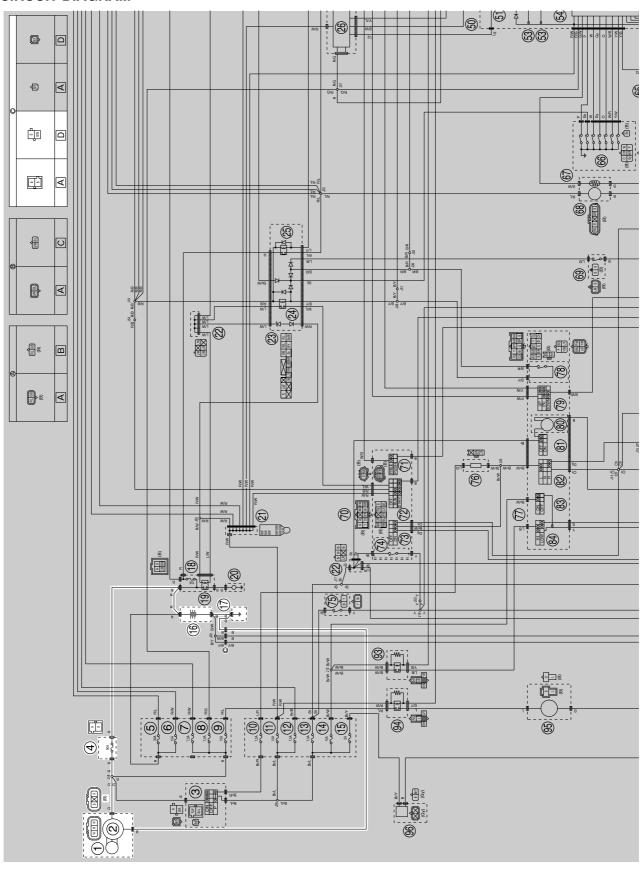
| PBefore troubleshooting, remove the follow                                                               | ing part(s):       |                                                                                                  |
|----------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------|
| Rider seat                                                                                               |                    |                                                                                                  |
| Fuel tank cover                                                                                          |                    |                                                                                                  |
| Fuel tank                                                                                                |                    |                                                                                                  |
| Air filter case                                                                                          |                    |                                                                                                  |
| Throttle bodies                                                                                          |                    |                                                                                                  |
| Check the fuses.     (Main, ignition and fuel injection system)                                          | NO .               | Replace the fuse(s).                                                                             |
| Refer to "CHECKING THE FUSES" on page 8-151.                                                             | NG→                |                                                                                                  |
| OK↓                                                                                                      |                    |                                                                                                  |
| 2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.                        | $NG \rightarrow$   | <ul><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 START- ER MOTOR OPERATION" on page 8-160.   | OK→                | Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5. |
| NG↓                                                                                                      |                    |                                                                                                  |
| 4. Check the starter motor. Refer to "CHECKING THE START-ER MOTOR" on page 5-36.                         | $NG \rightarrow$   | Repair or replace the starter motor.                                                             |
| OK↓                                                                                                      |                    |                                                                                                  |
| 5. Check the relay unit (starting circuit cut-off relay). Refer to "CHECKING THE RE-LAYS" on page 8-155. | $NG {\rightarrow}$ | Replace the relay unit.                                                                          |
| OK↓                                                                                                      |                    |                                                                                                  |
| 6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-157.               | $NG {\rightarrow}$ | Replace the relay unit.                                                                          |
| OK↓                                                                                                      |                    |                                                                                                  |
| 7. Check the starter relay. Refer to "CHECKING THE RE-LAYS" on page 8-155.                               | $NG {\rightarrow}$ | Replace the starter relay.                                                                       |
| OK↓                                                                                                      |                    |                                                                                                  |
| 8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-147.                                | $NG \rightarrow$   | Replace the main switch/immobilizer uni                                                          |

| <ol> <li>Check the gear position switch.         Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-167.     </li> </ol> | NG→      | Replace the gear position switch.                        |
|------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------|
| OK↓                                                                                                                          | <b>_</b> |                                                          |
| 10.Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-147.                                               | NG→      | Replace the sidestand switch.                            |
| OK↓                                                                                                                          | _        |                                                          |
| 11.Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-147.                                                  | NG→      | Replace the clutch switch.                               |
| OK↓                                                                                                                          |          |                                                          |
| 12.Check the start/engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-147.                                       | NG→      | Replace the right handlebar switch.                      |
| OK↓                                                                                                                          |          |                                                          |
| 13.Check the entire starting system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-7.                                        | NG→      | Properly connect or repair the starting system's wiring. |
| OK↓                                                                                                                          | _        |                                                          |
| The starting system circuit is OK.                                                                                           |          |                                                          |

## **CHARGING SYSTEM**

EAS30496

## **CIRCUIT DIAGRAM**



# **CHARGING SYSTEM**

- 1. AC magneto
- 2. Rectifier/regulator
- 4. Main fuse
- 16.Battery
- 17.Engine ground
- A. Wire harness
- D. Negative battery sub-wire harness

## **TROUBLESHOOTING**

The battery is not being charged.

TIP

- Before troubleshooting, remove the following part(s):
- 1. Rider seat
- 2. Rear side cover
  - Check the fuse.
     (Main)
     Refer to "CHECKING THE FUSES"
     on page 8-151.

 $NG \rightarrow$ 

Replace the fuse.

OK↓

Check the battery.
 Refer to "CHECKING AND
 CHARGING THE BATTERY" on
 page 8-152.

 $NG \rightarrow$ 

• Clean the battery terminals.

Recharge or replace the battery.

OK↓

3. Check the stator coil.
Refer to "CHECKING THE STATOR COIL" on page 8-160.

 $NG \rightarrow$ 

Replace the stator coil assembly.

OK↓

 Check the rectifier/regulator. Refer to "CHECKING THE RECTI-FIER/REGULATOR" on page 8-161.

 $NG\rightarrow$ 

Replace the rectifier/regulator.

OK↓

 Check the entire charging system's wiring.
 Refer to "CIRCUIT DIAGRAM" on page 8-13.

 $NG \rightarrow$ 

Properly connect or repair the charging system's wiring.

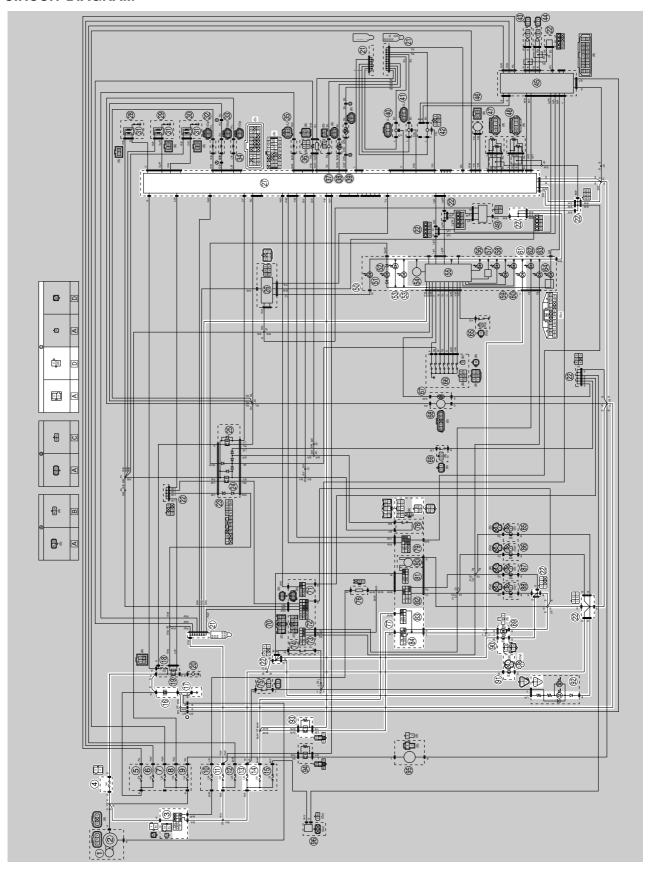
OK↓

The charging system circuit is OK.

## **LIGHTING SYSTEM**

EAS30498

## **CIRCUIT DIAGRAM**



## **LIGHTING SYSTEM**

- 3. Main switch
- 4. Main fuse
- 11.Ignition fuse
- 13. Signaling system fuse
- 14.Headlight fuse
- 16.Battery
- 17. Engine ground
- 21. Joint connector
- 22. Joint coupler
- 27.ECU (Engine Control Unit)
- 50.Meter assembly
- 53.Meter light
- 61. High beam indicator light
- 77. Handlebar switch (left)
- 83. Pass switch
- 84. Dimmer switch
- 89.Headlight
- 90. Auxiliary light
- 91.License plate light
- 92. Tail/brake light
- 93.Headlight relay
- A. Wire harness
- D. Negative battery sub-wire harness

### **TROUBLESHOOTING**

Any of the following fail to light: headlight, high beam indicator light, taillight, license light or meter light.

- Before troubleshooting, remove the following part(s):
- 1. Rider seat
- 2. Fuel tank cover
- 3. Fuel tank
- 4. Rear side cover
- 5. Headlight assembly
  - Check the each bulbs and bulb sockets condition.
     Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-150.

 $NG \rightarrow$ 

Replace the bulb(s) and bulb socket(s).

OK↓

Check the fuses.
 (Main, headlight, ignition and signaling system)
 Refer to "CHECKING THE FUSES" on page 8-151.

 $NG \rightarrow$ 

Replace the fuse(s).

OK↓

Check the battery.
 Refer to "CHECKING AND
 CHARGING THE BATTERY" on
 page 8-152.

NG→

Clean the battery terminals.Recharge or replace the battery.

OK↓

 Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-147.

NG→

Replace the main switch/immobilizer unit.

OK↓

5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 8-147.

NG→

The dimmer switch is faulty. Replace the left handlebar switch.

OK↓

Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 8-147.

 $NG \rightarrow$ 

The pass switch is faulty. Replace the left handlebar switch.

OK↓

7. Check the headlight relay (on/off). Refer to "CHECKING THE RE-LAYS" on page 8-155.

 $NG \rightarrow$ 

Replace the headlight relay.

OK↓

## **LIGHTING SYSTEM**

 Check the entire lighting system's wiring.
 Refer to "CIRCUIT DIAGRAM" on page 8-17.

 $NG \rightarrow$ 

Properly connect or repair the lighting system's wiring.

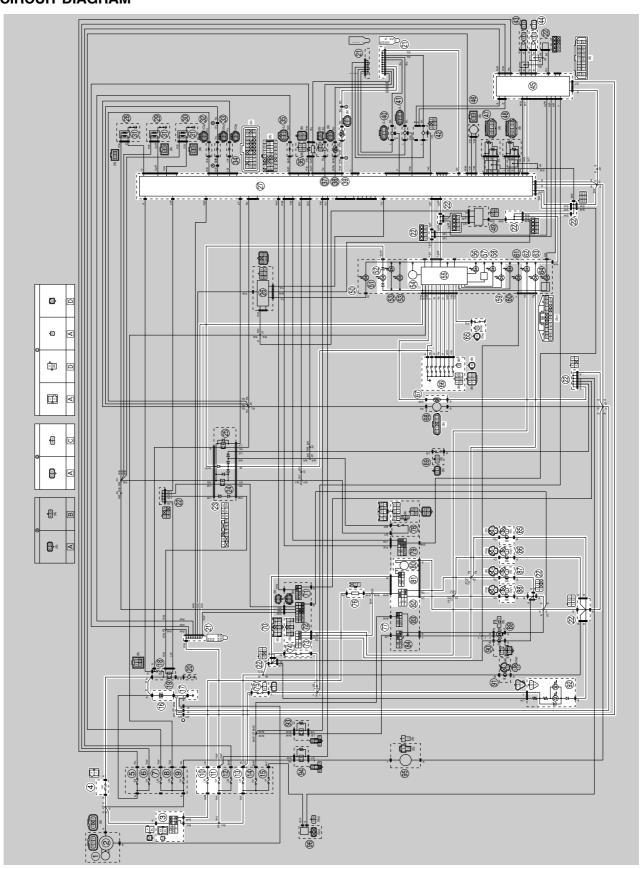
OK↓

Replace the ECU or meter assembly. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.

## **SIGNALING SYSTEM**

EAS30500

## **CIRCUIT DIAGRAM**



- 3. Main switch
- 4. Main fuse
- 10. Parking lighting fuse
- 11.Ignition fuse
- 13. Signaling system fuse
- 16.Battery
- 17. Engine ground
- 21. Joint connector
- 22. Joint coupler
- 23.Relay unit
- 27.ECU (Engine Control Unit)
- 39. Coolant temperature sensor
- 44.Rear wheel sensor
- 45.ABS ECU (electronic control unit)
- 50.Meter assembly
- 52. Neutral indicator light
- 54. Tachometer
- 55.Multi-function meter
- 56.Oil level warning light
- 57.Fuel meter
- 58. Engine trouble warning light
- 59. Coolant temperature warning light
- 62. Turn signal indicator light (left)
- 63. Turn signal indicator light (right)
- 65.Oil level switch
- 66.Gear position switch
- 67.Fuel sender
- 70. Handlebar switch (right)
- 73. Hazard switch
- 74. Front brake light switch
- 75.Rear brake light switch
- 76. Turn signal/hazard relay
- 77. Handlebar switch (left)
- 80.Horn
- 81. Horn switch
- 82. Turn signal switch
- 85.Rear turn signal light (right)
- 86.Rear turn signal light (left)
- 87. Front turn signal light (right)
- 88. Front turn signal light (left)
- 92. Tail/brake light
- A. Wire harness
- C. Sub-wire harness (Coolant temperature sensor)
- D. Negative battery sub-wire harness

### **TROUBLESHOOTING**

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.
- The fuel meter fails to come on.
- The speedometer fails to operate.

### TIP -

- Before troubleshooting, remove the following part(s):
- 1. Rider seat
- 2. Fuel tank cover
- 3. Fuel tank
- 4. Air filter case
- 5. Canister
- 6. Throttle bodies
  - Check the fuses.
     (Main, ignition, signaling system and parking lighting)
     Refer to "CHECKING THE FUSES" on page 8-151.

OK↓

Check the battery.
 Refer to "CHECKING AND
 CHARGING THE BATTERY" on
 page 8-152.

OK↓

3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-147.

OK↓

 Check the entire signaling system's wiring.
 Refer to "CIRCUIT DIAGRAM" on page 8-21.

OK↓

This circuit is OK.

## Checking the signaling system

The horn fails to sound.

 Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 8-147.

OK↓

Check the horn.Refer to "CHECKING THE HORN" on page 8-162.

OK↓

NG→

Replace the fuse(s).

- NG→
- Clean the battery terminals.
  - Recharge or replace the battery.

 $NG\rightarrow$ 

Replace the main switch/immobilizer unit.

NG→

Properly connect or repair the signaling system's wiring.

NG→

Replace the left handlebar switch.

 $NG \rightarrow$ 

Replace the horn.

| Check the entire signaling system's wiring.     Refer to "CIRCUIT DIAGRAM" on page 8-21.                        | $NG {\rightarrow}$ | Properly connect or repair the signaling system's wiring. |  |
|-----------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------|--|
| OK↓                                                                                                             |                    |                                                           |  |
| This circuit is OK.                                                                                             |                    |                                                           |  |
| The tail/brake light fails to come on.                                                                          |                    |                                                           |  |
| Check the front brake light switch.     Refer to "CHECKING THE     SWITCHES" on page 8-147.                     | $NG \rightarrow$   | Replace the front brake light switch.                     |  |
| ОК↓                                                                                                             |                    |                                                           |  |
| Check the rear brake light switch.     Refer to "CHECKING THE     SWITCHES" on page 8-147.                      | $NG \rightarrow$   | Replace the rear brake light switch.                      |  |
| OK↓                                                                                                             |                    |                                                           |  |
| Check the entire signaling system's wiring.     Refer to "CIRCUIT DIAGRAM" on page 8-21.                        | $NG {\rightarrow}$ | Properly connect or repair the signaling system's wiring. |  |
| OK↓                                                                                                             |                    |                                                           |  |
| This circuit is OK.                                                                                             |                    |                                                           |  |
| The turn signal light, turn signal indicator                                                                    | light or both f    | fail to blink.                                            |  |
| Check the turn signal light bulb and socket.     Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-150.  | $NG \rightarrow$   | Replace the turn signal light bulb(s), socket(s) or both. |  |
| OK↓                                                                                                             |                    |                                                           |  |
| Check the turn signal switch.     Refer to "CHECKING THE     SWITCHES" on page 8-147.                           | $NG {\to}$         | Replace the left handlebar switch.                        |  |
| OK↓                                                                                                             |                    |                                                           |  |
| Check the hazard switch.     Refer to "CHECKING THE     SWITCHES" on page 8-147.                                | $NG \rightarrow$   | Replace the left handlebar switch.                        |  |
| OK↓                                                                                                             |                    |                                                           |  |
| 4. Check the turn signal/hazard relay.<br>Refer to "CHECKING THE TURN<br>SIGNAL/HAZARD RELAY" on page<br>8-156. | $NG {\to}$         | Replace the turn signal/hazard relay.                     |  |
| OK↓                                                                                                             |                    |                                                           |  |

| <ol> <li>Check the entire signaling system's wiring.</li> <li>Refer to "CIRCUIT DIAGRAM" on page 8-21.</li> </ol> | NG→       | Properly connect or repair the signaling system's wiring. |  |  |  |
|-------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------|--|--|--|
| OK↓                                                                                                               | OK↓       |                                                           |  |  |  |
| Replace the meter assembly.                                                                                       |           |                                                           |  |  |  |
| The neutral indicator light fails to come o                                                                       | <u>n.</u> |                                                           |  |  |  |
| Check the gear position switch.     Refer to "CHECKING THE GEAR     POSITION SWITCH" on page     8-167.           | NG→       | Replace the gear position switch.                         |  |  |  |
| OK↓                                                                                                               |           |                                                           |  |  |  |
| 2. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-157.                        | NG→       | Replace the relay unit.                                   |  |  |  |
| OK↓                                                                                                               | _         |                                                           |  |  |  |
| <ol> <li>Check the entire signaling system's wiring.     Refer to "CIRCUIT DIAGRAM" on page 8-21.</li> </ol>      | NG→       | Properly connect or repair the signaling system's wiring. |  |  |  |
| OK↓                                                                                                               |           |                                                           |  |  |  |
| Replace the meter assembly.                                                                                       |           |                                                           |  |  |  |
| The oil level warning light fails to come o                                                                       | <u>n.</u> |                                                           |  |  |  |
| Check the oil level switch.     Refer to "CHECKING THE     SWITCHES" on page 8-147.                               | NG→       | Replace the oil level switch.                             |  |  |  |
| OK↓                                                                                                               | l         |                                                           |  |  |  |
| 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.                                                                                       |           |                                                           |  |  |  |
| The fuel meter, fuel level warning light, or both fail to come on.                                                |           |                                                           |  |  |  |
| Check the fuel sender.     Refer to "CHECKING THE FUEL SENDER" on page 8-162.                                     | NG→       | Replace the fuel pump assembly.                           |  |  |  |
| OK↓                                                                                                               |           |                                                           |  |  |  |

2. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.

 $NG \rightarrow$ 

Properly connect or repair the signaling system's wiring.

OK↓

Replace the ECU or meter assembly. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.

The speedometer fails to operate.

1. Check the rear wheel sensor. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.

 $NG \rightarrow$ 

Replace the rear wheel sensor.

OK↓

2. Check the entire wheel sensor wiring. Refer to TIP.

 $NG \rightarrow$ 

Properly connect or repair the wheel sensor wiring.

OK↓

Replace the hydraulic unit assembly, ECU, meter assembly. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.

Repair or replace if there is an open or short circuit.

• Between rear wheel sensor coupler and ABS ECU coupler.

(white-white) (black-black)

• Between ABS ECU coupler and ECU coupler.

(white/green-white/green) (white/yellow-white/yellow)

• Between ECU coupler and meter assembly.

(light green/blue-light green/blue) (light green/white-light green/white)

The coolant temperature warning light fails to come on.

1. Check the coolant temperature sen-

Refer to "CHECKING THE COOL-ANT TEMPERATURE SENSOR" on page 8-164.

 $NG \rightarrow$ 

Replace the coolant temperature sensor.

OK↓

 Check the entire signaling system's wiring.
 Refer to "CIRCUIT DIAGRAM" on page 8-21.

 $NG \rightarrow$ 

Properly connect or repair the signaling system's wiring.

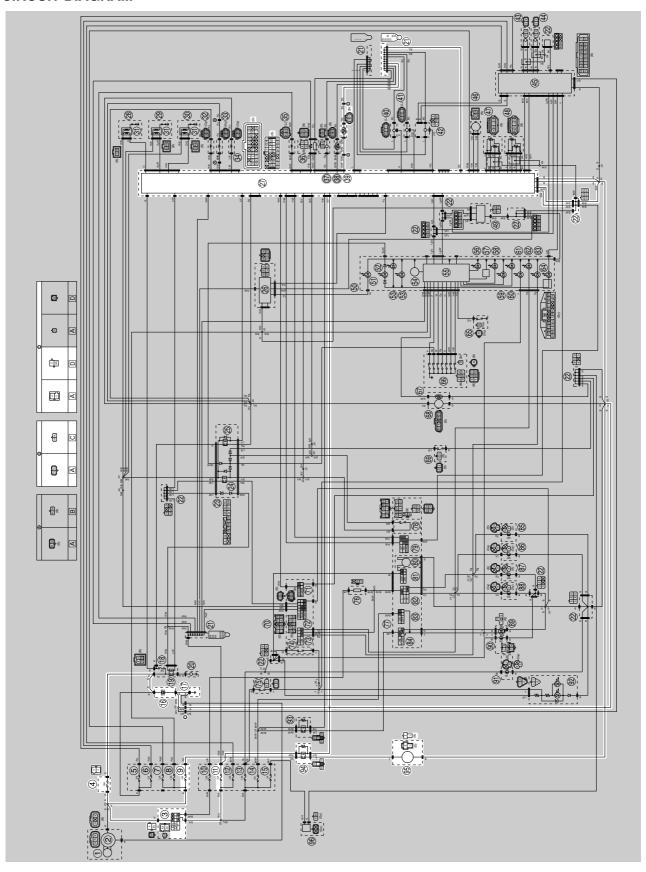
OK↓

Replace the ECU or meter assembly. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.

## **COOLING SYSTEM**

EAS30502

## **CIRCUIT DIAGRAM**



## **COOLING SYSTEM**

- 3. Main switch
- 4. Main fuse
- 9. Radiator fan motor fuse
- 11.Ignition fuse
- 16.Battery
- 17. Engine ground
- 21. Joint connector
- 22. Joint coupler
- 27.ECU (Engine Control Unit)
- 39. Coolant temperature sensor
- 94. Radiator fan motor relay
- 95. Radiator fan motor
- A. Wire harness
- C. Sub-wire harness (Coolant temperature sensor)
- D. Negative battery sub-wire harness

FAS30503 **TROUBLESHOOTING** • Before troubleshooting, remove the following part(s): 1. Rider seat 2. Fuel tank cover 3. Fuel tank 4. Air filter case 5. Canister 6. Throttle bodies 1. Check the fuses. (Main, ignition and radiator fan mo-Replace the fuse(s).  $NG \rightarrow$ Refer to "CHECKING THE FUSES" on page 8-151. OK↓ 2. Check the battery. Refer to "CHECKING AND Clean the battery terminals. CHARGING THE BATTERY" on Recharge or replace the battery.  $NG \rightarrow$ page 8-152. OK↓ 3. Check the main switch. Refer to "CHECKING THE Replace the main switch/immobilizer unit.  $NG \rightarrow$ SWITCHES" on page 8-147. OK↓ 4. Check the radiator fan motor. Refer to "CHECKING THE RADIA-Replace the radiator fan motor(s).  $NG \rightarrow$ TOR FAN MOTOR" on page 8-163. OK↓ 5. Check the radiator fan motor relay. Refer to "CHECKING THE RE-Replace the radiator fan motor relay.  $NG \rightarrow$ LAYS" on page 8-155. OK↓ 6. Check the coolant temperature sen-Refer to "CHECKING THE COOL-Replace the coolant temperature sensor.  $NG \rightarrow$ ANT TEMPERATURE SENSOR" on page 8-164. OK√ 7. Check the entire cooling system's Properly connect or repair the cooling syswiring. Refer to "CIRCUIT DIAGRAM" on tem's wiring.  $NG \rightarrow$ page 8-29. OK↓

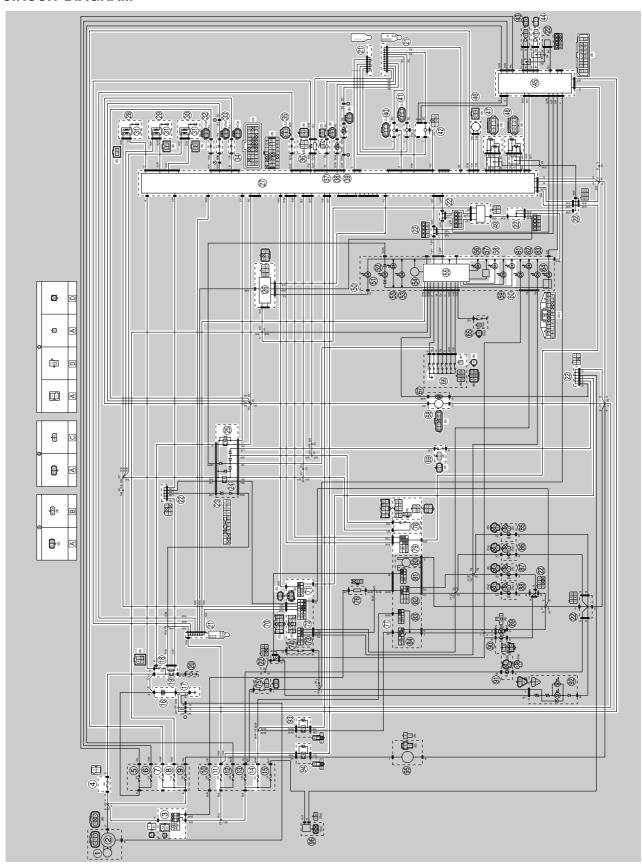
Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.

Replace the ECU.

## **FUEL INJECTION SYSTEM**

EAS30504

## **CIRCUIT DIAGRAM**



- 3. Main switch
- 4. Main fuse
- 7. Electric throttle valve fuse
- 8. Backup fuse
- 11.Ignition fuse
- 14. Headlight fuse
- 16.Battery
- 17. Engine ground
- 18. Fuel injection system fuse
- 19.Starter relay
- 21. Joint connector
- 22. Joint coupler
- 23.Relay unit
- 24. Starting circuit cut-off relay
- 25. Fuel pump relay
- 26.Immobilizer unit
- 27.ECU (Engine Control Unit)
- 28.Ignition coil #1
- 29. Ignition coil #2
- 30.Ignition coil #3
- 31.Spark plug
- 32.Injector #1
- 33.Injector #2
- 34.Injector #3
- 35. Air induction system solenoid
- 36.O<sub>2</sub> sensor
- 37. Crankshaft position sensor
- 38.Intake air temperature sensor
- 39. Coolant temperature sensor
- 40.Intake air pressure sensor 1
- 41.Intake air pressure sensor 2
- 42.Lean angle sensor
- 44.Rear wheel sensor
- 45.ABS ECU (electronic control unit)
- 46. Throttle servo motor
- 47. Accelerator position sensor
- 48. Throttle position sensor
- 49. Yamaha diagnostic tool coupler
- 50. Meter assembly
- 55.Multi-function meter
- 58. Engine trouble warning light
- 60. Traction control system indicator light
- 66. Gear position switch
- 68.Fuel pump
- 69. Sidestand switch
- 70. Handlebar switch (right)
- 71. Drive mode switch
- 72. Start/engine stop switch
- 77. Handlebar switch (left)
- 78. Clutch switch
- 79. Traction control system switch
- 93.Headlight relay
- 94. Radiator fan motor relay

- A. Wire harness
- B. Sub-wire harness (Injector #2)
- C. Sub-wire harness (Coolant temperature sensor)
- D. Negative battery sub-wire harness

### **ECU SELF-DIAGNOSTIC FUNCTION**

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code number is stored in the memory of the ECU.

## Checking the engine trouble warning light

The engine trouble warning light comes on for around 2 seconds after the main switch has been set to "ON". If the warning light does not come on, the warning light (LED) may be defective.

## ECU detects an abnormal signal from a sensor

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue operating or stop operating, depending on the conditions.

EAS30506

### TROUBLESHOOTING METHOD

The engine operation is not normal and the engine trouble warning light comes on.

- 1. Check:
  - Fault code number

- a. Check the fault code numbers that have a condition of "Detected" using the Yamaha diagnostic tool.
- b. Identify the faulty system with the fault code number.
- c. Identify the probable cause of the malfunction.

2. Check and repair the probable cause of the malfunction.

| Fault code No.                                                                                                                                                                                                                                                                                  | No fault code No. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Check and repair. Refer to "TROUBLESHOOTING DETAILS (FAULT CODE)" on page 8-37.  Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to "TROUBLESHOOT-ING DETAILS (FAULT CODE)" on page 8-37 and "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-5. | Check and repair. |

Perform the reinstatement action for the fuel injection system.
 Refer to "Confirmation of service completion" in the appropriate table in "TROUBLESHOOTING DETAILS (FAULT CODE)" on page 8-37.

### TIP

- If another fault code number is displayed, repeat steps (1) to (3) until no fault code number is displayed.
- Turning the main switch to "OFF" will not erase the malfunction history.

### The engine operation is not normal, but the engine trouble warning light does not come on.

1. Check the operation of the following sensors and actuators in the diagnostic mode. Refer to "DIAG-NOSTIC CODE: SENSOR OPERATION TABLE" on page 9-13 and "DIAGNOSTIC CODE: ACTU-ATOR OPERATION TABLE" on page 9-16.

01: Throttle position sensor signal 1

(throttle angle)

13: Throttle position sensor signal 2

(throttle angle)

14: Accelerator position sensor signal 1

(throttle angle)

15: Accelerator position sensor signal 2

(throttle angle)

30: Cylinder-#1 ignition coil

31: Cylinder-#2 ignition coil 32: Cylinder-#3 ignition coil

36: Injector #1

37: Injector #2

38: Injector #3

48: Air induction system solenoid

If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.

If no malfunction is detected in the sensors and actuators, check and repair the inner parts of the engine.

FAS30951

### YAMAHA DIAGNOSTIC TOOL

This model uses the Yamaha diagnostic tool to identify malfunctions.

For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



Yamaha diagnostic tool 90890-03250

A generic scan tool can also be used to identify malfunctions.



**OBD/ GST Leadwire kit** 90890-03249

### Features of the Yamaha diagnostic tool

You can use the Yamaha diagnostic tool to identify malfunctions guicker than with conventional methods.

By connecting the adapter interface, which is connected to the USB port of a computer, to a vehicle's ECU using the communication cable, you can display information that is necessary for identifying malfunctions and for maintenance to display on the computer. The displayed information includes the sensor output data and information recorded in the ECU.

Functions of the Yamaha diagnostic tool

Diagnosis of malfunction: Fault codes recorded on the ECU are read, and the contents are dis-

played.

The freeze frame data (FFD) is the operation data when a malfunction was detected. This data can be used to identify when the malfunction occurred and check the engine conditions and running conditions when

it occurred.

Diagnosis of function: Check the operation of the output value of each sensor and actuator.

Dynamic inspection: Check the electric component condition automatically.

Active test: Manually adjust injection duration and/or switch some actuators for

troubleshooting.

Maintenance record: Store the inspection history into the Yamaha diagnostic tool application.

Recall search: Search the recall campaign information.

Monitoring: Displays a graph of sensor output values for actual operating condi-

tions.

Logging: Records and saves the sensor output value in actual driving conditions.

CO adjustment: Adjust the concentration of CO admissions during idling.

Reprogram ECU: If necessary, the ECU is rewritten using ECU rewrite data provided by

Yamaha.

Ignition timing adjustment, etc. cannot be changed from the vehicle's

original state.

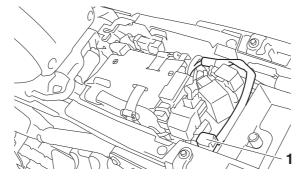
Writing VIN/frame number: Write the VIN/frame number in the ECU.

View logs: Displays the logging data.

However, the Yamaha diagnostic tool cannot be used to freely change the basic vehicle functions, such as adjusting the ignition timing.

Connecting the Yamaha diagnostic tool

Remove the protective cap "1", and then connect the Yamaha diagnostic tool to the coupler.



FAS3179

### TROUBLESHOOTING DETAILS (FAULT CODE)

This section describes the measures per fault code number displayed on the Yamaha diagnostic tool. Check and service the items or components that are the probable cause of the malfunction following the order given.

After the check and service of the malfunctioning part have been completed, delete the fault codes displayed on the Yamaha diagnostic tool according to the reinstatement method.

Fault code No.:

Fault code number displayed on the Yamaha diagnostic tool when the engine failed to work normally. Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "SELF-DIAGNOS-TIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-5.

## Parts connected to the ECU

The following parts are connected to the ECU.

When checking for a power short circuit, the couplers must be disconnected from all of the following parts beforehand.

Crankshaft position sensor
 Intake air temperature sensor

Fuel injector #1
 O<sub>2</sub> sensor

• Fuel injector #2 • Lean angle sensor

Fuel injector #3
 ABS ECU (electronic control unit)

• Ignition coil #1 • Air induction system solenoid

Ignition coil #2
 throttle servo motor

- Ignition coil #3
- Throttle position sensor
- Accelerator position sensor
- Intake air pressure sensor 1
- Intake air pressure sensor 2
- Coolant temperature sensor

- Relay unit
- Headlight relay
- Radiator fan motor relay
- · Meter assembly
- Immobilizer unit

### Fault code No. P0030

### TIP\_

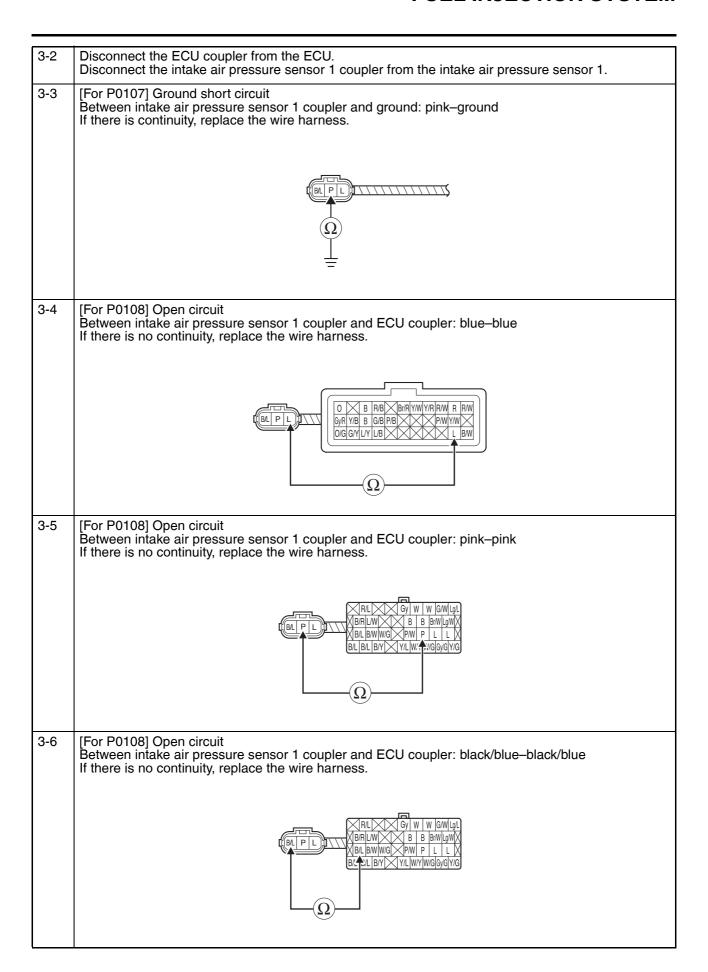
- If fault code numbers "P0030" and "P0112" are both indicated, take the actions specified for fault code number "P0112" first.
- If fault code numbers "P0030" and "P0113" are both indicated, take the actions specified for fault code number "P0113" first.
- If fault code numbers "P0030" and "P0122" are both indicated, take the actions specified for fault code number "P0122" first.
- If fault code numbers "P0030" and "P0123" are both indicated, take the actions specified for fault code number "P0123" first.
- If fault code numbers "P0030" and "P0222" are both indicated, take the actions specified for fault code number "P0222" first.
- If fault code numbers "P0030" and "P0223" are both indicated, take the actions specified for fault code number "P0223" first.
- If fault code numbers "P0030" and "P2135" are both indicated, take the actions specified for fault code number "P2135" first.

| Fault            | code No.                                                                                                                                                                              | P0030                                                               |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item             |                                                                                                                                                                                       | O <sub>2</sub> sensor heater: defective heater controller detected. |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Fail-safe system |                                                                                                                                                                                       | Able to start engine                                                |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
|                  |                                                                                                                                                                                       | Able                                                                | to drive vehicle                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Diagr            | nostic code No.                                                                                                                                                                       |                                                                     |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Tool             | display                                                                                                                                                                               |                                                                     |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Proce            | edure —                                                                                                                                                                               |                                                                     |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Item             | Probable cause of malfe                                                                                                                                                               | unc-                                                                | Maintenance job                                                                  | Confirmation of service completion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| 1                | Connection of O <sub>2</sub> sensor of pler. Check the locking condition the coupler. Disconnect the coupler and check the pins (bent or brotterminals and locking cond of the pins). | n of<br>d<br>oken                                                   | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Start the engine, and then check the condition of the fault code.  Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 2.  TIP  For this check, also set the start/engine stop switch to "ON". |  |

| 2 | Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                                                                                                       | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Start the engine, and then check the condition of the fault code.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 3.  TIP  For this check, also set the start/engine stop switch to "ON". |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Wire harness continuity.                                                                                                                                                                    | Open or short circuit → Properly connect or replace the wire harness.  Between O₂ sensor coupler and ECU coupler. pink/black-pink/black Between O₂ sensor coupler and joint connector. red/white-red/white Between main switch and ignition fuse. brown/blue-brown/blue Between ignition fuse and joint connector. red/white-red/white | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Start the engine, and then check the condition of the fault code.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 4.  TIP  For this check, also set the start/engine stop switch to "ON". |
| 4 | Defective O <sub>2</sub> sensor heater.                                                                                                                                                     | Replace the O <sub>2</sub> sensor.                                                                                                                                                                                                                                                                                                     | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Start the engine, and then check the condition of the fault code.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 5.  TIP  For this check, also set the start/engine stop switch to "ON". |
| 5 | Malfunction in ECU.                                                                                                                                                                         | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                                            | Service is finished.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 6 | Delete the fault code and check that the engine trouble warning light goes off.                                                                                                             | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

#### Fault code No. P0107, P0108

| Fault   | code No.                                                                                                                                                                                                       | P010             | 7, P0108                                                                                                                                         |                                                                                                                                                                                                                                                  |  |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item    |                                                                                                                                                                                                                | [P010            | [P0107] Intake air pressure sensor 1: ground short circuit detected. [P0108] Intake air pressure sensor 1: open or power short circuit detected. |                                                                                                                                                                                                                                                  |  |
| Fail-e  | Fail-safe system -                                                                                                                                                                                             |                  | to start engine                                                                                                                                  |                                                                                                                                                                                                                                                  |  |
| i aii-s | ale system                                                                                                                                                                                                     | Able             | to drive vehicle                                                                                                                                 |                                                                                                                                                                                                                                                  |  |
| Diagn   | ostic code No.                                                                                                                                                                                                 | 03               |                                                                                                                                                  |                                                                                                                                                                                                                                                  |  |
| Tool    | display                                                                                                                                                                                                        | Displa           | ays the intake air pressure 1.                                                                                                                   |                                                                                                                                                                                                                                                  |  |
| Proce   | edure                                                                                                                                                                                                          | Opera<br>switch  | ate the throttle while pushing the "<br>h. (If the display value changes, th                                                                     | (§)" side of the start/engine stop<br>e performance is OK.)                                                                                                                                                                                      |  |
| Item    | Probable cause of malf                                                                                                                                                                                         | unc-             | Maintenance job                                                                                                                                  | Confirmation of service completion                                                                                                                                                                                                               |  |
| 1       | Connection of intake air pr<br>sure sensor 1 coupler.<br>Check the locking condition<br>the coupler.<br>Disconnect the coupler and<br>check the pins (bent or broaterminals and locking cond-<br>of the pins). | n of<br>d<br>ken | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                 | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 2. |  |
| 2       | Connection of ECU couple<br>Check the locking condition<br>the coupler.<br>Disconnect the coupler and<br>check the pins (bent or broaterminals and locking cond<br>of the pins).                               | n of<br>d<br>ken | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                 | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 3. |  |
| 3       | Wire harness continuity.                                                                                                                                                                                       |                  | Open or short circuit → Replace the wire harness.                                                                                                | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 4. |  |
| 3-1     | 1. Intake air pressure sensor 1 2. ECU 3. Sensor input lead 4. Sensor output lead 5. Sensor ground lead                                                                                                        |                  |                                                                                                                                                  |                                                                                                                                                                                                                                                  |  |



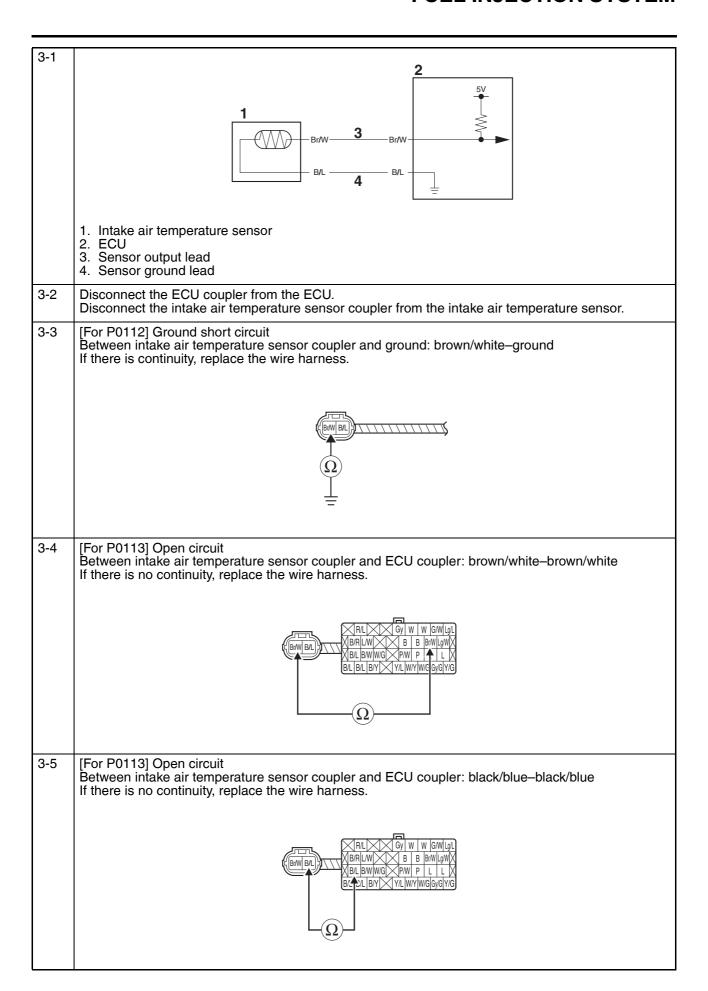
| 3-7 | Disconnect the couplers from the Refer to "Parts connected to the                                                                   | parts that are connected to the E<br>ECU" on page 8-37.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CU.                                                                                                                                                                                                                                              |
|-----|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3-8 | [For P0107/P0108] Short circuit<br>Between intake air pressure sens<br>coupler terminal "b".<br>If there is continuity, replace the | sor 1 output terminal (pink) "a" of E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ECU coupler and any other ECU                                                                                                                                                                                                                    |
|     |                                                                                                                                     | a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                  |
|     |                                                                                                                                     | RL Gy W W JAMLOL<br>KBRILWW B B B JAWILAWIX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                  |
|     |                                                                                                                                     | BL BW WG PW P'L L BL BL BY YLW ANG GWG YG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                  |
|     |                                                                                                                                     | ' <u>(Ω</u> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                  |
| 4   | Installed condition of intake air pressure sensor 1.                                                                                | Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 5. |
| 5   | Defective intake air pressure sensor 1.                                                                                             | Execute the diagnostic mode. (Code No. 03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. At sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 1000 m (3300 ft) above sea level: Approx. 90 kPa (675.1 mmHg, 26.6 inHg) 2000 m (6700 ft) above sea level: Approx. 80 kPa (600.0 mmHg, 23.6 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Check the intake air pressure sensor 1. Replace if defective. Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-166. | Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 6.             |
| 6   | Malfunction in ECU.                                                                                                                 | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Service is finished.                                                                                                                                                                                                                             |
| 7   | Delete the fault code and check that the engine trouble warning light goes off.                                                     | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                  |

#### **Fault code No. P0112, P0113**

TIP

Perform this procedure when the engine is cold.

| Fault     | code No.                                                                                                                                                                                                 | P011          | 2, P0113                                                                         |                                                                                                                                                                                                                                                  |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item dete |                                                                                                                                                                                                          | detec         | [3] Intake air temperature senso                                                 | J                                                                                                                                                                                                                                                |
| Fail c    | afe system                                                                                                                                                                                               | Able          | to start engine                                                                  |                                                                                                                                                                                                                                                  |
| raii-5    | ale system                                                                                                                                                                                               | Able          | to drive vehicle                                                                 |                                                                                                                                                                                                                                                  |
| Diagn     | ostic code No.                                                                                                                                                                                           | 05            |                                                                                  |                                                                                                                                                                                                                                                  |
| Tool o    | display                                                                                                                                                                                                  | Displ         | ays the air temperature.                                                         |                                                                                                                                                                                                                                                  |
| Proce     | edure                                                                                                                                                                                                    | Comp<br>value | pare the actually measured air tem                                               | perature with the tool display                                                                                                                                                                                                                   |
| Item      | Probable cause of malfunction and check                                                                                                                                                                  |               | Maintenance job                                                                  | Confirmation of service completion                                                                                                                                                                                                               |
| 1         | Connection of intake air temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). |               | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 2. |
| 2         | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).                           |               | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 3. |
| 3         | Wire harness continuity.                                                                                                                                                                                 |               | Open or short circuit → Replace the wire harness.                                | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 4. |



| 3-6 | Disconnect the couplers from the Refer to "Parts connected to the                                                                                                                                                | eparts that are connected to the E<br>ECU" on page 8-37.                                                                                                                                                                                                                                                                            | CU.                                                                                                                                                                                                                                              |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3-7 | [For P0112/P0113] Short circuit Between intake air temperature sensor output terminal (brown/white) "a" of ECU coupler and any other ECU coupler terminal "b". If there is continuity, replace the wire harness. |                                                                                                                                                                                                                                                                                                                                     | e) "a" of ECU coupler and any                                                                                                                                                                                                                    |
|     |                                                                                                                                                                                                                  | Br. Br. Br. Yr. Wr. Wr. Gy. Yr. Wr. Gy. Yr. Wr. Gy. Gy. Gy. Wr. Gy. Gy. Gy. Gy. Gy. Gy. Gy. Gy. Gy. Gy                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                  |
| 4   | Installed condition of intake air temperature sensor.                                                                                                                                                            | Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.                                                                                                                                                                                                                                     | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 5. |
| 5   | Defective intake air temperature sensor.                                                                                                                                                                         | Execute the diagnostic mode. (Code No. 05) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature. → Check the intake air temperature sensor. Replace if defective. Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-167. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 6. |
| 6   | Malfunction in ECU.                                                                                                                                                                                              | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                                         | Service is finished.                                                                                                                                                                                                                             |
| 7   | Delete the fault code and check that the engine trouble warning light goes off.                                                                                                                                  | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                                                                                                        |                                                                                                                                                                                                                                                  |

#### **Fault code No. P0117, P0118**

TIP

Perform this procedure when the engine is cold.

| Fault code No.   | P0117, P0118                                                                                                                                 |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Item             | [P0117] Coolant temperature sensor: ground short circuit detected. [P0118] Coolant temperature sensor: open or power short circuit detected. |
| Fail-safe system | Able to start engine                                                                                                                         |
| r an-sale system | Able to drive vehicle                                                                                                                        |

| Diagn    | ostic code No.                                                                                                                                                                               | 06               |                                                                                  |                                                                                                                                                                                                                                                  |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u> </u> | lisplay                                                                                                                                                                                      | Wher<br>Wher     | n engine is cold: Displays tempera<br>n engine is hot: Displays current co       | ture closer to air temperature.<br>polant temperature.                                                                                                                                                                                           |
| Proce    | Procedure Comparison value                                                                                                                                                                   |                  | oare the actually measured coolant                                               | t temperature with the tool display                                                                                                                                                                                                              |
| Item     | Probable cause of malfution and check                                                                                                                                                        | ınc-             | Maintenance job                                                                  | Confirmation of service completion                                                                                                                                                                                                               |
| 1        | Connection of coolant tempture sensor coupler. Check the locking condition the coupler. Disconnect the coupler and check the pins (bent or brotherminals and locking condition of the pins). | n of<br>d<br>ken | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 2. |
| 2        | Connection of ECU couple<br>Check the locking condition<br>the coupler.<br>Disconnect the coupler and<br>check the pins (bent or bro<br>terminals and locking cond<br>of the pins).          | n of<br>d<br>ken | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 3. |
| 3        | Wire harness continuity.                                                                                                                                                                     |                  | Open or short circuit → Replace the wire harness.                                | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 4. |
| 3-1      | 11511.51                                                                                                                                                                                     |                  | 5V                                                                               |                                                                                                                                                                                                                                                  |
| 3-2      | Disconnect the ECU coupl<br>Disconnect the coolant ten                                                                                                                                       |                  | n the ECU.<br>ure sensor coupler from the coolar                                 | nt temperature sensor.                                                                                                                                                                                                                           |

3-3 [For P0117] Ground short circuit Between coolant temperature sensor coupler and ground: green/white-ground If there is continuity, replace the wire harness. G/W B/I 3-4 [For P0118] Open circuit Between coolant temperature sensor coupler and ECU coupler: green/white-green/white If there is no continuity, replace the wire harness. (R/L) Gy | W | W |G/W|L( G/W B/L B/L B/L B/Y Y/L W/Y W/G 3-5 [For P0118] Open circuit Between coolant temperature sensor coupler and ECU coupler: black/blue-black/blue If there is no continuity, replace the wire harness. Gy W W G/W Lg B/RLW> B B Br/W Lg/W E/L B/Y Y/L W/Y W/G Gy/G Y/G 3-6 Disconnect the couplers from the parts that are connected to the ECU. Refer to "Parts connected to the ECU" on page 8-37. 3-7 [For P0117/P0118] Short circuit Between coolant temperature sensor output terminal (green/white) "a" of ECU coupler and any other ECU coupler terminal "b". If there is continuity, replace the wire harness. Gy W W G/W B B Br/Vv B/L B/W W/G P/W P L B/L B/L B/Y Y/L W/Y W/G G

| 4 | Installed condition of coolant temperature sensor.                              | Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.                                                                                                                                                                                                                              | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 5. |
|---|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | Defective coolant temperature sensor.                                           | Execute the diagnostic mode. (Code No. 06) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature → Check the coolant temperature sensor. Replace if defective. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-164. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 6.   |
| 6 | Malfunction in ECU.                                                             | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                                  | Service is finished.                                                                                                                                                                                                                             |
| 7 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                                                                                                 |                                                                                                                                                                                                                                                  |

#### Fault code No. P0122, P0123, P0222, P0223, P2135

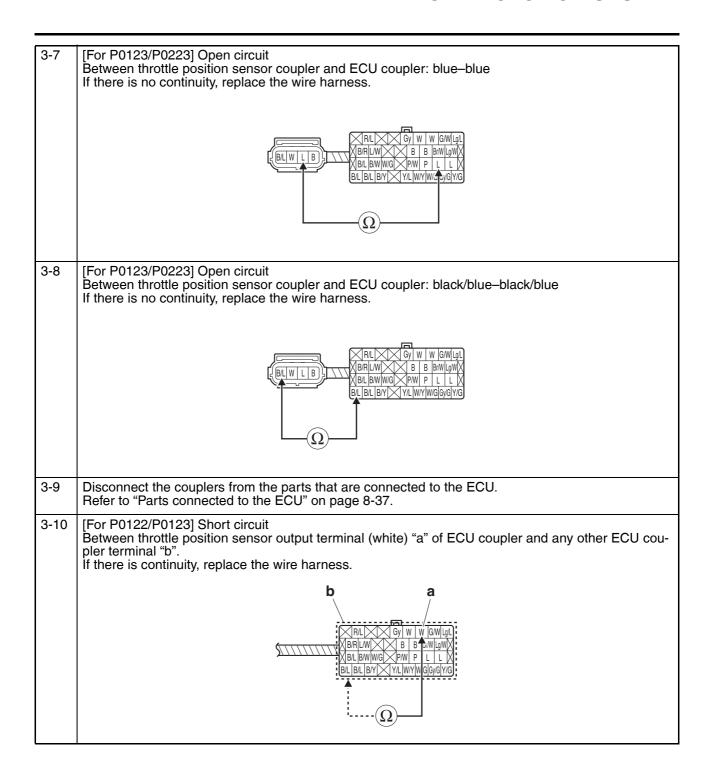
TIP

If a fault code other than No. P2135 (P0122/P0123/P0222/P0223) is detected, perform troubleshooting first.

| Fault code No. |                 | P0122, P0123, P0222, P0223, P2135                                                                                                                                                                                                                                                                                                                  |
|----------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item           |                 | [P0122] Throttle position sensor: ground short circuit detected. [P0123] Throttle position sensor: open or power short circuit detected. [P0222] Throttle position sensor: ground short circuit detected. [P0223] Throttle position sensor: open or power short circuit detected. [P2135] Throttle position sensor: Output voltage deviation error |
| Fail.          | safe system     | Able/Unable to start engine                                                                                                                                                                                                                                                                                                                        |
| ı alı          | saic system     | Able/Unable to drive vehicle                                                                                                                                                                                                                                                                                                                       |
| Diag           | nostic code No. | 01, 13                                                                                                                                                                                                                                                                                                                                             |
| 01             | Tool display    | Throttle position sensor signal 1 • 11–21 (fully closed position) • 96–106 (fully open position)                                                                                                                                                                                                                                                   |
|                | Procedure       | <ul> <li>Check with throttle valves fully closed.</li> <li>Check with throttle valves fully open.</li> </ul>                                                                                                                                                                                                                                       |
| 13             | Tool display    | Throttle position sensor signal 2 • 9–23 (fully closed position) • 94–108 (fully open position)                                                                                                                                                                                                                                                    |
|                | Procedure       | <ul><li>Check with throttle valves fully closed.</li><li>Check with throttle valves fully open.</li></ul>                                                                                                                                                                                                                                          |

| Item | Probable cause of malfunction and check                                                                                                                                                             | Maintenance job                                                                  | Confirmation of service completion                                                                                                                                                                                                               |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Connection of throttle position sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 2. |
| 2    | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).                      | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 3. |
| 3    | Wire harness continuity.                                                                                                                                                                            | Open or short circuit → Replace the wire harness.                                | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 4. |
| 3-1  | 1. Throttle position sensor 2. ECU 3. Sensor input lead 4. Sensor output lead 1 5. Sensor output lead 2 6. Sensor ground lead                                                                       | 2<br>W 4<br>W 5<br>B 5<br>B 6<br>B/L                                             |                                                                                                                                                                                                                                                  |
| 3-2  | Disconnect the ECU coupler from Disconnect the throttle position s                                                                                                                                  | n the ECU.<br>ensor coupler from the throttle pos                                | sition sensor.                                                                                                                                                                                                                                   |

3-3 [For P0122] Ground short circuit Between throttle position sensor coupler and ground: white-ground If there is continuity, replace the wire harness. B/L W L B 3-4 [For P0123] Open circuit Between throttle position sensor coupler and ECU coupler: white—white If there is no continuity, replace the wire harness. Gy W W G/W Lg/L B B**∱**r/W Lg/W B/R L/W B/L B/W W/G P/W P B/L B/L B/Y Y/L W/Y W G Gy/G Y/G 3-5 [For P0222] Ground short circuit Between throttle position sensor coupler and ground: black-ground If there is continuity, replace the wire harness. 3-6 [For P0223] Open circuit Between throttle position sensor coupler and ECU coupler: black-black If there is no continuity, replace the wire harness. Gy W W G/W Lg/L B/L W L B  $(\mathbf{\Omega})$ 



| 3-11 | [For P0222/P0223] Short circuit<br>Between throttle position sensor<br>pler terminal "b".<br>If there is continuity, replace the | output terminal (black) "a" of ECU wire harness.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | coupler and any other ECU cou-                                                                                                                                                                                                                   |
|------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                                                                                                                  | b a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                  |
|      |                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                  |
|      |                                                                                                                                  | BRL BW WG PW L L  BL BL BY YL WY WGGYGY/G                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                  |
|      |                                                                                                                                  | :Ω)—                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                  |
| 4    | Installed condition of throttle position sensor.                                                                                 | Check for looseness or pinching. Improperly installed sensor → Reinstall or adjust the sensor. Refer to "ADJUSTING THE THROTTLE POSITION SEN- SOR" on page 7-13.                                                                                                                                                                                                                                                                                                                                                                                                  | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 5. |
| 5    | Throttle position sensor resistance.                                                                                             | Measure the throttle position sensor resistance. black/blue-blue Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-164.                                                                                                                                                                                                                                                                                                                                                                                                                                  | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 6. |
| 6    | Defective throttle position sensor.                                                                                              | Check throttle position sensor signal 1. Execute the diagnostic mode. (Code No. 01) When the throttle valves are fully closed: A value of 11–21 is indicated. When throttle valves are fully open: A value of 96–106 is indicated. Check throttle position sensor signal 2. Execute the diagnostic mode. (Code No. 13) When the throttle valves are fully closed: A value of 9–23 is indicated. When the throttle valves are fully open: A value of 94–108 is indicated. An indicated value is out of the specified range → Replace the throttle position sensor. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 7. |
| 7    | Malfunction in ECU.                                                                                                              | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Service is finished.                                                                                                                                                                                                                             |

| 8 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. |  |
|---|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--|
|---|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--|

| Fault code No.      | P0132                                                                |  |
|---------------------|----------------------------------------------------------------------|--|
| Item                | O <sub>2</sub> sensor: short circuit detected (power short circuit). |  |
| Cail aafa ayatam    | Able to start engine                                                 |  |
| Fail-safe system    | Able to drive vehicle                                                |  |
| Diagnostic code No. | _                                                                    |  |
| Tool display        | _                                                                    |  |
| Procedure           | -                                                                    |  |

| 1 1000 | duic                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                  |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item   | Probable cause of malfunction and check                                                                                                                                                          | Maintenance job                                                                                                                                                                                                                                                                                     | Confirmation of service completion                                                                                                                                                                                                               |
| 1      | Installed condition of O <sub>2</sub> sensor.                                                                                                                                                    | Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.                                                                                                                                                                                                     | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 2.   |
| 2      | Connection of O <sub>2</sub> sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                                                                    | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 3. |
| 3      | Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).      | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                                                                    | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 4. |
| 4      | Wire harness continuity.                                                                                                                                                                         | Open or short circuit → Properly connect or replace the wire harness.  Between O <sub>2</sub> sensor coupler and joint connector. black/blue-black/blue Between joint connector and ECU coupler. black/blue-black/blue Between O <sub>2</sub> sensor coupler and ECU coupler. gray/green-gray/green | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 5. |

| 5 | Defective O <sub>2</sub> sensor.                                                | Check the $O_2$ sensor.<br>Defective $\rightarrow$ Replace the $O_2$ sensor.<br>Refer to "ENGINE REMOVAL"<br>on page 5-3.    | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 6. |
|---|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 | Malfunction in ECU.                                                             | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                  |                                                                                                                                                                                                                                                  |
| 7 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. |                                                                                                                                                                                                                                                  |

| rault code No. Pozol |                                                                                                                                                                                             |                  |                                                                                                                              |                                                                                                               |  |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--|
| Fault                | code No.                                                                                                                                                                                    | P0201            |                                                                                                                              |                                                                                                               |  |
| Item                 |                                                                                                                                                                                             | Fuel             | injector #1: malfunction in fuel i                                                                                           | njector #1.                                                                                                   |  |
| Eail c               | afe system                                                                                                                                                                                  | Able             | to start engine (depending on the                                                                                            | number of faulty cylinders)                                                                                   |  |
| raii-s               | ale system                                                                                                                                                                                  | Able             | to drive vehicle (depending on the                                                                                           | number of faulty cylinders)                                                                                   |  |
| Diagn                | ostic code No.                                                                                                                                                                              | 36               |                                                                                                                              |                                                                                                               |  |
| Actua                | ition                                                                                                                                                                                       | The "            | ates fuel injector #1 five times at or<br>check" indicator on the Yamaha di<br>time the fuel injector is actuated.           |                                                                                                               |  |
| Proce                | dure                                                                                                                                                                                        | Disco<br>five ti | onnect the fuel pump coupler. Chec<br>mes by listening for the operating                                                     | ck that fuel injector #1 is actuated sound.                                                                   |  |
| Item                 | Probable cause of malfunction and check                                                                                                                                                     |                  | Maintenance job                                                                                                              | Confirmation of service completion                                                                            |  |
| 1                    | Connection of fuel injector #1 coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). |                  | Improperly connected → Connect the coupler securely or replace the wire harness.                                             | Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 6. No operating sound → Go to item 2. |  |
| 2                    | Defective fuel injector #1.                                                                                                                                                                 |                  | Measure the fuel injector resistance. Replace if out of specification. Refer to "CHECKING THE FUEL INJECTORS" on page 8-168. | Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 6. No operating sound → Go to item 3. |  |
| 3                    | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).              |                  | Improperly connected → Connect the coupler securely or replace the wire harness.                                             | Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 6. No operating sound → Go to item 4. |  |

| 4 | Wire harness continuity.                                                        | Open or short circuit → Replace the wire harness.  Between fuel injector coupler and ECU coupler. red/black-red/black Between fuel injector coupler and relay unit coupler. red/blue-red/blue                      | Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 6. No operating sound → Go to item 5. |
|---|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| 5 | Malfunction in ECU.                                                             | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                        |                                                                                                               |
| 6 | Delete the fault code and check that the engine trouble warning light goes off. | Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of "Recovered" using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code. |                                                                                                               |

| -auit code No. Pozoz |                                                                                                                                                                                             |                  |                                                                                                                              |                                                                                                               |  |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--|
| Fault code No.       |                                                                                                                                                                                             | P0202            |                                                                                                                              |                                                                                                               |  |
| Item                 |                                                                                                                                                                                             | Fuel             | injector #2: malfunction in fuel i                                                                                           | injector #2.                                                                                                  |  |
| Fail-e               | afe system                                                                                                                                                                                  | Able             | to start engine (depending on the                                                                                            | number of faulty cylinders)                                                                                   |  |
| i ali-s              | are system                                                                                                                                                                                  | Able             | to drive vehicle (depending on the                                                                                           | number of faulty cylinders)                                                                                   |  |
| Diagn                | ostic code No.                                                                                                                                                                              | 37               |                                                                                                                              |                                                                                                               |  |
| Actua                | ition                                                                                                                                                                                       | The "            | ates fuel injector #2 five times at or<br>check" indicator on the Yamaha di<br>time the fuel injector is actuated.           |                                                                                                               |  |
| Proce                | edure                                                                                                                                                                                       | Disco<br>five ti | onnect the fuel pump coupler. Chec<br>mes by listening for the operating                                                     | ck that fuel injector #2 is actuated sound.                                                                   |  |
| Item                 | Probable cause of malfunction and check                                                                                                                                                     |                  | Maintenance job                                                                                                              | Confirmation of service completion                                                                            |  |
| 1                    | Connection of fuel injector #2 coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). |                  | Improperly connected → Connect the coupler securely or replace the wire harness.                                             | Execute the diagnostic mode. (Code No. 37) Operating sound → Go to item 7. No operating sound → Go to item 2. |  |
| 2                    | Defective fuel injector #2.                                                                                                                                                                 |                  | Measure the fuel injector resistance. Replace if out of specification. Refer to "CHECKING THE FUEL INJECTORS" on page 8-168. | Execute the diagnostic mode. (Code No. 37) Operating sound → Go to item 7. No operating sound → Go to item 3. |  |
| 3                    | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).              |                  | Improperly connected → Connect the coupler securely or replace the wire harness.                                             | Execute the diagnostic mode. (Code No. 37) Operating sound → Go to item 7. No operating sound → Go to item 4. |  |

| 4 | Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the sub-wire harness.                                                                                                                                                                                                                            | Execute the diagnostic mode. (Code No. 37) Operating sound → Go to item 7. No operating sound → Go to item 5. |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| 5 | Wire harness continuity.                                                                                                                                                                    | Open or short circuit → Replace the wire harness.  Between fuel injector coupler and sub-wire harness coupler. green/black—green/black red/blue—red/blue  Between sub-wire harness coupler and ECU coupler. green/black—green/black  Between sub-wire harness coupler and relay unit coupler. red/blue—red/blue | Execute the diagnostic mode. (Code No. 37) Operating sound → Go to item 7. No operating sound → Go to item 6. |
| 6 | Malfunction in ECU.                                                                                                                                                                         | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                     |                                                                                                               |
| 7 | Delete the fault code and check<br>that the engine trouble warning<br>light goes off.                                                                                                       | Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of "Recovered" using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code.                                                                                              |                                                                                                               |

|                     | auit code No. F0203                                                                                                                                                                         |                                                                                                                                                                             |                                                                                  |                                                                                                               |  |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--|
| Fault code No.      |                                                                                                                                                                                             | P0203                                                                                                                                                                       |                                                                                  |                                                                                                               |  |
| Item                |                                                                                                                                                                                             | Fuel                                                                                                                                                                        | injector #3: malfunction in fuel i                                               | njector #3.                                                                                                   |  |
| Fall and acceptance |                                                                                                                                                                                             | Able                                                                                                                                                                        | to start engine (depending on the                                                | number of faulty cylinders)                                                                                   |  |
| raii-s              | afe system                                                                                                                                                                                  | Able                                                                                                                                                                        | to drive vehicle (depending on the                                               | number of faulty cylinders)                                                                                   |  |
| Diagn               | ostic code No.                                                                                                                                                                              | 38                                                                                                                                                                          |                                                                                  |                                                                                                               |  |
| Actuation           |                                                                                                                                                                                             | Actuates Fuel injector #3 five times at one-second intervals.  The "check" indicator on the Yamaha diagnostic tool screen comes on each time the fuel injector is actuated. |                                                                                  |                                                                                                               |  |
| Proce               | edure                                                                                                                                                                                       | Disconnect the fuel pump coupler. Check that fuel injector #3 is actuated five times by listening for the operating sound.                                                  |                                                                                  |                                                                                                               |  |
| Item                | Probable cause of malfe                                                                                                                                                                     | unc-                                                                                                                                                                        | Maintenance job                                                                  | Confirmation of service completion                                                                            |  |
| 1                   | Connection of Fuel injector #3 coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). |                                                                                                                                                                             | Improperly connected → Connect the coupler securely or replace the wire harness. | Execute the diagnostic mode. (Code No. 38) Operating sound → Go to item 6. No operating sound → Go to item 2. |  |

| 2 | Defective Fuel injector #3.                                                                                                                                                    | Measure the fuel injector resistance. Replace if out of specification. Refer to "CHECKING THE FUEL INJECTORS" on page 8-168.                                                                                       | Execute the diagnostic mode. (Code No. 38) Operating sound → Go to item 6. No operating sound → Go to item 3. |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| 3 | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                   | Execute the diagnostic mode. (Code No. 38) Operating sound → Go to item 6. No operating sound → Go to item 4. |
| 4 | Wire harness continuity.                                                                                                                                                       | Open or short circuit → Replace the wire harness.  Between fuel injector coupler and ECU coupler. blue/black-blue/black Between fuel injector coupler and relay unit coupler. red/blue-red/blue                    | Execute the diagnostic mode. (Code No. 38) Operating sound → Go to item 6. No operating sound → Go to item 5. |
| 5 | Malfunction in ECU.                                                                                                                                                            | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                        |                                                                                                               |
| 6 | Delete the fault code and check that the engine trouble warning light goes off.                                                                                                | Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of "Recovered" using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code. |                                                                                                               |

| Fault code No.      |                                                                                                                                                                                   | P0335                                                                                           |                                                                                  |                                                                                                                                                                                                                                      |  |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item                |                                                                                                                                                                                   | Crankshaft position sensor: no normal signals are received from the crankshaft position sensor. |                                                                                  |                                                                                                                                                                                                                                      |  |
| Fail-e              | afe system                                                                                                                                                                        | Unab                                                                                            | le to start engine                                                               |                                                                                                                                                                                                                                      |  |
| i ali-3             | are system                                                                                                                                                                        | Unab                                                                                            | le to drive vehicle                                                              |                                                                                                                                                                                                                                      |  |
| Diagnostic code No. |                                                                                                                                                                                   | _                                                                                               |                                                                                  |                                                                                                                                                                                                                                      |  |
| Tool display        |                                                                                                                                                                                   | _                                                                                               |                                                                                  |                                                                                                                                                                                                                                      |  |
| Proce               | edure                                                                                                                                                                             | _                                                                                               |                                                                                  |                                                                                                                                                                                                                                      |  |
| Item                | m Probable cause of malfunction and check                                                                                                                                         |                                                                                                 | Maintenance job                                                                  | Confirmation of service completion                                                                                                                                                                                                   |  |
| 1                   | Connection of crankshaft prion sensor coupler. Check the locking condition the coupler. Disconnect the coupler and check the pins (bent or brotherminals and locking conditions). | n of<br>d<br>oken                                                                               | Improperly connected → Connect the coupler securely or replace the wire harness. | Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 2. |  |

| 2 | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).          | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                                             | Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 3. |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Wire harness continuity.                                                                                                                                                                | Open or short circuit → Replace the wire harness. Between crankshaft position sensor coupler and ECU coupler. gray-gray Between crankshaft position sensor coupler and joint connector. black/blue-black/blue Between joint connector and ECU coupler. black/blue-black/blue | Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 4. |
| 4 | Installed condition of crankshaft position sensor. Check for looseness or pinching. Check the gap (0.85 mm (0.0335 in)) between the crankshaft position sensor and the generator rotor. | Improperly installed sensor → Reinstall or replace the sensor. Refer to "GENERATOR AND STARTER CLUTCH" on page 5-29.                                                                                                                                                         | Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 5. |
| 5 | Defective crankshaft position sensor.                                                                                                                                                   | Check the crankshaft position<br>sensor.<br>Refer to "CHECKING THE<br>CRANKSHAFT POSITION<br>SENSOR" on page 8-159.<br>Replace if defective.                                                                                                                                 | Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 6. |
| 6 | Malfunction in ECU.                                                                                                                                                                     | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                  | Service is finished.                                                                                                                                                                                                                 |
| 7 | Delete the fault code and check that the engine trouble warning light goes off.                                                                                                         | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                                                 |                                                                                                                                                                                                                                      |

| Fault code No. P0351 |                                                                                                                 |  |  |
|----------------------|-----------------------------------------------------------------------------------------------------------------|--|--|
| Item                 | Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil. |  |  |
| Fail-safe system     | Able to start engine (depending on the number of faulty cylinders)                                              |  |  |
| rail-sale system     | Able to drive vehicle (depending on the number of faulty cylinders)                                             |  |  |
| Diagnostic code No.  | 30                                                                                                              |  |  |

| Actuation The "c |                                                                                                                                                                                       | uates the cylinder-#1 ignition coil five times at one-second intervals. "check" indicator on the Yamaha diagnostic tool screen comes on h time the ignition coil is actuated. |                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                        |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Proce            | dure                                                                                                                                                                                  | Chec<br>• Cor                                                                                                                                                                 | k that a spark is generated five tim<br>nect an ignition checker.                                                                                                                                                              | es.                                                                                                                                                                                                                                                                    |
| Item             | Probable cause of malfution and check                                                                                                                                                 | unc-                                                                                                                                                                          | Maintenance job                                                                                                                                                                                                                | Confirmation of service completion                                                                                                                                                                                                                                     |
| 1                | Connection of cylinder-#1 ition coil coupler. Check the locking condition the coupler. Disconnect the coupler and check the pins (bent or broterminals and locking cond of the pins). | n of<br>d<br>ken                                                                                                                                                              | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                               | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 2. |
| 2                | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).        |                                                                                                                                                                               | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                               | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 3.  |
| 3                | Wire harness continuity.                                                                                                                                                              |                                                                                                                                                                               | Open or short circuit → Replace the wire harness.  Between cylinder-#1 ignition coil coupler and ECU coupler. orange—orange Between cylinder-#1 ignition coil coupler and right handlebar switch coupler.  red/black—red/black | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 4.  |
| 4                | Installed condition of cylinder-#1 ignition coil.                                                                                                                                     |                                                                                                                                                                               | Check for looseness or pinching. Improperly installed ignition coil → Reinstall or replace the ignition coil.                                                                                                                  | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5.  |
| 5                | Defective cylinder-#1 ignition coil.                                                                                                                                                  | on                                                                                                                                                                            | Measure the primary coil resistance of the cylinder-#1 ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 8-158.                                                                   | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 6. |

| 6 | Malfunction in ECU.                                                                   | Execute the diagnostic mode. (Code No. 30)  No spark → Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152. | Service is finished. |
|---|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 7 | Delete the fault code and check<br>that the engine trouble warning<br>light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.              |                      |

| Fault  | code No.                                                                                                                                                                             | P035              | P0352                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                        |  |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item   |                                                                                                                                                                                      |                   | Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.                                                                                                                   |                                                                                                                                                                                                                                                                        |  |
| Foil o | ofo ovotom                                                                                                                                                                           | Able              | to start engine (depending on the                                                                                                                                                                                                 | number of faulty cylinders)                                                                                                                                                                                                                                            |  |
| raii-5 | afe system                                                                                                                                                                           | Able              | to drive vehicle (depending on the                                                                                                                                                                                                | number of faulty cylinders)                                                                                                                                                                                                                                            |  |
| Diagn  | ostic code No.                                                                                                                                                                       | 31                |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                        |  |
| Actua  | ation                                                                                                                                                                                | The "             | ates the cylinder-#2 ignition coil five<br>check" indicator on the Yamaha di<br>time the ignition coil is actuated.                                                                                                               | e times at one-second intervals.<br>agnostic tool screen comes on                                                                                                                                                                                                      |  |
| Proce  | edure                                                                                                                                                                                | Chec<br>• Cor     | k that a spark is generated five tim<br>nect an ignition checker.                                                                                                                                                                 | nes.                                                                                                                                                                                                                                                                   |  |
| Item   | Probable cause of malfe tion and check                                                                                                                                               | unc-              | Maintenance job                                                                                                                                                                                                                   | Confirmation of service completion                                                                                                                                                                                                                                     |  |
| 1      | Connection of cylinder-#2 tion coil coupler. Check the locking condition the coupler. Disconnect the coupler and check the pins (bent or broterminals and locking cond of the pins). | n of<br>d<br>oken | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                  | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 2. |  |
| 2      | Connection of ECU couple Check the locking condition the coupler. Disconnect the coupler and check the pins (bent or broterminals and locking cond of the pins).                     | n of<br>d<br>oken | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                  | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 3. |  |
| 3      | Wire harness continuity.                                                                                                                                                             |                   | Open or short circuit → Replace the wire harness.  Between cylinder-#2 ignition coil coupler and ECU coupler. gray/red—gray/red Between cylinder-#2 ignition coil coupler and right handlebar switch coupler. red/black—red/black | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 4. |  |

| 4 | Installed condition of cylinder-#2 ignition coil.                               | Check for looseness or pinching. Improperly installed ignition coil → Reinstall or replace the ignition coil.                                                | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5. |
|---|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | Defective cylinder-#2 ignition coil.                                            | Measure the primary coil resistance of the cylinder-#2 ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 8-158. | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 6. |
| 6 | Malfunction in ECU.                                                             | Execute the diagnostic mode.<br>(Code No. 31)<br>No spark → Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.      | Service is finished.                                                                                                                                                                                                                                                  |
| 7 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                 |                                                                                                                                                                                                                                                                       |

| Fault code No.   |                                                                                                                                                                                            | P0353                                                                                                                                                                                   |                                                                                  |                                                                                                                                                                                                                                                                       |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item             |                                                                                                                                                                                            | Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.                                                                         |                                                                                  |                                                                                                                                                                                                                                                                       |
| Fail-safe system |                                                                                                                                                                                            | Able                                                                                                                                                                                    | to start engine (depending on the                                                | number of faulty cylinders)                                                                                                                                                                                                                                           |
| i ali-s          | ale system                                                                                                                                                                                 | Able                                                                                                                                                                                    | to drive vehicle (depending on the                                               | number of faulty cylinders)                                                                                                                                                                                                                                           |
| Diagr            | ostic code No.                                                                                                                                                                             | 32                                                                                                                                                                                      |                                                                                  |                                                                                                                                                                                                                                                                       |
| Actuation        |                                                                                                                                                                                            | Actuates the cylinder-#3 ignition coil five times at one-second intervals. The "check" indicator on the Yamaha diagnostic tool screen comes on each time the ignition coil is actuated. |                                                                                  |                                                                                                                                                                                                                                                                       |
| Proce            | edure                                                                                                                                                                                      | Check that a spark is generated five times.  • Connect an ignition checker.                                                                                                             |                                                                                  |                                                                                                                                                                                                                                                                       |
| Item             | Probable cause of malfe                                                                                                                                                                    | unc-                                                                                                                                                                                    | Maintenance job                                                                  | Confirmation of service completion                                                                                                                                                                                                                                    |
| 1                | Connection of cylinder-#3 tion coil coupler. Check the locking condition the coupler. Disconnect the coupler and check the pins (bent or brotherminals and locking condition of the pins). | n of<br>d<br>oken                                                                                                                                                                       | Improperly connected → Connect the coupler securely or replace the wire harness. | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 2. |

| 2 | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                            | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 3.  |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Wire harness continuity.                                                                                                                                                       | Open or short circuit → Replace the wire harness.  Between cylinder-#3 ignition coil coupler and ECU coupler. orange/green—orange/green  Between cylinder-#3 ignition coil coupler and right handlebar switch coupler.  red/black—red/black | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 4.  |
| 4 | Installed condition of cylinder-#3 ignition coil.                                                                                                                              | Check for looseness or pinching. Improperly installed ignition coil → Reinstall or replace the ignition coil.                                                                                                                               | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5.  |
| 5 | Defective cylinder-#3 ignition coil.                                                                                                                                           | Measure the primary coil resistance of the cylinder-#3 ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 8-158.                                                                                | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 6. |
| 6 | Malfunction in ECU.                                                                                                                                                            | Execute the diagnostic mode. (Code No. 32) No spark → Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.                                                                                                    | Service is finished.                                                                                                                                                                                                                                                   |
| 7 | Delete the fault code and check that the engine trouble warning light goes off.                                                                                                | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                |                                                                                                                                                                                                                                                                        |

| Fault code No. | P050 | 0                                                                             |
|----------------|------|-------------------------------------------------------------------------------|
|                | A    | Rear wheel sensor: no normal signals are received from the rear wheel sensor. |
| Item           | В    | Gear position switch: open or short circuit is detected.                      |
|                | С    | Clutch switch: open or short circuit is detected.                             |

|                        |                                                                                                                                                                                              | Able              | to start engine                                                                                                                                                    |                                                                                                                                                                                                    |  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Fail-s                 | afe system                                                                                                                                                                                   | Able              | to drive vehicle                                                                                                                                                   |                                                                                                                                                                                                    |  |
| Diagnostic code No. 07 |                                                                                                                                                                                              | 07                | ,                                                                                                                                                                  |                                                                                                                                                                                                    |  |
| Tool o                 | Tool display Re                                                                                                                                                                              |                   | wheel speed pulse<br>9                                                                                                                                             |                                                                                                                                                                                                    |  |
| Proce                  | dure                                                                                                                                                                                         |                   | k that the number increases when<br>er is cumulative and does not rese                                                                                             |                                                                                                                                                                                                    |  |
| Item                   | Probable cause of malfe                                                                                                                                                                      | unc-              | Maintenance job                                                                                                                                                    | Confirmation of service completion                                                                                                                                                                 |  |
| A-1                    | A-1 Locate the malfunction.                                                                                                                                                                  |                   | Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.  Execute the diagnostic mode. (Code No. 21) | Value does not increase → Go to item A-2.  Incorrect indication → Go to item B-2 for the gear position                                                                                             |  |
|                        |                                                                                                                                                                                              |                   | When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF"                                                   | switch.                                                                                                                                                                                            |  |
|                        |                                                                                                                                                                                              |                   | When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: "ON"                                                                  | Incorrect indication → Go to item C-2 for the clutch switch.                                                                                                                                       |  |
| A-2                    | Connection of rear wheel sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). |                   | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                   | Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-8. Value does not increase → Go to item A-3. |  |
| A-3                    | Connection of ABS ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).           |                   | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                   | Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-8. Value does not increase → Go to item A-4. |  |
| A-4                    | Connection of ECU couple<br>Check the locking condition<br>the coupler.<br>Disconnect the coupler and<br>check the pins (bent or broaterminals and locking cond<br>of the pins).             | n of<br>d<br>oken | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                   | Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-8. Value does not increase → Go to item A-5. |  |

| A-5 | Rear wheel sensor lead continuity, or defective rear wheel sensor.              | Open or short circuit, or defective sensor → Replace the rear wheel sensor.  Between rear wheel sensor coupler and ABS ECU coupler.  black-black white-white Between ABS ECU coupler and ECU coupler. white/yellow-white/yellow                                                                                                                                                                             | Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-8. Value does not increase → Go to item A-6. |
|-----|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A-6 | Malfunction in ECU.                                                             | Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.                                                                                                                                                                                                                                                                                                                          | Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases                                                             |
| A-7 | Malfunction in ABS ECU.                                                         | Replace the ABS ECU.                                                                                                                                                                                                                                                                                                                                                                                        | Go to item A-8.                                                                                                                                                                                    |
| A-8 | Delete the fault code and check that the engine trouble warning light goes off. | Turn the main switch to "ON", and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph). Confirm that the fault code has a condition of "Recovered" using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code. Delete this fault code even if it has a condition of "Detected". |                                                                                                                                                                                                    |

| Fault code No. |                         | P0500                                                                                                                                       |                                                                               |                                    |  |
|----------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------|--|
|                |                         | A                                                                                                                                           | Rear wheel sensor: no normal signals are received from the rear wheel sensor. |                                    |  |
| Item           |                         | В                                                                                                                                           | Gear position switch: open or short circuit is detected.                      |                                    |  |
|                |                         | С                                                                                                                                           | Clutch switch: open or short ci                                               | rcuit is detected.                 |  |
| Eail-c         | Fail-safe system        |                                                                                                                                             | Able to start engine                                                          |                                    |  |
| i ali-s        | ale system              | Able to drive vehicle                                                                                                                       |                                                                               |                                    |  |
| Diagn          | nostic code No.         | 21                                                                                                                                          |                                                                               |                                    |  |
| Tool display   |                         | Gear position switch  • "ON" (when the transmission is in neutral)  • "OFF" (when the transmission is in gear or the clutch lever released) |                                                                               |                                    |  |
| Procedure      |                         | Operate the transmission and clutch lever.                                                                                                  |                                                                               |                                    |  |
| Item           | Probable cause of malfe | unc-                                                                                                                                        | Maintenance job                                                               | Confirmation of service completion |  |

| B-1 | Locate the malfunction.                                                                                                                                                                         | Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.                                                                                   | Value does not increase → Go to item A-2 for the rear wheel sensor.                                                                                                                                                                     |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                                                                                                 | Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF"                                              | Incorrect indication → Go to item B-2.                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                 | When the transmission is in gear with the clutch lever squeezed and the sidestand is retracted: "ON"                                                                                                     | Incorrect indication → Go to item C-2 for the clutch switch.                                                                                                                                                                            |
| B-2 | Connection of gear position switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                         | Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-3. |
| B-3 | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).                  | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                         | Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-4. |
| B-4 | Wire harness continuity.                                                                                                                                                                        | Open or short circuit → Replace the wire harness.  Between relay unit coupler and gear position switch coupler. sky blue—sky blue  Between relay unit coupler and ECU coupler. black/yellow—black/yellow | Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-5. |
| B-5 | Defective relay unit.                                                                                                                                                                           | Check the relay unit. Replace if defective. Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-157.                                                                                                    | Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-6. |

| B-6 | Defective gear position switch.                                                 | Check the gear position switch.<br>Replace if defective.<br>Refer to "CHECKING THE<br>GEAR POSITION SWITCH" on<br>page 8-167.                                                                                                                                                                                                                                                                               | Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-7. |
|-----|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B-7 | Faulty shift drum (neutral detection area).                                     | Malfunction → Replace the shift<br>drum.<br>Refer to "TRANSMISSION" on<br>page 5-77.                                                                                                                                                                                                                                                                                                                        | Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-8. |
| B-8 | Malfunction in ECU.                                                             | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                                                                                                                 | Service is finished.                                                                                                                                                                                                                    |
| B-9 | Delete the fault code and check that the engine trouble warning light goes off. | Turn the main switch to "ON", and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph). Confirm that the fault code has a condition of "Recovered" using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code. Delete this fault code even if it has a condition of "Detected". |                                                                                                                                                                                                                                         |

| Fault code No.   |                                       | P0500                                                  |                                                                                                                                                    |                                    |
|------------------|---------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
|                  |                                       | A                                                      | Rear wheel sensor: no normal signals are received from the rear wheel sensor.                                                                      |                                    |
| Item             |                                       | В                                                      | Gear position switch: open or s                                                                                                                    | short circuit is detected.         |
|                  |                                       | С                                                      | Clutch switch: open or short circuit is detected.                                                                                                  |                                    |
| Fail-safe system |                                       | Able to start engine                                   |                                                                                                                                                    |                                    |
| i ali-sa         | ne system                             | Able to drive vehicle                                  |                                                                                                                                                    |                                    |
| Diagno           | ostic code No.                        | 21                                                     |                                                                                                                                                    |                                    |
| Tool display     |                                       | • "ON and • "OF                                        | h switch I" (when the clutch lever is squeeze when the sidestand is retracted) F" (when the clutch lever is squees when the sidestand is extended) | <b>G</b>                           |
| Procedure        |                                       | Operate the transmission, clutch lever, and sidestand. |                                                                                                                                                    |                                    |
| Item             | Probable cause of malfution and check | unc-                                                   | Maintenance job                                                                                                                                    | Confirmation of service completion |

| C-1 | Locate the malfunction.                                                                                                                                                                  | Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.                                      | Value does not increase → Go to item A-2 for the rear wheel sensor.                                                                                                                                                                                                                                                                        |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                                                                                          | Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" | Incorrect indication → Go to item B-2 for the gear position switch.                                                                                                                                                                                                                                                                        |
|     |                                                                                                                                                                                          | When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: "ON"                                                           | Incorrect indication $\rightarrow$ Go to item C-2.                                                                                                                                                                                                                                                                                         |
| C-2 | Clutch lever adjustment.                                                                                                                                                                 | Refer to "ADJUSTING THE<br>CLUTCH LEVER FREE PLAY"<br>on page 3-11.                                                                                         | Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: "OFF" When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: "ON" Correct indication→ Go to item C-8. Incorrect indication → Go to item C-3. |
| C-3 | Connection of clutch switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                            | Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: "OFF" When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: "ON" Correct indication→ Go to item C-8. Incorrect indication → Go to item C-4. |
| C-4 | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).           | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                            | Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: "OFF" When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: "ON" Correct indication→ Go to item C-8. Incorrect indication → Go to item C-5. |

| C-5 | Wire harness continuity.                                                        | Open or short circuit → Replace the wire harness.  Between clutch switch coupler and left handlebar switch coupler.  black/red-black/red black/yellow-black/yellow Between left handlebar switch coupler and relay unit coupler.  black/red-black/red black/yellow-black/yellow Between relay unit coupler and ECU coupler.  black/red-black/red black/red-black/red black/yellow-black/yellow              | Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: "OFF" When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: "ON" Correct indication→ Go to item C-8. Incorrect indication → Go to item C-6. |
|-----|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C-6 | Defective clutch switch.                                                        | Check the clutch switch. Replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-147.                                                                                                                                                                                                                                                                                                              | Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: "OFF" When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: "ON" Correct indication→ Go to item C-8. Incorrect indication → Go to item C-7. |
| C-7 | Malfunction in ECU.                                                             | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                                                                                                                 | Service is finished.                                                                                                                                                                                                                                                                                                                       |
| C-8 | Delete the fault code and check that the engine trouble warning light goes off. | Turn the main switch to "ON", and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph). Confirm that the fault code has a condition of "Recovered" using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code. Delete this fault code even if it has a condition of "Detected". |                                                                                                                                                                                                                                                                                                                                            |

| Fault               | code No.                                  | P056                          | 0                     |                                    |  |
|---------------------|-------------------------------------------|-------------------------------|-----------------------|------------------------------------|--|
| Item                |                                           | Charging voltage is abnormal. |                       |                                    |  |
| Fail and acceptance |                                           | Able to start engine          |                       |                                    |  |
| raii-Si             | Fail-safe system                          |                               | Able to drive vehicle |                                    |  |
| Diagn               | Diagnostic code No.                       |                               | _                     |                                    |  |
| Tool o              | Tool display                              |                               | _                     |                                    |  |
| Procedure           |                                           | _                             |                       |                                    |  |
| Item                | Probable cause of malfe<br>tion and check | unc-                          | Maintenance job       | Confirmation of service completion |  |

| 1 | Malfunction in charging system.                                                 | Check the charging system. Refer to "CHARGING SYSTEM" on page 8-13. Defective rectifier/regulator or AC magneto → Replace. Defective connection in the charging system circuit → Properly connect or replace the wire harness. | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 2 and finish the service. Condition is "Detected" → Repeat item 1. |
|---|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                   |                                                                                                                                                                                                                                                                        |

#### Fault code No. P0601, P0606

| Fault               | code No.               | P0601, P0606                                                                                                                             |                                                                                             |                                                                                                   |  |
|---------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--|
| Item                |                        | Internal malfunction in ECU. (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.) |                                                                                             |                                                                                                   |  |
| Eail₋e              | afe system             | Able/                                                                                                                                    | Unable to start engine                                                                      |                                                                                                   |  |
| raii-s              | ale system             | Able/Unable to drive vehicle                                                                                                             |                                                                                             |                                                                                                   |  |
| Diagnostic code No. |                        | _                                                                                                                                        |                                                                                             |                                                                                                   |  |
| Tool display —      |                        | _                                                                                                                                        | _                                                                                           |                                                                                                   |  |
| Proce               | edure                  | _                                                                                                                                        |                                                                                             |                                                                                                   |  |
| Item                | Probable cause of malf | unc-                                                                                                                                     | Maintenance job                                                                             | Confirmation of service completion                                                                |  |
| 1                   | Malfunction in ECU.    |                                                                                                                                          | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152. | Turn the main switch to "ON".<br>Check that the engine trouble<br>warning light does not come on. |  |

#### Fault code No. P062F

| Fault                                                                       | code No.                       | P062                                                                                                                                                                                                                                                                                 | P062F                                                                                          |                                    |  |
|-----------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------|--|
| Item                                                                        |                                |                                                                                                                                                                                                                                                                                      | EEPROM fault code number: an error is detected while reading or writing on EEPROM.             |                                    |  |
| Fail-e                                                                      | Fail and acceptant             |                                                                                                                                                                                                                                                                                      | Unable to start engine                                                                         |                                    |  |
| raii-se                                                                     | afe system                     | Able/                                                                                                                                                                                                                                                                                | Unable to drive vehicle                                                                        |                                    |  |
| Diagn                                                                       | ostic code No.                 | 60                                                                                                                                                                                                                                                                                   | 60                                                                                             |                                    |  |
| Tool display  Tool display  00  • No cate 01–0  • (If n sec nun 11 (D 12 (C |                                | malfunctions detected (If the self-ded, the ECU is defective.)  3 (CO adjustment value) nore than one cylinder is defective, onds to show all the detected cylin bers are shown, the display repeatate error for ISC (idle speed control 2 feedback learning value) BD memory value) | , the display alternates every two<br>der numbers. When all cylinder<br>ats the same process.) |                                    |  |
| Proce                                                                       | Procedure                      |                                                                                                                                                                                                                                                                                      |                                                                                                |                                    |  |
| Item                                                                        | Probable cause of tion and che |                                                                                                                                                                                                                                                                                      | Maintenance job                                                                                | Confirmation of service completion |  |

|   |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                            | -                                                                                                                                                                                                                                                                                                |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Locate the malfunction                                                                                                                                                                                                                                                                                                                      | Execute the diagnostic mode. (Code No. 60) 00: Go to item 7. 01: Go to item 2. 02: Go to item 3. 03: Go to item 4. 11–13: go to item 5.                                                    |                                                                                                                                                                                                                                                                                                  |
| 2 | "01" is indicated in diagnostic mode (code No. 60). EEPROM data error for adjustment of CO concentration of cylinder #1.                                                                                                                                                                                                                    | Change the CO concentration of cylinder #1, and rewrite in EEPROM. Refer to "ADJUSTING THE EXHAUST GAS VOLUME" on page 3-10. After this adjustment is made, turn the main switch to "OFF". | Set the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Repeat item 1.  If the same number is indicated, go to item 6. |
| 3 | "02" is indicated in diagnostic mode (code No. 60). EEPROM data error for adjustment of CO concentration of cylinder #2.                                                                                                                                                                                                                    | Change the CO concentration of cylinder #2, and rewrite in EEPROM. Refer to "ADJUSTING THE EXHAUST GAS VOLUME" on page 3-10. After this adjustment is made, turn the main switch to "OFF". | Set the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Repeat item 1.  If the same number is indicated, go to item 6. |
| 4 | "03" is indicated in diagnostic mode (code No. 60). EEPROM data error for adjustment of CO concentration of cylinder #3.                                                                                                                                                                                                                    | Change the CO concentration of cylinder #3, and rewrite in EEPROM. Refer to "ADJUSTING THE EXHAUST GAS VOLUME" on page 3-10. After this adjustment is made, turn the main switch to "OFF". | Set the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Repeat item 1.  If the same number is indicated, go to item 6. |
| 5 | "11" is indicated in diagnostic mode (code No. 60). EEPROM data error for ISC (idle speed control) learning values. "12" is indicated in the diagnostic mode. (Code No. 60) EEPROM data error for O <sub>2</sub> feedback learning values. "13" is indicated in the diagnostic mode. (Code No. 60) EEPROM data error for OBD memory values. | Turn the main switch to "OFF".                                                                                                                                                             | Set the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Repeat item 1. If the same number is indicated, go to item 6.    |
| 6 | Malfunction in ECU.                                                                                                                                                                                                                                                                                                                         | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                | Service is finished.                                                                                                                                                                                                                                                                             |
| 7 | Delete the fault code and check that the engine trouble warning light goes off.                                                                                                                                                                                                                                                             | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                               |                                                                                                                                                                                                                                                                                                  |

| Fault  | code No.                                                                                                                                                                                        | P063                                      | 8                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                  |  |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item   |                                                                                                                                                                                                 | YCC-T drive system: malfunction detected. |                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                  |  |
| F-:: - | Fail and acceptant                                                                                                                                                                              |                                           | Able/Unable to start engine                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                  |  |
| Faii-s | Fail-safe system                                                                                                                                                                                |                                           | Unable to drive vehicle                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                  |  |
| Diagr  | nostic code No.                                                                                                                                                                                 |                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                  |  |
| Tool   | display                                                                                                                                                                                         | _                                         |                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                  |  |
| Proce  | edure                                                                                                                                                                                           | _                                         |                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                  |  |
| Item   | Probable cause of malfunction and che                                                                                                                                                           | ck                                        | Maintenance job                                                                                                                                                                                                                                  | Confirmation of service completion                                                                                                                                                                                                               |  |
| 1      | Connection of throttle servo motor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). |                                           | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                 | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 2. |  |
| 2      | Connection of wire harness ECU coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).                                                 |                                           | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                 | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 3. |  |
| 3      | Check the electronic throttle valve fuse.                                                                                                                                                       |                                           | Blown fuse → Replace the electronic throttle valve fuse.                                                                                                                                                                                         | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 4. |  |
| 4      | Wire harness continuity.                                                                                                                                                                        |                                           | Open or short circuit → Replace the wire harness.  Between throttle servo motor coupler and ECU coupler. yellow/red-yellow/red yellow/white-yellow/white Between ECU coupler and fuse box (electronic throttle valve fuse).  red/white-red/white | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 5. |  |
| 5      | Defective throttle servo mo                                                                                                                                                                     | otor.                                     | Check the throttle servo motor. Replace the throttle bodies if defective. Refer to "CHECKING THE THROTTLE SERVO MOTOR" on page 8-165.                                                                                                            | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 6. |  |

| 6 | Defective throttle bodies.                                                      | Check the throttle bodies. Replace if defective. Refer to "CHECKING THE THROTTLE SERVO MOTOR" on page 8-165.                 | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 7. |
|---|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | Malfunction in ECU.                                                             | Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.                                           | Service is finished.                                                                                                                                                                                                                             |
| 8 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. |                                                                                                                                                                                                                                                  |

| Fault  | code No.                                                                                                                                                                              | P065                                                                                                                                                            | 7                                                                                |                                                                                                                                                                                                                                                                       |  |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item   |                                                                                                                                                                                       | Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.                                                                             |                                                                                  |                                                                                                                                                                                                                                                                       |  |
| Fail a | oofe avatem                                                                                                                                                                           | Able                                                                                                                                                            | to start engine                                                                  |                                                                                                                                                                                                                                                                       |  |
| raii-s | Fail-safe system                                                                                                                                                                      |                                                                                                                                                                 | to drive vehicle                                                                 |                                                                                                                                                                                                                                                                       |  |
| Diagr  | nostic code No.                                                                                                                                                                       | 09, 5                                                                                                                                                           | 0                                                                                |                                                                                                                                                                                                                                                                       |  |
|        | Tool display                                                                                                                                                                          |                                                                                                                                                                 | system voltage (battery voltage)<br>oximately 12.0                               |                                                                                                                                                                                                                                                                       |  |
| 09     | Procedure                                                                                                                                                                             | Set the start/engine stop switch to "()", measured battery voltage with the tool c sured battery voltage is low, recharge the                                   |                                                                                  | display value. (If the actually mea-                                                                                                                                                                                                                                  |  |
| 50     | Actuation                                                                                                                                                                             | Actuates the relay unit five times at one-second intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the relay is actuated. |                                                                                  |                                                                                                                                                                                                                                                                       |  |
|        | Procedure                                                                                                                                                                             | Check that the relay unit is actuated five times by listening for thing sound.                                                                                  |                                                                                  |                                                                                                                                                                                                                                                                       |  |
| Item   | Probable cause of malf tion and check                                                                                                                                                 | unc-                                                                                                                                                            | Maintenance job                                                                  | Confirmation of service completion                                                                                                                                                                                                                                    |  |
| 1      | Connection of relay unit coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). |                                                                                                                                                                 | Improperly connected → Connect the coupler securely or replace the wire harness. | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 2. |  |

| 2 | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                                                                   | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 3. |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Wire harness continuity.                                                                                                                                                       | Open or short circuit → Replace the wire harness. Between battery and starter relay (fuel injection system fuse). red-red Between starter relay (fuel injection system fuse) and relay unit coupler. red-red Between relay unit coupler and ECU coupler. red/blue-red/blue blue/yellow-blue/yellow | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 4. |
| 4 | Defective relay unit.                                                                                                                                                          | Execute the diagnostic mode. (Code No. 50) No operating sound → Replace the relay unit.                                                                                                                                                                                                            | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5. |
| 5 | Defective relay unit.                                                                                                                                                          | Execute the diagnostic mode. (Code No. 09) Fuel system voltage is below 3 V → Replace the relay unit.                                                                                                                                                                                              | Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 6. |
| 6 | Malfunction in ECU.                                                                                                                                                            | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                        | Service is finished.                                                                                                                                                                                                                                                  |
| 7 | Delete the fault code and check<br>that the engine trouble warning<br>light goes off.                                                                                          | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                                                                       |                                                                                                                                                                                                                                                                       |

| Fault code No.   | P1004                                                                                                                                                                                                   |  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item             | Intake air pressure sensor 1 or intake air pressure sensor 2: when the main switch is turned to "ON", the intake air pressure sensor 1 voltage and intake air pressure sensor 2 voltage differ greatly. |  |
| Fail-safe system | Able to start engine                                                                                                                                                                                    |  |
| Tail-Sale System | Able to drive vehicle                                                                                                                                                                                   |  |

| Diagn |                                                                                 |                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                  |  |  |
|-------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| 03    | Tool display                                                                    | 03, 04  Displays the intake air pressure 1.                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                  |  |  |
|       | Procedure                                                                       | Operate the throttle while pushing the "(s)" side of the start/engine stop switch. (If the display value changes, the performance is OK.) |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                  |  |  |
| 04    | Tool display Displa                                                             |                                                                                                                                           | ays the intake air pressure 2.                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                  |  |  |
|       | Procedure                                                                       | Operate the throttle while pushing the "(s)" side of the start/engine stop switch. (If the display value changes, the performance is OK.) |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                  |  |  |
| Item  | Probable cause of malfunction and check                                         |                                                                                                                                           | Maintenance job                                                                                                                                                                                                                                                                                                                                                                                                                                           | Confirmation of service completion                                                                                                                                                                                                               |  |  |
| 1     | Defective intake air pressure sensor 1.                                         |                                                                                                                                           | Execute the diagnostic mode. (Code No. 03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. 0 m above sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) Displayed value is incorrect → Check the intake air pressure sensor 1. Replace if defective. Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-166. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 4 and finish the service.  Condition is "Detected" → Go to item 2. |  |  |
| 2     | Defective intake air pressure sensor 2.                                         |                                                                                                                                           | Execute the diagnostic mode. (Code No. 04) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. 0 m above sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) Displayed value is incorrect → Check the intake air pressure sensor 2. Replace if defective. Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-166. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 4 and finish the service.  Condition is "Detected" → Go to item 3. |  |  |
| 3     | Malfunction in ECU.                                                             |                                                                                                                                           | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                                                                                                                                                               | Service is finished.                                                                                                                                                                                                                             |  |  |
| 4     | Delete the fault code and check that the engine trouble warning light goes off. |                                                                                                                                           | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                  |  |  |

| Fault code No. P1400 |                                                                                                                                                                                                          |                                                                                                                                                                                                             |                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|                      |                                                                                                                                                                                                          | P1400                                                                                                                                                                                                       |                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
| Item                 |                                                                                                                                                                                                          | Air induction system solenoid: open or short circuit detected.                                                                                                                                              |                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
| Fail-safe system     |                                                                                                                                                                                                          | Able to start engine                                                                                                                                                                                        |                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
|                      |                                                                                                                                                                                                          | Able to drive vehicle                                                                                                                                                                                       |                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
| Diagnostic code No.  |                                                                                                                                                                                                          | 48                                                                                                                                                                                                          |                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
| 48                   | Actuation                                                                                                                                                                                                | Actuates the air induction system solenoid five times at one-second intervals.  The "check" indicator on the Yamaha diagnostic tool screen come on each time the air induction system solenoid is actuated. |                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
|                      | Procedure                                                                                                                                                                                                | Chec<br>tening                                                                                                                                                                                              | that the air induction system solenoid is actuated five times by listor the operating sound. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
| Item                 | Probable cause of malfunction and check                                                                                                                                                                  |                                                                                                                                                                                                             | Maintenance job                                                                              | Confirmation of service completion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |
| 1                    | Connection of air induction system solenoid coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). |                                                                                                                                                                                                             | Improperly connected → Connect the coupler securely or replace the wire harness.             | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Start the engine and check the status of the fault code.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 2.  TIP  Check that the start/engine stop switch is turned to "ON" then. |  |  |
| 2                    | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).                           |                                                                                                                                                                                                             | Improperly connected → Connect the coupler securely or replace the wire harness.             | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Start the engine and check the status of the fault code.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 3.  TIP  Check that the start/engine stop switch is turned to "ON" then.                                                                  |  |  |

| 4 | Defective air induction system solenoid.                                        | Open or short circuit → Replace the wire harness. Between air induction system solenoid coupler and ECU coupler. brown/red—brown/red Between air induction system solenoid coupler and joint connector. red/white—red/white Between joint connector and fuse box. red/white—red/white  Refer to "CHECKING THE AIR INDUCTION SYSTEM SOLENOID" on page 8-166. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Start the engine and check the status of the fault code.  Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 4.  TIP  Check that the start/engine stop switch is turned to "ON" then.  Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Start the engine and check the status of the fault code.  Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 5.  TIP  Check that the start/engine stop switch is turned to "ON" then. |
|---|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | Malfunction in ECU.                                                             | Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.                                                                                                                                                                                                                                                                          | Service is finished.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 6 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

### Fault code No. P1601

| Fault code No.      | P1601                                                                                 |
|---------------------|---------------------------------------------------------------------------------------|
| Item                | Sidestand switch: open or short circuit of the black/red lead of the ECU is detected. |
| Fail-safe system    | Unable to start engine                                                                |
| raii-sale system    | Unable to drive vehicle                                                               |
| Diagnostic code No. | 20                                                                                    |
| Tool display        | Sidestand switch  • "ON" (sidestand retracted)  • "OFF" (sidestand extended)          |
| Procedure           | Extend and retract the sidestand (with the transmission in gear).                     |

| Item | Probable cause of malfunction and check                                                                                                                                                     | Maintenance job                                                                                                                                                                                  | Confirmation of service completion                                                                                                                                                                                                                                               |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Connection of sidestand switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                 | Turn the main switch to "ON", and then extend and retract the sidestand. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 2. |
| 2    | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).              | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                 | Turn the main switch to "ON", and then extend and retract the sidestand. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 3. |
| 3    | Connection of relay unit coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).       | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                 | Turn the main switch to "ON", and then extend and retract the sidestand. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 4. |
| 4    | Wire harness continuity.                                                                                                                                                                    | Open or short circuit → Replace the wire harness. Between relay unit coupler and ECU coupler. black/red-black/red Between relay unit coupler and sidestand switch coupler. blue/black-blue/black | Turn the main switch to "ON", and then extend and retract the sidestand. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5. |
| 5    | Defective sidestand switch.                                                                                                                                                                 | Execute the diagnostic mode. (Code No. 20) Shift the transmission into gear. Sidestand retracted: "ON" Sidestand extended: "OFF" Replace if defective.                                           | Turn the main switch to "ON", and then extend and retract the sidestand. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 6. |
| 6    | Malfunction in ECU.                                                                                                                                                                         | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                      | Service is finished.                                                                                                                                                                                                                                                             |

|  | Delete the fault code and check<br>that the engine trouble warning<br>light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. |  |
|--|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--|
|--|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--|

### Fault code No. P1602

| Fault code No.      | P1602                                                                            |  |  |
|---------------------|----------------------------------------------------------------------------------|--|--|
| Item                | Malfunction in ECU internal circuit (malfunction of ECU power cut-off function). |  |  |
| Foil cofe gyatam    | Able/Unable to start engine                                                      |  |  |
| Fail-safe system    | Able/Unable to drive vehicle                                                     |  |  |
| Diagnostic code No. | _                                                                                |  |  |
| Tool display        | _                                                                                |  |  |
| Procedure           | _                                                                                |  |  |

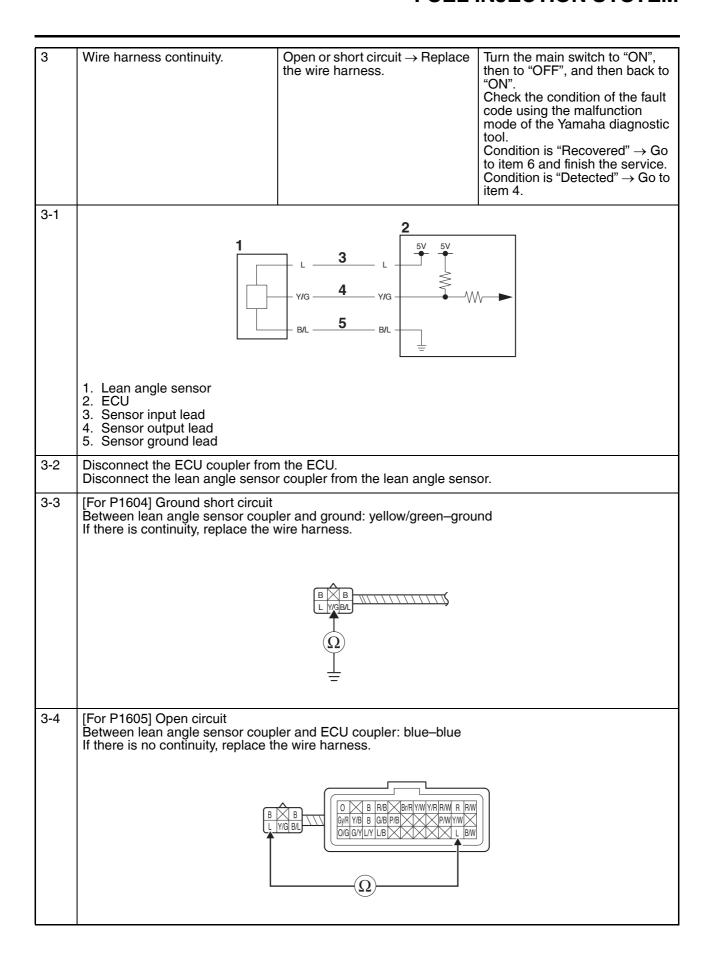
| Item | Probable cause of malfunction and check                                                                                                                                                   | Maintenance job                                                                                   | Confirmation of service completion                                                                                                                                                                                                               |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Installed condition of battery leads. Check the installed condition of the battery and battery leads (loose bolts).                                                                       | Improperly installed battery or battery leads → Reinstall or replace the battery leads.           | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 2. |
| 2    | Connection of starter relay coupler. Check the locking condition of the coupler.  Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                  | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 3. |
| 3    | Check the fuel injection system fuse.                                                                                                                                                     | Blown fuse → Replace the fuse.                                                                    | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 4. |
| 4    | Wire harness continuity between starter relay and ECU coupler.                                                                                                                            | Open or short circuit → Replace the wire harness.  Between starter relay and ECU coupler. red-red | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5.   |

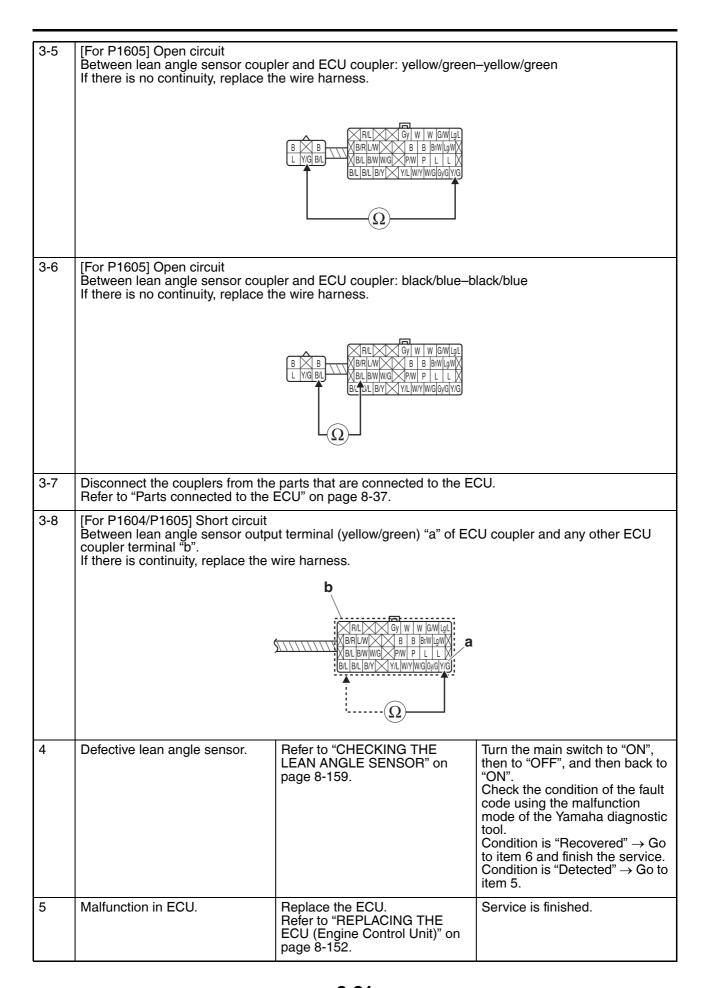
| 5 | Wire harness continuity between starter relay and battery.                      | Open or short circuit → Replace the wire harness.  Between battery terminal and starter relay. red-red                       | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 6. |
|---|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 | Malfunction in ECU.                                                             | Replace the ECU.                                                                                                             | Service is finished.                                                                                                                                                                                                                             |
| 7 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. |                                                                                                                                                                                                                                                  |

### **Fault code No. P1604, P1605**

| Fault code No.      | P1604, P1605  [P1604] Lean angle sensor: ground short circuit detected. [P1605] Lean angle sensor: open or power short circuit. |  |  |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------|--|--|
| Item                |                                                                                                                                 |  |  |
| Cail aafa ayatam    | Unable to start engine                                                                                                          |  |  |
| Fail-safe system    | Unable to drive vehicle                                                                                                         |  |  |
| Diagnostic code No. | 08                                                                                                                              |  |  |
| Tool display        | Lean angle sensor output voltage  • 0.4–1.4 (upright)  • 3.7–4.4 (overturned)                                                   |  |  |
| Procedure           | Remove the lean angle sensor and incline it more than 65 degrees.                                                               |  |  |

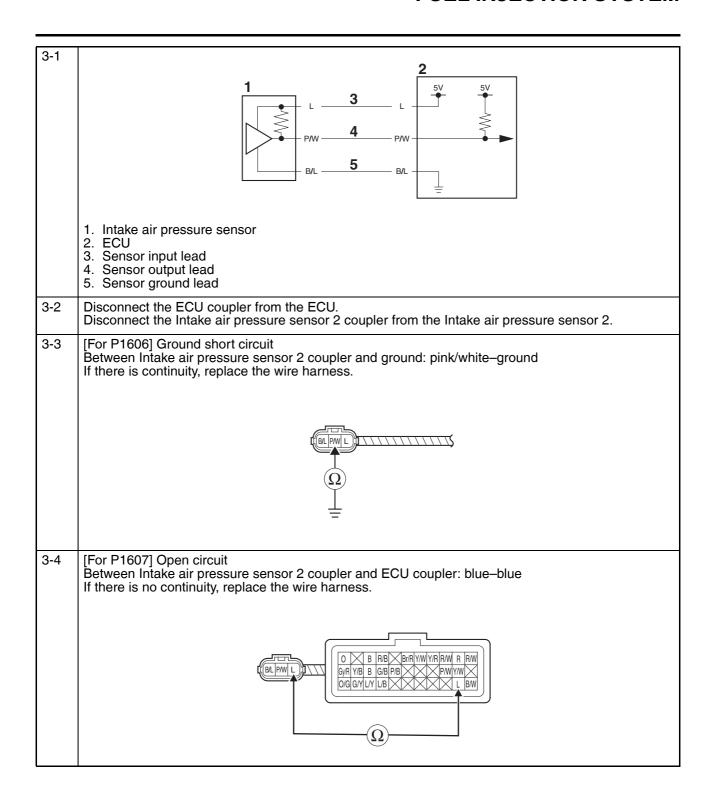
| Item | Probable cause of malfunction and check                                                                                                                                                      | Maintenance job                                                                  | Confirmation of service completion                                                                                                                                                                                                                                             |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Connection of lean angle sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", then to "OFF", and then back to "ON".  Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 2. |
| 2    | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).               | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", then to "OFF", and then back to "ON".  Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 3. |





| 6 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. |  |
|---|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--|
|---|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--|

| Fault          | code No. P1606, P1607                                                                                                                                                                                     |                   |                                                                                                                                                  |                                                                                                                                                                                                                                                  |  |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Fault code No. |                                                                                                                                                                                                           | P160              | 6, P1607                                                                                                                                         |                                                                                                                                                                                                                                                  |  |
| Item           |                                                                                                                                                                                                           | [P160             | [P1606] Intake air pressure sensor 2: ground short circuit detected. [P1607] Intake air pressure sensor 2: open or power short circuit detected. |                                                                                                                                                                                                                                                  |  |
| Eail-e         | afe system                                                                                                                                                                                                | Able              | to start engine                                                                                                                                  |                                                                                                                                                                                                                                                  |  |
| i ali-s        | ale system                                                                                                                                                                                                | Able              | to drive vehicle                                                                                                                                 |                                                                                                                                                                                                                                                  |  |
| Diagn          | nostic code No.                                                                                                                                                                                           | 04                |                                                                                                                                                  |                                                                                                                                                                                                                                                  |  |
| Tool           | display                                                                                                                                                                                                   | Displ             | ays the intake air pressure 2.                                                                                                                   |                                                                                                                                                                                                                                                  |  |
| Proce          | edure                                                                                                                                                                                                     | Oper<br>switc     | ate the throttle while pushing the "<br>h. (If the display value changes, th                                                                     | (s)" side of the start/engine stop<br>e performance is OK.)                                                                                                                                                                                      |  |
| Item           | Probable cause of malfunction and check                                                                                                                                                                   |                   | Maintenance job                                                                                                                                  | Confirmation of service completion                                                                                                                                                                                                               |  |
| 1              | Connection of Intake air pr<br>sure sensor 2 coupler.<br>Check the locking condition<br>the coupler.<br>Disconnect the coupler and<br>check the pins (bent or broad<br>terminals and locking conditions). | n of<br>d<br>oken | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                 | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 2.  |  |
| 2              | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).                            |                   | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                 | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 3.   |  |
| 3              | Wire harness continuity.                                                                                                                                                                                  |                   | Open or short circuit → Replace the wire harness.                                                                                                | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 4. |  |



3-5 [For P1607] Open circuit Between Intake air pressure sensor 2 coupler and ECU coupler: pink/white-pink/white If there is no continuity, replace the wire harness. R/L Gy W W G/W Lg/L | B/R L/W | B | B | Br/W Lg/W | B/L | B/W | W/G | P/W | P | L | L | D B/L B/L B/Y Y/A I/Y W/G G/G Y/G 3-6 [For P1607] Open circuit Between Intake air pressure sensor 2 coupler and ECU coupler: black/blue-black/blue If there is no continuity, replace the wire harness. R/L Gy W W G/W Lg/L | B/R L/W | B | B | Br/W Lg/W | B/L | B/W | W/G | P/W | P | L | L | X B/L P/W L B/L 3/L B/Y Y/L W/Y W/G Gy/G Y/G 3-7 Disconnect the couplers from the parts that are connected to the ECU. Refer to "Parts connected to the ECU" on page 8-37. 3-8 [For P1606/P1607] Short circuit Between Intake air pressure sensor 2 output terminal (pink/white) "a" of ECU coupler and any other ECU coupler terminal "b". If there is continuity, replace the wire harness. b a B/L B/L B/Y Y/LTV/Y W/G Gy/G Y/G 4 Installed condition of Intake air Turn the main switch to "ON", Check for looseness or pinchpressure sensor 2. and then check the condition of the fault code using the mal-Improperly installed sensor → Reinstall or replace the sensor. function mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5.

| 5 | Defective Intake air pressure sensor 2.                                         | Execute the diagnostic mode. (Code No. 04) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. At sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 1000 m (3300 ft) above sea level: Approx. 90 kPa (675.1 mmHg, 26.6 inHg) 2000 m (6700 ft) above sea level: Approx. 80 kPa (600.0 mmHg, 23.6 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Check the Intake air pressure sensor 2. Replace if defective. Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-166. | Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 7 and finish the service.  Condition is "Detected" → Go to item 6. |
|---|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 | Malfunction in ECU.                                                             | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Service is finished.                                                                                                                                                                                                                 |
| 7 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                      |

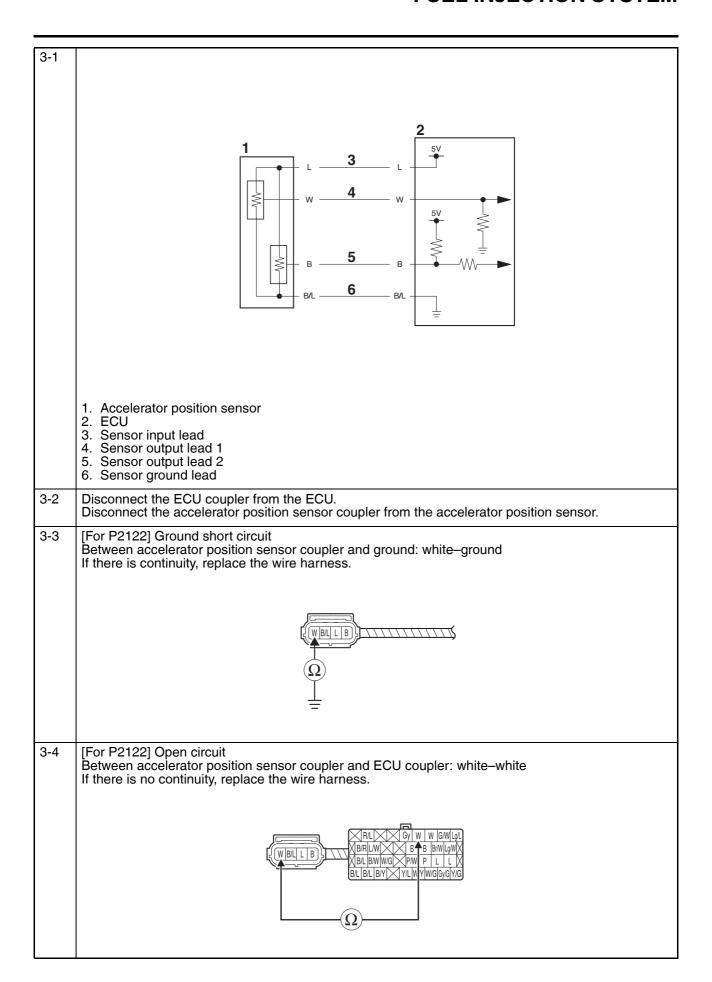
### Fault code No. P2122, P2123, P2127, P2128, P2138

TID

If a fault code other than No. P2138 (P2122/P2123/P2127/P2128) is detected, perform troubleshooting first.

| Fault code No. |                 | P2122, P2123, P2127, P2128, P2138                                                                                                                                                                                                                                                                                                                                 |  |  |
|----------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Item           |                 | [P2122] Accelerator position sensor: open or ground short circuit detected. [P2123] Accelerator position sensor: power short circuit detected. [P2127] Accelerator position sensor: ground short circuit detected. [P2128] Accelerator position sensor: open or power short circuit detected. [P2138] Accelerator position sensor: Output voltage deviation error |  |  |
| Fail-          | safe system     | Able/Unable to start engine                                                                                                                                                                                                                                                                                                                                       |  |  |
| raii-          | sale system     | Able/Unable to drive vehicle                                                                                                                                                                                                                                                                                                                                      |  |  |
| Diag           | nostic code No. | 14, 15                                                                                                                                                                                                                                                                                                                                                            |  |  |
| 14             | Tool display    | Accelerator position sensor signal 1 • 12–22 (fully closed position) • 97–107 (fully open position)                                                                                                                                                                                                                                                               |  |  |
|                | Procedure       | <ul> <li>Check with throttle grip in fully closed position.</li> <li>Check with throttle grip in fully open position.</li> </ul>                                                                                                                                                                                                                                  |  |  |

| 15   | Tool display                                                                                                                                                                              | Accelerator position sensor signal 2 • 10–24 (fully closed position) • 95–109 (fully open position) |                                                                                  |                                                                                                                                                                                                                                                  |  |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|      | Procedure                                                                                                                                                                                 | • Che                                                                                               | eck with throttle grip in fully closed<br>eck with throttle grip in fully open p | position.<br>osition.                                                                                                                                                                                                                            |  |
| Item | Probable cause of malfu<br>tion and check                                                                                                                                                 | ınc-                                                                                                | Maintenance job                                                                  | Confirmation of service completion                                                                                                                                                                                                               |  |
| 1    | Connection of accelerator pation sensor coupler. Check the locking condition the coupler. Disconnect the coupler and check the pins (bent or bro terminals and locking cond of the pins). | n of<br>d<br>ken                                                                                    | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 2. |  |
| 2    | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).            |                                                                                                     | Improperly connected → Connect the coupler securely or replace the wire harness. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 3. |  |
| 3    | Wire harness continuity.                                                                                                                                                                  |                                                                                                     | Open or short circuit → Replace the wire harness.                                | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 4. |  |



3-5 [For P2127] Ground short circuit Between accelerator position sensor coupler and ground: black-ground If there is continuity, replace the wire harness. 3-6 [For P2128] Open circuit Between accelerator position sensor coupler and ECU coupler: black-black If there is no continuity, replace the wire harness. R/L Gy W W G/W Lg/L B/R L/W B B Br/W Lg/W W B/L L B 3-7 [For P2122/P2128] Open circuit Between accelerator position sensor coupler and ECU coupler: blue-blue If there is no continuity, replace the wire harness. R/L Gy W W G/W Lg/L B/R L/W B B Br/W Lg/W B/L B/W W/G P/W P L L L W B/L L B/L B/L B/Y Y/L W/Y W/G Gy/ 1/G  $\Omega$ 3-8 [For P2122/P2128] Open circuit Between accelerator position sensor coupler and ECU coupler: black/blue-black/blue If there is no continuity, replace the wire harness. | R/L | Gy | W | W | GM| LgL | R/L | W | SM | LgL | W | LgL | W | SM | LgL | W B/L L B 3-9 Disconnect the couplers from the parts that are connected to the ECU. Refer to "Parts connected to the ECU" on page 8-37.

| 3-10 | [For P2122/P2123] Short circuit Between accelerator position sensor output terminal (white) "a" of ECU coupler and any other ECU coupler terminal "b". If there is continuity, replace the wire harness. |                                                                                                                                                                   |                                                                                                                                                                                                                                                  |  |  |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|      | BRL BL BW YL W GWLOL  BRL BW WG PW P L L X  BRL BL BW YL WYWGGYGYG                                                                                                                                       |                                                                                                                                                                   |                                                                                                                                                                                                                                                  |  |  |
| 3-11 | [For P2127/P2128] Short circuit<br>Between accelerator position ser<br>coupler terminal "b".<br>If there is continuity, replace the                                                                      | nsor output terminal (black) "a" of I                                                                                                                             | ECU coupler and any other ECU                                                                                                                                                                                                                    |  |  |
|      | BLBRIBRI BRY YL WYWGGYGYG                                                                                                                                                                                |                                                                                                                                                                   |                                                                                                                                                                                                                                                  |  |  |
| 4    | Installed condition of accelerator position sensor.                                                                                                                                                      | Check for looseness or pinching. Improperly installed sensor → Reinstall or adjust the sensor. Refer to "ADJUSTING THE ACCELERATOR POSITION SENSOR" on page 7-14. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 5. |  |  |
| 5    | Accelerator position sensor resistance.                                                                                                                                                                  | Measure the accelerator position sensor resistance. black/blue-blue Refer to "CHECKING THE ACCELERATOR POSITION SENSOR" on page 8-165.                            | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 6. |  |  |

| 6 | Defective accelerator position sensor.                                          | Check accelerator position sensor signal 1.  Execute the diagnostic mode. (Code No. 14) When the throttle grip is fully closed: A value of 12–22 is indicated. When throttle grip is are fully open: A value of 97–107 is indicated.  Check accelerator position sensor signal 2.  Execute the diagnostic mode. (Code No. 15) When the throttle grip is fully closed: A value of 10–24 is indicated. When the throttle grip is fully open: A value of 95–109 is indicated.  An indicated value is out of the specified range → Replace the accelerator position sensor. | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service.  Condition is "Detected" → Go to item 7. |
|---|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | Malfunction in ECU.                                                             | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Service is finished.                                                                                                                                                                                                                             |
| 8 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                  |

### Fault code No. P2158

| Fault code No.                            |        | P2158                                                                                                                                        |                                    |  |
|-------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--|
| Item                                      |        | Front wheel sensor: no normal signals are received from the front wheel sensor.                                                              |                                    |  |
| Fail-safe system                          | Able t | to start engine                                                                                                                              |                                    |  |
| i all-sale system                         | Able t | Able to drive vehicle                                                                                                                        |                                    |  |
| Diagnostic code No.                       | 16     | 16                                                                                                                                           |                                    |  |
| Tool display                              |        | Front wheel speed pulse 0–999                                                                                                                |                                    |  |
| Procedure                                 |        | Check that the number increases when the front wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped. |                                    |  |
| Item Probable cause of malfunction and ch |        | Maintenance job                                                                                                                              | Confirmation of service completion |  |

| 1 | Locate the malfunction.                                                                                                                                                                       | If the ABS warning light is on, refer to "BASIC INSTRUC-TIONS FOR TROUBLESHOOT-ING" on page 8-118.  If the ABS warning light is off, perform the following procedure. Execute the diagnostic mode. (Code No. 16)  Rotate the front wheel by hand and check that the indicated value increases.  Value increases → Go to item 9 and finish the service.  Value does not increase → Go to item 2. |                                                                                                                                                                                                                        |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Connection of front wheel sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                                                                                                                                                                | Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and finish the service. Value does not increase → Go to item 3. |
| 3 | Connection of ABS ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).            | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                                                                                                                                                                | Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and finish the service. Value does not increase → Go to item 4. |
| 4 | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).                | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                                                                                                                                                                | Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and finish the service. Value does not increase → Go to item 5. |
| 5 | Wire harness continuity.                                                                                                                                                                      | Open or short circuit → Replace the wire harness.  Between front wheel sensor coupler and ABS ECU coupler. black-black white-white  Between ABS ECU coupler and ECU coupler. white/green-white/green                                                                                                                                                                                            | Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and finish the service. Value does not increase → Go to item 6. |
| 6 | Defective front wheel sensor.                                                                                                                                                                 | Improperly installed sensor → Reinstall or replace the sensor.                                                                                                                                                                                                                                                                                                                                  | Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and finish the service. Value does not increase → Go to item 7. |

| 7 | Malfunction in ECU.                                                             | Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.                                                                                                                                                                                                                                                                                                                           | Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 9 and finish the service. Value does not increase → Go to item 8. |
|---|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8 | Malfunction in ABS ECU.                                                         | Replace the ABS ECU.                                                                                                                                                                                                                                                                                                                                                                                         | Go to item 9.                                                                                                                                                                                                          |
| 9 | Delete the fault code and check that the engine trouble warning light goes off. | Turn the main switch to "ON", and then rotate the front wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph). Confirm that the fault code has a condition of "Recovered" using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code. Delete this fault code even if it has a condition of "Detected". |                                                                                                                                                                                                                        |

### Fault code No. P2195

TIP

If fault code numbers "P2195" and "P0030" are both indicated, take the actions specified for fault code number "P0030" first.

| Fault code No. |                                          | D210              | E                                                                                               |                                                                                                                                                                                                                                                                                                                                             |  |  |
|----------------|------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|                |                                          |                   | P2195                                                                                           |                                                                                                                                                                                                                                                                                                                                             |  |  |
| Item           |                                          | O <sub>2</sub> se | ensor: Open circuit detected.                                                                   |                                                                                                                                                                                                                                                                                                                                             |  |  |
| Foil c         | Fail-safe system                         |                   | to start engine                                                                                 |                                                                                                                                                                                                                                                                                                                                             |  |  |
| raii-s         | ale system                               | Able              | to drive vehicle                                                                                |                                                                                                                                                                                                                                                                                                                                             |  |  |
| Diagn          | ostic code No.                           | _                 |                                                                                                 |                                                                                                                                                                                                                                                                                                                                             |  |  |
| Tool           | display                                  | _                 |                                                                                                 |                                                                                                                                                                                                                                                                                                                                             |  |  |
| Proce          | Procedure -                              |                   |                                                                                                 |                                                                                                                                                                                                                                                                                                                                             |  |  |
| Item           | Probable cause of malf tion and check    | unc-              | Maintenance job                                                                                 | Confirmation of service completion                                                                                                                                                                                                                                                                                                          |  |  |
| 1              | Installed condition of O <sub>2</sub> se | ensor.            | Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor. | Start the engine and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 2.  Also, delete this fault code, which has a condition of "Detected". |  |  |

| 2 | Connection of O <sub>2</sub> sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins). | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                                                                                                                                                                            | Start the engine and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 3.  Also, delete this fault code, which has a condition of "Detected". |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).                   | Improperly connected → Connect the coupler securely or replace the wire harness.                                                                                                                                                                                                                                                                                                                            | Start the engine and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered"                                                                                                                                                    |
| 4 | Wire harness continuity.                                                                                                                                                                         | Open or short circuit → Replace the wire harness. Between O <sub>2</sub> sensor coupler and ECU coupler. gray/green—gray/green pink/black—pink/black Between O <sub>2</sub> sensor coupler and joint connector. black/blue—black/blue red/white—red/white Between joint connector and ECU coupler. black/blue—black/blue red/white—red/white Between joint connector and ignition fuse. red/white—red/white | Start the engine and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 5. Also, delete this fault code, which has a condition of "Detected".   |
| 5 | Check fuel pressure.                                                                                                                                                                             | Refer to "CHECKING THE<br>FUEL PRESSURE" on page<br>7-12.                                                                                                                                                                                                                                                                                                                                                   | Start the engine and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 6.  Also, delete this fault code, which has a condition of "Detected". |

| 6 | Defective O <sub>2</sub> sensor.                                                | Check the O <sub>2</sub> sensor. Replace if defective. Refer to "ENGINE REMOVAL" on page 5-3.                                | Start the engine and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 7.  Also, delete this fault code, which has a condition of "Detected". |
|---|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | Malfunction in ECU.                                                             | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                  | Service is finished.                                                                                                                                                                                                                                                                                                                        |
| 8 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. |                                                                                                                                                                                                                                                                                                                                             |

FΔS31790

# TROUBLESHOOTING DETAILS (EVENT CODE) Event code No. U0155 or "Err"

#### TIP

- "Err" is displayed on the clock display of the multi-function meter, but the engine trouble warning light does not come on.
- When the Yamaha diagnostic tool is used, event code No. U0155 is displayed as a fault code.

| Event | Event code No. U0                                                                                                                                                                 |                  | 0155 or "Err"                                                                              |                                                                                                                                                                                                                                                  |  |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item  |                                                                                                                                                                                   |                  | ti-function meter: signals cannot be transmitted between the ECU the multi-function meter. |                                                                                                                                                                                                                                                  |  |
| Item  | Probable cause of malfunction and check                                                                                                                                           |                  | Maintenance job                                                                            | Confirmation of service completion                                                                                                                                                                                                               |  |
| 1     | Connection of meter asser coupler. Check the locking condition the coupler. Disconnect the coupler and check the pins (bent or brol terminals and locking condition of the pins). | of<br>I<br>ken   | Improperly connected → Connect the coupler securely or replace the wire harness.           | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 2. |  |
| 2     | Connection of ECU coupler Check the locking condition the coupler. Disconnect the coupler and check the pins (bent or brol terminals and locking condition of the pins).          | n of<br>I<br>ken | Improperly connected → Connect the coupler securely or replace the wire harness.           | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 3. |  |

| 3 | Wire harness continuity.                                                        | Open or short circuit → Replace the wire harness.  Between meter assembly coupler and joint coupler.  Lg/L-Lg/L  Lg/W-Lg/W  Between joint coupler and ECU coupler.  Lg/L-Lg/L  Lg/W-Lg/W | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 4. |
|---|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Defective meter assembly.                                                       | Replace the meter assembly.                                                                                                                                                              | Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.  Condition is "Recovered" → Go to item 6 and finish the service.  Condition is "Detected" → Go to item 5. |
| 5 | Malfunction in ECU.                                                             | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                                                                                              | Service is finished.                                                                                                                                                                                                                             |
| 6 | Delete the fault code and check that the engine trouble warning light goes off. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.                                                             |                                                                                                                                                                                                                                                  |

### **Event code No. 30**

| Event code No.   |                                           | 30                                                                          |                                                                   |                                                                                                                                                                                                                        |  |  |
|------------------|-------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Item             |                                           | Latch up detected.                                                          |                                                                   |                                                                                                                                                                                                                        |  |  |
| Fail-safe system |                                           | Unable to start engine                                                      |                                                                   |                                                                                                                                                                                                                        |  |  |
|                  |                                           | Unab                                                                        | Unable to drive vehicle                                           |                                                                                                                                                                                                                        |  |  |
| Diagn            | Diagnostic code No.                       |                                                                             |                                                                   |                                                                                                                                                                                                                        |  |  |
| Tool display     |                                           | Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned) |                                                                   |                                                                                                                                                                                                                        |  |  |
| Proce            | Procedure                                 |                                                                             | Remove the lean angle sensor and incline it more than 65 degrees. |                                                                                                                                                                                                                        |  |  |
| Item             | Probable cause of malfunction and check   |                                                                             | Maintenance job                                                   | Confirmation of service completion                                                                                                                                                                                     |  |  |
| 1                | The vehicle has overturned.               |                                                                             | Raise the vehicle upright.                                        | Turn the main switch to "ON", then to "OFF", and then back to "ON".  Engine trouble warning light does not come on → Service is finished.  Engine trouble warning light comes on → Go to item 2.                       |  |  |
| 2                | Installed condition of lean angle sensor. |                                                                             | Check the installed direction and condition of the sensor.        | Turn the main switch to "ON", then to "OFF", and then back to "ON". Engine trouble warning light does not come on $\rightarrow$ Service is finished. Engine trouble warning light comes on $\rightarrow$ Go to item 3. |  |  |

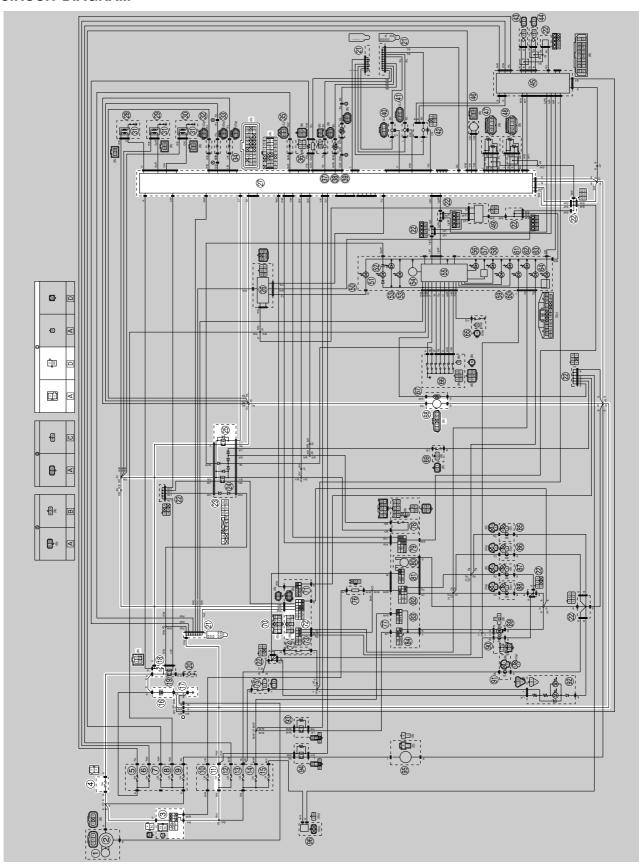
| 3 | Defective lean angle sensor. | Execute the diagnostic mode. (Code No. 08) Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-159. | Turn the main switch to "ON", then to "OFF", and then back to "ON".  Engine trouble warning light does not come on → Service is finished.  Engine trouble warning light comes on → Go to item 4. |
|---|------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Malfunction in ECU.          | Replace the ECU.<br>Refer to "REPLACING THE<br>ECU (Engine Control Unit)" on<br>page 8-152.                               | Service is finished.                                                                                                                                                                             |

EAS20081

### **FUEL PUMP SYSTEM**

EAS30513

#### **CIRCUIT DIAGRAM**



## **FUEL PUMP SYSTEM**

- 3. Main switch
- 4. Main fuse
- 11.Ignition fuse
- 16.Battery
- 17. Engine ground
- 18. Fuel injection system fuse
- 21. Joint connector
- 22. Joint coupler
- 23.Relay unit
- 25. Fuel pump relay
- 27.ECU (Engine Control Unit)
- 68. Fuel pump
- 70. Handlebar switch (right)
- 72. Start/engine stop switch
- A. Wire harness
- D. Negative battery sub-wire harness

EAS30514 **TROUBLESHOOTING** If the fuel pump fails to operate. Before troubleshooting, remove the following part(s): 1. Rider seat 2. Fuel tank cover 3. Fuel tank 1. Check the fuses. (Main, ignition and fuel injection Replace the fuse(s). system)  $NG \rightarrow$ Refer to "CHECKING THE FUSES" on page 8-151. OK↓ 2. Check the battery. Refer to "CHECKING AND Clean the battery terminals. CHARGING THE BATTERY" on Recharge or replace the battery.  $NG \rightarrow$ page 8-152. OK↓ Check the main switch. Refer to "CHECKING THE Replace the main switch/immobilizer unit.  $NG \rightarrow$ SWITCHES" on page 8-147. OK↓ 4. Check the start/engine stop switch. Refer to "CHECKING THE Replace the right handlebar switch.  $NG \rightarrow$ SWITCHES" on page 8-147. OK↓ 5. Check the relay unit (fuel pump relay). Replace the relay unit. Refer to "CHECKING THE RE- $NG \rightarrow$ LAYS" on page 8-155. OK↓ 6. Check the fuel pump. Refer to "CHECKING THE FUEL Replace the fuel pump.  $NG \rightarrow$ PUMP OPERATION" on page 7-4. OK↓ 7. Check the entire fuel pump system's wiring. Properly connect or repair the fuel pump Refer to "CIRCUIT DIAGRAM" on system's wiring.  $NG \rightarrow$ page 8-97.

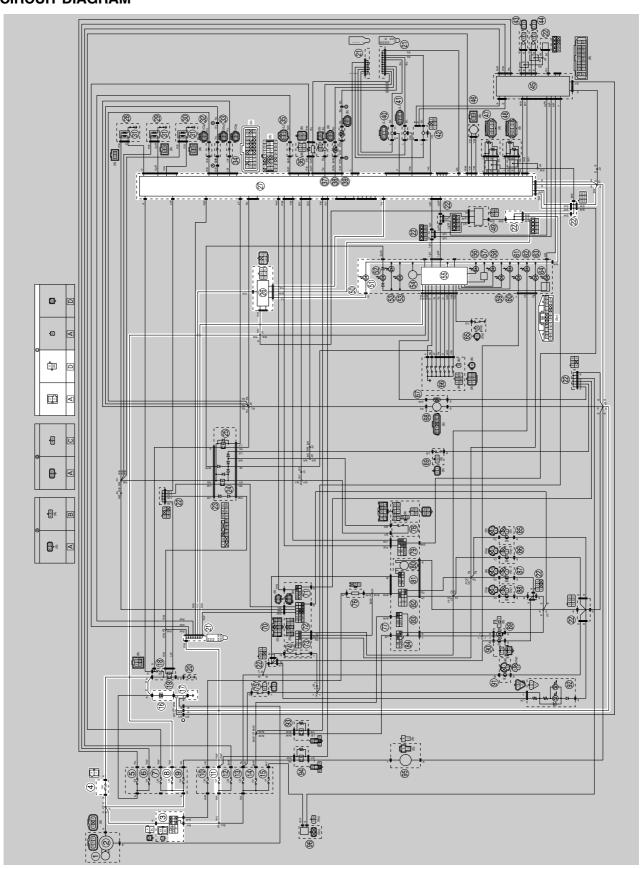
OK↓

Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152. EAS20084

### **IMMOBILIZER SYSTEM**

EAS30519

### **CIRCUIT DIAGRAM**



## **IMMOBILIZER SYSTEM**

- 3. Main switch
- 4. Main fuse
- 8. Backup fuse
- 11.Ignition fuse
- 16.Battery
- 17. Engine ground
- 21. Joint connector
- 22. Joint coupler
- 26.Immobilizer unit
- 27.ECU (Engine Control Unit)
- 50.Meter assembly
- 51.Immobilizer system indicator light
- 55. Multi-function meter
- A. Wire harness
- D. Negative battery sub-wire harness

EAS30520

#### **GENERAL INFORMATION**

This vehicle is equipped with an immobilizer system to help prevent theft by re-registering codes in the standard keys. This system consists of the following:

- A code re-registering key (with a red bow)
- Two standard keys (with a black bow) that can be re-registered with new codes
- A transponder (installed in the red key bow)
- An immobilizer unit
- The ECU
- An immobilizer system indicator light

The key with the red bow is used to register codes in each standard key. Do not use the key with the red bow for driving. It should only be used for re-registering new codes in the standard keys. The immobilizer system cannot be operated with a new key until the key registered with a code. If you lose the code re-registering key, the ECU and main switch (equipped with the immobilizer unit) need to be replaced.

Therefore, always use a standard key for driving. (See NOTICE.)

TIP

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

ECA14971

#### NOTICE

- DO NOT LOSE THE CODE RE-REGISTERING KEY! If the code re-registering key is lost, registering new codes in the standard keys is impossible. The standard keys can still be used to start the vehicle. However, if code re-registering is required (e.g., if a new standard key is made or all keys are lost) the entire immobilizer system must be replaced. Therefore, it is highly recommended to use either standard key for driving, and to keep the code re-registering key in a safe place.
- Do not submerse the keys in water.
- Do not expose the keys to excessively high temperatures.
- Do not place the keys close to magnets (this includes, but is not limited to, products such as speakers, etc.).
- Do not place heavy items on the keys.
- Do not grind the keys or alter their shape.
- Do not disassemble the key bows.
- Do not put two keys of any immobilizer system on the same key ring.
- Keep the standard keys as well as other immobilizer system keys away from the code re-registering key.
- Keep other immobilizer system keys away from the main switch as they may cause signal interference.

EAS3052

#### PARTS REPLACEMENT AND KEY CODE REGISTRATION REQUIREMENTS

In the course of use, you may encounter the following cases where replacement of parts and registration of code re-registering/standard keys are required.

TIP.

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

|                                                             | Parts to be replaced             |                       |          |     |                       |                                           |
|-------------------------------------------------------------|----------------------------------|-----------------------|----------|-----|-----------------------|-------------------------------------------|
|                                                             | Main switch/<br>immobilizer unit |                       | Standard | FOU | Acces-                | Key registration requirement              |
|                                                             | Main<br>switch                   | Immobi-<br>lizer unit | key      | ECU | sory lock*<br>and key |                                           |
| Standard key is lost                                        |                                  |                       | √        |     |                       | New standard key                          |
| All keys have been lost (including code re-registering key) |                                  | √                     | <b>√</b> | √   | √                     | Code re-registering key and standard keys |
| ECU is defective                                            |                                  |                       |          | V   |                       | Code re-registering key and standard keys |
| Immobilizer unit is defective                               |                                  | V                     |          |     |                       | Code re-registering key and standard keys |
| Main switch is defective                                    |                                  | V                     | V        | V   | V                     | Code re-registering key and standard keys |
| Accessory lock* is defective                                |                                  |                       |          |     | <b>V</b>              | Not required                              |

<sup>\*</sup>Accessory locks mean the seat lock and fuel tank cap.

#### Code re-registering key registration:

When the immobilizer unit or ECU is replaced, the code re-registering key must be registered to the unit.

To register a code re-registering key:

1. Turn the main switch to "ON" with the code re-registering key.

#### TIE

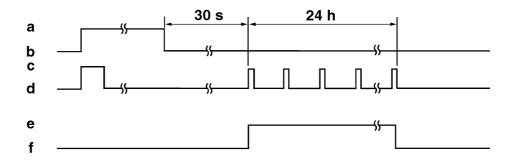
Check that the immobilizer system indicator light comes on for one second, then goes off. When the immobilizer system indicator light goes off, the code re-registering key has been registered.

- 2. Check that the engine can be started.
- 3. Register the standard key, following the instructions in the section below.

#### Standby mode:

To enable the immobilizer system, turn the ignition key to "OFF". 30 seconds later, the indicator light will start flashing continuously in the standby flashing mode pattern for up to 24 hours. After that time, the indicator light will stop flashing, but the immobilizer system is still enabled.

#### Standby mode



- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off

- e. Standby mode on
- f. Standby mode off

#### Standard key registration:

Standard key registration is required when a standard key is lost and needs to be replaced, or when the code re-registering key is re-registered after the immobilizer unit or ECU are replaced.

TIP\_

Do not start the engine with a standard key that has not been registered. If the main switch is turned "ON" with a standard key that has not been registered, the immobilizer system indicator light flashes to indicate fault code "52". (Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-108).

- 1. Check that the immobilizer system indicator light signals the standby mode.
- 2. Using the code re-registering key, turn the main switch to "ON", then "OFF", and then remove the key within 5 seconds.
- 3. Insert the first standard key to be registered into the main switch, then turn the key to "ON" within 5 seconds to activate the key registration mode.

TIP

The existing standard key code is erased from the memory when the key registration mode is activated. When the key registration mode is activated, the immobilizer system indicator light flashes rapidly.

4. While the indicator light is flashing, turn the main switch to "OFF", remove the key, and within 5 seconds, insert the second standard key to be registered into the main switch.

TIP

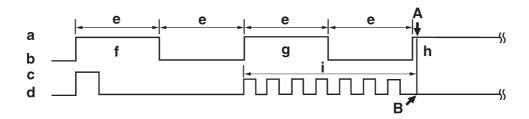
If he immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the registration mode is deactivated. If this occurs, the second standard key cannot be registered, and steps 2 to 4 need to be repeated to register both standard keys.

5. Turn the main switch to "ON".

TIP\_

When the indicator light goes off, the registration is complete.

6. Check that the engine can be started with the two registered standard keys. **Standard key registration** 



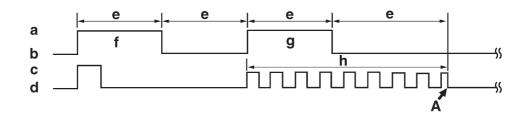
- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. First standard key

- h. Second standard key
- i. Registration mode
- A. Registration of the second standard key is complete.
- B. Immobilizer system indicator light stops flashing when the registration of the second standard key is complete.

#### Voiding the standard key code:

If a standard key has been lost, it is possible to disable its use by re-registering the remaining standard key. Standard key registration erases the stored standard key code from the memory, thus disabling the lost standard key. To re-register, refer to "Standard key registration".

### Standard key code voiding method



- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. Remaining standard key
- h. Registration mode
- A. If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the second standard key cannot be registered.

EAS30522

#### **TROUBLESHOOTING**

When the main switch is turned to "ON", the immobilizer system indicator light does not come on nor flashes.

 Check the fuses. (Main, ignition, and backup) Refer to "CHECKING THE FUSES" on page 8-151.

 $NG \rightarrow$ 

Replace the fuse(s).

OK↓

Check the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.

 $NG \rightarrow$ 

Clean the battery terminals.Recharge or replace the battery.

OK↓

3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-147.

 $NG\rightarrow$ 

Replace the main switch/immobilizer unit.

OK↓

Check the entire immobilizer system wiring.
 Refer to "CIRCUIT DIAGRAM" on page 8-101.

 $NG \rightarrow$ 

Properly connect or repair the immobilizer system wiring.

OK↓

- Check the condition of the each immobilizer system circuits.
- Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-108.

EAS30523

### **SELF-DIAGNOSIS FAULT CODE INDICATION**

When a system failure occurs, the immobilizer system indicator light blinks. The pattern of blinking shows the fault code.

| Fault code | Part                | Symptom                                                                  | Cause                                                                                                                                                                                                                                                                 | Action                                                                                                                                                                                                                                                  |
|------------|---------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 51         | IMMOBILIZER<br>UNIT | Code cannot be transmitted between the key and the immobilizer unit.     | <ol> <li>Radio wave interference caused by objects around the keys and antennas.</li> <li>Immobilizer unit malfunction.</li> <li>Key malfunction.</li> </ol>                                                                                                          | <ol> <li>Keep magnets,<br/>metal objects, and<br/>other immobilizer<br/>system keys away<br/>from the keys and<br/>antennas.</li> <li>Replace the main<br/>switch/immobi-<br/>lizer unit.</li> <li>Replace the key.</li> </ol>                          |
| 52         | IMMOBILIZER<br>UNIT | Codes between the key and immobilizer unit do not match.                 | <ol> <li>Signal received from other transponder (failed to recognize code after ten consecutive attempts).</li> <li>Signal received from unregistered standard key.</li> </ol>                                                                                        | <ol> <li>Place the immobilizer unit at least 50 mm away from the transponder of other vehicles.</li> <li>Register the standard key.</li> </ol>                                                                                                          |
| 53         | IMMOBILIZER<br>UNIT | Codes cannot be transmitted between the ECU and the immobilizer unit.    | Noise interference or disconnected lead/cable.  1. Interference due to radio wave noise.  2. Disconnected communication harness.  3. Immobilizer unit malfunction.  4. ECU malfunction.                                                                               | <ol> <li>Check the wire harness and connector.</li> <li>Replace the main switch/immobilizer unit.</li> <li>Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.</li> </ol>                                                |
| 54         | IMMOBILIZER<br>UNIT | Codes transmitted between the ECU and the immobilizer unit do not match. | Noise interference or disconnected lead/cable.  1. Interference due to radio wave noise.  2. Disconnected communication harness.  3. Immobilizer unit malfunction.  4. ECU failure. (The ECU or immobilizer unit was replaced with a used unit from another vehicle.) | <ol> <li>Register the code re-registering key.</li> <li>Check the wire harness and connector.</li> <li>Replace the main switch/immobilizer unit.</li> <li>Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.</li> </ol> |
| 55         | IMMOBILIZER<br>UNIT | Key code registration malfunction.                                       | Same standard key was attempted to be registered two consecutive times.                                                                                                                                                                                               | Register another standard key.                                                                                                                                                                                                                          |

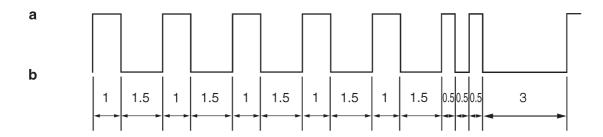
## **IMMOBILIZER SYSTEM**

| Fault code | Part | Symptom                        | Cause                                          | Action                                                                                                                                                                                                   |
|------------|------|--------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 56         | ECU  | Unidentified code is received. | Noise interference or disconnected lead/cable. | <ol> <li>Check the wire harness and connector.</li> <li>Replace the main switch/immobilizer unit.</li> <li>Replace the ECU. Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-152.</li> </ol> |

## Immobilizer system indicator light fault code indication

Digit of 10: Cycles of 1 sec. ON and 1.5 sec. OFF. Digit of 1: Cycles of 0.5 sec. ON and 0.5 sec. OFF.

Example: fault code 52



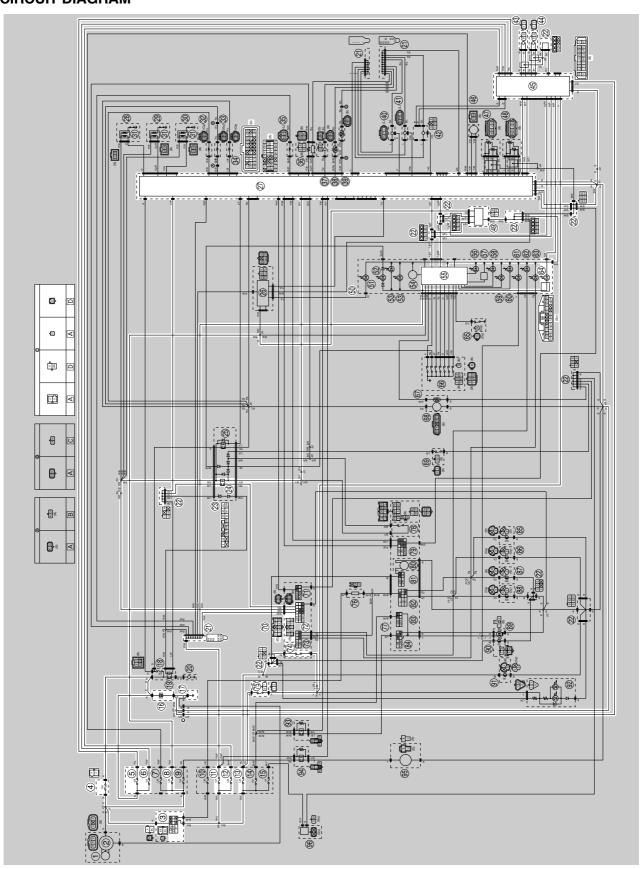
- a. Light on
- b. Light off

EAS2008

## **ABS (ANTI-LOCK BRAKE SYSTEM)**

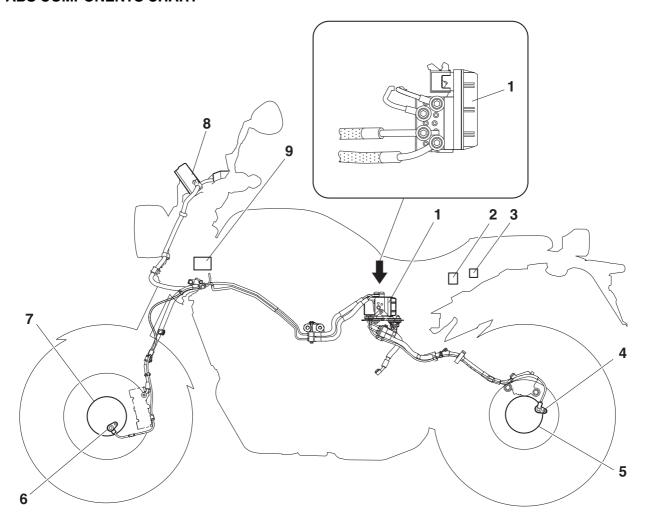
EAS30843

### CIRCUIT DIAGRAM



- 3. Main switch
- 4. Main fuse
- 5. ABS motor fuse
- 6. ABS solenoid fuse
- 8. Backup fuse
- 11.Ignition fuse
- 12.ABS ECU fuse
- 13. Signaling system fuse
- 16.Battery
- 17. Engine ground
- 21. Joint connector
- 22. Joint coupler
- 23.Relay unit
- 24. Starting circuit cut-off relay
- 27.ECU (Engine Control Unit)
- 43. Front wheel sensor
- 44.Rear wheel sensor
- 45.ABS ECU (electronic control unit)
- 49. Yamaha diagnostic tool coupler
- 50.Meter assembly
- 55. Multi-function meter
- 64.ABS warning light
- 70. Handlebar switch (right)
- 72. Start/engine stop switch
- 74. Front brake light switch
- 75. Rear brake light switch
- A. Wire harness
- D. Negative battery sub-wire harness

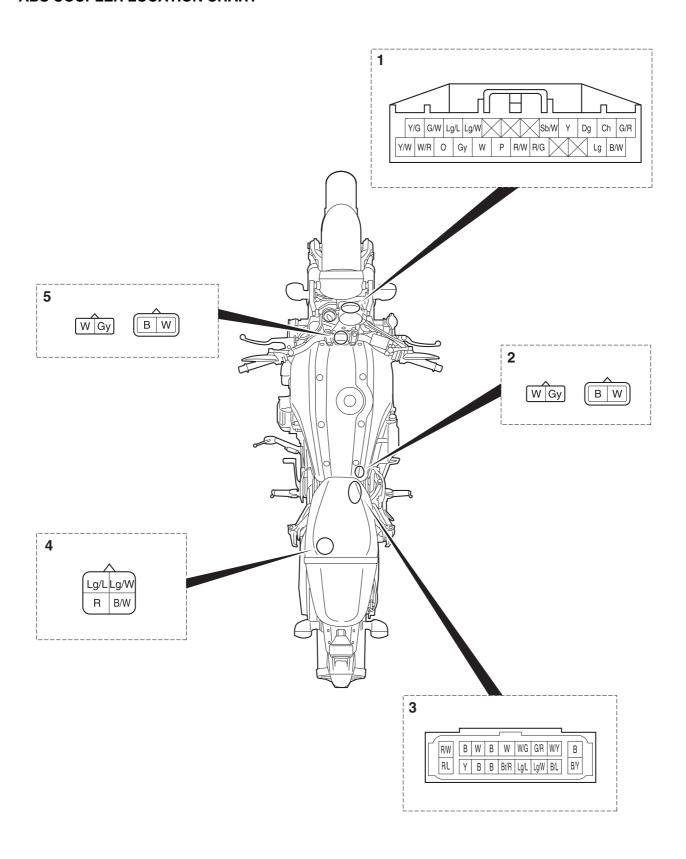
# ABS COMPONENTS CHART



- 1. Hydraulic unit assembly
- 2. Fuse box 2
- 3. Yamaha diagnostic tool coupler
- 4. Rear wheel sensor
- 5. Rear wheel sensor rotor
- 6. Front wheel sensor
- 7. Front wheel sensor rotor
- 8. ABS warning light
- 9. Fuse box 1

EAS30844

### **ABS COUPLER LOCATION CHART**



- 1. Meter assembly coupler
- 2. Rear wheel sensor coupler
- 3. ABS ECU coupler
- 4. Yamaha diagnostic tool coupler
- 5. Front wheel sensor coupler

EAS30845

### MAINTENANCE OF THE ABS ECU Checking the ABS ECU

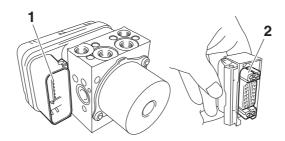
- 1. Check:
- Terminals "1" of the ABS ECU

Cracks/damages  $\rightarrow$  Replace the hydraulic unit assembly, brake hoses, and brake pipes that are connected to the assembly as a set.

Terminals "2" of the ABS ECU coupler
 Connection defective, contaminated, come-off → Correct or clean.

TIP

If the ABS ECU coupler is clogged with mud or dirt, clean with compressed air.



EAS30528

#### **ABS TROUBLESHOOTING OUTLINE**

This section describes the troubleshooting for the ABS in detail. Read this service manual carefully and make sure you fully understand the information provided before repairing any malfunctions or performing service.

The ABS ECU (electronic control unit) has a self-diagnosis function. When failures occur in the system, the ABS warning light on the meter assembly indicates a malfunction.

The following troubleshooting describes the problem identification and service method using the Yamaha diagnostic tool. For information about using the Yamaha diagnostic tool, refer to "[B-2] DIAGNOSIS USING THE FAULT CODES" on page 8-121. For troubleshooting items other than the following items, follow the normal service method.

WA1671

### **WARNING**

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer.

TIP

To final check, refer to "[C-1] FINAL CHECK" on page 8-141.

#### ABS operation when the ABS warning light comes on

- 1. The ABS warning light remains on  $\rightarrow$  ABS operates as a normal brake system.
  - A malfunction was detected using the ABS self-diagnosis function.
  - The ABS self-diagnosis has not been completed.
    - The ABS self-diagnosis starts when the main switch is turned to "ON" and finishes when the vehicle has traveled at a speed of approximately 10 km/h (6 mi/h).
- 2. The ABS warning light comes on after the engine starts, and then goes off when the vehicle starts moving (traveling at a speed of approximately 10 km/h (6 mi/h)). → ABS operation is normal.
- 3. The ABS warning light flashes  $\rightarrow$  ABS operation is normal.
  - Refer to "BASIC INSTRUCTIONS FOR TROUBLESHOOTING" on page 8-118.

### Self-diagnosis and servicing

The ABS ECU has a self-diagnosis function. By utilizing this function, quick problem identification and service are possible. Previous malfunctions can be checked since the ABS ECU also stores the malfunction history.

The fault codes recorded in the ABS ECU can be checked using the Yamaha diagnostic tool. When the service is finished, check the normal operation of the vehicle, and then delete the fault code(s). For information about deleting the fault codes, refer to "[B-3] DELETING THE FAULT CODES" on page 8-141. By deleting the fault codes stored in the ABS ECU memory, it is possible to pursue the cause correctly if another malfunction occurs.

#### TIP

The ABS performs a self-diagnosis test for a few seconds each time the vehicle first starts off after the main switch was turned to "ON". During this test, a "clicking" noise can be heard from under the seat, and if the brake lever or brake pedal are even slightly applied, a vibration can be felt at the lever and pedal, but these do not indicate a malfunction.

#### Self-diagnosis using the ABS ECU

The ABS ECU performs a static check of the entire system when the main switch is turned to "ON". It also checks for malfunctions while the vehicle is ridden. Since all malfunctions are recorded after they are detected, it is possible to check the recorded malfunction data by utilizing the Yamaha diagnostic tool when the ABS ECU has entered the self-diagnosis mode.

### Special precautions for handling and servicing a vehicle equipped with ABS

ECA17620

#### **NOTICE**

Care should be taken not to damage components by subjecting them to shocks or pulling on them with too much force since the ABS components are precisely adjusted.

- The ABS ECU and hydraulic unit are united assemblies and cannot be disassembled.
- The malfunction history is stored in the memory of the ABS ECU. Delete the fault codes when the service is finished. (This is because the past fault codes will be displayed again if another malfunction occurs.)

EAS30529

#### BASIC INSTRUCTIONS FOR TROUBLESHOOTING

EWA17420

#### **WARNING**

- Perform the troubleshooting [A]→[B]→[C] in order. Be sure to follow the order since a wrong diagnosis could result if the steps are followed in a different order or omitted.
- Use sufficiently charged regular batteries only.
- [A] Malfunction check using the ABS warning light
- [B] Use the Yamaha diagnostic tool and determine the location of the malfunction and the cause from the recorded fault code.

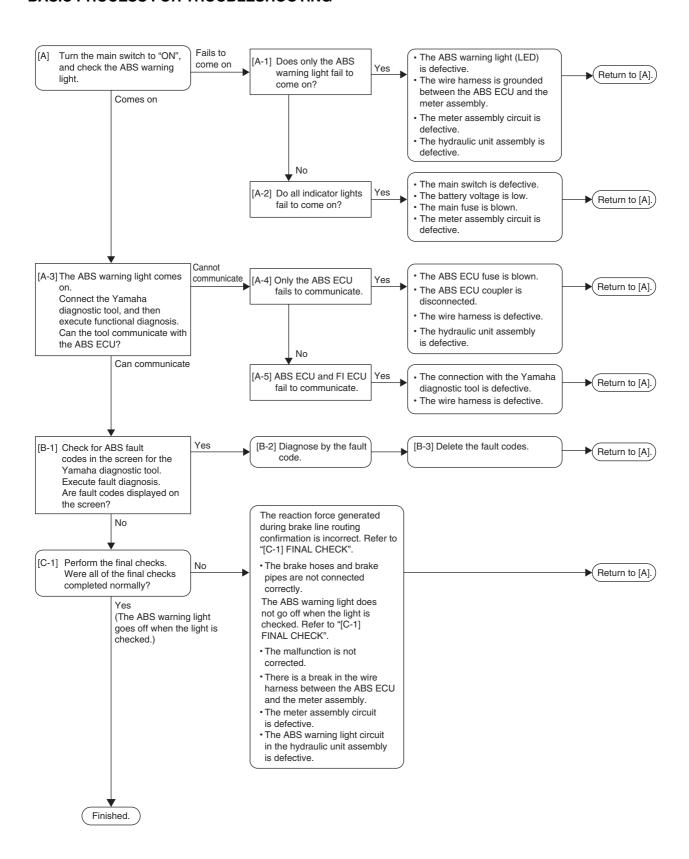
Determine the cause of the malfunction from the condition and place where the malfunction occurred.

[C] Servicing the ABS

Execute the final check after disassembly and assembly.

FAS30530

#### **BASIC PROCESS FOR TROUBLESHOOTING**



EWA16710

### **WARNING**

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer.

TIP

To final check, refer to "[C-1] FINAL CHECK" on page 8-141.

EAS3053

### [A] CHECKING THE ABS WARNING LIGHT

Turn the main switch to "ON". (Do not start the engine.)

- 1. The ABS warning light does not come on.
  - Only the ABS warning light fails to come on. [A-1]
  - The ABS warning light and all other indicator lights fail to come on. [A-2]
- 2. The ABS warning light comes on. [A-3]

EAS30532

#### [A-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON

- 1. Check for a short circuit to the ground between the green/red terminal of the ABS ECU coupler and green/red terminal of the meter assembly.
- If there is short circuit to the ground, the wire harness is defective. Replace the wire harness.
- 2. Disconnect the ABS ECU coupler and check that the ABS warning light comes on when the main switch is turned to "ON".
  - If the ABS warning light does not come on, the meter assembly circuit (including the ABS warning light [LED]) is defective. Replace the meter assembly.
  - If the ABS warning light comes on, the ABS ECU is defective. Replace the hydraulic unit assembly.

EAS30533

### [A-2] THE ABS WARNING LIGHT AND OTHER INDICATOR LIGHTS FAIL TO COME ON

- 1. Main switch
- Check the main switch for continuity.

Refer to "CHECKING THE SWITCHES" on page 8-147.

- If there is no continuity, replace the main switch/immobilizer unit.
- 2. Battery
  - Check the condition of the battery.

Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.

- If the battery is defective, clean the battery terminals and recharge it, or replace the battery.
- 3. Main fuse
  - Check the fuse for continuity.

Refer to "CHECKING THE FUSES" on page 8-151.

- If the main fuse is blown, replace the fuse.
- 4. Circuit
  - Check the meter assembly circuit.

Refer to "CIRCUIT DIAGRAM" on page 8-111.

• If the meter assembly circuit is open, replace the wire harness.

EAS3116

#### [A-3] THE ABS WARNING LIGHT COMES ON

Connect the Yamaha diagnostic tool to the Yamaha diagnostic tool coupler and execute functional diagnosis. (For information about how to execute functional diagnosis, refer to the operation manual that is included with the tool.)

Check that communication with the ABS ECU is possible.

- Only the ABS ECU fails to communicate. [A-4]
- ABS ECU and FI ECU fail to communicate. [A-5]
- Communication is possible with the ABS ECU. [B-1] (The ABS is displayed on the select unit screen.)

EAS31163

### [A-4] ONLY THE ABS ECU FAILS TO COMMUNICATE

- 1. ABS ECU fuse
- Check the ABS ECU fuse for continuity.
   Refer to "CHECKING THE FUSES" on page 8-151.
- If the ABS ECU fuse is blown, replace the fuse.
- 2. ABS ECU coupler
  - Check that the ABS ECU coupler is connected properly.
     For information about connecting the ABS ECU coupler properly, refer to "INSTALLING THE HY-DRAULIC UNIT ASSEMBLY" on page 4-54.
- 3. Wire harness
  - Open circuit between the main switch and the ABS ECU, or between the ABS ECU and the ground.
     Check for continuity between brown/blue terminal of the main switch coupler and brown/red terminal of the ABS ECU coupler.

Check for continuity between black/yellow terminal of the ABS ECU coupler and the ground. If there is no continuity, the wire harness is defective. Replace the wire harness.

Open circuit in the wire harness between the ABS ECU coupler and the Yamaha diagnostic tool coupler.

Check for continuity between light green/blue terminal of the ABS ECU coupler and light green/blue terminal of the Yamaha diagnostic tool coupler. (CANH)

Check for continuity between light green/white terminal of the ABS ECU coupler and light green/white terminal of the Yamaha diagnostic tool coupler. (CANL)

4. ABS ECU malfunction

Replace the hydraulic unit assembly.

EAS31164

#### [A-5] ABS ECU AND FI ECU FAIL TO COMMUNICATE

1. Yamaha diagnostic tool

Check that the Yamaha diagnostic tool is properly connected.

- 2. Wire harness
  - Open circuit in the wire harness between the ABS ECU coupler and the Yamaha diagnostic tool coupler.

Check for continuity between light green/blue terminal of the ABS ECU coupler and light green/blue terminal of the Yamaha diagnostic tool coupler. (CANH)

Check for continuity between light green/white terminal of the ABS ECU coupler and light green/white terminal of the Yamaha diagnostic tool coupler. (CANL)

EAS3116

#### [B-1] MALFUNCTION ARE CURRENTLY DETECTED

When the Yamaha diagnostic tool is connected to the Yamaha diagnostic tool coupler, the fault codes will be displayed on the computer screen.

- A fault code is displayed. [B-2]
- A fault code is not displayed. [C-1]

EAS31166

### [B-2] DIAGNOSIS USING THE FAULT CODES

This model uses the Yamaha diagnostic tool to identify malfunctions.

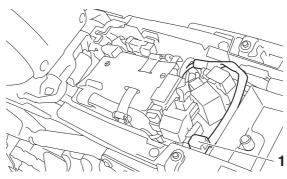
For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



Connecting the Yamaha diagnostic tool

Removing the rider seat. Refer to "GENERAL CHASSIS (1)" on page 4-1.

Removing the protective cap "1", and then connect the Yamaha diagnostic tool to the coupler.



Details about the displayed fault codes are shown in the following chart. Refer to this chart and check the vehicle.

Once all the work is complete, delete the fault codes. [B-3]

TIP

Check the inspection points after terminating the connection with the Yamaha diagnostic tool and turning the main switch off.

### Fault code table

TIP\_

Record all of the fault codes displayed and inspect the check points.

| Fault code<br>No. | Item                                                  | Symptom                                                                                                                                      | Check point                                                                                                                                                                                                                                                                        |
|-------------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11*<br>25*        | Front wheel sensor (intermittent pulses or no pulses) | Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.) | <ul> <li>Foreign material adhered around the front wheel sensor</li> <li>Incorrect installation of the front wheel</li> <li>Defective sensor rotor or incorrect installation of the rotor</li> <li>Defective front wheel sensor or incorrect installation of the sensor</li> </ul> |
| 12                | Rear wheel sensor (intermittent pulses or no pulses)  | Rear wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)  | <ul> <li>Foreign material adhered around the rear wheel sensor</li> <li>Incorrect installation of the rear wheel</li> <li>Defective sensor rotor or incorrect installation of the rotor</li> <li>Defective rear wheel sensor or incorrect installation of the sensor</li> </ul>    |
| 13*<br>26*        | Front wheel sensor (abnormal pulse period)            | Front wheel sensor signal is<br>not received properly. (The<br>pulse period is abnormal<br>while the vehicle is traveling.)                  | <ul> <li>Foreign material adhered around the front wheel sensor</li> <li>Incorrect installation of the front wheel</li> <li>Defective sensor rotor or incorrect installation of the rotor</li> <li>Defective front wheel sensor or incorrect installation of the sensor</li> </ul> |

| Fault code<br>No. | Item                                                       | Symptom                                                                                                                                      | Check point                                                                                                                                                                                                                                                                        |
|-------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14*<br>27*        | Rear wheel sensor (abnormal pulse period)                  | Rear wheel sensor signal is<br>not received properly. (The<br>pulse period is abnormal<br>while the vehicle is traveling.)                   | <ul> <li>Foreign material adhered around the rear wheel sensor</li> <li>Incorrect installation of the rear wheel</li> <li>Defective sensor rotor or incorrect installation of the rotor</li> <li>Defective rear wheel sensor or incorrect installation of the sensor</li> </ul>    |
| 15                | Front wheel sensor (open or short circuit)                 | Open or short circuit is detected in the front wheel sensor.                                                                                 | Defective coupler between the front wheel sensor and the hydraulic unit assembly     Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly     Defective front wheel sensor or hydraulic unit assembly                          |
| 16                | Rear wheel sensor (open or short circuit)                  | Open or short circuit is detected in the rear wheel sensor.                                                                                  | Defective coupler between the rear wheel sensor and the hydraulic unit assembly     Open or short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly     Defective rear wheel sensor or hydraulic unit assembly                             |
| 17*<br>45*        | Front wheel sensor (missing pulses)                        | Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)              | <ul> <li>Foreign material adhered around the front wheel sensor</li> <li>Incorrect installation of the front wheel</li> <li>Defective sensor rotor or incorrect installation of the rotor</li> <li>Defective front wheel sensor or incorrect installation of the sensor</li> </ul> |
| 18*<br>46*        | Rear wheel sensor (missing pulses)                         | Rear wheel sensor signal is<br>not received properly. (Miss-<br>ing pulses are detected in<br>the signal while the vehicle is<br>traveling.) | <ul> <li>Foreign material adhered around the rear wheel sensor</li> <li>Incorrect installation of the rear wheel</li> <li>Defective sensor rotor or incorrect installation of the rotor</li> <li>Defective rear wheel sensor or incorrect installation of the sensor</li> </ul>    |
| 21                | Hydraulic unit assembly (defective solenoid drive circuit) | Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.                                                            | Defective hydraulic unit assembly                                                                                                                                                                                                                                                  |

| Fault code<br>No. | Item                                                                               | Symptom                                                                                                                                                                                                                                                                     | Check point                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 24                | Brake light switch or tail/brake light                                             | Brake light signal is not received properly while the vehicle is traveling. (Brake light circuit, or front or rear brake light switch circuit).                                                                                                                             | Defective signaling system (tail/brake light or brake light switch)     Defective coupler between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly     Open or short circuit in the wire harness between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly     Defective hydraulic unit assembly |
| 31                | Hydraulic unit assembly<br>(abnormal ABS solenoid<br>power supply)                 | Power is not supplied to the solenoid circuit in the hydraulic unit assembly.                                                                                                                                                                                               | Blown ABS solenoid fuse     Defective coupler between the battery and the hydraulic unit assembly     Open or short circuit in the wire harness between the battery and the hydraulic unit assembly     Defective hydraulic unit assembly                                                                                                                                                 |
| 32                | Hydraulic unit assembly<br>(short circuit in ABS solenoid<br>power supply circuit) | Short circuit is detected in the solenoid power supply circuit in the hydraulic unit assembly.                                                                                                                                                                              | Defective hydraulic unit assembly                                                                                                                                                                                                                                                                                                                                                         |
| 33                | Hydraulic unit assembly<br>(abnormal ABS motor power<br>supply)                    | Power is not supplied to the motor circuit in the hydraulic unit assembly.                                                                                                                                                                                                  | Blown ABS motor fuse     Defective coupler between the battery and the hydraulic unit assembly     Open or short circuit in the wire harness between the battery and the hydraulic unit assembly     Defective hydraulic unit assembly                                                                                                                                                    |
| 34                | Hydraulic unit assembly (short circuit in ABS motor power supply circuit)          | Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly.                                                                                                                                                                                 | Defective hydraulic unit assembly                                                                                                                                                                                                                                                                                                                                                         |
| 41                | Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)    | <ul> <li>Pulses from the front wheel sensor are received intermittently while the vehicle is traveling.</li> <li>Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.</li> </ul> | <ul> <li>Incorrect installation of the front wheel sensor</li> <li>Incorrect rotation of the front wheel</li> <li>Front brake dragging</li> <li>Defective hydraulic unit assembly</li> </ul>                                                                                                                                                                                              |

| Fault code<br>No. | Item                                                                                                                                                                                                                          | Symptom                                                                                                                                                                                                                                                                                           | Check point                                                                                                                                                                                                                                                                     |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 42<br>47          | Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)                                                                                                                                                | <ul> <li>Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. (for fault code No. 42)</li> <li>Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.</li> </ul> | Incorrect installation of the rear wheel sensor (for fault code No. 42)     Incorrect rotation of the rear wheel     Rear brake dragging     Defective hydraulic unit assembly                                                                                                  |
| 43                | Front wheel sensor (missing pulses)                                                                                                                                                                                           | Front wheel sensor signal is<br>not received properly. (Miss-<br>ing pulses are detected in<br>the signal while the vehicle is<br>traveling.)                                                                                                                                                     | Foreign material adhered around the front wheel sensor     Incorrect installation of the front wheel     Defective sensor rotor or incorrect installation of the rotor     Defective front wheel sensor or incorrect installation of the sensor                                 |
| 44                | Rear wheel sensor (missing pulses)                                                                                                                                                                                            | Rear wheel sensor signal is<br>not received properly. (Miss-<br>ing pulses are detected in<br>the signal while the vehicle is<br>traveling.)                                                                                                                                                      | <ul> <li>Foreign material adhered around the rear wheel sensor</li> <li>Incorrect installation of the rear wheel</li> <li>Defective sensor rotor or incorrect installation of the rotor</li> <li>Defective rear wheel sensor or incorrect installation of the sensor</li> </ul> |
| 51<br>52          | <ul> <li>Vehicle system power supply (voltage of ABS ECU power supply is high) (for fault code No. 51)</li> <li>Vehicle system power supply (voltage of wheel sensor power supply is high) (for fault code No. 52)</li> </ul> | <ul> <li>Power voltage supplied to<br/>the ABS ECU in the<br/>hydraulic unit assembly is<br/>too high. (for fault code No.<br/>51)</li> <li>Power voltage supplied to<br/>the wheel sensor is too<br/>high. (for fault code No. 52)</li> </ul>                                                    | Defective battery     Disconnected battery terminal     Defective charging system                                                                                                                                                                                               |
| 53                | Vehicle system power supply<br>(voltage of ABS ECU power<br>supply is low)                                                                                                                                                    | Power voltage supplied to<br>the ABS ECU in the hydrau-<br>lic unit assembly is too low.                                                                                                                                                                                                          | Defective battery     Defective coupler between the battery and the hydraulic unit assembly     Open or short circuit in the wire harness between the battery and the hydraulic unit assembly     Defective charging system                                                     |
| 54                | Hydraulic unit assembly<br>(defective ABS solenoid and<br>ABS motor power supply cir-<br>cuits)                                                                                                                               | Abnormality is detected in the solenoid or motor power supply circuit in the hydraulic unit assembly.                                                                                                                                                                                             | Defective battery     Defective coupler between the battery and the hydraulic unit assembly     Open or short circuit in the wire harness between the battery and the hydraulic unit assembly     Defective charging system     Defective hydraulic unit assembly               |

| Fault code<br>No. | Item                                                             | Symptom                                                                             | Check point                                                                                                                                                             |
|-------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 55                | Hydraulic unit assembly (defective ABS ECU)                      | Abnormal data is detected in the hydraulic unit assembly.                           | Defective hydraulic unit assembly                                                                                                                                       |
| 56                | Hydraulic unit assembly (abnormal internal power supply)         | Abnormality is detected in the power supply circuit in the hydraulic unit assembly. | Defective hydraulic unit assembly                                                                                                                                       |
| 63                | Front wheel sensor power supply (voltage of power supply is low) | Power voltage supplied from<br>the ABS ECU to the front<br>wheel sensor is too low. | Short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly     Defective front wheel sensor     Defective hydraulic unit assembly |
| 64                | Rear wheel sensor power supply (voltage of power supply is low)  | Power voltage supplied from<br>the ABS ECU to the rear<br>wheel sensor is too low.  | Short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly     Defective rear wheel sensor     Defective hydraulic unit assembly   |

<sup>\*</sup>The fault code number varies according to the vehicle conditions. For details, refer to the "Trouble-shooting details".

# Troubleshooting details Fault code No. 11, 25

| Fault                                | code No.                                                             | 11<br>25        |                                                                                                                                                                                                                |  |
|--------------------------------------|----------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item                                 |                                                                      | Front wheel se  | nsor (intermittent pulses or no pulses)                                                                                                                                                                        |  |
| Symptom Front when received on ing.) |                                                                      | received or are | el sensor signal is not received properly. (Pulses are not r are received intermittently while the vehicle is travel-                                                                                          |  |
| Order                                | Item/components and pr                                               | robable cause   | Check or maintenance job                                                                                                                                                                                       |  |
| 1                                    | Foreign material adhered around the front wheel sensor               |                 | Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.                                                    |  |
| 2                                    | Incorrect installation of the front wheel                            |                 | Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-12.                                                                                                   |  |
| 3                                    | Defective sensor rotor or incorrect installation of the rotor        |                 | Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.                         |  |
| 4                                    | Defective front wheel sensor or incorrect installation of the sensor |                 | Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary.  Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14. |  |

#### TIP

With the front wheel stopped, the rear wheel was rotated for longer than about 20 seconds (fault code No. 11) or for longer than about 2 seconds (fault code No. 25).

### Fault code No. 12

| Fault code No. |                                                                     | 12                                                                                                                                          |                                                                                                                                                                                                               |
|----------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item           |                                                                     | Rear wheel ser                                                                                                                              | nsor (intermittent pulses or no pulses)                                                                                                                                                                       |
| Symptom        |                                                                     | Rear wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.) |                                                                                                                                                                                                               |
| Order          | Item/components and pr                                              | robable cause                                                                                                                               | Check or maintenance job                                                                                                                                                                                      |
| 1              | Foreign material adhered around the rear wheel sensor               |                                                                                                                                             | Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.                                                   |
| 2              | Incorrect installation of the rear wheel                            |                                                                                                                                             | Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-22.                                                                                                   |
| 3              | Defective sensor rotor or incorrect installation of the rotor       |                                                                                                                                             | Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.                         |
| 4              | Defective rear wheel sensor or incorrect installation of the sensor |                                                                                                                                             | Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary.  Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-23. |

### Fault code No. 13, 26

| Fault o | code No.                                                             | 13<br>26       |                                                                                                                                                                                                                |  |
|---------|----------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item    |                                                                      | Front wheel se | nsor (abnormal pulse period)                                                                                                                                                                                   |  |
| Sympt   | tom                                                                  |                | Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)                                                                                             |  |
| Order   | Item/components and pr                                               | obable cause   | Check or maintenance job                                                                                                                                                                                       |  |
| 1       | Foreign material adhered around the front wheel sensor               |                | Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.                                                    |  |
| 2       | Incorrect installation of the front wheel                            |                | Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-12.                                                                                                   |  |
| 3       | Defective sensor rotor or incorrect installation of the rotor        |                | Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.                         |  |
| 4       | Defective front wheel sensor or incorrect installation of the sensor |                | Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary.  Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14. |  |

#### TIP

- If the front brake ABS operates continuously for 20 seconds or more, fault code No. 26 will be recorded.
   If the front brake ABS operates continuously for 36 seconds or more, fault code No. 13 will be recorded.
- Vehicle possibly ridden on uneven roads.

### Fault code No. 14, 27

| Fault | code No.                                                            | 14<br>27                                                                                                          |                                                                                                                                                                                                               |
|-------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item  |                                                                     | Rear wheel se                                                                                                     | nsor (abnormal pulse period)                                                                                                                                                                                  |
| Symp  | tom                                                                 | Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.) |                                                                                                                                                                                                               |
| Order | Item/components and pr                                              | robable cause                                                                                                     | Check or maintenance job                                                                                                                                                                                      |
| 1     | Foreign material adhered around the rear wheel sensor               |                                                                                                                   | Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.                                                   |
| 2     | Incorrect installation of the rear wheel                            |                                                                                                                   | Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-22.                                                                                                   |
| 3     | Defective sensor rotor or incorrect installation of the rotor       |                                                                                                                   | Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.                         |
| 4     | Defective rear wheel sensor or incorrect installation of the sensor |                                                                                                                   | Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary.  Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-23. |

#### TIP

- If the rear brake ABS operates continuously for 20 seconds or more, fault code No. 27 will be recorded. If the rear brake ABS operates continuously for 36 seconds or more, fault code No. 14 will be recorded.
- Vehicle possibly ridden on uneven roads.

| Fault code No. |                                                                                  | 15                                                           |                                                                                                                                                                                                                                                             |  |
|----------------|----------------------------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item           |                                                                                  | Front wheel sensor (open or short circuit)                   |                                                                                                                                                                                                                                                             |  |
| Sympt          | tom                                                                              | Open or short circuit is detected in the front wheel sensor. |                                                                                                                                                                                                                                                             |  |
| Order          | er Item/components and probable cause                                            |                                                              | Check or maintenance job                                                                                                                                                                                                                                    |  |
| 1              | Defective coupler between the front wheel sensor and the hydraulic unit assembly |                                                              | Check the coupler for any pins that may be pulled out. Check the locking condition of the coupler. If there is a malfunction, repair it and connect the coupler securely.  TIP  Turn the main switch to "OFF" before disconnecting or connecting a coupler. |  |

| Fault o | code No.                                                                       | 15                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------|--------------------------------------------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item    |                                                                                | Front wheel sensor (open or short circuit) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Sympt   | tom                                                                            | Open or short                              | circuit is detected in the front wheel sensor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Order   | Item/components and pr                                                         | robable cause                              | Check or maintenance job                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2       | Open or short circuit in the between the front wheel s hydraulic unit assembly |                                            | <ul> <li>Check for continuity between the white terminal "1" and the white terminal "4" and between the black terminal "2" and the black terminal "5".</li> <li>If there is no continuity, the wire harness is defective. Replace the wire harness.</li> <li>Check that there is no short circuit between the white terminal "1" and the black terminal "2" and between the white terminal "4" and the black terminal "5".</li> <li>If there is short circuit, the wire harness is defective. Replace the wire harness.</li> <li>Check that there is no short circuit between the black/yellow terminal "3" and the white terminal "4" and between the black/yellow terminal "3" and the black terminal "5".</li> <li>If there is short circuit, the wire harness is defective. Replace the wire harness.</li> <li>There is short circuit, the wire harness is defective. Replace the wire harness.</li> <li>There is short circuit, the wire harness is defective. Replace the wire harness.</li> </ul> |
| 3       | Defective front wheel sens<br>unit assembly                                    | sor or hydraulic                           | If the above items were performed and no malfunctions were found, the wheel sensor or hydraulic unit assembly is defective. Replace the wheel sensor or hydraulic unit assembly.  Refer to "FRONT WHEEL" on page 4-10 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Fault code No. |                                                                                 | 16                                        |                                                                                                                                                                                                                                                                     |  |
|----------------|---------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item           |                                                                                 | Rear wheel sensor (open or short circuit) |                                                                                                                                                                                                                                                                     |  |
| Sympt          | Symptom Open                                                                    |                                           | or short circuit is detected in the rear wheel sensor.                                                                                                                                                                                                              |  |
| Order          | Item/components and probable cause                                              |                                           | Check or maintenance job                                                                                                                                                                                                                                            |  |
| 1              | Defective coupler between the rear wheel sensor and the hydraulic unit assembly |                                           | Check the coupler for any pins that may be pulled out.     Check the locking condition of the coupler.     If there is a malfunction, repair it and connect the coupler securely.  TIP  Turn the main switch to "OFF" before disconnecting or connecting a coupler. |  |

| Fault o | code No.                                                                       | 16                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------|--------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item    |                                                                                | Rear wheel sensor (open or short circuit) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Sympt   | tom                                                                            | Open or short                             | circuit is detected in the rear wheel sensor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Order   | Item/components and pr                                                         | robable cause                             | Check or maintenance job                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2       | Open or short circuit in the between the rear wheel so hydraulic unit assembly |                                           | <ul> <li>Check for continuity between the white terminal "1" and the white terminal "4" and between the black terminal "2" and the black terminal "5".</li> <li>If there is no continuity, the wire harness is defective. Replace the wire harness.</li> <li>Check that there is no short circuit between the white terminal "1" and the black terminal "2" and between the white terminal "4" and the black terminal "5".</li> <li>If there is short circuit, the wire harness is defective. Replace the wire harness.</li> <li>Check that there is no short circuit between the black/yellow terminal "3" and the white terminal "4" and between the black/yellow terminal "3" and the black terminal "5".</li> <li>If there is short circuit, the wire harness is defective. Replace the wire harness.</li> <li>There is short circuit, the wire harness is defective. Replace the wire harness.</li> <li>There is short circuit, the wire harness is defective. Replace the wire harness.</li> </ul> |
| 3       | Defective rear wheel sens unit assembly                                        | or or hydraulic                           | If the above items were performed and no malfunctions were found, the wheel sensor or hydraulic unit assembly is defective. Replace the wheel sensor or hydraulic unit assembly.  Refer to "REAR WHEEL" on page 4-18 and "ABS (ANTILOCK BRAKE SYSTEM)" on page 4-51.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

### Fault code No. 17, 45

| Fault code No. |                                                        | 17<br>45                                                                                                                        |                                                                                                                                                             |
|----------------|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item           |                                                        | Front wheel sensor (missing pulses)                                                                                             |                                                                                                                                                             |
| Symptom        |                                                        | Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.) |                                                                                                                                                             |
| Order          | Item/components and probable cause                     |                                                                                                                                 | Check or maintenance job                                                                                                                                    |
| 1              | Foreign material adhered around the front wheel sensor |                                                                                                                                 | Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary. |
| 2              | Incorrect installation of the front wheel              |                                                                                                                                 | Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-12.                                                |

| Fault code No. |                                                                      | 17<br>45                                                                                                                        |                                                                                                                                                                                                                |
|----------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item           |                                                                      | Front wheel sensor (missing pulses)                                                                                             |                                                                                                                                                                                                                |
| Symptom        |                                                                      | Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.) |                                                                                                                                                                                                                |
| Order          | Item/components and probable cause                                   |                                                                                                                                 | Check or maintenance job                                                                                                                                                                                       |
| 3              | Defective sensor rotor or incorrect installation of the rotor        |                                                                                                                                 | Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.                         |
| 4              | Defective front wheel sensor or incorrect installation of the sensor |                                                                                                                                 | Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary.  Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14. |

### TIP -

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mi/h) or more, fault code No. 17 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mi/h) or less, fault code No. 45 will be recorded first and fault code No. 17 will be recorded if the condition continues.

### Fault code No. 18, 46

| Fault code No. |                                                                     | 18<br>46                          |                                                                                                                                                                                                               |  |
|----------------|---------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item           |                                                                     | Rear wheel ser                    | nsor (missing pulses)                                                                                                                                                                                         |  |
| Symp           | tom                                                                 | Rear wheel ser<br>are detected in | Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)                                                                                |  |
| Order          | Item/components and pr                                              | robable cause                     | Check or maintenance job                                                                                                                                                                                      |  |
| 1              | Foreign material adhered around the rear wheel sensor               |                                   | Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.                                                   |  |
| 2              | Incorrect installation of the rear wheel                            |                                   | Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-22.                                                                                                   |  |
| 3              | Defective sensor rotor or incorrect installation of the rotor       |                                   | Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.                         |  |
| 4              | Defective rear wheel sensor or incorrect installation of the sensor |                                   | Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary.  Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-23. |  |

#### TIP

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mi/h) or more, fault code No. 18 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mi/h) or less, fault code No. 46 will be recorded first and fault code No. 18 will be recorded if the condition continues.

### Fault code No. 21

| Fault o | code No.                           | 21                                                                                |                                                                                            |
|---------|------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Item    |                                    | Hydraulic unit assembly (defective solenoid drive circuit)                        |                                                                                            |
| Sympt   | tom                                | Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited. |                                                                                            |
| Order   | Item/components and probable cause |                                                                                   | Check or maintenance job                                                                   |
| 1       | Defective hydraulic unit assembly  |                                                                                   | Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51. |

### Fault code No. 24

| Fault o | ode No.                                                                                                                                                    | 24             |                                                                                                                                                                                                                 |  |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item    |                                                                                                                                                            | Brake light sw | Brake light switch or tail/brake light                                                                                                                                                                          |  |
| Sympt   |                                                                                                                                                            |                | Brake light signal is not received properly while the vehicle is trav-<br>ling (Brake light circuit, or front or rear brake light switch circuit).                                                              |  |
| Order   | Item/components and pr                                                                                                                                     | robable cause  | Check or maintenance job                                                                                                                                                                                        |  |
| 1       | Defective signaling system (tail/brake light or brake light switch)                                                                                        |                | Check the tail/brake light and brake light switches.<br>Refer to "CHECKING THE SWITCHES" on page 8-147.                                                                                                         |  |
| 2       | Defective coupler between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly                                    |                | <ul> <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> |  |
| 3       | Open or short circuit in the wire harness<br>between the signaling system (tail/brake<br>light or brake light switch) and the hydrau-<br>lic unit assembly |                | Between ABS ECU coupler and front brake light switch coupler.     (yellow-yellow)     Between ABS ECU coupler and rear brake light switch coupler.     (yellow-yellow)                                          |  |
| 4       | Defective hydraulic unit assembly                                                                                                                          |                | If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51.                                                    |  |

| Fault code No. |                                    | 31                                                                            |                                                                                                                                                           |
|----------------|------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item           |                                    | Hydraulic unit assembly (abnormal ABS solenoid power supply)                  |                                                                                                                                                           |
| Symptom        |                                    | Power is not supplied to the solenoid circuit in the hydraulic unit assembly. |                                                                                                                                                           |
| Order          | Item/components and probable cause |                                                                               | Check or maintenance job                                                                                                                                  |
| 1              | Blown ABS solenoid fuse            |                                                                               | Check the ABS solenoid fuse. If the ABS solenoid fuse is blown, replace the fuse and check the wire harness. Refer to "CHECKING THE FUSES" on page 8-151. |

| Fault o | code No.                                                                                      | 31                                                                            |                                                                                                                                                                                                          |
|---------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item    |                                                                                               | Hydraulic unit                                                                | assembly (abnormal ABS solenoid power supply)                                                                                                                                                            |
| Sympt   | om                                                                                            | Power is not supplied to the solenoid circuit in the hydraulic unit assembly. |                                                                                                                                                                                                          |
| Order   | Item/components and probable cause                                                            |                                                                               | Check or maintenance job                                                                                                                                                                                 |
| 2       | Defective coupler between the battery and the hydraulic unit assembly                         |                                                                               | Check the locking condition of the coupler.     If there is a malfunction, repair it and connect the coupler securely.  TIP  Turn the main switch to "OFF" before disconnecting or connecting a coupler. |
| 3       | Open or short circuit in the wire harness between the battery and the hydraulic unit assembly |                                                                               | Replace if there is an open or short circuit.     Between ABS ECU coupler and ABS solenoid fuse. (red/white–red/white)                                                                                   |
| 4       | Defective hydraulic unit assembly                                                             |                                                                               | If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51.                                             |

### Fault code No. 32

| Fault code No. |                                    | 32                                                                                             |                                                                                            |  |
|----------------|------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--|
| Item           |                                    | Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)                   |                                                                                            |  |
| Symptom        |                                    | Short circuit is detected in the solenoid power supply circuit in the hydraulic unit assembly. |                                                                                            |  |
| Order          | Item/components and probable cause |                                                                                                | Check or maintenance job                                                                   |  |
| 1              | Defective hydraulic unit assembly  |                                                                                                | Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51. |  |

| Fault code No. |                                                                       | 33                                                                         |                                                                                                                                                                                                                                                                     |  |
|----------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item           | Item Hy                                                               |                                                                            | Hydraulic unit assembly (abnormal ABS motor power supply)                                                                                                                                                                                                           |  |
|                |                                                                       | Power is not supplied to the motor circuit in the hydraulic unit assembly. |                                                                                                                                                                                                                                                                     |  |
| Order          | Item/components and probable cause                                    |                                                                            | Check or maintenance job                                                                                                                                                                                                                                            |  |
| 1              | Blown ABS motor fuse                                                  |                                                                            | Check the ABS motor fuse. If the ABS motor fuse is blown, replace the fuse and check the wire harness. Refer to "CHECKING THE FUSES" on page 8-151.                                                                                                                 |  |
| 2              | Defective coupler between the battery and the hydraulic unit assembly |                                                                            | Check the coupler for any pins that may be pulled out.     Check the locking condition of the coupler.     If there is a malfunction, repair it and connect the coupler securely.  TIP  Turn the main switch to "OFF" before disconnecting or connecting a coupler. |  |

| Fault code No. Item |                                                                                               | 33                                                                         |                                                                                                                                                                                                                                                 |
|---------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     |                                                                                               | Hydraulic unit assembly (abnormal ABS motor power supply)                  |                                                                                                                                                                                                                                                 |
|                     |                                                                                               | Power is not supplied to the motor circuit in the hydraulic unit assembly. |                                                                                                                                                                                                                                                 |
| Order               | Item/components and probable cause                                                            |                                                                            | Check or maintenance job                                                                                                                                                                                                                        |
| 3                   | Open or short circuit in the wire harness between the battery and the hydraulic unit assembly |                                                                            | <ul> <li>Replace if there is an open or short circuit.</li> <li>Between ABS ECU coupler and starter relay coupler (ABS motor fuse).</li> <li>(red/blue–red/blue)</li> <li>Between ABS ECU coupler and ground.</li> <li>(black–black)</li> </ul> |
| 4                   | Defective hydraulic unit assembly                                                             |                                                                            | If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51.                                                                                    |

### Fault code No. 34

| Fault code No. |                                    | 34                                                                                          |                                                                                            |
|----------------|------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Item           |                                    | Hydraulic unit assembly (short circuit in ABS motor power supply circuit)                   |                                                                                            |
| Symptom        |                                    | Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly. |                                                                                            |
| Order          | Item/components and probable cause |                                                                                             | Check or maintenance job                                                                   |
| 1              | Defective hydraulic unit assembly  |                                                                                             | Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51. |

| Fault code No. |                                                  | 41                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                       |
|----------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item           |                                                  | Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)                                                                                                                                                                                             |                                                                                                                                                                                                       |
| Symptom        |                                                  | <ul> <li>Pulses from the front wheel sensor are received intermittently while the vehicle is traveling.</li> <li>Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.</li> </ul> |                                                                                                                                                                                                       |
| Order          | Item/components and probable cause               |                                                                                                                                                                                                                                                                             | Check or maintenance job                                                                                                                                                                              |
| 1              | Incorrect installation of the front wheel sensor |                                                                                                                                                                                                                                                                             | Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-12.                                                                                          |
| 2              | Incorrect rotation of the front wheel            |                                                                                                                                                                                                                                                                             | Check that there is no brake disc drag on the front wheel and make sure that it rotates smoothly. Refer to "CHECKING THE FRONT WHEEL" on page 4-12 and "CHECKING THE FRONT BRAKE DISCS" on page 4-31. |

| Fault code No. 4 |                                    | 41                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                         |  |
|------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item             |                                    | Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)                                                                                                                                                                                             |                                                                                                                                                                                                                                         |  |
| Symptom          |                                    | <ul> <li>Pulses from the front wheel sensor are received intermittently while the vehicle is traveling.</li> <li>Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.</li> </ul> |                                                                                                                                                                                                                                         |  |
| Order            | Item/components and probable cause |                                                                                                                                                                                                                                                                             | Check or maintenance job                                                                                                                                                                                                                |  |
| 3                | Front brake dragging               |                                                                                                                                                                                                                                                                             | Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake lever is operated and that the pressure decreases when the lever is released.  Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-31. |  |
| 4                | Defective hydraulic unit assembly  |                                                                                                                                                                                                                                                                             | If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51.                                                                            |  |

### Fault code No. 42, 47

| Fault o | code No.                                                                | 42<br>47                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                       |
|---------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item    | Item Rear widepres                                                      |                                                                                                                                                                                                                                                                                                   | S (intermittent wheel speed pulses or incorrect on)                                                                                                                                                                                   |
|         |                                                                         | <ul> <li>Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. (for fault code No. 42)</li> <li>Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.</li> </ul> |                                                                                                                                                                                                                                       |
| Order   | Item/components and probable cause                                      |                                                                                                                                                                                                                                                                                                   | Check or maintenance job                                                                                                                                                                                                              |
| 1       | Incorrect installation of the rear wheel sensor (for fault code No. 42) |                                                                                                                                                                                                                                                                                                   | Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-22.                                                                                                                           |
| 2       | Incorrect rotation of the rear wheel                                    |                                                                                                                                                                                                                                                                                                   | Check that there is no brake disc drag on the wheel and make sure that it rotates smoothly.  Refer to "CHECKING THE REAR WHEEL" on page 4-22.                                                                                         |
| 3       | Rear brake dragging                                                     |                                                                                                                                                                                                                                                                                                   | Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake pedal is operated and that the pressure decreases when the pedal is released.  Refer to "CHECKING THE REAR BRAKE DISC" on page 4-45. |
| 4       | Defective hydraulic unit assembly                                       |                                                                                                                                                                                                                                                                                                   | If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51.                                                                          |

### Fault code No. 43

| Fault code No. |                                                                      | 43                                                                                                                              |                                                                                                                                                                                                                |  |
|----------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item           |                                                                      | Front wheel se                                                                                                                  | Front wheel sensor (missing pulses)                                                                                                                                                                            |  |
| Sympt          | com                                                                  | Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.) |                                                                                                                                                                                                                |  |
| Order          | Item/components and pr                                               | robable cause                                                                                                                   | Check or maintenance job                                                                                                                                                                                       |  |
| 1              | Foreign material adhered around the front wheel sensor               |                                                                                                                                 | Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.                                                    |  |
| 2              | Incorrect installation of the front wheel                            |                                                                                                                                 | Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-12.                                                                                                   |  |
| 3              | Defective sensor rotor or incorrect installation of the rotor        |                                                                                                                                 | Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.                         |  |
| 4              | Defective front wheel sensor or incorrect installation of the sensor |                                                                                                                                 | Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary.  Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14. |  |

| Fault o        | code No.                                                            | 44                                 |                                                                                                                                                                                                               |  |
|----------------|---------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item           |                                                                     | Rear wheel sensor (missing pulses) |                                                                                                                                                                                                               |  |
| Symptom Re are |                                                                     | Rear wheel ser<br>are detected in  | Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)                                                                                |  |
| Order          | Item/components and pr                                              | robable cause                      | Check or maintenance job                                                                                                                                                                                      |  |
| 1              | Foreign material adhered around the rear wheel sensor               |                                    | Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.                                                   |  |
| 2              | Incorrect installation of the rear wheel                            |                                    | Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-22.                                                                                                   |  |
| 3              | Defective sensor rotor or incorrect installation of the rotor       |                                    | Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.                         |  |
| 4              | Defective rear wheel sensor or incorrect installation of the sensor |                                    | Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary.  Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-23. |  |

### Fault code No. 51, 52

| Fault code No. |                                    | 51<br>52                                                                                                                                                                                                                      |                                                                                              |
|----------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Item           |                                    | <ul> <li>Vehicle system power supply (voltage of ABS ECU power supply is high) (for fault code No. 51)</li> <li>Vehicle system power supply (voltage of wheel sensor power supply is high) (for fault code No. 52)</li> </ul> |                                                                                              |
| 0              |                                    | <ul> <li>Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high. (for fault code No. 51)</li> <li>Power voltage supplied to the wheel sensor is too high. (for fault code No. 52)</li> </ul>        |                                                                                              |
| Order          | Item/components and probable cause |                                                                                                                                                                                                                               | Check or maintenance job                                                                     |
| 1              | Defective battery                  |                                                                                                                                                                                                                               | Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152. |
| 2              | Disconnected battery terminal      |                                                                                                                                                                                                                               | Check the connection. Replace or reconnect the terminal if necessary.                        |
| 3              | Defective charging system          |                                                                                                                                                                                                                               | Check the charging system. Refer to "CHARGING SYSTEM" on page 8-13.                          |

| Fault code No. |                                                                                               | 53                                                                   |                                                                                                                                                                                                                              |
|----------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item           |                                                                                               | Vehicle system power supply (voltage of ABS ECU power supply is low) |                                                                                                                                                                                                                              |
| Symp           | Symptom Power vo                                                                              |                                                                      | supplied to the ABS ECU in the hydraulic unit assem-                                                                                                                                                                         |
| Order          | Item/components and probable cause                                                            |                                                                      | Check or maintenance job                                                                                                                                                                                                     |
| 1              | Defective battery                                                                             |                                                                      | Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.                                                                                                                                 |
| 2              | Defective coupler between the battery and the hydraulic unit assembly                         |                                                                      | <ul> <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> <li>TIP</li> </ul> |
|                |                                                                                               |                                                                      | Turn the main switch to "OFF" before disconnecting or connecting a coupler.                                                                                                                                                  |
| 3              | Open or short circuit in the wire harness between the battery and the hydraulic unit assembly |                                                                      | Replace if there is an open or short circuit.     Between ABS ECU coupler and ABS ECU fuse. (brown/red-brown/red)                                                                                                            |
| 4              | Defective charging system                                                                     |                                                                      | Check the charging system.<br>Refer to "CHARGING SYSTEM" on page 8-13.                                                                                                                                                       |

### Fault code No. 54

| Fault o | code No.                                                                                      | 54                                                                                   |                                                                                                                                                                                                                                                          |  |
|---------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Item    |                                                                                               | Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits) |                                                                                                                                                                                                                                                          |  |
| Sympt   | Symptom Abnorm cuit in the                                                                    |                                                                                      | mality is detected in the solenoid or motor power supply cirthe hydraulic unit assembly.                                                                                                                                                                 |  |
| Order   | Item/components and pr                                                                        | robable cause                                                                        | Check or maintenance job                                                                                                                                                                                                                                 |  |
| 1       | Defective battery                                                                             |                                                                                      | Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.                                                                                                                                                             |  |
| 2       | Defective coupler between the battery and the hydraulic unit assembly                         |                                                                                      | Check the coupler for any pins that may be pulled out. Check the locking condition of the coupler. If there is a malfunction, repair it and connect the coupler securely.  TIP  Turn the main switch to "OFF" before disconnecting or                    |  |
|         |                                                                                               |                                                                                      | connecting a coupler.                                                                                                                                                                                                                                    |  |
| 3       | Open or short circuit in the wire harness between the battery and the hydraulic unit assembly |                                                                                      | <ul> <li>Replace if there is an open or short circuit.</li> <li>Between ABS ECU coupler and starter relay coupler (ABS motor fuse).<br/>(red/blue–red/blue)</li> <li>Between ABS ECU coupler and ABS solenoid fuse.<br/>(red/white–red/white)</li> </ul> |  |
| 4       | Defective charging system                                                                     |                                                                                      | Check the charging system. Refer to "CHARGING SYSTEM" on page 8-13.                                                                                                                                                                                      |  |
| 5       | Defective hydraulic unit assembly                                                             |                                                                                      | If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51.                                                                                             |  |

| Fault code No. |                                    | 55                                                        |                                                                                            |
|----------------|------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Item           |                                    | Hydraulic unit assembly (defective ABS ECU)               |                                                                                            |
| Symptom        |                                    | Abnormal data is detected in the hydraulic unit assembly. |                                                                                            |
| Order          | Item/components and probable cause |                                                           | Check or maintenance job                                                                   |
| 1              | Defective hydraulic unit assembly  |                                                           | Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51. |

### Fault code No. 56

| Fault code No. |                                    | 56                                                                                  |                                                                                            |
|----------------|------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Item           |                                    | Hydraulic unit assembly (abnormal internal power supply)                            |                                                                                            |
| Symptom        |                                    | Abnormality is detected in the power supply circuit in the hydraulic unit assembly. |                                                                                            |
| Order          | Item/components and probable cause |                                                                                     | Check or maintenance job                                                                   |
| 1              | Defective hydraulic unit assembly  |                                                                                     | Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51. |

| Fault c | Fault code No. 63                                      |                           |                                                                                                                                                                                                                                                                                                                                    |  |
|---------|--------------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Fault o | code No.                                               | 63                        |                                                                                                                                                                                                                                                                                                                                    |  |
| Item    |                                                        | Front wheel se            | Front wheel sensor power supply (voltage of power supply is low)                                                                                                                                                                                                                                                                   |  |
| Sympt   | tom                                                    | Power voltage is too low. | Power voltage supplied from the ABS ECU to the front wheel sensor is too low.                                                                                                                                                                                                                                                      |  |
| Order   | Item/components and pr                                 | robable cause             | Check or maintenance job                                                                                                                                                                                                                                                                                                           |  |
| 1       | the front wheel sensor and the hydraulic unit assembly |                           | <ul> <li>Check that there is no short circuit between the white terminal "1" and the black terminal "2".</li> <li>Check that there is no short circuit between the black/yellow terminal "3" and the white terminal "1".</li> <li>If there is a short circuit, the wire harness is defective. Replace the wire harness.</li> </ul> |  |
|         |                                                        |                           | RW B W B W W/G GR W/Y B B W/W Gy RL Y B B B//R LgL LgW BL BY 3                                                                                                                                                                                                                                                                     |  |
|         |                                                        |                           | 4. ABS ECU<br>5. Wheel sensor                                                                                                                                                                                                                                                                                                      |  |
| 2       | Defective front wheel sens                             | sor                       | <ul> <li>Check that there is no short circuit between the gray terminal "1" and the white terminal "2".</li> <li>If there is a short circuit, the wheel sensor is defective. Repair or replace the wheel sensor.</li> </ul>                                                                                                        |  |
|         |                                                        |                           | RIL Y B B BIR LOL LOW BL BY  3 4                                                                                                                                                                                                                                                                                                   |  |
|         |                                                        |                           | 3. ABS ECU<br>4. Wheel sensor                                                                                                                                                                                                                                                                                                      |  |

| Fault code No. 63 |                                    | 63                                                               |                                                                                            |  |
|-------------------|------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--|
|                   |                                    | Front wheel sensor power supply (voltage of power supply is low) |                                                                                            |  |
|                   |                                    |                                                                  | supplied from the ABS ECU to the front wheel sensor                                        |  |
| Order             | Item/components and probable cause |                                                                  | Check or maintenance job                                                                   |  |
| 3                 | Defective hydraulic unit assembly  |                                                                  | Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51. |  |

| Fault code No.  Item  Symptom |                             | Rear wheel sensor power supply (voltage of power supply is low)  Power voltage supplied from the ABS ECU to the rear wheel sensor is too low. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               |                             |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Order | Item/components and probable cause                                                                    |  | Check or maintenance job                                                                                                                                                                                                                                                                                                           |
|                               |                             |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1     | Short circuit in the wire harness between<br>the rear wheel sensor and the hydraulic<br>unit assembly |  | <ul> <li>Check that there is no short circuit between the white terminal "1" and the black terminal "2".</li> <li>Check that there is no short circuit between the black/yellow terminal "3" and the white terminal "1".</li> <li>If there is a short circuit, the wire harness is defective. Replace the wire harness.</li> </ul> |
|                               |                             |                                                                                                                                               | RW B W B W WG GR WY B B W WGy RL Y B B B/R LgL LgW BL BY  4 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                    |
|                               |                             |                                                                                                                                               | 4. ABS ECU<br>5. Wheel sensor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                    |
| 2                             | Defective rear wheel sensor |                                                                                                                                               | <ul> <li>Check that there is no short circuit between the gray terminal "1" and the white terminal "2".</li> <li>If there is a short circuit, the wheel sensor is defective. Repair or replace the wheel sensor.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                    |
|                               |                             |                                                                                                                                               | RW B W B W WG GR WY B B W WG W BL BY B W WG W BL BY B W WG W BL BY B W W W G W BL B W W W G W B W W G W B W W G W W G W W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W W G W G W W G W W G W G W W G W W G W G W W G W G W W G W G W W G W W G W G W W G W G W W G W G W W G W G W W G W G W W G W G W W G W G W W G W G W W G W G W W G W G W W G W G W W G W G W W G W G W G W W G W G W G W W G W G W W G W G W W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W G W |       |                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                    |
|                               |                             |                                                                                                                                               | 3. ABS ECU<br>4. Wheel sensor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                    |

| Fault code No. Item |                                    | 64                                                                           |                                                                                            |
|---------------------|------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                     |                                    | Rear wheel sensor power supply (voltage of power supply is low)              |                                                                                            |
| Symptom             |                                    | Power voltage supplied from the ABS ECU to the rear wheel sensor is too low. |                                                                                            |
| Order               | Item/components and probable cause |                                                                              | Check or maintenance job                                                                   |
| 3                   | Defective hydraulic unit assembly  |                                                                              | Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-51. |

EAS31167

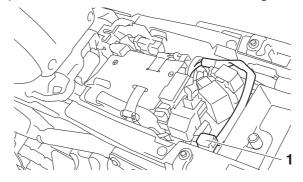
#### [B-3] DELETING THE FAULT CODES

To delete the fault codes, use the Yamaha diagnostic tool. For information about deleting the fault codes, refer to the operation manual of the Yamaha diagnostic tool. Check that all the displayed fault codes are deleted.



### Connecting the Yamaha diagnostic tool

Remove the protective cap "1", and then connect the Yamaha diagnostic tool to the coupler.



EAS31168

#### [C-1] FINAL CHECK

Check all the following items to complete the inspection.

If the process is not completed properly, start again from the beginning.

### **Checking procedures**

- 1. Check the brake fluid level in the brake master cylinder reservoir and brake fluid reservoir. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-12.
- 2. Check the wheel sensors for proper installation.

  Refer to "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-16 and "INSTALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-23.
- 3. Perform brake line routing confirmation.

Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-56.

If it does not have reaction-force properly, the brake hose is not properly routed or connected.

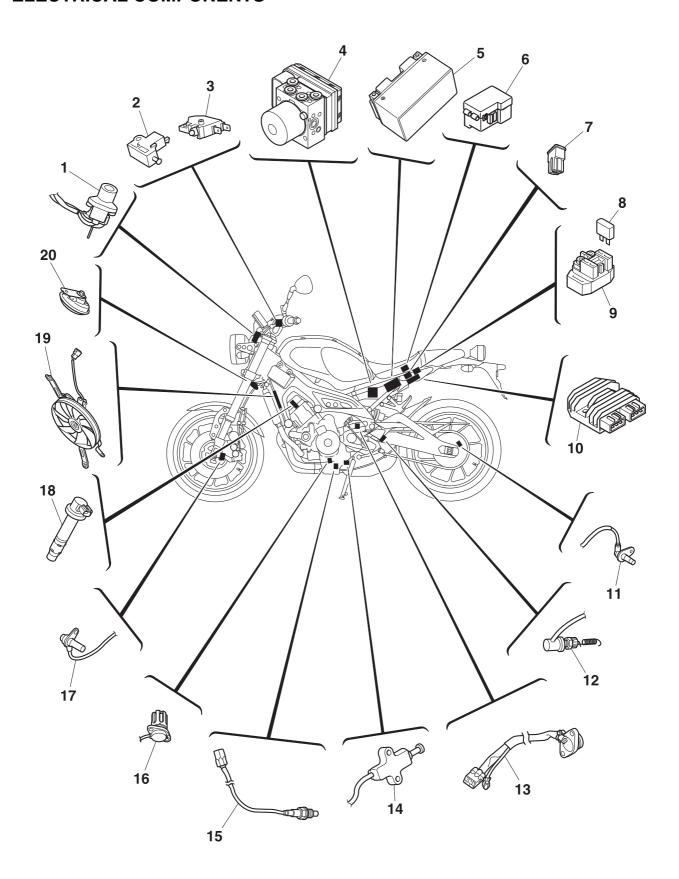
- 4. Delete the fault codes.
  - Refer to "[B-3] DELETING THE FAULT CODES" on page 8-141.
- 5. Checking the ABS warning light.

Refer to "CHECKING THE ABS WARNING LIGHT" on page 4-59.

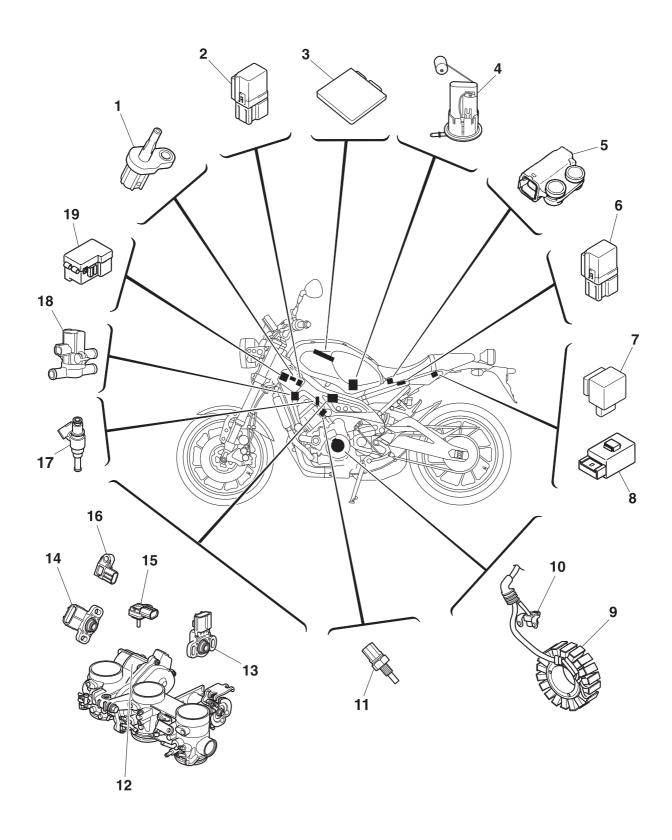
If the ABS warning light does not turn off, the possible causes are following:

• The problem is not solved.

- Open circuit between the ABS ECU and the meter assembly.
   Check for continuity between green/red terminal of the ABS ECU coupler and green/red terminal of the meter assembly coupler.
- Malfunction in the meter assembly circuit.
- Malfunction in the ABS warning light circuit in the hydraulic unit assembly.



- 1. Main switch/Immobilizer unit
- 2. Clutch switch
- 3. Front brake light switch
- 4. Hydraulic unit assembly
- 5. Battery
- 6. Fuse box 2
- 7. Main fuse
- 8. Fuel injection system fuse
- 9. Starter relay
- 10.Rectifier/regulator
- 11.Rear wheel sensor
- 12.Rear brake light switch
- 13.Gear position switch
- 14. Sidestand switch
- 15.O<sub>2</sub> sensor
- 16.Oil level switch
- 17.Front wheel sensor
- 18.Ignition coil
- 19.Radiator fan motor
- 20.Horn



- 1. Intake air temperature sensor
- 2. Headlight relay
- 3. ECU (Engine Control Unit)
- 4. Fuel pump
- 5. Lean angle sensor
- 6. Radiator fan motor relay
- 7. Turn signal/hazard relay
- 8. Relay unit
- 9. Stator coil
- 10. Crankshaft position sensor
- 11. Coolant temperature sensor
- 12. Throttle servo motor
- 13. Accelerator position sensor
- 14. Throttle position sensor
- 15.Intake air pressure sensor 1
- 16.Intake air pressure sensor 2
- 17.Injector
- 18. Air induction system solenoid
- 19.Fuse box 1

### FAS30549 **CHECKING THE SWITCHES** R/Y Br/W B/Y Y Dg | H | Y | B | B | R | G | Br | Ch | LOW | O 9 Dg Br/W Ch R/W L/W Dg B R/B B/L Br/W Ch B/L P B/G OFF Y/W L/Y ON O (W/GB/W) 2 R/Y Y ON O O 10 3 Ch Br/W Dg R/W R/B L/W B OFF RUN 0-0 Ν RUN O O R OFF OO 4 W/G B/W FREE OOO PUSH ON P B/G Y/W UP O O 5 12 DOWN O 6 B/R B/L B/L 13 7 Br/R R,W Br/L Br/R ON 0-0-0 R,W OFF Br/L Gy 14 8 I L/B (Br Y) ВВ

- 1. Dimmer switch
- 2. Pass switch
- 3. Turn signal switch
- 4. Horn switch
- 5. Traction control system switch
- 6. Clutch switch
- 7. Oil level switch
- 8. Sidestand switch
- 9. Hazard switch
- 10.Start/engine stop switch
- 11.Drive mode switch
- 12. Front brake light switch
- 13. Main switch
- 14.Rear brake light switch

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

### **NOTICE**

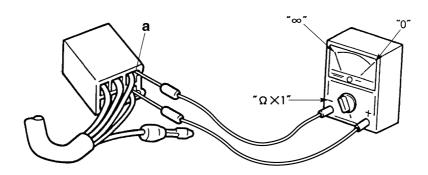
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



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

#### TIP\_

- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.
- When checking for continuity, switch back and forth between the switch positions a few times.



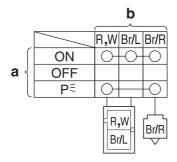
The switches and their terminal connections are illustrated as in the following example of the main switch.

The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row.

The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indicated by "O—O".

There is continuity between red-white, brown/blue and brown/red when the switch is set to "ON".

There is continuity between red-white and brown/red when the switch is set to "P".



EAS30550

## CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

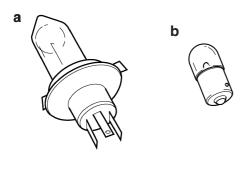
Damage/wear  $\rightarrow$  Repair or replace the bulb, bulb socket or both.

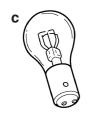
Improperly connected  $\rightarrow$  Properly connect. No continuity  $\rightarrow$  Repair or replace the bulb, bulb socket or both.

## Types of bulbs

The bulbs used on this vehicle are shown in the illustration.

- Bulbs "a" is used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulbs "b" and "c" are used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs "d" is used for meter and indicator lights and can be removed from their respective socket by carefully pulling them out.







## Checking the condition of the bulbs

The following procedure applies to all of the bulbs.

- 1. Remove:
  - Bulb

EWA13320

## **WARNING**

Since the headlight bulb gets extremely hot,

keep flammable products and your hands away from the bulb until it has cooled down.

ECA14381

## **NOTICE**

- Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.
- Avoid touching the glass part of a headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.
- 2. Check:
  - Bulb (for continuity)
     (with the pocket tester)
     No continuity → Replace.



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

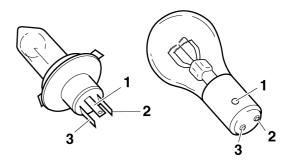
TIP

Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.

a. Connect the positive tester probe to terminal"1" and the negative tester probe to terminal"2", and check the continuity.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

- b. Connect the positive tester probe to terminal "1" and the negative tester probe to terminal "3", and check the continuity.
- c. If either of the readings indicate no continuity, replace the bulb.



Checking the condition of the bulb sockets The following procedure applies to all of the bulb

sockets.

- 1. Check:
  - Bulb socket (for continuity) (with the pocket tester)
     No continuity → Replace.



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

TIP

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

### \*\*\*\*\*\*\*\*\*\*\*

- a. Install a good bulb into the bulb socket.
- b. Connect the pocket tester probes to the respective leads of the bulb socket.
- c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

EAS3055

#### **CHECKING THE FUSES**

The following procedure applies to all of the fus-

ECA13680

#### NOTICE

To avoid a short circuit, always set the main switch to "OFF" when checking or replacing a fuse.

- 1. Remove:
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.
- 2. Check:
  - Fuse

a. Connect the pocket tester to the fuse and check the continuity.

TIP

Set the pocket tester selector to " $\Omega \times 1$ ".



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               | 15 A            | 1    |
| Signaling system        | 7.5 A           | 1    |
| Ignition                | 15 A            | 1    |
| Radiator fan motor      | 15 A            | 1    |
| Parking lighting        | 7.5 A           | 1    |
| Fuel injection system   | 10 A            | 1    |
| Auxiliary DC outlet     | 2 A             | 1    |
| Backup                  | 7.5 A           | 1    |
| Electric throttle valve | 7.5 A           | 1    |
| ABS motor               | 30 A            | 1    |
| ABS ECU                 | 7.5 A           | 1    |
| ABS solenoid            | 15 A            | 1    |
| Spare fuse              | 30 A            | 1    |
| Spare fuse              | 15 A            | 1    |
| Spare fuse              | 10 A            | 1    |
| Spare fuse              | 7.5 A           | 1    |
| Spare fuse              | 2 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 seat Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS3100

## **REPLACING THE ECU (Engine Control Unit)**

- 1. Turn the main switch to "OFF".
- 2. Replace the ECU (engine control unit).
- 3. Clean the throttle bodies and reset the ISC (idle speed control) learning value.

  Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-9.
- 4. Check:
  - Engine idling speed
     Start the engine, warm it up, and then measure the engine idling speed.



Engine idling speed 1100–1300 r/min

EAS30552

## **CHECKING AND CHARGING THE BATTERY**

EWA1329

## **WARNING**

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- Wear protective eye gear when handling or working near batteries.
- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).
- DO NOT SMOKE when charging or handling batteries.
- KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.
- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.

FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

- Skin Wash with water.
- Eyes Flush with water for 15 minutes and get immediate medical attention.

### INTERNAL

 Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.

ECA13661

### NOTICE

 This is a VRLA (Valve Regulated Lead Acid) battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.

 Charging time, charging amperage and charging voltage for a VRLA (Valve Regulated Lead Acid) battery are different from those of conventional batteries. The VRLA (Valve Regulated Lead Acid) battery should be charged according to the appropriate charging method. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.

#### TIP

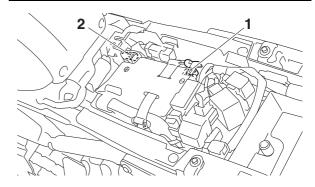
Since VRLA (Valve Regulated Lead Acid) batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

- 1. Remove:
  - Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.
- 2. Disconnect:
  - Battery leads (from the battery terminals)

ECA1364

## NOTICE

First, disconnect the negative battery lead "1", and then positive battery lead "2".



- 3. Remove:
  - Battery Refer to "GENERAL CHASSIS (1)" on page 4-1.
- 4. Check:
- Battery charge

# a. Connect a pocket tester to the battery terminals.

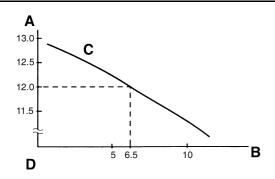
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

- Positive tester probe → positive battery terminal
- Negative tester probe → negative battery terminal

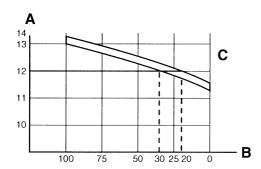
#### TIP\_

- The charge state of a VRLA (Valve Regulated Lead Acid) battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.
- b. Check the charge of the battery, as shown in the charts and the following example.

Example
Open-circuit voltage = 12.0 V
Charging time = 6.5 hours
Charge of the battery = 20–30 %



- A. Open-circuit voltage (V)
- B. Charging time (hours)
- C. Relationship between the open-circuit voltage and the charging time at 20 °C (68 °F)
- D. These values vary with the temperature, the condition of the battery plates, and the electrolyte level.



- A. Open-circuit voltage (V)
- B. Charging condition of the battery (%)

C. Ambient temperature 20 °C (68 °F)

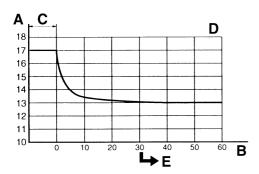
- 5. Charge:
- Battery (refer to the appropriate charging method)

## WARNING

Do not quick charge a battery.

NOTICE

- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative battery lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of a VRLA (Valve Regulated Lead Acid) battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



- A. Open-circuit voltage (V)
- B. Time (minutes)
- C. Charging
- D. Ambient temperature 20 °C (68 °F)
- E. Check the open-circuit voltage.

# Charging method using a variable-current (voltage) charger

a. Measure the open-circuit voltage prior to charging.

#### TIP

Voltage should be measured 30 minutes after the engine is stopped.

b. Connect a charger and ammeter to the battery and start charging.

### TIP

Set the charging voltage to 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

 Make sure that the current is higher than the standard charging current written on the battery.

### TIP\_

If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

- Standard charging current is reached Battery is good.
- Standard charging current is not reached Replace the battery.
- d. Adjust the voltage so that the current is at the standard charging level.
- e. Set the time according to the charging time suitable for the open-circuit voltage.
- f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.

g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete. 12.7 V or less --- Recharging is required. Under 12.0 V --- Replace the battery.

# Charging method using a constant voltage charger

a. Measure the open-circuit voltage prior to charging.

#### TIF

Voltage should be measured 30 minutes after the engine is stopped.

- b. Connect a charger and ammeter to the battery and start charging.
- Make sure that the current is higher than the standard charging current written on the battery.

#### TIP

If the current is lower than the standard charging current written on the battery, this type of battery charger cannot charge the VRLA (Valve Regulated Lead Acid) battery. A variable voltage charger is recommended.

d. Charge the battery until the battery's charging voltage is 15 V.

### TIP.

Set the charging time at 20 hours (maximum).

e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

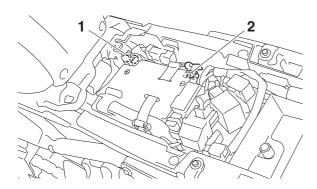
12.8 V or more --- Charging is complete. 12.7 V or less --- Recharging is required. Under 12.0 V --- Replace the battery.

### 6. Install:

- Battery Refer to "GENERAL CHASSIS (1)" on page 4-1.
- 7. Connect:
- Battery leads (to the battery terminals)

### NOTICE

First, connect the positive battery lead "1", and then the negative battery lead "2".



- 8. Check:
  - Battery terminals
     Dirt → Clean with a wire brush.
     Loose connection → Connect properly.
- 9. Lubricate:
  - Battery terminals



Recommended lubricant Dielectric grease

### 10.Install:

 Rider seat Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30553

### **CHECKING THE RELAYS**

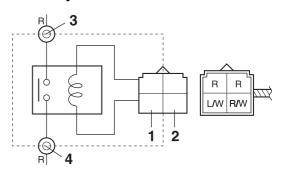
Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.



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

- 1. Disconnect the relay from the wire harness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the relay terminal as shown.
   Check the relay operation.
   Out of specification → Replace.

### Starter relay

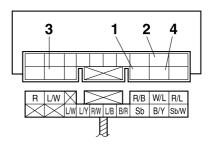


- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe



Relay operation Continuity (between "3" and "4")

### Relay unit (starting circuit cut-off relay)

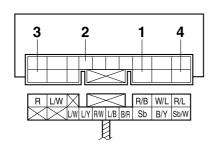


- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe



Result
Continuity
(between "3" and "4")

## Relay unit (fuel pump relay)

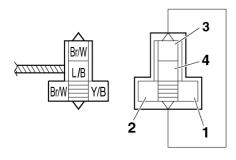


- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe



Result Continuity (between "3" and "4")

### Headlight relay

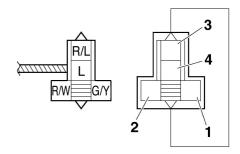


- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe



Result
Continuity
(between "3" and "4")

### Radiator fan motor relay



- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe



Result Continuity (between "3" and "4")

EAS30794

## 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 re lay coupler is faulty and must be repaired.



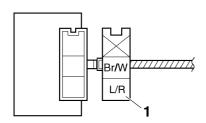
Turn signal/hazard relay input voltage DC 12 V

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

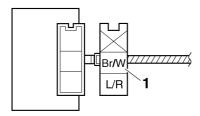
a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



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.

FAS30795

## **CHECKING THE RELAY UNIT (DIODE)**

- 1. Check:
- Relay unit (diode)
   Out of specification → Replace.



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

#### TIP

The pocket tester or the analog pocket tester readings are shown in the following table.



### Continuity

Positive tester probe sky blue "1"
Negative tester probe black/yellow "2"
No continuity

Positive tester probe black/yellow "2" Negative tester probe sky blue "1"

Continuity

Positive tester probe sky blue "1" Negative tester probe black/red "3"

No continuity

Positive tester probe black/red "3" Negative tester probe sky blue "1"

Continuity

Positive tester probe sky blue "1" Negative tester probe sky blue/white "4"

No continuity

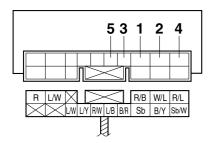
Positive tester probe sky blue/white "4" Negative tester probe sky blue "1"

Continuity

Positive tester probe blue/black "5"
Negative tester probe black/red "3"

No continuity
Positive tester probe

black/red "3"
Negative tester probe blue/black "5"



- a. Disconnect the relay unit coupler from the wire harness.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the relay unit terminal as shown.
- c. Check the relay unit (diode) for continuity.
- d. Check the relay unit (diode) for no continuity.

EAS3055

### **CHECKING THE IGNITION COILS**

The following procedure applies to all of the ignition coils.

- 1. Check:
  - Primary coil resistance
     Out of specification → Replace.



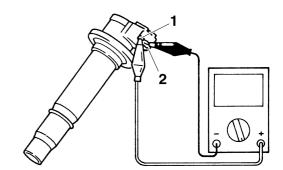
Primary coil resistance 1.19–1.61  $\Omega$ 

- a. Remove the ignition coil from the spark plug.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil as shown.



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

- Positive tester probe → red/black "1"
- Negative tester probe → Cylinder-#1 ignition coil orange "2" Cylinder-#2 ignition coil gray/red "2" Cylinder-#3 ignition coil orange/green "2"



c. Measure the primary coil resistance.

- 2. Check:
  - Secondary coil resistance
     Out of specification → Replace.



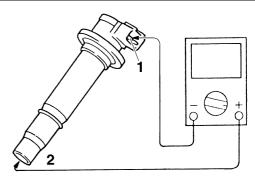
Secondary coil resistance 9.35–12.65 kΩ

a. Connect the pocket tester ( $\Omega \times 1$  k) to the ignition coil as shown.



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

- Negative tester probe → red/black "1"
- Positive tester probe → spark plug terminal "2"



b. Measure the secondary coil resistance.

EAS30556

### CHECKING THE IGNITION SPARK GAP

- 1. Check:
- Ignition spark gap
   Out of specification → Perform the ignition
   system troubleshooting, starting with step 5.
   Refer to "TROUBLESHOOTING" on page
   8-4.



## Minimum ignition spark gap 6.0 mm (0.24 in)

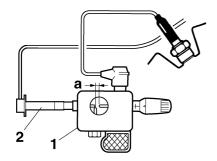
#### TIP

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

- a. Remove the ignition coil from the spark plug.
- b. Connect the ignition checker "1" as shown.



Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487



- 2. Ignition coil
- c. Turn the main switch to "ON".
- d. Measure the ignition spark gap "a".
- e. Crank the engine by pushing the "(s)" side of the start/engine stop switch and gradually increase the spark gap until a misfire occurs.

EAS3056

# CHECKING THE CRANKSHAFT POSITION SENSOR

- 1. Disconnect:
  - Crankshaft position sensor coupler (from the wire harness)
- 2. Check:
  - Crankshaft position sensor resistance
     Out of specification → Replace the crankshaft position sensor.



Crankshaft position sensor resistance 228–342 O.

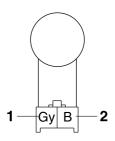
a. Connect the pocket tester ( $\Omega \times 100$ ) to the crankshaft position sensor coupler as shown.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



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.

EAS3056

#### CHECKING THE LEAN ANGLE SENSOR

- 1. Remove:
  - Lean angle sensor (from the fuel tank bracket)
- 2. Check:
- Lean angle sensor output voltage Out of specification → Replace.



Lean angle sensor output voltage
Operating angle
65°
Output voltage up to operating
angle
0.4–1.4 V
Output voltage over operating angle
3.7–4.4 V

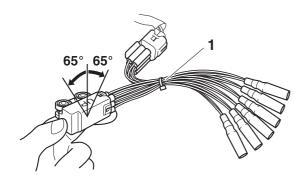
- a. Connect the test harness-lean angle sensor (6P) "1" to the lean angle sensor and wire harness as shown.
- b. Connect the pocket tester (DC 20 V) to the test harness-lean angle sensor (6P).



Pocket tester 90890-03112 Analog pocket tester YU-03112-C Test harness– lean angle sensor (6P) 90890-03209 Test harness– lean angle sensor (6P) YU-03209

 Positive tester probe yellow/green (wire harness color)

 Negative tester probe black/blue (wire harness color)



- c. Set the main switch to "ON".
- d. Turn the lean angle sensor to 65°.
- e. Measure the lean angle sensor output voltage.

EAS30562

# CHECKING THE STARTER MOTOR OPERATION

- 1. Check:
  - Starter motor operation

Does not operate  $\rightarrow$  Perform the electric starting system troubleshooting, starting with step 4.

Refer to "TROUBLESHOOTING" on page 8-11.

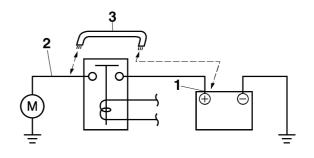
 a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

\*\*\*\*\*\*\*\*\*

WARNING

- A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore, make sure no flammable gas or

fluid is in the vicinity.



b. Check the starter motor operation.

EAS30566

### **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.



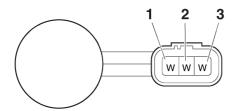
Stator coil resistance 0.152–0.228 Ω (W-W)

 Connect the digital circuit tester to the stator coil coupler as shown.



Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927

- Positive tester probe white "1"
- Negative tester probe white "2"
- Positive tester probe white "1"
- Negative tester probe white "3"
- Positive tester probe white "2"
- Negative tester probe white "3"



b. Measure the stator coil resistance.

EAS3068

### CHECKING THE RECTIFIER/REGULATOR

- 1. Check:
- Rectifier/regulator input voltage
   Out of specification → Correct the stator coil condition.

Refer to "CHECKING THE STATOR COIL" on page 8-160.



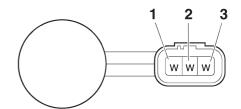
Rectifier/regulator input voltage above 14 V at 5000 r/min

- a. Set the engine tachometer to the ignition coil of cylinder #1.
- b. Connect the pocket tester (AC 20 V) to the rectifier/regulator coupler as shown.



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

- Positive tester probe white "1"
- Negative tester probe white "2"
- Positive tester probe white "1"
- Negative tester probe white "3"
- Positive tester probe white "2"
- Negative tester probe white "3"



- c. Start the engine and let it run at approximately 5000 r/min.
- d. Measure the rectifier/regulator input voltage.

## 

- 2 Check:
  - Rectifier/regulator output voltage
     Out of specification → Replace the rectifier/regulator.



Regulated voltage (DC) 14.3–14.7 V

a. Set the engine tachometer to the ignition coil of cylinder #1.

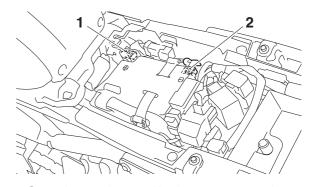
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

b. Connect the pocket tester (DC 20 V) to the battery as shown.



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

- Positive tester probe → positive battery terminal "1"
- Negative tester probe → negative battery terminal "2"



c. Start the engine and let it run at approximately 5000 r/min.

d. Measure the charging voltage.

EAS30569

#### **CHECKING THE HORN**

- 1. Check:
- Horn resistance
   Out of specification → Replace.



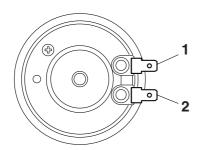
Horn Coil resistance  $1.07-1.11 \Omega$ 

- a. Disconnect the horn leads from the horn terminals.
- b. Connect the digital circuit tester to the horn terminals.



Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927

- Positive tester probe Horn terminal "1"
- Negative tester probe Horn terminal "2"



c. Measure the horn resistance.

### 

- 2. Check:
  - Horn sound
     Faulty sound → Replace.

EAS3084

# CHECKING THE ENGINE OIL LEVEL SWITCH

- 1. Drain:
  - Engine oil
- 2. Remove:
  - Oil level switch (from the oil pan)
- 3. Check:
  - Oil level switch resistance



Oil level switch

Oil level switch resistance (maximum level position) 484.0–536.0  $\Omega$  Oil level switch resistance (minimum level position)

114.0–126.0 Ω

a. Connect the pocket tester ( $\Omega \times 100$ ) to the oil level switch terminal as shown.



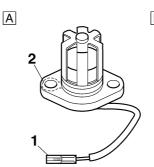
Pocket tester 90890-03112 Analog pocket tester YU-03112-C

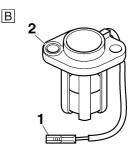
Minimum level position "A"

- Positive tester probe Connector (gray) "1"
- Negative tester probe
- Negative tester probe Body earth "2"

Maximum level position "B"

- Positive tester probe Connector (gray) "1"
- Connector (gray) "1"
   Negative tester probe
  Body earth "2"





b. Measure the oil level switch resistance.

\*\*\*\*\*\*\*\*\*\*

EAS30573

### **CHECKING THE FUEL SENDER**

- 1. Disconnect:
  - Fuel pump coupler (from the fuel pump)
- 2. Remove:
  - Fuel tank
- 3. Remove:
  - Fuel pump (from the fuel tank)
- 4. Check:
  - Fuel sender resistance
     Out of specification → Replace the fuel pump

assembly.



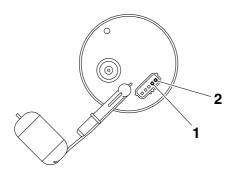
Sender unit resistance (full) 9.0–11.0  $\Omega$  Sender unit resistance (empty) 213.0–219.0  $\Omega$ 

a. Connect the pocket tester ( $\Omega \times 10/100$ ) to the fuel sender terminals as shown.

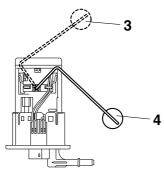


Pocket tester 90890-03112 Analog pocket tester YU-03112-C

- Positive tester probe → Fuel sender terminal "1"
- Negative tester probe → Fuel sender terminal "2"



b. Move the fuel sender float to maximum "3" and minimum "4" level position.



EAS30938

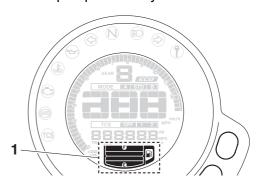
# CHECKING THE FUEL METER/FUEL LEVEL WARNING LIGHT

This model is equipped with a self-diagnosis device for the fuel level detection circuit.

- 1. Check:
  - Fuel meter/fuel level warning light "1" (Turn the main switch to "ON".)
     Warning light comes on for a few seconds, then goes off → Warning light is OK.

Warning light does not come on  $\rightarrow$  Replace the meter assembly.

Warning light flashes eight times, then goes off for 3 seconds in a repeated cycle (malfunction detected in fuel sender) → Replace the fuel pump assembly.



EAS30575

# CHECKING THE OIL LEVEL WARNING LIGHT

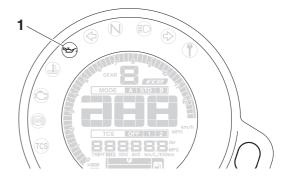
This model is equipped with a self-diagnosis device for the oil level detection circuit.

- 1. Check:
  - Oil level warning light "1" (Turn the main switch to "ON".)

Warning light comes on for a few seconds, then goes off  $\rightarrow$  Warning light is OK.

Warning light does not come on  $\rightarrow$  Replace the meter assembly.

Warning light flashes ten times, then goes off for 2.5 seconds in a repeated cycle (malfunction detected in oil level switch)  $\rightarrow$  Replace the oil level switch.

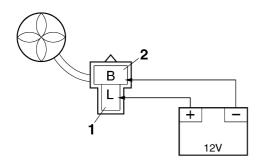


EAS30577

### **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.

EAS30578

# CHECKING THE COOLANT TEMPERATURE SENSOR

- 1. Remove:
- Coolant temperature sensor
   Refer to "CYLINDER HEAD" on page 5-19.

WARNING

- Handle the coolant temperature sensor with special care.
- Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.
- 2. Check:
  - Coolant temperature sensor resistance Out of specification → Replace.



Coolant temperature sensor resistance

2512–2777  $\Omega$  at 20 °C (2512–2777  $\Omega$  at 68 °F)

Coolant temperature sensor resistance

210–221  $\Omega$  at 100 °C (210–221  $\Omega$  at 212 °F)

a. Connect the pocket tester ( $\Omega \times 1$  k) to the coolant temperature sensor as shown.



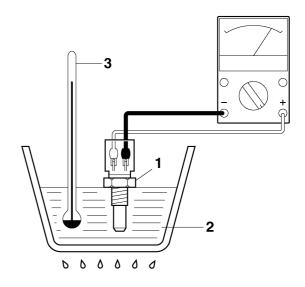
Pocket tester 90890-03112 Analog pocket tester YU-03112-C

b. Immerse the coolant temperature sensor "1" in a container filled with coolant "2".

#### TIP

Make sure the coolant temperature sensor terminals do not get wet.

c. Place a thermometer "3" in the coolant.



- d. Heat the coolant or let it cool down to the specified temperatures.
- e. Measure the coolant temperature sensor resistance.

- 3. Install:
  - Coolant temperature sensor



Coolant temperature sensor 16 Nm (1.6 m·kgf, 12 ft·lbf)

EAS3058

# CHECKING THE THROTTLE POSITION SENSOR

- 1. Remove:
  - Throttle position sensor (from the throttle bodies)

ECA17540

### NOTICE

- Handle the throttle position sensor with special care.
- Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.
- 2. Check:
  - Throttle position sensor maximum resistance Out of specification → Replace the throttle position sensor.



Resistance 1.20–2.80 k $\Omega$ 

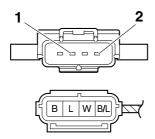
a. Connect the pocket tester ( $\Omega \times 1$  k) to the throttle position sensor terminals as shown.

\*\*\*\*\*\*\*\*\*\*\*\*\*



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

- Positive tester probe → blue "1"
- Negative tester probe → black/blue "2"



Measure the throttle position sensor maximum resistance.

3. Install:

• Throttle position sensor

TIE

When installing the throttle position sensor, adjust its angle properly. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-13.

EAS30582

## CHECKING THE ACCELERATOR POSITION SENSOR

- 1. Remove:
- Accelerator position sensor (from the throttle bodies)

EWA1596

## **WARNING**

- Handle the accelerator position sensor with special care.
- Never subject the accelerator position sensor to strong shocks. If the accelerator position sensor is dropped, replace it.
- 2. Check:
  - · Accelerator position sensor maximum resis-

tance

Out of specification  $\rightarrow$  Replace the accelerator position sensor.



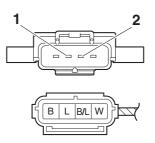
Resistance 1.08–2.52 k $\Omega$ 

a. Connect the pocket tester ( $\Omega \times 1$  k) to the accelerator position sensor terminals as shown.



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

- Positive tester probe → blue "1"
- Negative tester probe → black/blue "2"



b. Measure the accelerator position sensor maximum resistance.

3. Install:

Accelerator position sensor

TIP

When installing the accelerator position sensor, adjust its angle properly. Refer to "ADJUSTING THE ACCELERATOR POSITION SENSOR" on page 7-14.

EAS30592

#### **CHECKING THE THROTTLE SERVO MOTOR**

- 1. Remove:
  - Air filter case Refer to "GENERAL CHASSIS (1)" on page 4-1.
- 2. Check:
  - Throttle valve operation
     Throttle valves do not fully close → Replace the throttle bodies.

a. Connect two C-size batteries to the throttle servo motor terminals "1" as shown.

\*\*\*\*\*\*\*\*\*

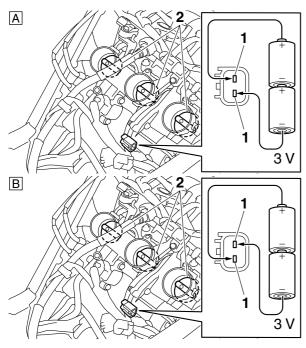
ECA17660

### NOTICE

Do not use a 12 V battery to operate the throttle servo motor.

#### TIP

Do not use old batteries to operate the throttle servo motor.



- A. Check that the throttle valves "2" open.
- B. Check that the throttle valves "2" fully close.

EAS30587

## CHECKING THE AIR INDUCTION SYSTEM SOLENOID

- 1. Check:
  - Air induction system solenoid resistance Out of specification → Replace.



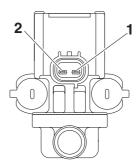
Solenoid resistance 20–24  $\Omega$ 

- Remove the air induction system solenoid coupler from the air induction system solenoid.
- 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 →
- Air induction system solenoid terminal "1"
- Negative tester probe → Air induction system solenoid terminal "2"



c. Measure the air induction system solenoid resistance.

EAS3059

# CHECKING THE INTAKE AIR PRESSURE SENSOR

- 1. Check:
- Intake air pressure sensor output voltage Out of specification → Replace.



Intake air pressure sensor output voltage

3.57-3.71 V@101.3 kPa

a. Connect the test harness S- pressure sensor
 (3P) "1" to the intake air pressure sensor and wire harness as shown.

ECA20920

### NOTICE

Pay attention to the installing direction of the test harness S- pressure sensor (3P) coupler.

b. Connect the digital circuit tester (DCV) to the test harness S– pressure sensor (3P).



Digital circuit tester 90890-03174

Model 88 Multimeter with tachometer

YU-A1927

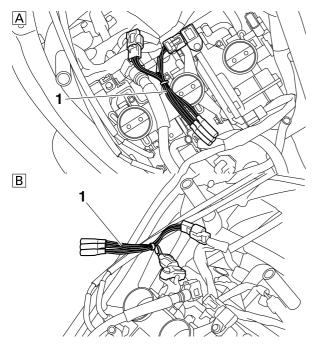
Test harness S– pressure sensor (3P)

90890-03207

Test harness S– pressure sensor (3P)

YU-03207

- Positive tester probe pink (wire harness color) (intake air pressure sensor 1) pink/white (wire harness color) (intake air pres
  - sure sensor 2)
- Negative tester probe black/blue (wire harness color)



- A. Intake air pressure sensor 1
- B. Intake air pressure sensor 2
- c. Set the main switch to "ON".
- d. Measure the intake air pressure sensor output voltage.

EAS30594

# CHECKING THE INTAKE AIR TEMPERATURE SENSOR

- 1. Remove:
- Intake air temperature sensor

WA1411

## **WARNING**

- Handle the intake air temperature sensor with special care.
- Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.
- 2. Check:
  - Intake air temperature sensor resistance
     Out of specification → Replace.



Intake air temperature sensor resistance

5400.0–6600.0  $\Omega$  at 0 °C (5400.0–6600.0  $\Omega$  at 32 °F)

Intake air temperature sensor resistance

290–390  $\Omega$  at 80 °C (290–390  $\Omega$  at 176 °F)

a. Connect the pocket tester ( $\Omega \times 100$ ) to the intake air temperature sensor terminal as shown.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



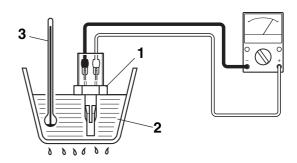
Pocket tester 90890-03112 Analog pocket tester YU-03112-C

b. Immerse the intake air temperature sensor "1" in a container filled with water "2".

#### TIP

Make sure that the intake air temperature sensor terminals do not get wet.

c. Place a thermometer "3" in the water.



- d. Slowly heat the water, then let it cool down to the specified temperature.
- e. Measure the intake air temperature sensor resistance.

3. Install:

• Intake air temperature sensor

EAS3108

#### **CHECKING THE GEAR POSITION SWITCH**

- 1. Remove:
  - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
  - Gear position switch Refer to "CRANKCASE" on page 5-57.
- 2. Check:
  - Gear position switch
     Out of specification → Replace the gear posi-

tion switch.



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



Result

**Neutral position** 

Continuity

Positive tester probe

sky blue "1"

**Negative tester probe** 

Sensor terminal "a"

1st position

Continuity

Positive tester probe

white "2"

Negative tester probe

Sensor terminal "b"

2nd position

Continuity

Positive tester probe

pink "3"

Negative tester probe

Sensor terminal "c"

3rd position

Continuity

Positive tester probe

yellow/white "4"

Negative tester probe

Sensor terminal "d"

4th position

Continuity

Positive tester probe

white/red "5"

Negative tester probe

Sensor terminal "e"

5th position

Continuity

Positive tester probe

orange "6"

Negative tester probe

Sensor terminal "f"

6th position

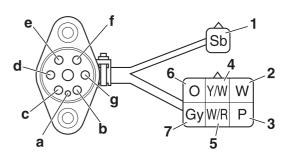
Continuity

Positive tester probe

gray "7"

**Negative tester probe** 

Sensor terminal "q"



### **CHECKING THE FUEL INJECTORS**

The following procedure applies to all of the fuel injectors.

- 1. Remove:
- Fuel injector

Refer to "THROTTLE BODIES" on page 7-6.

- 2. Check:
  - Fuel injector resistance

Out of specification → Replace the fuel injec-



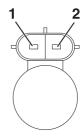
Resistance  $12.0 \Omega$ 

- a. Disconnect the fuel injector coupler from the fuel injector.
- b. Connect the pocket tester ( $\Omega \times 10$ ) to the fuel injector coupler as shown.



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

- Positive tester probe → Injector terminal "1"
- Negative tester probe  $\rightarrow$ Injector terminal "2"



c. Measure the fuel injector resistance.

| TROUBLESHOOTING                                    | 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  |
| OVERCOOLING                                        | 9-3  |
| POOR BRAKING PERFORMANCE                           | 9-3  |
| FAULTY FRONT FORK LEGS                             | 9-3  |
| UNSTABLE HANDLING                                  | 9-3  |
| FAULTY LIGHTING OR SIGNALING SYSTEM                | 9-3  |
| TROUBLESHOOTING AT THE ABS WARNING LIGHT           | 9-4  |
|                                                    |      |
| SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE | 9-5  |
| SELF-DIAGNOSTIC FUNCTION TABLE                     |      |
| (FOR FUEL INJECTION SYSTEM)                        | 9-5  |
| SELF-DIAGNOSTIC FUNCTION TABLE                     |      |
| (FOR IMMOBILIZER SYSTEM)                           |      |
| COMMUNICATION ERROR WITH THE METER                 |      |
| DIAGNOSTIC CODE: SENSOR OPERATION TABLE            |      |
| DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE          | 9-16 |
|                                                    |      |
| EVENT CODE TABLE                                   | 9-18 |

EAS2009

### **TROUBLESHOOTING**

EAS30599

### **GENERAL INFORMATION**

TIP

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic trouble-shooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAS30600

#### **STARTING FAILURES**

## **Engine**

- 1. Cylinder(s) and cylinder head(s)
- · Loose spark plug
- Loose cylinder head or cylinder
- Damaged cylinder head gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Improperly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve
- 2. Piston(s) and piston ring(s)
  - Improperly installed piston ring
  - Damaged, worn or fatigued piston ring
  - Seized piston ring
  - Seized or damaged piston
- 3. Air filter
  - Improperly installed air filter
- Clogged air filter element
- 4. Crankcase and crankshaft
  - Improperly assembled crankcase
  - Seized crankshaft

#### **Fuel system**

- 1. Fuel tank
  - Empty fuel tank
- Clogged fuel tank cap breather hose
- Deteriorated or contaminated fuel
- Clogged or damaged fuel hose
- 2. Fuel pump
  - Faulty fuel pump
  - · Faulty fuel pump relay
- 3. Throttle body (-ies)
  - · Deteriorated or contaminated fuel
- Sucked-in air

## **Electrical system**

- 1. Battery
- Discharged battery
- Faulty battery

- 2. Fuse(s)
  - Blown, damaged or incorrect fuse
- Improperly installed fuse
- 3. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
  - Fouled spark plug
  - Worn or damaged electrode
  - Worn or damaged insulator
- 4. Ignition coil(s)
  - Cracked or broken ignition coil body
  - Broken or shorted primary or secondary coils
- 5. Ignition system
  - Faulty ECU
  - Faulty crankshaft position sensor
- Broken generator rotor woodruff key
- 6. Switches and wiring
  - Faulty main switch
  - Faulty start/engine stop switch
  - Broken or shorted wiring
  - Faulty gear position switch
  - 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

EAS30601

# INCORRECT ENGINE IDLING SPEED Engine

- 1. Cylinder(s) and cylinder head(s)
  - Incorrect valve clearance
  - Damaged valve train components
- 2. Air filter
  - Clogged air filter element

### **Fuel system**

- 1. Throttle body (-ies)
- Damaged or loose throttle body joint
- Improperly synchronized throttle bodies
- Improper throttle grip free play
- Flooded throttle body
- 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
  - Broken generator rotor woodruff key

FAS3060

# POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURES" on page 9-1. **Engine** 

- 1. Air filter
- Clogged air filter element

### **Fuel system**

- 1. Throttle body (-ies)
- Faulty throttle body
- 2. Fuel pump
  - · Faulty fuel pump

EAS3060

# FAULTY GEAR SHIFTING Shifting is difficult

Refer to "Clutch drags".

EAS30604

## 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

EAS30605

# 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

FAS30849

### **FAULTY CLUTCH**

### Clutch slips

- 1. Clutch
- Improperly assembled clutch
- Improperly adjusted clutch cable
- · Loose or fatigued clutch spring
- Worn friction plate
- Worn clutch plate
- 2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity (low)
  - Deteriorated oil

### Clutch drags

- 1. Clutch
- Unevenly tensioned clutch springs
- Warped pressure plate
- Bent clutch plate
- Swollen friction plate
- Bent clutch pull rod
- Broken clutch boss
- Burnt primary driven gear bushing
- Match marks not aligned
- 2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity (high)
  - Deteriorated oil

FAS30607

# OVERHEATING Engine

- 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
- 4. Thermostat
  - Thermostat stays closed
- 5. Oil cooler
- Clogged or damaged oil cooler
- 6. Hose(s) and pipe(s)
- Damaged hose
- Improperly connected hose

- Damaged pipe
- Improperly connected pipe

## **Fuel system**

- 1. Throttle body (-ies)
- Damaged or loose throttle body joint
- 2. Air filter
  - · Clogged air filter element

### **Chassis**

- 1. Brake(s)
- Dragging brake

## **Electrical system**

- 1. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
- 2. Ignition system
  - Faulty ECU

EAS3060

## **OVERCOOLING**

## Cooling system

- 1. Thermostat
  - Thermostat stays open

EAS30609

#### 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

EAS30610

# 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

EAS3061

#### **UNSTABLE HANDLING**

#### Handlebar

Bent or improperly installed handlebar

## Steering head components

- Improperly installed upper bracket
- Improperly installed lower bracket (improperly tightened ring nut)
- · Bent steering stem
- Damaged ball bearing or bearing race

## 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

### **Swingarm**

- · Worn bearing or bushing
- Bent or damaged swingarm

## Rear shock absorber assembly

- Faulty rear shock absorber spring
- · Leaking oil or gas

### Tire(s)

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

## Wheel(s)

- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

#### **Frame**

- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

EAS30612

# FAULTY LIGHTING OR SIGNALING SYSTEM Headlight does not come on

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

### Headlight bulb burnt out

- Wrong headlight bulb
- Faulty battery

- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Faulty dimmer switch
- Headlight bulb life expired

## Tail/brake light does not come on

- Too many electrical accessories
- Incorrect connection

## Turn signal does not come on

- Faulty turn signal switch
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

## Turn signal blinks slowly

- Faulty turn signal/hazard relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

## Turn signal remains lit

- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

## Turn signal blinks quickly

- Incorrect turn signal bulb
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

### Horn does not sound

- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

EAS30848

## TROUBLESHOOTING AT THE ABS WARNING LIGHT

Refer to "BASIC PROCESS FOR TROUBLE-SHOOTING" on page 8-119.

EAS2011

## SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS3179

## **SELF-DIAGNOSTIC FUNCTION TABLE (FOR FUEL INJECTION SYSTEM)**

TIP

For details of the fault code, refer to "TROUBLESHOOTING METHOD" on page 8-35.

| Fault code No. | Item                                                                                                                                               | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                                                            | Vehicle symptom                                                                                                                                            | Fail-safe system operation                                                                                                                                                                                                                                                                  |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0030          | O <sub>2</sub> sensor heater<br>(defective heater con-<br>troller detected)                                                                        | <ul> <li>Open or short circuit in wire harness.</li> <li>Disconnected coupler.</li> <li>Defective O<sub>2</sub> sensor heater controller.</li> <li>Broken or disconnected lead in O<sub>2</sub> sensor heater.</li> </ul>                                                                                                                                                                                                                                | (When the O <sub>2</sub> sensor does not operate because the exhaust temperature is low) Increased exhaust emissions. Fuel learning cannot be carried out. | Display only (If the O <sub>2</sub> sensor does not operate, O <sub>2</sub> feedback is not carried out.)                                                                                                                                                                                   |
| P0107<br>P0108 | [P0107] Intake air pressure sensor 1 (ground short circuit detected) [P0108] Intake air pressure sensor 1 (open or power short circuit detected)   | [P0107] Low voltage of the intake air pressure sensor 1 circuit (0.5 V or less) [P0108] High voltage of the intake air pressure sensor 1 circuit (4.8 V or more) • Defective coupler between intake air pressure sensor 1 and ECU. • Open or short circuit in wire harness between intake air pressure sensor 1 and ECU. • Defective intake air pressure sensor 1. • Malfunction in ECU.                                                                 | Engine idling speed is unstable. Engine response is poor. Loss of engine power. Increased exhaust emissions.                                               | Intake air pressure difference is fixed to 0 [kPa]. α-N is fixed. Fuel is not cut off due to the intake air pressure difference. Intake air pressure is fixed to 101.3 [kPa]. O <sub>2</sub> feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |
| P0112<br>P0113 | [P0112] Intake air temperature sensor (ground short circuit detected) [P0113] Intake air temperature sensor (open or power short circuit detected) | [P0112] Low voltage of the intake air temperature sensor circuit (0.1 V or less) [P0113] High voltage of the intake air temperature sensor circuit (4.8 V or more)  • Defective coupler between intake air temperature sensor and ECU.  • Open or short circuit in wire harness between intake air temperature sensor and ECU.  • Improperly installed intake air temperature sensor.  • Defective intake air temperature sensor.  • Malfunction in ECU. | Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable.                                                                | The intake air temperature is fixed to 20 [°C].  O <sub>2</sub> feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.                                                                                                                              |

| Fault code No.                            | Item                                                                                                                                                                                                                                                                                                                                                | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Vehicle symptom                                                                                                                                                                           | Fail-safe system operation                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0117<br>P0118                            | [P0117] Coolant temperature sensor (ground short circuit detected) [P0118] Coolant temperature sensor (open or power short circuit detected)                                                                                                                                                                                                        | <ul> <li>[P0117] Low voltage of the coolant temperature sensor circuit (0.1 V or less)</li> <li>[P0118] High voltage of the coolant temperature sensor circuit (4.9 V or more)</li> <li>Defective coupler between coolant temperature sensor and ECU.</li> <li>Open or short circuit in wire harness between coolant temperature sensor and ECU.</li> <li>Improperly installed coolant temperature sensor.</li> <li>Defective coolant temperature sensor.</li> <li>Malfunction in ECU.</li> </ul>           | Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable.                                                                                               | The radiator fan motor relay is on only when the vehicle is traveling at low speeds.  O <sub>2</sub> feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. The coolant temperature is fixed to 60 [°C].                                                                                                                                                                                                                           |
| P0122<br>P0123<br>P0222<br>P0223<br>P2135 | [P0122] Throttle position sensor (ground short circuit detected) [P0123] Throttle position sensor (open or power short circuit detected) [P0222] Throttle position sensor (ground short circuit detected) [P0223] Throttle position sensor (open or power short circuit detected) [P2135] Throttle position sensor (output voltage deviation error) | [P0122, P0222] Low voltage of the throttle position sensor circuit (0.25 V or less) [P0123, P0223] High voltage of the throttle position sensor circuit (4.75 V or more) [P2135] Difference in output voltage 1 and output voltage 2 of the throttle position sensor • Defective coupler between throttle position sensor and ECU. • Open or short circuit in wire harness between throttle position sensor and ECU. • Improperly installed throttle position sensor. • Defective throttle position sensor. | Engine idling speed is high. Engine idling speed is unstable. Engine response is poor. Loss of engine power. Deceleration is poor. Increased exhaust emissions. Vehicle cannot be driven. | Change in the throttle opening is 0 (transient control is not carried out).  D–j is fixed. Throttle opening is fixed to 125 [°]. Estimated atmospheric pressure is fixed to 101.3 [kPa].  O <sub>2</sub> feedback is not carried out. Fuel is not cut off due to the throttle opening. Output is restricted. Air induction system solenoid is turned on all the time (air induction system air cut off). ISC feedback is not carried out. ISC learning is not carried out. |

| Fault code No.          | Item                                                                                                                                                                                                     | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                              | Vehicle symptom                                                                                                                                           | Fail-safe system operation                                                                                                                                                                                |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0132                   | O <sub>2</sub> sensor (short circuit detected (power short circuit))                                                                                                                                     | <ul> <li>[P0132] High voltage of the O<sub>2</sub> sensor circuit (4.8 V or more)</li> <li>• Improperly installed O<sub>2</sub> sensor.</li> <li>• Defective coupler between O<sub>2</sub> sensor and ECU.</li> <li>• Open or short circuit in wire harness between O<sub>2</sub> sensor and ECU.</li> <li>• Incorrect fuel pressure.</li> <li>• Defective O<sub>2</sub> sensor.</li> <li>• Malfunction in ECU.</li> </ul> | Increased exhaust emissions.                                                                                                                              | O <sub>2</sub> feedback is not carried out. O <sub>2</sub> feedback learning is not carried out. Air induction system solenoid is turned on all the time (air induction system air cut off).              |
| P0201<br>P0202<br>P0203 | [P0201] Fuel injector<br>#1 (malfunction in fuel<br>injector #1)<br>[P0202] Fuel injector<br>#2 (malfunction in fuel<br>injector #2)<br>[P0203] Fuel injector<br>#3 (malfunction in fuel<br>injector #3) | <ul> <li>Defective coupler between injector and ECU.</li> <li>Open or short circuit in wire harness between injector and ECU.</li> <li>Defective injector.</li> <li>Malfunction in ECU.</li> <li>Improperly installed injector.</li> </ul>                                                                                                                                                                                 | Loss of engine power. Engine is difficult to start. Engine cannot be started. Engine stops. Engine idling speed is unstable. Increased exhaust emissions. | O <sub>2</sub> feedback is not carried out. Air induction system solenoid is turned on all the time (air induction system air cut off). ISC feedback is not carried out. ISC learning is not carried out. |
| P0335                   | Crankshaft position<br>sensor (no normal<br>signals are received<br>from the crankshaft<br>position sensor)                                                                                              | <ul> <li>Defective coupler between crankshaft position sensor and ECU.</li> <li>Open or short circuit in wire harness between crankshaft position sensor and ECU.</li> <li>Improperly installed crankshaft position sensor.</li> <li>Malfunction in generator rotor.</li> <li>Defective crankshaft position sensor.</li> <li>Malfunction in ECU.</li> </ul>                                                                | Engine cannot be started.                                                                                                                                 | Does not operate. ISC feedback is not carried out. ISC learning is not carried out.                                                                                                                       |

|                         | +                                                                                                                                                                                                                                                                                                                                                                          | +                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fault code No.          | Item                                                                                                                                                                                                                                                                                                                                                                       | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Vehicle symptom                                                                                                                                                                                                                                                                                                                                                                            | Fail-safe system operation                                                                                                                                                                                                                                                                                                                                    |
| P0351<br>P0352<br>P0353 | [P0351] Cylinder-#1 ignition coil (open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.) [P0352] Cylinder-#2 ignition coil (open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.) [P0353] Cylinder-#3 ignition coil (open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.) | Defective coupler between ignition coil and ECU.     Open or short circuit in wire harness between ignition coil and ECU.     Improperly installed ignition coil.     Defective ignition coil.     Malfunction in ECU.                                                                                                                                                                                                                                                                                                                                                                                                         | Engine stops. Loss of engine power. Engine is difficult to start. Engine cannot be started. Engine idling speed is unstable. Increased exhaust emissions.                                                                                                                                                                                                                                  | Injection to the applicable cylinder group is cut off. Air induction system solenoid is turned on all the time (air induction system air cut off). O <sub>2</sub> feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.                                                                                              |
| P0500                   | Rear wheel sensor (no normal signals are received from the rear wheel sensor)     Gear position switch (open or short circuit is detected)     Clutch switch (open or short circuit is detected)  detected)                                                                                                                                                                | <ul> <li>Open or short circuit in wire harness between rear wheel sensor and ABS unit.</li> <li>Open or short circuit in wire harness between ABS unit and ECU.</li> <li>Open or short circuit in wire harness between gear position switch and ECU.</li> <li>Open or short circuit in wire harness between gear position switch and ECU.</li> <li>Open or short circuit in wire harness between clutch switch and ECU.</li> <li>Defective rear wheel sensor.</li> <li>Defective gear position switch.</li> <li>Defective clutch switch.</li> <li>Improper adjustment of clutch lever.</li> <li>Malfunction in ECU.</li> </ul> | Vehicle speed is not displayed on the meter. Engine stalls when the vehicle is decelerating to a stop. Engine idling speed is high. Indication of the neutral indicator light is incorrect. Engine cannot be restarted when the transmission is in gear even with the clutch lever squeezed. Engine idling speed is unstable. Increased exhaust emissions. Traction control does not work. | Vehicle speed displayed on the meter = 0 [km/h] The gear ratio is fixed to the gear ratio of the top gear. O <sub>2</sub> feedback is not carried out. Fuel cut-off control when the rear wheel sensor or gear position switch malfunctions is carried out. ISC feedback is not carried out. ISC learning is not carried out. Traction control does not work. |
| P0560                   | Charging voltage is abnormal.                                                                                                                                                                                                                                                                                                                                              | Battery overcharging (defective rectifier/regulator).     Battery overcharging (broken or disconnected lead in rectifier/regulator wire harness).     Battery over-discharging (broken or disconnected lead in charging system).     Battery over-discharging (defective rectifier/regulator).                                                                                                                                                                                                                                                                                                                                 | Engine is difficult to start. Increased exhaust emissions. Battery performance has deteriorated or battery is defective.                                                                                                                                                                                                                                                                   | O <sub>2</sub> feedback is not carried out.                                                                                                                                                                                                                                                                                                                   |

| Fault code No. | Item                                                                                                                                                      | Probable cause of malfunction                                                                                                                                                                                                                                                                       | Vehicle symptom                                                                                                                                   | Fail-safe system operation                                                                                                                                                                                                                                                                                              |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0601          | Internal malfunction in ECU (ROM data error) (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.)  | Malfunction in ECU.                                                                                                                                                                                                                                                                                 | Engine cannot be started.                                                                                                                         | Engine cannot be started.                                                                                                                                                                                                                                                                                               |
| P0606          | Internal malfunction in ECU (processor error) (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.) | Malfunction in ECU.                                                                                                                                                                                                                                                                                 | Engine cannot be started. Engine response is poor. Loss of engine power.                                                                          | Engine cannot be started. Ignition and injection are not carried out. Judgment for other fault codes is not carried out. Load control is not carried out. (The relay unit, headlight relay, and other relays are all turned off.) The CO adjustment mode and diagnostic mode cannot be activated. Output is restricted. |
| P062F          | EEPROM fault code<br>number (an error is<br>detected while read-<br>ing or writing on<br>EEPROM)                                                          | <ul> <li>CO adjustment value is not properly written.</li> <li>ISC learning value is not properly written.</li> <li>OBD memory value is not properly written.</li> <li>Malfunction in ECU.</li> </ul>                                                                                               | Increased exhaust emissions. Engine cannot be started or is difficult to start. Engine idling speed is unstable. OBD memory value is not correct. | CO adjustment value for the faulty cylinder = 0 (default value) ISC learning values = Default values OBD memory value is initialized. Initialization of O <sub>2</sub> feedback learning value.                                                                                                                         |
| P0638          | YCC-T drive system: malfunction detected.                                                                                                                 | Defective coupler between throttle servo motor and ECU.     Open or short circuit in wire harness between throttle servo motor and ECU.     Defective throttle servo motor.     Throttle servo motor is stuck (mechanism or motor).     Malfunction in ECU.     Blown electric throttle valve fuse. | Engine response is poor. Loss of engine power. Engine idling speed is unstable.                                                                   | O <sub>2</sub> feedback is not carried out. YCC-T evacuation is activated. Output is restricted. ISC feedback is not carried out. ISC learning is not carried out.                                                                                                                                                      |
| P0657          | Fuel system voltage<br>(incorrect voltage sup-<br>plied to the fuel injec-<br>tor, fuel pump and<br>relay unit)                                           | <ul> <li>Open or short circuit in wire harness between relay unit and ECU.</li> <li>Open circuit in wire harness between battery and ECU.</li> <li>Defective relay unit.</li> <li>Malfunction in ECU.</li> </ul>                                                                                    | Engine is difficult to<br>start.<br>Increased exhaust<br>emissions.                                                                               | Monitor voltage = 12 [V] O <sub>2</sub> feedback is not carried out.                                                                                                                                                                                                                                                    |

| Fault code No. | Item                                                                                                                                                                                                    | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                                         | Vehicle symptom                                                                                                   | Fail-safe system operation                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P1004          | Intake air pressure sensor 1 or intake air pressure sensor 2: when the main switch is turned to "ON", the intake air pressure sensor 1 voltage and intake air pressure sensor 2 voltage differ greatly. | Malfunction in ECU.     Hose of intake air pressure sensor 1 or intake air pressure sensor 2 is detached, clogged, twisted or bent.     Intake air pressure sensor 1 or intake air pressure sensor 2 is defective.                                                                                                                                                                                                                    | Engine is difficult to start. Engine idling speed is unstable. Increased exhaust emissions. Loss of engine power. | Intake air pressure is fixed to 101.3 [kPa]. Intake air pressure difference is fixed to 0 [kPa]. Atmospheric pressure is fixed to 101.3 [kPa]. $\alpha$ –N is fixed. Fuel is not cut off due to the intake air pressure difference. Corrected output value of atmospheric pressure sensor is fixed to 0. $O_2$ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |
| P1400          | Air induction system solenoid (open or short circuit detected)                                                                                                                                          | <ul> <li>Open or short circuit in wire harness.</li> <li>Disconnected coupler.</li> <li>Defective air induction system solenoid.</li> <li>Defective air induction system solenoid controller. (malfunction in ECU)</li> </ul>                                                                                                                                                                                                         | Increased exhaust emissions.                                                                                      | Electric current in air induction system solenoid is prohibited (air induction system air in).  O <sub>2</sub> feedback is not carried out.                                                                                                                                                                                                                                                                   |
| P1601          | Sidestand switch<br>(open or short circuit<br>of the black/red lead<br>of the ECU is<br>detected)                                                                                                       | <ul> <li>Defective coupler between relay unit and ECU.</li> <li>Open or short circuit in wire harness between relay unit and relay unit.</li> <li>Defective coupler between sidestand switch and relay unit.</li> <li>Open or short circuit in wire harness between sidestand switch and relay unit.</li> <li>Defective sidestand switch and relay unit.</li> <li>Defective sidestand switch.</li> <li>Malfunction in ECU.</li> </ul> | Engine cannot be started.                                                                                         | Engine is forcefully stopped (the injector output is stopped).                                                                                                                                                                                                                                                                                                                                                |

| Fault code No. | Item                                                                                                                                             | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                                                                          | Vehicle symptom                                                                                                                   | Fail-safe system operation                                                                                                                                                                                                                                                                                                                                        |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P1602          | Malfunction in ECU internal circuit (malfunction of ECU power cut-off function)                                                                  | <ul> <li>Open or short circuit in wire harness between ECU and battery.</li> <li>Open or short circuit in wire harness between ECU and main switch.</li> <li>Blown backup fuse.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                                                                                                | Engine idling speed is unstable. Engine idling speed is high. Increased exhaust emissions. Engine is difficult to start.          | O <sub>2</sub> feedback learning is not carried out. O <sub>2</sub> feedback learning value is not written.                                                                                                                                                                                                                                                       |
| P1604<br>P1605 | [P1604] Lean angle<br>sensor (ground short<br>circuit detected)<br>[P1605] Lean angle<br>sensor (open or<br>power short circuit<br>detected)     | [P1604] Low voltage of the lean angle sensor circuit (0.2 V or less) [P1605] High voltage of the lean angle sensor circuit (4.8 V or more) • Open or short circuit in wire harness between lean angle sensor and ECU. • Defective lean angle sensor. • Malfunction in ECU.                                                                                                                                                                                             | Engine cannot be started.                                                                                                         | Engine cannot be started.                                                                                                                                                                                                                                                                                                                                         |
| P1606<br>P1607 | [P1606] Intake air pressure sensor 2 (ground short circuit detected) [P1607] Intake air pressure sensor 2 (open or power short circuit detected) | [P1606] Low voltage of the intake air pressure sensor 2 circuit (0.5 V or less) [P1607] High voltage of the intake air pressure sensor 2 circuit (4.8 V or more)  • Defective coupler between intake air pressure sensor 2 and ECU.  • Open or short circuit in wire harness between intake air pressure sensor 2 and ECU.  • Improperly installed intake air pressure sensor 2.  • Defective intake air pressure sensor 2.  • Defective intake air pressure sensor 2. | Engine is difficult to start. Increased exhaust emissions. Power on high ground is insufficient. Engine idling speed is unstable. | α-N is fixed. Intake air pressure difference is fixed to 0 [kPa]. Atmospheric pressure is fixed to 101.3 [kPa]. Corrected output value of atmospheric pressure sensor is fixed to 0. Fuel is not cut off due to the intake air pressure difference. O <sub>2</sub> feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |

| Fault code No.                            | Item                                                                                                                                                                                                                                                                                                                                                               | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Vehicle symptom                                                                                                                                                                                | Fail-safe system operation                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P2122<br>P2123<br>P2127<br>P2128<br>P2138 | [P2122] Accelerator position sensor (open or ground short circuit detected) [P2123] Accelerator position sensor (power short circuit detected) [P2127] Accelerator position sensor (ground short circuit detected) [P2128] Accelerator position sensor (open or power short circuit detected) [P2138] Accelerator position sensor (output voltage deviation error) | [P2122, P2127] Low voltage of the accelerator position sensor circuit (0.25 V or less) [P2123, P2128] High voltage of the accelerator position sensor circuit (4.75 V or more) [P2138] Difference in output voltage 1 and output voltage 2 of the accelerator position sensor.  • Defective coupler between accelerator position sensor and ECU.  • Open or short circuit in wire harness between accelerator position sensor and ECU.  • Improperly installed accelerator position sensor.  • Defective accelerator position sensor.  • Defective accelerator position sensor.  • Malfunction in ECU. | Engine response is poor. Loss of engine power. Engine idling speed is unstable.                                                                                                                | No change in accelerator opening. (transientcontrol is not carried out). Accelerator opening is fixed to 0[°]. O <sub>2</sub> feedback is not carried out. YCC-T evacuation is activated. Fuel cut is prohibited by accelerator opening. Output is restricted. ISC feedback is not carried out. ISC learning is not carried out. |
| P2158                                     | Front wheel sensor<br>(no normal signals are<br>received from the<br>front wheel sensor)                                                                                                                                                                                                                                                                           | <ul> <li>Open or short circuit in wire harness between front wheel sensor and ECU.</li> <li>Defective front wheel sensor.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      | Traction control does not work. Traction control system indicator on the meter comes on. Traction control system switch is disabled. (Traction control system indicator on the meter goes OFF) | Traction control does not work.                                                                                                                                                                                                                                                                                                  |
| P2195                                     | O <sub>2</sub> sensor (open circuit detected)                                                                                                                                                                                                                                                                                                                      | <ul> <li>Signal voltage is 0.25–0.53 V.</li> <li>Improperly installed O<sub>2</sub> sensor.</li> <li>Defective coupler between O<sub>2</sub> sensor and ECU.</li> <li>Open or short circuit in wire harness between O<sub>2</sub> sensor and ECU.</li> <li>Defective O<sub>2</sub> sensor.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                                                                                                                     | Increased exhaust emissions.                                                                                                                                                                   | O <sub>2</sub> feedback is not carried out. O <sub>2</sub> feedback learning is not carried out. Air induction system solenoid is turned on all the time (air induction system air cut off).                                                                                                                                     |

EAS3179

## SELF-DIAGNOSTIC FUNCTION TABLE (FOR IMMOBILIZER SYSTEM)

TIP

For details of the fault code, refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-108.

| Fault code No. | Item                                                                                       |  |  |  |
|----------------|--------------------------------------------------------------------------------------------|--|--|--|
| 51             | Immobilizer unit: Code cannot be transmitted between the key and the immobilizer unit.     |  |  |  |
| 52             | Immobilizer unit: Codes between the key and immobilizer unit do not match.                 |  |  |  |
| 53             | Immobilizer unit: Codes cannot be transmitted between the ECU and the immobilizer unit.    |  |  |  |
| 54             | Immobilizer unit: Codes transmitted between the ECU and the immobilizer unit do not match. |  |  |  |
| 55             | Immobilizer unit: Key code registration malfunction.                                       |  |  |  |
| 56             | ECU: Unidentified code is received.                                                        |  |  |  |

EAS31119

### **COMMUNICATION ERROR WITH THE METER**

| Fault code No.                                                                            | Item                                     | Probable cause of malfunction                                                                                                                                                                                               | Vehicle symptom                                          | Fail-safe system operation                                                                                                          |
|-------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| U0155<br>(Yamaha<br>diagnostic<br>tool)<br>Err (multi-<br>function<br>meter dis-<br>play) | CAN communication error (with the meter) | Communication between the ECU and the meter is not possi- ble • Defective meter cou- pler and ECU cou- pler • Open or short cir- cuit in the wire har- ness between the meter and the ECU • Defective meter • Defective ECU | Defective meter display. Traction control does not work. | Grip warmer output: OFF is fixed. MAP changeover: State is fixed. Traction control does not work. Meter switch input: OFF is fixed. |

EAS31120

### **DIAGNOSTIC CODE: SENSOR OPERATION TABLE**

| Diagnostic code No. | Item                              | Tool display                      | Procedure                                                                                                                                 |
|---------------------|-----------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 01                  | Throttle position sensor signal 1 |                                   |                                                                                                                                           |
|                     | Fully closed position             | 11–21                             | Check with throttle valves fully closed.                                                                                                  |
|                     | Fully open position               | 96–106                            | Check with throttle valves fully open.                                                                                                    |
| 03                  | Intake air pressure 1             | Displays the intake air pressure. | Operate the throttle while pushing the "(s)" side of the start/engine stop switch. (If the display value changes, the performance is OK.) |
| 04                  | Intake air pressure 2             | Displays the intake air pressure. | Operate the throttle while pushing the "(s)" side of the start/engine stop switch. (If the display value changes, the performance is OK.) |

| Diagnostic code No. | Item                                     | Tool display                                                                                                                   | Procedure                                                                                                                                                                                                      |
|---------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 05                  | Air temperature                          | Displays the air temperature.                                                                                                  | Compare the actually measured air temperature with the tool display value.                                                                                                                                     |
| 06                  | Coolant temperature                      | When engine is cold: Displays temperature closer to air temperature. When engine is hot: Displays current coolant temperature. | Compare the actually measured coolant temperature with the tool display value.                                                                                                                                 |
| 07                  | Rear wheel vehicle speed pulses          | Rear wheel speed pulse 0–999                                                                                                   | Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.                                                                    |
| 08                  | Lean angle sensor                        | Lean angle sensor output voltage                                                                                               | Remove the lean angle sensor and incline it more than                                                                                                                                                          |
|                     | Upright                                  | 0.4–1.4                                                                                                                        | 65 degrees.                                                                                                                                                                                                    |
|                     | Overturned                               | 3.7–4.4                                                                                                                        |                                                                                                                                                                                                                |
| 09                  | Fuel system voltage<br>(battery voltage) | Fuel system voltage<br>Approximately 12.0                                                                                      | Set the start/engine stop switch to "\( \cap \)", and then compare the actually measured battery voltage with the tool display value. (If the actually measured battery voltage is low, recharge the battery.) |
| 13                  | Throttle position sensor signal 2        |                                                                                                                                |                                                                                                                                                                                                                |
|                     | Fully closed position                    | 9–23                                                                                                                           | Check with throttle valves fully closed.                                                                                                                                                                       |
|                     | Fully open position                      | 94–108                                                                                                                         | Check with throttle valves fully open.                                                                                                                                                                         |
| 14                  | Accelerator position sensor signal 1     |                                                                                                                                |                                                                                                                                                                                                                |
|                     | Fully closed position                    | 12–22                                                                                                                          | Check with throttle grip fully closed position.                                                                                                                                                                |
|                     | Fully open position                      | 97–107                                                                                                                         | Check with throttle grip fully open position.                                                                                                                                                                  |
| 15                  | Accelerator position sensor signal 2     |                                                                                                                                |                                                                                                                                                                                                                |
|                     | Fully closed position                    | 10–24                                                                                                                          | Check with throttle grip fully closed position.                                                                                                                                                                |
|                     | Fully open position                      | 95–109                                                                                                                         | Check with throttle grip fully open position.                                                                                                                                                                  |
| 16                  | Front wheel vehicle speed pulses         | Front wheel speed pulse 0–999                                                                                                  | Check that the number increases when the front wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.                                                                   |

| Diagnostic | Item                                                                                                                                                                                              | Tool display                                                                                                                                                                                                                                 | Procedure                                                                                                                   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| code No.   |                                                                                                                                                                                                   |                                                                                                                                                                                                                                              |                                                                                                                             |
| 20         | Sidestand switch                                                                                                                                                                                  |                                                                                                                                                                                                                                              | Extend and retract the sidestand (with the transmission in                                                                  |
|            | Stand retracted                                                                                                                                                                                   | ON                                                                                                                                                                                                                                           | gear).                                                                                                                      |
| 04         | Stand extended                                                                                                                                                                                    | OFF                                                                                                                                                                                                                                          | O a controller to a controller                                                                                              |
| 21         | gear position switch and clutch switch                                                                                                                                                            |                                                                                                                                                                                                                                              | Operate the transmission, clutch lever, and sidestand.                                                                      |
|            | Transmission is in neutral                                                                                                                                                                        | ON                                                                                                                                                                                                                                           |                                                                                                                             |
|            | Transmission is in gear or<br>the clutch lever released                                                                                                                                           | OFF                                                                                                                                                                                                                                          |                                                                                                                             |
|            | Clutch lever is squeezed<br>with the transmission in<br>gear and when the sides-<br>tand is retracted                                                                                             | ON                                                                                                                                                                                                                                           |                                                                                                                             |
|            | Clutch lever is squeezed<br>with the transmission in<br>gear and when the sides-<br>tand is extended                                                                                              | OFF                                                                                                                                                                                                                                          |                                                                                                                             |
| 60         | EEPROM fault code display                                                                                                                                                                         |                                                                                                                                                                                                                                              | _                                                                                                                           |
|            | No history                                                                                                                                                                                        | No malfunctions detected     (If the self-diagnosis fault code P062F is indicated, the ECU is defective.)                                                                                                                                    |                                                                                                                             |
|            | History exists     Display the EEPROM writing error for fault code No. P062F.     If more than one item is defective, the displays alternates every two seconds to show all the detected numbers. | 01–03 (Cylinder adjustment value) • (If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.) |                                                                                                                             |
|            |                                                                                                                                                                                                   | 11 (Data error for ISC (idle speed control) learning values)                                                                                                                                                                                 |                                                                                                                             |
|            |                                                                                                                                                                                                   | 12 (O <sub>2</sub> feedback learning value)                                                                                                                                                                                                  |                                                                                                                             |
|            |                                                                                                                                                                                                   | 13 (OBD memory value)                                                                                                                                                                                                                        |                                                                                                                             |
| 67         | ISC (idle speed control) learning condition display ISC (idle speed control) learning data erasure                                                                                                | 00 ISC (idle speed control) learning data has been erased. 01 It is not necessary to erase the ISC (idle speed control) learning data. 02 It is necessary to erase the ISC (idle speed control) learning data.                               | To erase the ISC (idle speed control) learning data, set the start/engine stop switch from "⊠" to "○" 3 times in 5 seconds. |
| 70         | Control number                                                                                                                                                                                    | 0–254 [-]                                                                                                                                                                                                                                    | _                                                                                                                           |

| Diagnostic code No. |                                               | Tool display                                                                                                            | Procedure                                                                                                                            |  |
|---------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--|
| 87                  | O <sub>2</sub> feedback learning data erasure | O0 O <sub>2</sub> feedback learning data has been erased. O1 O <sub>2</sub> feedback learning data has not been erased. | To erase the $O_2$ feedback learning data, set the start/engine stop switch from " $\boxtimes$ " to " $\cap$ " 3 times in 5 seconds. |  |

EAS31121

#### **DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE**

| Diagnostic code No. | Item                      | Actuation                                                                                                                                                                             | Procedure                                                                                                             |  |
|---------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--|
| 30                  | Cylinder-#1 ignition coil | Actuates the cylinder-#1 ignition coil five times at onesecond intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated. | Check that a spark is generated five times.  Connect an ignition checker.                                             |  |
| 31                  | Cylinder-#2 ignition coil | Actuates the cylinder-#2 ignition coil five times at onesecond intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated. | Check that a spark is generated five times.  Connect an ignition checker.                                             |  |
| 32                  | Cylinder-#3 ignition coil | Actuates the cylinder-#3 ignition coil five times at onesecond intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated. | Check that a spark is generated five times.  Connect an ignition checker.                                             |  |
| 36                  | Injector #1               | Actuates the injector #1 five times at one-second intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the injector is actuated.                   | Disconnect the fuel pump coupler. Check that injector #1 is actuated five times by listening for the operating sound. |  |
| 37                  | Injector #2               | Actuates the injector #2 five times at one-second intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the injector is actuated.                   | Disconnect the fuel pump coupler. Check that injector #2 is actuated five times by listening for the operating sound. |  |
| 38                  | Injector #3               | Actuates the injector #3 five times at one-second intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the injector is actuated.                   | Disconnect the fuel pump coupler. Check that injector #3 is actuated five times by listening for the operating sound. |  |

| Diagnostic code No. | Item                          | Actuation                                                                                                                                                                                                  | Procedure                                                                                                 |  |
|---------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--|
| 48                  | Air induction system solenoid | Actuates the air induction system solenoid five times at one-second intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the air induction system solenoid is actuated. | Check that the air induction system solenoid is actuated five times by listening for the operating sound. |  |
| 50                  | Relay unit                    | Actuates the relay unit five times at one-second intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the relay is actuated.                                            | Check that the relay unit is actuated five times by listening for the operating sound.                    |  |
| 51                  | Radiator fan motor relay      | Actuates the radiator fan motor relay five times at five-second intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the relay is actuated.                             | Check that the radiator fan motor relay is actuated five times by listening for the operating sound.      |  |
| 52                  | Headlight relay               | Actuates the headlight relay five times at five-second intervals. The "check" indicator on the Yamaha diagnostic tool screen come on each time the relay is actuated.                                      | Check that the headlight relay is actuated five times by listening for the operating sound.               |  |

EAS20164

### **EVENT CODE TABLE**

| No. | Item                                                                     | Symptom                                                                                  | Possible causes                                                                                                                                                                                                                                               | Note                                                                                                                             |
|-----|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 30  | Latch up detected                                                        | Latch up detected                                                                        | Vehicle has overturned     Improperly installed sensor     Sensor malfunction     Defective ECU                                                                                                                                                               | Perform the checks and maintenance jobs for event code number 30.                                                                |
| 192 | Intake air pres-<br>sure sensor 1                                        | Brief abnormality<br>detected in the intake<br>air pressure sensor 1                     | Same as for fault code<br>number P0107 and<br>P0108                                                                                                                                                                                                           | Perform the checks and maintenance jobs for fault code number P0107 and P0108.                                                   |
| 193 | Throttle position sensor                                                 | Brief abnormality<br>detected in the throt-<br>tle position sensor                       | Same as for fault code<br>number P0122, P0123,<br>P0222, P0223 and<br>P2135                                                                                                                                                                                   | Perform the checks and<br>maintenance jobs for fault<br>code number P0122,<br>P0123, P0222, P0223 and<br>P2135                   |
| 195 | Sidestand switch                                                         | Brief abnormality<br>detected in the ECU<br>(black/red lead) input<br>line               | Same as for fault code<br>number P1601                                                                                                                                                                                                                        | Perform the checks and maintenance jobs for fault code number P1601.                                                             |
| 196 | Coolant tempera-<br>ture sensor                                          | Brief abnormality<br>detected a in the<br>coolant temperature<br>sensor                  | Same as for fault code<br>number P0117 and<br>P0118                                                                                                                                                                                                           | Perform the checks and maintenance jobs for fault code number P0117 and P0118.                                                   |
| 197 | Intake air temper-<br>ature sensor                                       | Brief abnormality<br>detected in the intake<br>air temperature sen-<br>sor               | Same as for fault code<br>number P0112 and<br>P0113                                                                                                                                                                                                           | Perform the checks and maintenance jobs for fault code number P0112 and P0113.                                                   |
| 199 | Intake air pres-<br>sure sensor 2                                        | Brief abnormality<br>detected in the intake<br>air pressure sensor 2                     | Same as for fault code<br>number P1606 and<br>P1607                                                                                                                                                                                                           | Perform the checks and maintenance jobs for fault code number P1606 and P1607.                                                   |
| 203 | Lean angle sen-<br>sor                                                   | Brief abnormality<br>detected in the lean<br>angle sensor                                | Same as for fault code<br>number P1604 and<br>P1605                                                                                                                                                                                                           | Perform the checks and maintenance jobs for fault code number P1604 and P1605.                                                   |
| 207 | Accelerator position sensor                                              | Brief abnormality<br>detected in the accel-<br>erator position sensor                    | Same as for fault code<br>number P2122, P2123,<br>P2127, P2128 and<br>P2138                                                                                                                                                                                   | Perform the checks and<br>maintenance jobs for fault<br>code number P2122,<br>P2123, P2127, P2128 and<br>P2138.                  |
| 240 | O <sub>2</sub> sensor<br>(Stuck at the<br>upper limit for<br>adjustment) | During O <sub>2</sub> feedback,<br>the adjustment is<br>maintained at the<br>upper limit | <ul> <li>Open or short circuit in the wire harness between the sensor and ECU</li> <li>Drop in fuel pressure</li> <li>Clogged fuel injector</li> <li>Fault in sensor</li> <li>Malfunction in ECU</li> <li>Malfunction in the fuel injection system</li> </ul> | If a fault code is occurring, respond to that first.     * Rarely, Code 240 occurs even when the system is functioning properly. |

# **EVENT CODE TABLE**

| No. | Item                                                                     | Symptom                                                                                  | Possible causes                                                                                                                                                                                                                                               | Note                                                                                                                                                                                                                              |
|-----|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 241 | O <sub>2</sub> sensor<br>(Stuck at the<br>lower limit for<br>adjustment) | During O <sub>2</sub> feedback,<br>the adjustment is<br>maintained at the<br>lower limit | <ul> <li>Open or short circuit in the wire harness between the sensor and ECU</li> <li>Drop in fuel pressure</li> <li>Clogged fuel injector</li> <li>Fault in sensor</li> <li>Malfunction in ECU</li> <li>Malfunction in the fuel injection system</li> </ul> | If a fault code is occurring, respond to that first.     * Rarely, Code 241 occurs even when the system is functioning properly.                                                                                                  |
| 242 | ISC<br>(Stuck at the<br>upper limit for<br>adjustment)                   | During idling, the<br>adjustment is main-<br>tained at the upper<br>limit                | Idling engine speed is slow  Clogged throttle body Poorly adjusted throttle cable Poorly adjusted clutch cable Malfunction in the fuel injection system Dirty or worn spark plug Malfunction in the battery Malfunction in ECU                                | Implement diagnosis mode (diagnostic code number 67), and check the ISC maintenance request.     If a fault code is occurring, respond to that first.     * Rarely, Code 242 occurs even when the system is functioning properly. |
| 243 | ISC<br>(Stuck at the<br>lower limit for<br>adjustment)                   | During idling, the<br>adjustment is main-<br>tained at the lower<br>limit                | Idling engine speed is fast  Poorly adjusted throttle cable Poorly adjusted clutch cable Malfunction in the fuel injection system Dirty or worn spark plug Malfunction in the battery Malfunction in ECU                                                      | If a fault code is occurring, respond to that first.     Rarely, Code 243 occurs even when the system is functioning properly.                                                                                                    |
| 244 | Poor start-<br>ing/inability to<br>start                                 | Poor starting/inability to start detected                                                | <ul> <li>No gasoline</li> <li>Malfunction in the fuel injection system</li> <li>Dirty or worn spark plug</li> <li>Malfunction in the battery</li> <li>Malfunction in ECU</li> </ul>                                                                           | If a fault code is occurring, respond to that first.     Rarely, Code 244 occurs even when the system is functioning properly.                                                                                                    |
| 245 | Engine stop                                                              | Engine stop detected                                                                     | No gasoline Poorly adjusted throttle cable Poorly adjusted clutch cable Malfunction in the fuel injection system Dirty or worn spark plug Malfunction in the battery Malfunction in ECU                                                                       | If a fault code is occurring, respond to that first.     * Rarely, Code 245 occurs even when the system is functioning properly.                                                                                                  |

FAS30613 55. Multi-function meter **COLOR CODE** WIRING DIAGRAM 56. Oil level warning light 57. Fuel meter В MTM850/MTM850G 2016 Black 58. Engine trouble warning light Br Brown 1. AC magneto 59. Coolant temperature warning Chocolate 2. Rectifier/regulator Ch Dq Dark green 3. Main switch 60. Traction control system indica-G Green 4. Main fuse tor light Gy Gray 5. ABS motor fuse 61. High beam indicator light L Blue 6. ABS solenoid fuse 62. Turn signal indicator light (left) Lg Light green 7. Electric throttle valve fuse 63. Turn signal indicator light (right) 0 Orange 8. Backup fuse 64. ABS warning light Р Pink 9. Radiator fan motor fuse 65. Oil level switch R Red 10. Parking lighting fuse 66. Gear position switch Sb Sky blue 11. Ignition fuse 67. Fuel sender W White 12. ABS ECU fuse 68. Fuel pump Υ Yellow 13. Signaling system fuse 69. Sidestand switch B/G Black/Green 14. Headlight fuse 70. Handlebar switch (right) 15. Auxiliary DC outlet fuse B/L Black/Blue 71. Drive mode switch B/R Black/Red 16. Battery 72. Start/engine stop switch B/W Black/White 17. Engine ground 73. Hazard switch B/Y Black/Yellow 18. Fuel injection system fuse 74. Front brake light switch Br/L Brown/Blue 19. Starter relay 75. Rear brake light switch 20. Starter motor Br/R Brown/Red 76. Turn signal/hazard relay Brown/White 21. Joint connector Br/W 77. Handlebar switch (left) Br/Y Brown/Yellow 22. Joint coupler 78. Clutch switch Green/Black G/B 23. Relay unit 79. Traction control system switch Green/Red G/R 24. Starting circuit cut-off relay 80. Horn G/W Green/White 25. Fuel pump relay 81. Horn switch G/Y Green/Yellow 26. Immobilizer unit 82. Turn signal switch Gy/G Gray/Green 27. ECU (Engine Control Unit) 83. Pass switch Gray/Red 28. Ignition coil #1 Gy/R 84. Dimmer switch 29. Ignition coil #2 L/B Blue/Black 85. Rear turn signal light (right) 30. Ignition coil #3 L/R Blue/Red 86. Rear turn signal light (left) L/W Blue/White 31. Spark plug 87. Front turn signal light (right) L/Y Blue/Yellow 32. Injector #1 88. Front turn signal light (left) Light green/Blue 33. Injector #2 La/L 89. Headlight Light green/White Lg/W 34. Injector #3 90. Auxiliary light Orange/Green O/G 35. Air induction system solenoid 91. License plate light P/B Pink/Black 36. O<sub>2</sub> sensor 92. Tail/brake light P/W Pink/White 37. Crankshaft position sensor 93. Headlight relay R/B Red/Black 38. Intake air temperature sensor 94. Radiator fan motor relay R/G Red/Green 39. Coolant temperature sensor 95. Radiator fan motor Red/Blue 40. Intake air pressure sensor 1 R/L 96. Auxiliary DC outlet R/W Red/White 41. Intake air pressure sensor 2 R/Y Red/Yellow 42. Lean angle sensor A. Wire harness Sb/W Sky blue/White 43. Front wheel sensor B. Sub-wire harness (Injector #2) White/Green 44. Rear wheel sensor W/G Sub-wire harness (Coolant 45. ABS ECU (electronic control W/L White/Blue temperature sensor) W/R White/Red D. Negative battery sub-wire har-W/Y White/Yellow 46. Throttle servo motor ness Y/B Yellow/Black 47. Accelerator position sensor Yellow/Green Y/G 48. Throttle position sensor Y/L Yellow/Blue 49. Yamaha diagnostic tool cou-Y/R Yellow/Red pler Y/W Yellow/White 50. Meter assembly

EAS20001

51. Immobilizer system indicator

52. Neutral indicator light

53. Meter light 54. Tachometer



MTM850/MTM850G 2016 MTM850/

