

# YZF-R6(V)

## **SERVICE MANUAL**

2C0-28197-E0

EAS20040

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## NOTICE

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

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

#### NOTE:\_

Designs and specifications are subject to change without notice.

## IMPORTANT MANUAL INFORMATION

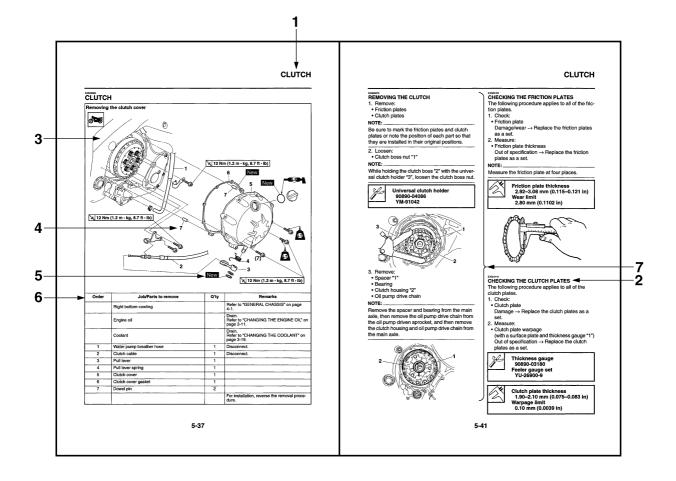
Particularly important information is distinguished in this manual by the following.

	The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!
	Failure to follow WARNING instructions <u>could result in severe injury or death</u> to the vehicle operator, a bystander or a person checking or repairing the vehicle.
CAUTION:	A CAUTION indicates special precautions that must be taken to avoid damage to the vehicle.
NOTE:	A NOTE provides key information to make procedures easier or clearer.

## HOW TO USE THIS MANUAL

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

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

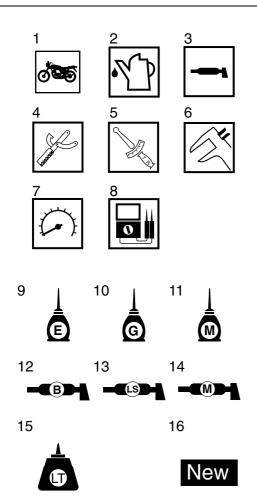


## SYMBOLS

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

#### NOTE:

The following symbols are not relevant to every vehicle.



- 1. Serviceable with engine mounted
- 2. Filling fluid
- 3. Lubricant
- 4. Special tool
- 5. Tightening torque
- 6. Wear limit, clearance
- 7. Engine speed
- 8. Electrical data
- 9. Engine oil
- 10. Gear oil
- 11. Molybdenum disulfide oil
- 12. Wheel bearing grease
- 13. Lithium-soap-based grease
- 14. Molybdenum disulfide grease
- 15. Apply locking agent (LOCTITE<sup>®</sup>).
- 16. Replace the part with a new one.

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EAS20110

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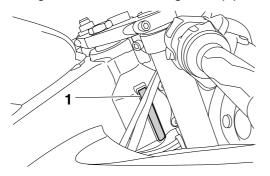
## **GENERAL INFORMATION**

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## IDENTIFICATION

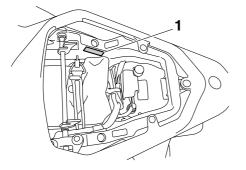
#### EAS20140 VEHICLE IDENTIFICATION NUMBER

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



#### EAS20150 MODEL LABEL

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



## FEATURES

#### ET2C01025

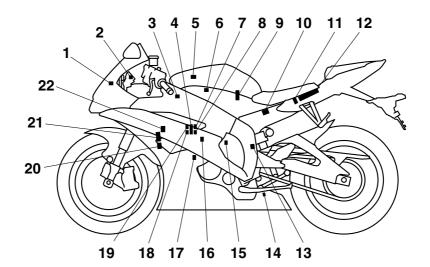
#### OUTLINE OF THE FI SYSTEM

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

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

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

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



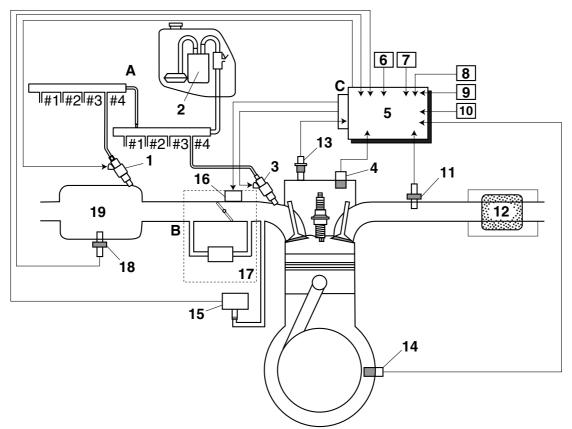
- 1. Air temperature sensor
- 2. Engine trouble warning light
- 3. Air induction system solenoid
- 4. Throttle servo motor
- 5. Atmospheric pressure sensor
- 6. Secondary injectors
- 7. Primary injectors
- 8. Intake air pressure sensor
- 9. Fuel pump
- 10. Relay unit (fuel pump relay)
- 11. Lean angle sensor
- 12. ECU (engine control unit)
- 13. EXUP servo motor
- 14.O2 sensor

- 15. Speed sensor
- 16. Coolant temperature sensor
- 17. Crankshaft position sensor
- 18. Throttle position sensor (for throttle cable pulley)
- 19. Throttle position sensor (for throttle valves)
- 20. Spark plug
- 21. Ignition coil
- 22. Cylinder identification sensor

#### ET2C01019 FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at only 324 kPa (3.24 kg/cm<sup>2</sup>, 46.1 psi). Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.

The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor (for throttle cable pulley), throttle position sensor (for throttle valves), coolant temperature sensor, atmospheric pressure sensor, cylinder identification sensor, lean angle sensor, crankshaft position sensor, intake air pressure sensor, air temperature sensor, speed sensor and  $O_2$  sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.



- 1. Secondary injector
- 2. Fuel pump
- 3. Primary injector
- 4. Cylinder identification sensor
- 5. ECU (engine control unit)
- 6. Throttle position sensor (for throttle cable pulley)
- 7. Throttle position sensor (for throttle valves)
- 8. Speed sensor
- 9. Air temperature sensor
- 10. Lean angle sensor
- 11.O<sub>2</sub> sensor

- 12. Catalytic converter
- 13. Coolant temperature sensor
- 14. Crankshaft position sensor
- 15. Intake air pressure sensor
- 16. Throttle servo motor
- 17. Throttle body
- 18. Atmospheric pressure sensor
- 19. Air filter case
- A. Fuel systemB. Air system
- D. All System
- C. Control system

## 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 three 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

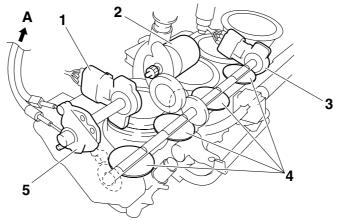
Due to the throttle control, optimal engine braking is made possible.

• 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.

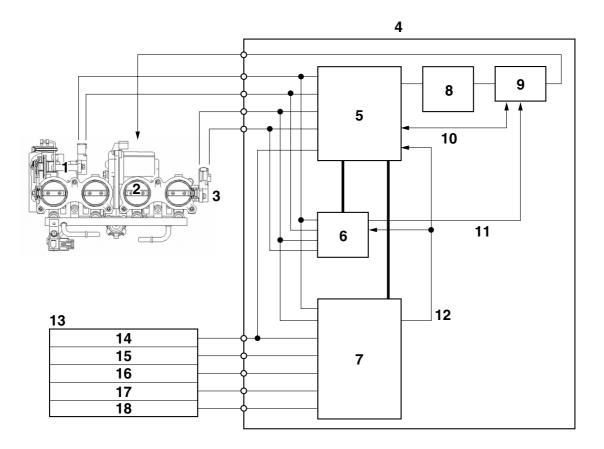
Reduced weight

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



- 1. Throttle position sensor (for throttle cable pulley)
- 2. Throttle servo motor
- 3. Throttle position sensor (for throttle valves)
- 4. Throttle valves
- 5. Throttle cable pulley with linkage guard
- A. To throttle grip

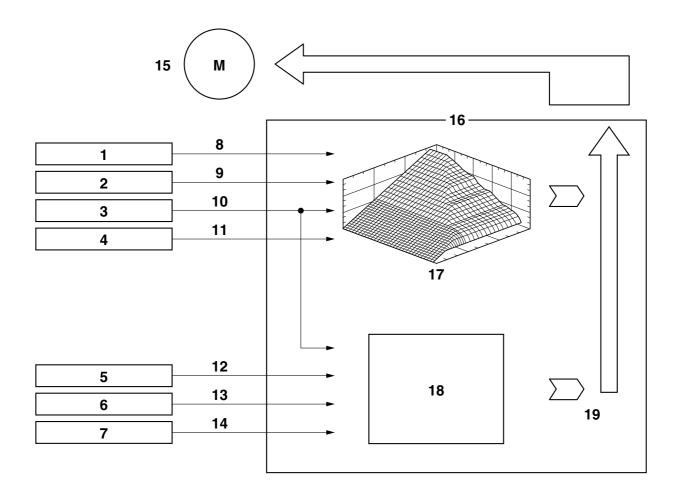
#### YCC-T system outline



- 1. Throttle position sensor (for throttle cable pulley)
- 2. Throttle servo motor
- 3. Throttle position sensor (for throttle valves)
- 4. ECU (engine control unit)
- 5. ETV main CPU (32 bit)
- 6. ETV sub CPU (16 bit)
- 7. FI CPU (32 bit)
- 8. Throttle servo motor driver
- 9. Throttle servo motor driver operation sensing/shut off circuit
- 10. Throttle servo motor driver operation sensing feedback/emergency stop
- 11. Emergency stop
- 12. Engine revolution (pulse signal)
- 13. Sensor input
- 14. Neutral switch
- 15. Crankshaft position sensor
- 16. Speed sensor
- 17. Coolant temperature sensor

18. Atmospheric pressure sensor

#### YCC-T control outline



- 1. Throttle position sensor (for throttle cable pulley)
- 2. Throttle position sensor (for throttle valves)
- 3. Crankshaft position sensor
- 4. Speed sensor
- 5. Coolant temperature sensor
- 6. Neutral switch
- 7. Atmospheric pressure sensor
- 8. Throttle position (for throttle cable pulley) (two signals)
- 9. Throttle position (for throttle valves) (two signals)
- 10. Engine revolution
- 11. Vehicle speed
- 12. Coolant temperature
- 13. Neutral/In gear
- 14. Atmospheric pressure
- 15. Throttle servo motor
- 16. ECU (engine control unit)
- 17. Base map

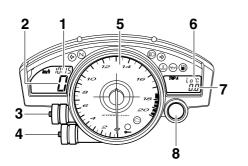
- 18. Idle speed control
- 19. Calculated throttle valve opening angle

#### ET2C01020 INSTRUMENT FUNCTIONS

Multi-function meter unit

#### WARNING

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



- 1. Clock
- 2. Speedometer
- 3. "SELECT" button
- 4. "RESET" button
- 5. Tachometer
- 6. Coolant temperature display/air intake temperature display
- 7. Odometer/tripmeters/fuel reserve tripmeter/stopwatch
- 8. Shift timing indicator light

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

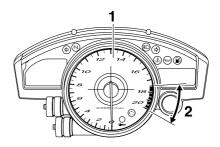
- a speedometer (which shows the riding speed)
- a tachometer (which shows engine speed)
- an odometer (which shows the total distance traveled)
- two tripmeters (which show the distance traveled since they were last set to zero)
- a fuel reserve tripmeter (which shows the distance traveled since the fuel level warning light came on)
- a stopwatch
- a clock
- a coolant temperature display
- an air intake temperature display
- a self-diagnosis device
- a display brightness and shift timing indicator light control mode

#### NOTE:

• Be sure to turn the key to "ON" before using the "SELECT" and "RESET" buttons.

• For the U.K. only: To switch the speedometer and odometer/tripmeter displays between kilometers and miles, press the "SELECT" button for at least one second.

#### Tachometer



- 1. Tachometer
- 2. Tachometer red zone

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

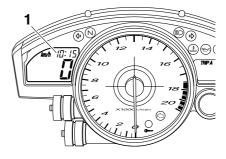
When the key is turned to "ON", the tachometer needle will sweep once across the r/min range and then return to zero r/min in order to test the electrical circuit.

#### CAUTION:

Do not operate the engine in the tachometer red zone.

#### Red zone: 17500 r/min and above

#### **Clock mode**



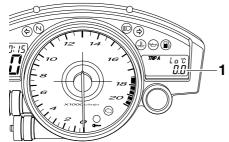
1. Clock

Turn the key to "ON".

#### To set the clock:

- 1. Push the "SELECT" button and "RESET" button together for at least two seconds.
- 2. When the hour digits start flashing, push the "RESET" button to set the hours.
- 3. Push the "SELECT" button, and the minute digits will start flashing.
- 4. Push the "RESET" button to set the minutes.
- 5. Push the "SELECT" button and then release it to start the clock.

#### Odometer, tripmeter, and stopwatch modes



1. Odometer/tripmeters/fuel reserve tripmeter/stopwatch

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

TRIP A  $\rightarrow$  TRIP B  $\rightarrow$  ODO  $\rightarrow$  Stopwatch  $\rightarrow$  TRIP A

If the fuel level warning light comes on, the odometer display will automatically change to the fuel reserve tripmeter mode "F-TRIP" and start counting the distance traveled from that point. In that case, push the "SELECT" button to switch the display between the various tripmeter, odometer, and stopwatch modes in the following order:

 $\text{F-TRIP} \rightarrow \text{Stopwatch} \rightarrow \text{TRIP} \text{ A} \rightarrow \text{TRIP} \text{ B} \rightarrow \text{ODO} \rightarrow \text{F-TRIP}$ 

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

#### Stopwatch mode

To change the display to the stopwatch mode, select it by pushing the "SELECT" button. (The stopwatch digits will start flashing.) Release the

"SELECT" button, and then push it again for a few seconds until the stopwatch digits stop flashing.

#### Standard measurement:

- 1. Push the "RESET" button to start the stopwatch.
- 2. Push the "SELECT" button to stop the stopwatch.
- 3. Push the "SELECT" button again to reset the stopwatch.

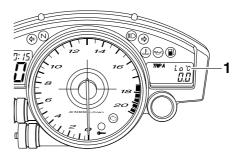
#### Split-time measurement:

- 1. Push the "RESET" button to start the stopwatch.
- 2. Push the "RESET" button or start switch "(豪)" to measure split-times. (The colon ":" will start flashing.)
- Push the "RESET" button or start switch "(s)" to display the final split-time or push the "SE-LECT" button to stop the stopwatch and display total elapsed time.
- 4. Push the "SELECT" button to reset the stopwatch.

#### NOTE: \_

To change the display back to the prior mode, push the "SELECT" button for a few seconds.

#### **Coolant temperature display**



1. Coolant temperature display

The coolant temperature display indicates the temperature of the coolant. Push the "RESET" button to switch the coolant temperature display to the air intake temperature display.

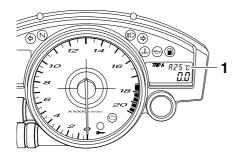
#### NOTE:

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

## CAUTION:

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

#### Air intake temperature display



1. Air intake temperature display

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

#### NOTE:

- Even if the air intake temperature is set to be displayed, the coolant temperature warning light comes on when the engine overheats.
- When the key is turned to "ON", the coolant temperature is automatically displayed, even if the air intake temperature was displayed prior to turning the key to "OFF".
- When the air intake temperature display is selected, "A" is displayed before the temperature.

#### Self-diagnosis device

This model is equipped with a self-diagnosis device for various electrical circuits.

If any of those circuits are defective, the engine trouble warning light will come on, and then the odometer/trip meter/fuel reserve trip meter/stop-watch display will indicate a two-digit error code (e.g., 11, 12, 13).

If the display indicates an error code, note the code number, and then check the vehicle. Refer to "FUEL INJECTION SYSTEM" on page 8-33.

#### CAUTION:

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

This model is also equipped with a self-diagnosis device for the immobilizer system. If any of the immobilizer system circuits are defective, the immobilizer system indicator light will flash, and then the odometer/trip meter/fuel reserve trip meter/stopwatch display will indicate a two-digit error code (e.g., 51, 52, 53).

#### NOTE:

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

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

#### NOTE:

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

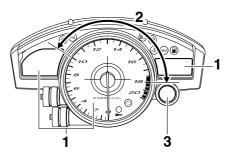
- 2. If the engine starts, turn it off and try starting the engine with the standard keys.
- 3. If one or both of the standard keys do not start the engine, re-register the standard keys.

If the display indicates an error code, note the code number, and then check the vehicle. Refer to "IMMOBILIZER SYSTEM" on page 8-77.

#### CAUTION:

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

## Display brightness and shift timing indicator light control mode



- 1. Display brightness
- 2. Shift timing indicator light activation/deactivation
- 3. Shift timing indicator light

This mode cycles through five control functions, allowing you to make the following settings in the order listed below. • Display brightness:

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

- Shift timing indicator light activity: This function allows you to choose whether or not the indicator light should be activated and whether it should flash or stay on when activated.
- Shift timing indicator light activation: This function allows you to select the engine speed at which the indicator light will be activated.
- Shift timing indicator light deactivation: This function allows you to select the engine speed at which the indicator light will be deactivated.
- Shift timing indicator light brightness: This function allows you to adjust the brightness of the indicator light to suit your preference.

#### NOTE: \_\_\_\_

In this mode, the odometer/trip meter/fuel reserve trip meter/stopwatch display shows the current setting for each function (except the shift timing indicator light activity function).

To adjust the brightness of the multi-function meter displays and tachometer:

- 1. Turn the key to "OFF".
- 2. Push and hold the "SELECT" button.
- 3. Turn the key to "ON", and then release the "SELECT" button after five seconds.
- 4. Push the "RESET" button to select the desired brightness level.
- 5. Push the "SELECT" button to confirm the selected brightness level. The control mode changes to the shift timing indicator light activity function.

To set the shift timing indicator light activity function:

- 1. Push the "RESET" button to select one of the following indicator light activity settings:
  - The indicator light will stay on when activated. (This setting is selected when the indicator light stays on.)
  - The indicator light will flash when activated. (This setting is selected when the indicator light flashes four times per second.)

- The indicator light is deactivated; in other words, it will not come on or flash. (This setting is selected when the indicator light flashes once every two seconds.)
- Push the "SELECT" button to confirm the selected indicator light activity. The control mode changes to the shift timing indicator light activation function.

## To set the shift timing indicator light activation function:

#### NOTE:

The shift timing indicator light activation function can be set between 10000 r/min and 18000 r/min. From 10000 r/min to 13000 r/min, the indicator light can be set in increments of 500 r/min. From 13000 r/min to 18000 r/min, the indicator light can be set in increments of 200 r/min.

- 1. Push the "RESET" button to select the desired engine speed for activating the indicator light.
- 2. Push the "SELECT" button to confirm the selected engine speed. The control mode changes to the shift timing indicator light deactivation function.

## To set the shift timing indicator light deactivation function:

#### NOTE:

- The shift timing indicator light deactivation function can be set between 10000 r/min and 18000 r/min. From 10000 r/min to 13000 r/min, the indicator light can be set in increments of 500 r/min. From 13000 r/min to 18000 r/min, the indicator light can be set in increments of 200 r/min.
- Be sure to set the deactivation function to a higher engine speed than for the activation function, otherwise the shift timing indicator light will remain deactivated.
- 1. Push the "RESET" button to select the desired engine speed for deactivating the indicator light.
- 2. Push the "SELECT" button to confirm the selected engine speed. The control mode changes to the shift timing indicator light brightness function.

To adjust the shift timing indicator light brightness:

- 1. Push the "RESET" button to select the desired indicator light brightness level.
- 2. Push the "SELECT" button to confirm the selected indicator light brightness level. The display will return to the odometer or tripmeter mode.

## IMPORTANT INFORMATION

## 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 1-15.
- 3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.



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

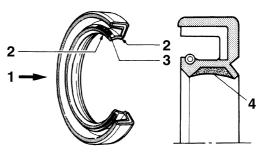
#### EAS20200 REPLACEMENT PARTS

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



## GASKETS, OIL SEALS AND O-RINGS

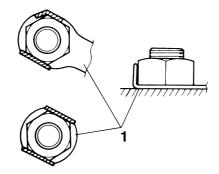
- 1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
- 2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



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

#### LOCK WASHERS/PLATES AND COTTER PINS

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

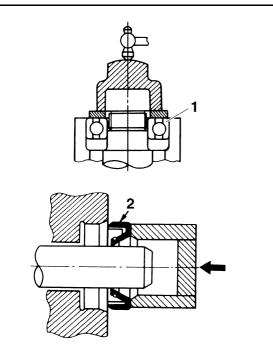


#### EAS20230 BEARINGS AND OIL SEALS

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

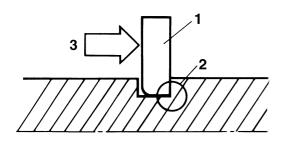
#### CAUTION:

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



## EAS20240

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



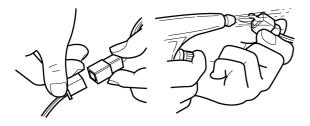
## **CHECKING THE CONNECTIONS**

## CHECKING THE CONNECTIONS

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

- 1. Disconnect:
  - Lead
  - Coupler
  - Connector
- 2. Check:
  - Lead
  - Coupler
  - Connector

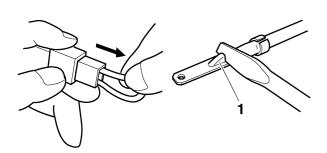
Moisture  $\rightarrow$  Dry with an air blower. Rust/stains  $\rightarrow$  Connect and disconnect several times.



- 3. Check:
  - All connections Loose connection  $\rightarrow$  Connect properly.

#### NOTE:

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



- 4. Connect:
  - Lead
  - Coupler
  - Connector

#### NOTE:

Make sure all connections are tight.

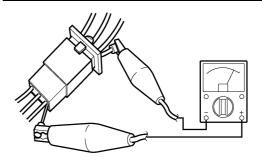
- 5. Check:
  - Continuity (with the pocket tester)

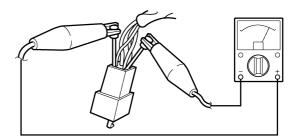


Pocket tester 90890-03112 Analog pocket tester YU-03112-C

#### NOTE:

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





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

#### NOTE:\_

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

Tool name/Tool No.	Illustration	Reference pages
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-14, 5-35, 8-93, 8-94, 8-95, 8-99, 8-100, 8-101, 8-102, 8-103, 8-104, 8-105, 8-106, 8-107, 8-108, 8-109, 8-110
Valve lapper 90890-04101 Valve lapping tool YM-A8998	014	3-4
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456	90890-03094	3-6
	YU-44456	
Compression gauge 90890-03081 Engine compression tester YU-33223		3-10
Extension 90890-04136	122	3-10

Tool name/Tool No.	Illustration	Reference pages
Oil filter wrench 90890-01426 YU-38411	64.2	3-12
Oil pressure gauge set 90890-03120		3-13
Oil pressure adapter H 90890-03139	M16×P1.5	3-13
Steering nut wrench 90890-01403 Spanner wrench YU-33975	R20	3-27, 4-57
Fork spring compressor 90890-01441 YM-01441		4-47, 4-52
Rod holder 90890-01434 Damper rod holder double ended YM-01434	11.	4-47, 4-52
Damper rod holder 90890-01506	Ø30	4-48, 4-49
Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442		4-50

Tool name/Tool No.	Illustration	Reference pages
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703	90890-01437	4-50, 4-52
	YM-A8703	
Rod puller attachment (M10) 90890-01436 Universal damping rod bleeding tool set YM-A8703	90890-01436	4-50, 4-52
	YM-A8703	
Ring nut wrench 90890-01268 Spanner wrench YU-01268	R22 R38	4-57
Ring nut wrench 90890-01507	0	4-66, 4-68
Damper rod holder (24 mm) 90890-01328 YM-01328	90890-01328	4-66, 4-67
	YM-01328	
Valve spring compressor 90890-04019 YM-04019	031 0 M6×P1.0	5-19, 5-24

Tool name/Tool No.	Illustration	Reference pages
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108	022	5-19, 5-24
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116	04.5	5-21
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117	Ø4.5	5-21
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118	4.5 mm	5-21
Valve spring compressor 90890-04109	0191	5-24
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-28, 5-29, 5-31
Flywheel puller 90890-01404 Flywheel puller YM-01404	M35×P1.5	5-28
Yamaha bond No. 1215 90890-85505 (Three Bond No.1215 <sup>®</sup> )		5-29, 5-31, 5-57

Tool name/Tool No.	Illustration	Reference pages
Universal clutch holder 90890-04086 YM-91042	90890-04086 <u>M8×P1.25</u> 30 <sup>119</sup> 156	5-41, 5-45
	YM-91042	
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9	$0.15 \ 0.10 \ 0.05 \\ 0.20 \\ 0.30 \\ 0.35 \\ 0.40 $	5-41
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304	5-60
	YU-01304	
Radiator cap tester 90890-01325 Radiator pressure tester YU-24460-01	90890-01325 90890-01325	6-3
	YU-24460-01	
Radiator cap tester adapter 90890-01352 Radiator pressure tester adapter YU-33984	90890-01352 041 028	6-3
	YU-33984	

Tool name/Tool No.	Illustration	Reference pages
Pressure gauge 90890-03153 Pressure gauge YU-03153	Contraction of the second seco	7-10
Fuel pressure adapter 90890-03176 YM-03176	E .	7-10
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		7-11
Ignition checker 90890-06754 Opama pet-4000 spark checker YM-34487	a comparison of the second sec	8-102

## SPECIFICATIONS

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## GENERAL SPECIFICATIONS

#### Model

Model

#### 2C01 (EUR)(ZAF) 2C02 (BEL)(FRA) 2C04 (AUS)

Dimensions		
Overall length	2040 mm (80.3 in)	
Overall width	700 mm (27.6 in)	
Overall height	1100 mm (43.3 in)	
Seat height	850 mm (33.5 in)	
Wheelbase	1380 mm (54.3 in)	
Ground clearance	130 mm (5.12 in)	
Minimum turning radius	3600 mm (141.7 in)	

#### Weight

With oil and fuel Maximum load 182.0 kg (401 lb) 193 kg (425 lb)

## ENGINE SPECIFICATIONS

Engine		
Engine type	Liquid-cooled 4-stroke, DOHC	
Displacement	599 cm <sup>3</sup> (36.55 cu.in)	
Cylinder arrangement	Forward-inclined parallel 4-cylinder	
Bore × stroke	• •	
Compression ratio	67.0 × 42.5 mm (2.64 × 1.67 in) 12.8 :1	
Standard compression pressure (at sea level)	1550 kPa/400 r/min (220.5 psi/400 r/min) (15.5	
	kgf/cm <sup>2</sup> /400 r/min)	
Minimum-maximum	1300–1600 kPa (184.9–227.6 psi) (13.0–16.0 kgf/cm²)	
Starting system	Electric starter	
Fuel		
Recommended fuel	Premium unleaded gasoline only	
Fuel tank capacity	17.5 L (4.62 US gal) (3.85 Imp.gal)	
Fuel reserve amount	3.5 L (0.92 US gal) (0.77 Imp.gal)	
Engine oil		
Lubrication system	Wet sump	
Туре	SAE10W30 or SAE10W40 or SAE15W40 or	
	SAE20W40 or SAE20W50	
Recommended engine oil grade	API service SF, SG type or higher	
Engine oil quantity		
Total amount	3.40 L (3.59 US qt) (2.99 Imp.qt)	
Without oil filter cartridge replacement	2.40 L (2.54 US qt) (2.11 Imp.qt)	
With oil filter cartridge replacement	2.60 L (2.75 US qt) (2.29 Imp.qt)	
Oil cooler capacity (including all routes)	0.23 L (2.43 US qt) (2.02 Imp.qt)	
	· · · · · · · · · · · · · · · · · · ·	
Oil pressure (hot)	80.0 kPa/1300 r/min (11.6 psi/1300 r/min) (0.80 kgf/cm²/1300 r/min)	
Oil filter	Opticidary (new pr)	
Oil filter type	Cartridge (paper)	
Oil pump		
Oil pump type	Trochoid	
Inner-rotor-to-outer-rotor-tip clearance	Less than 0.12 mm (0.0047 in)	
Limit	0.20 mm (0.0079 in)	
Outer-rotor-to-oil-pump-housing clearance	0.090–0.150 mm (0.0035–0.0059 in)	
Limit	0.220 mm (0.0087 in)	
Oil-pump-housing-to-inner-and-outer-rotor	· · · /	
clearance	0.06–0.11 mm (0.0024–0.0043 in)	
Limit	0.18 mm (0.0071 in)	
Bypass valve opening pressure	78.4–117.6 kPa (11.4–17.1 psi) (0.78–1.18	
Dypass valve opening pressure	kgf/cm <sup>2</sup> )	
Relief valve operating pressure	660.0–740.0 kPa (95.7–107.3 psi) (6.60–7.40	
rionor varvo operating pressure	kgf/cm <sup>2</sup> )	
Pressure check location	MAIN GALLERY	
Cooling system		
Radiator canacity (including all routes)	2 30 L (2 /3 LIS at) (2 02 Imp at)	

Radiator capacity (including all routes)

2.30 L (2.43 US qt) (2.02 Imp.qt)

Coolant reservoir capacity (up to the maximum level mark) Radiator cap opening pressure

Thermostat Valve opening temperature Valve full open temperature Valve lift (full open) Thermo sensor Model/manufacturer Resistance at 80 °C Radiator core Width Height Depth Water pump Water pump type Reduction ratio

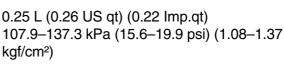
Reduction ratio Impeller shaft tilt limit

Spark plug (s)

Manufacturer/model Spark plug gap

#### Cylinder head

Volume Warpage limit



71 °C (159.8 °F) 85 °C (185 °F) More than 8 mm (0.31 in)

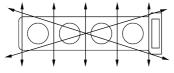
K003T20191/MITSUBISHI 290–354  $\Omega$ 

374.0 mm (14.72 in) 257.8 mm (10.15 in) 24.0 mm (0.94 in)

Single-suction centrifugal pump  $85/41 \times 29/31$  (1.939) 0.15 mm (0.006 in)

NGK/CR10EK 0.6-0.7 mm (0.024-0.028 in)

7.40-8.20 cm<sup>3</sup> (0.45-0.50 cu.in) 0.05 mm (0.0020 in)



#### Camshaft

Drive system Camshaft cap inside diameter Camshaft journal diameter Camshaft-journal-to-camshaft-cap clearance Limit Camshaft lobe dimensions Intake A Limit Intake B Limit Exhaust A Limit Chain drive (right) 22.500–22.521 mm (0.8858–0.8867 in) 22.459–22.472 mm (0.8842–0.8847 in) 0.028–0.062 mm (0.0011–0.0024 in) 0.080 mm (0.0032 in)

33.725–33.875 mm (1.3278–1.3337 in) 33.675 mm (1.3258 in) 25.225–25.325 mm (0.9931–0.9970 in) 25.175 mm (0.9911 in) 32.925–33.075 mm (1.2963–1.3022 in) 32.875 mm (1.2943 in)

## **ENGINE SPECIFICATIONS**

Exhaust B Limit

Camshaft runout limit

Timing chain

Model/number of links Tensioning system

#### Valve, valve seat, valve guide

Valve clearance (cold) Intake Exhaust Valve dimensions Valve head diameter A (intake) Valve head diameter A (exhaust)

Valve face width B (intake) Valve face width B (exhaust)

Valve seat width C (intake) Limit Valve seat width C (exhaust) Limit

25.082–25.182 mm (0.9875–0.9914 in) 25.032 mm (0.9855 in)

0.030 mm (0.0012 in)

98XRH2015/118 Automatic

0.12-0.19 mm (0.0047-0.0075 in) 0.16-0.23 mm (0.0063-0.0091 in)

26.90–27.10 mm (1.0591–1.0669 in) 22.90–23.10 mm (0.9016–0.9094 in)

1.410-2.550 mm (0.0555-0.1004 in) 1.400-2.670 mm (0.0551-0.1051 in)

0.90–1.10 mm (0.0354–0.0433 in) 1.6 mm (0.06 in) 1.10–1.30 mm (0.0433–0.0512 in) 1.8 mm (0.07 in) Valve margin thickness D (intake) Limit Valve margin thickness D (exhaust) Limit

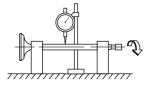


Valve stem diameter (intake) Limit Valve stem diameter (exhaust) Limit Valve guide inside diameter (intake) Limit Valve guide inside diameter (exhaust) Limit

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

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

Valve stem runout



Cylinder head valve seat width (intake) Limit Cylinder head valve seat width (exhaust)

#### Valve spring

Limit

Free length (intake) Limit Free length (exhaust) Limit Installed length (intake) Installed length (exhaust) Spring rate K1 (intake) Spring rate K2 (intake) Spring rate K2 (exhaust) Spring rate K2 (exhaust) Installed compression spring force (intake)

Installed compression spring force (exhaust)

0.90–1.10 mm (0.0354–0.0433 in) 0.8 mm (0.03 in) 1.10–1.30 mm (0.0433–0.0512 in) 1.0 mm (0.04 in)

4.475–4.490 mm (0.1762–0.1768 in) 4.460 mm (0.1756 in) 4.460–4.475 mm (0.1756–0.1762 in) 4.445 mm (0.1750 in) 4.500–4.512 mm (0.1772–0.1776 in) 4.542 mm (0.1788 in) 4.500–4.512 mm (0.1772–0.1776 in) 4.542 mm (0.1788 in) 0.010–0.037 mm (0.0004–0.0015 in) 0.080 mm (0.0032 in) 0.025–0.052 mm (0.0010–0.0020 in) 0.095 mm (0.0037 in) 0.040 mm (0.0016 in)

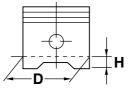
0.90–1.10 mm (0.0354–0.0433 in) 1.6 mm (0.06 in) 1.10–1.30 mm (0.0433–0.0512 in) 1.8 mm (0.07 in)

37.47 mm (1.48 in) 35.60 mm (1.40 in) 37.67 mm (1.48 in) 35.79 mm (1.42 in) 32.80 mm (1.29 in) 32.80 mm (1.29 in) 38.11 N/mm (217.61 lb/in) (3.89 kgf/mm) 52.40 N/mm (299.20 lb/in) (5.34 kgf/mm) 36.36 N/mm (207.62 lb/in) (3.71 kgf/mm) 53.40 N/mm (304.91 lb/in) (5.45 kgf/mm) 166.00–190.00 N (37.32–42.71 lb) (16.93– 19.37 kgf) 165.00–189.00 N (37.09–42.49 lb) (16.83–
165.00–189.00 N (37.09–42.49 lb) (16.83– 19.27 kgf)

2-5

### **ENGINE SPECIFICATIONS**

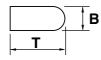
Spring tilt (intake) Spring tilt (exhaust)	2.5°/1.6 mm 2.5°/1.6 mm		
Winding direction (intake) Winding direction (exhaust)	Clockwise Clockwise		
Cylinder			
Bore	67.000–67.010 mm (2.6378–2.6382 in)		
Taper limit	0.050 mm (0.0020 in)		
Out of round limit	0.050 mm (0.0020 in)		
Piston			
Piston-to-cylinder clearance	0.010–0.035 mm (0.0004–0.0014 in)		
Limit	0.05 mm (0.0022 in)		
Diameter D	66.975–66.990 mm (2.6368–2.6374 in)		
Height H	10.0 mm (0.39 in)		



Offset Offset direction Piston pin bore inside diameter Limit Piston pin outside diameter Limit Piston-pin-to-piston-pin-bore clearance

#### **Piston ring**

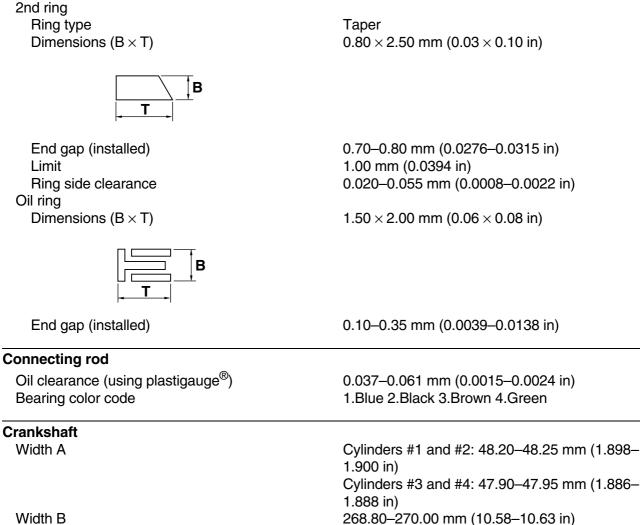
Top ring Ring type Dimensions  $(B \times T)$ 



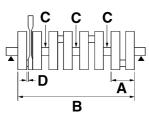
End gap (installed) Limit Ring side clearance 0.50 mm (0.0197 in) Intake side 15.002–15.013 mm (0.5906–0.5911 in) 15.043 mm (0.5922 in) 14.991–15.000 mm (0.5902–0.5906 in) 14.971 mm (0.5894 in) 0.002–0.022 mm (0.00007–0.00068 in)

Barrel 0.80  $\times$  2.40 mm (0.03  $\times$  0.09 in)

0.25–0.35 mm (0.0098–0.0138 in) 0.55 mm (0.0217 in) 0.030–0.065 mm (0.0012–0.0026 in)



Runout limit C Big end side clearance D



Small end free play F Journal oil clearance (using plastigauge<sup>®</sup>) Bearing color code

#### Clutch

Clutch type Clutch release method Clutch lever free play Friction plate thickness Wear limit Plate quantity Clutch plate thickness 0.32–0.50 mm (0.01–0.02 in) 0.020–0.044 mm (0.0008–0.0017 in) 1.Blue 2.Black 3.Brown 4.Green 5.Yellow

Wet, multiple-disc Outer pull, rack and pinion pull 10.0–15.0 mm (0.39–0.59 in) 2.92–3.08 mm (0.115–0.121 in) 2.80 mm (0.1102 in) 9 pcs 1.90–2.10 mm (0.075–0.083 in)

0.030 mm (0.0012 in)

0.160-0.262 mm (0.0063-0.0103 in)

Plate quantity	8 pcs		
Warpage limit	0.10 mm (0.0039 in)		
Clutch spring free length	55.00 mm (2.17 in)		
Minimum length	54.00 mm (2.13 in)		
Spring quantity	6 pcs		
Transmission			
Transmission type	Constant mesh 6-speed		
Primary reduction system	Spur gear		
Primary reduction ratio	85/41 (2.073)		
Secondary reduction system	Chain drive		
Secondary reduction ratio	45/16 (2.813)		
Operation	Left foot operation		
Gear ratio			
1st	31/12 (2.583)		
2nd	32/16 (2.000)		
3rd	30/18 (1.667)		
4th	26/18 (1.444)		
5th	27/21 (1.286)		
6th	23/20 (1.150)		
Main axle runout limit	0.02 mm (0.0008 in)		
Drive axle runout limit	0.02 mm (0.0008 in)		
Shifting mechanism			
Shift mechanism type	Shift drum		
Shift fork guide bar bending limit	0.050 mm (0.0020 in)		
Shift fork thickness	5.760–5.890 mm (0.2268–0.2319 in)		
Shift fork thickness	5.795–5.868 mm (0.2281–0.2310 in)		
Air filter			
Air filter element	Oil-coated paper element		
Fuel pump			
Pump type	Electrical		
Model/manufacturer	2C0/DENSO		
Maximum consumption amperage	5.1 A		
Output pressure	319.0–329.0 kPa (46.3–47.7 psi) (3.19–3.29		
	kgf/cm²)		
Injector			
Model/quantity	297500-0640/4, 297500-0660/4		
Manufacturer	DENSO		
Throttle body			
Type/quantity	41EIDW/1		
Manufacturer	MIKUNI		
ID mark	2C01 00		
Throttle valve size	#50		
Throttle position sensor			
Resistance	2.0–3.0 kΩ		

Fuel injection sensor	
Crankshaft position sensor resistance	248–372 Ω at 20 °C (68 °F)
Cylinder identification sensor output voltage (ON)	Less than 0.8 V
Cylinder identification sensor output voltage (OFF)	More than 4.8 V
Intake air pressure sensor output voltage	3.15–4.15 V
Atmospheric pressure sensor output voltage	3.15–4.15 V
Idling condition	
Engine idling anod	1050 1050 x/min

Engine idling speed
Intake vacuum
Water temperature
Oil temperature
Throttle cable free play

1250–1350 r/min 20.0 kPa (5.9 inHg) (150 mmHg) 95.0–105.0 °C (203.00–221.00 °F) 82–92 °C (180–198 °F) 3.0–5.0 mm (0.12–0.20 in)

#### Air induction system

Reed valve bending limit Solenoid resistance

0.4 mm (0.016 in) 18–22 Ω at 20 °C (68 °F)

# CHASSIS SPECIFICATIONS

Chassis				
Frame type	Diamond			
Caster angle	24.00°			
Trail	97.0 mm (3.82 in)			
ITAI	97.0 mm (3.82 m)			
Front wheel				
Wheel type	Cast wheel			
Rim size	$17M/C \times MT3.50$			
Rim material	Aluminum			
Wheel travel	120.0 mm (4.72 in)			
Radial wheel runout limit	1.0 mm (0.04 in)			
Lateral wheel runout limit	0.5 mm (0.02 in)			
Rear wheel				
Wheel type	Cast wheel			
Rim size	$17M/C \times MT5.50$			
Rim material	Aluminum			
Wheel travel	120.0 mm (4.72 in)			
Radial wheel runout limit	1.0 mm (0.04 in)			
Lateral wheel runout limit	0.5 mm (0.02 in)			
Front tire				
Туре	Tubeless			
Size	120/70 ZR17M/C (58W)			
Manufacturer/model	DUNLOP/D209F PT			
Manufacturer/model	MICHELIN/Pilot POWER P			
Wear limit (front)	1.6 mm (0.06 in)			
Rear tire				
Туре	Tubeless			
Size	180/55 ZR17M/C (73W)			
Manufacturer/model	DUNLOP/D209PT			
Manufacturer/model	MICHELIN/Pilot POWER			
Wear limit (rear)	1.6 mm (0.06 in)			
Tire air pressure (measured on cold tires)				
Loading condition	0–90 kg (0–198 lb)			
Front	250 kPa (36 psi) (2.50 kgf/cm²)			
Rear	250 kPa (36 psi) (2.50 kgf/cm <sup>2</sup> )			
Loading condition	90–193 kg (198–425 lb)			
Front	250 kPa (36 psi) (2.50 kgf/cm <sup>2</sup> )			
Rear	290 kPa (42 psi) (2.90 kgf/cm <sup>2</sup> )			
High-speed riding				
Front	250 kPa (36 psi) (2.50 kgf/cm <sup>2</sup> )			
Rear	$250 \text{ kPa} (36 \text{ psi}) (2.50 \text{ kgf/cm}^2)$			
Front brake				
Туре	Dual disc brake			

Front disc brake	$210.0 \times 4.5 \text{ mm} (10.00 \times 0.10 \text{ m})$
Disc outside diameter × thickness	$310.0 \times 4.5 \text{ mm} (12.20 \times 0.18 \text{ in})$
Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc deflection limit	0.10 mm (0.0039 in)
Brake pad lining thickness (inner)	4.5 mm (0.18 in)
Limit Brake and lining thickness (outer)	0.5 mm (0.02 in)
Brake pad lining thickness (outer) Limit	4.5 mm (0.18 in) 0.5 mm (0.02 in)
Master cylinder inside diameter	16.00 mm (0.63 in)
Caliper cylinder inside diameter	$30.23 \text{ mm} \times 1 (1.19 \text{ in} \times 1)$
Caliper cylinder inside diameter	$27.00 \text{ mm} \times 1 (1.06 \text{ in} \times 1)$
Recommended fluid	DOT 4
Rear brake	
Туре	Single disc brake
Operation	Right foot operation
Rear disc brake	
Disc outside diameter $\times$ thickness	220.0 $ imes$ 5.0 mm (8.66 $ imes$ 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Brake pad lining thickness (outer)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	38.18 mm (1.50 in)
Recommended fluid	DOT 4
Steering	
Steering head tension	200–500 g
Steering bearing type	Angular bearing
Lock to lock angle (left)	25.0°
Lock to lock angle (right)	25.0°
Front suspension	Telescopic fork
Type Spring/shock absorber type	Coil spring/oil damper
Front fork travel	120.0 mm (4.72 in)
Fork spring free length	247.0 mm (9.72 in)
Limit	242.1 mm (9.53 in)
Collar length	80.0 mm (3.15 in)
Installed length	240.0 mm (9.45 in)
Spring rate K1	8.80 N/mm (50.25 lb/in) (0.90 kgf/mm)
Spring stroke K1	0.0–120.0 mm (0.00–4.72 in)
Inner tube outer diameter	41.0 mm (1.61 in)
Inner tube bending limit	0.2 mm (0.01 in)
Optional spring available	No
Recommended oil	Ohlins R & T43
Quantity	465.0 cm <sup>3</sup> (15.72 US oz) (16.37 lmp.oz)
Level	108.0 mm (4.25 in)
Rear suspension	
Type	Swingarm (link suspension)

Туре

Swingarm (link suspension)

35.0-45.0 mm (1.38-1.77 in)

239.3 mm (9.42 in)

Spring/shock absorber type Rear shock absorber assembly travel Spring free length Installed length Spring rate K1 Spring stroke K1 Optional spring available Enclosed gas/air pressure (STD)	Coil spring/gas-oil damper 60.0 mm (2.36 in) 163.5 mm (6.44 in) 152.5 mm (6.00 in) 98.00 N/mm (559.58 lb/in) (9.99 kgf/mm) 0.0–60.0 mm (0.00–2.36 in) No 1200 kPa (170.7 psi) (12.0 kgf/cm <sup>2</sup> )
Swingarm	
Swingarm end free play limit (radial)	1.0 mm (0.04 in)
Swingarm end free play limit (axial)	1.0 mm (0.04 in)
Drive chain	
Type/manufacturer	525V8/DAIDO
Link quantity	114

Drive chain slack

15-link length limit

2-12

# ELECTRICAL SPECIFICATIONS

Voltage				
System voltage	12 V			
Oysiem voltage	12 V			
Ignition system				
Ignition system	Transistorized coil ignition (digital)			
Advancer type	Throttle position sensor and electrical			
Ignition timing (B.T.D.C.)	10.0°/1300 r/min			
Engine control unit				
Model/manufacturer	TBDF21/DENSO (EUR)(ZAF)(AUS) TBDF23/DENSO (BEL)(FRA)			
Ignition coil				
Model/manufacturer	F6T558/MITSUBISHI			
Minimum ignition spark gap	6.0 mm (0.24 in)			
Primary coil resistance	$1.19-1.61 \Omega$			
Secondary coil resistance	8.5–11.5 kΩ			
AC magneto				
Model/manufacturer	LMX62/DENSO			
Standard output	14.0 V 420 W 5000 r/min			
Stator coil resistance	0.12–0.18 Ω at 20 °C (68 °F)			
Rectifier/regulator				
Regulator type	Semi conductor-short circuit			
Model/manufacturer	SH678–11/SHINDENGEN			
Regulated voltage (DC)	14.1–14.9 V			
Rectifier capacity	22.0 A			
Battery				
Model	YTZ10S			
Voltage, capacity	12 V, 8.6 Ah			
Manufacturer	GS YUASA			
Ten hour rate amperage	0.86 A			
Headlight				
Bulb type	Halogen bulb			
Bulb voltage, wattage × quantity				
Headlight	12 V, 55.0 W × 2			
Auxiliary light	12 V, 5.0 W $\times$ 1			
Tail/brake light	LED			
Front turn signal light	12 V, 10.0 W × 2			
Rear turn signal light	12 V, 10.0 W × 2			
License plate light	12 V, 5.0 W × 1			
Meter lighting	LED			

LED		
LED		
Constant mesh		
SM14/MITSUBA		
0.60 kW		
0.0012–0.0022 Ω at 20 °C (68 °F)		
10.0 mm (0.39 in)		
3.50 mm (0.14 in)		
7.16–9.52 N (25.77–34.27 oz) (730–971 gf)		
28.0 mm (1.10 in)		
27.0 mm (1.06 in)		
0.70 mm (0.03 in)		
2768109-A/JIDECO		
180.0 A		
100.077		
Plane		
1 pc		
1 pc YF-12/NIKKO		
YF-12/NIKKO 3.0 A		
YF-12/NIKKO		
YF-12/NIKKO 3.0 A 1.15–1.25 Ω at 20 °C (68 °F)		
YF-12/NIKKO 3.0 A 1.15–1.25 Ω at 20 °C (68 °F) 105–113 dB/2m		
YF-12/NIKKO 3.0 A 1.15–1.25 Ω at 20 °C (68 °F) 105–113 dB/2m Full transistor		
YF-12/NIKKO 3.0 A 1.15–1.25 Ω at 20 °C (68 °F) 105–113 dB/2m Full transistor FE218BH/DENSO		
YF-12/NIKKO 3.0 A 1.15–1.25 Ω at 20 °C (68 °F) 105–113 dB/2m Full transistor FE218BH/DENSO No		
YF-12/NIKKO 3.0 A 1.15–1.25 Ω at 20 °C (68 °F) 105–113 dB/2m Full transistor FE218BH/DENSO No 75.0–95.0 cycles/min		
YF-12/NIKKO 3.0 A 1.15–1.25 Ω at 20 °C (68 °F) 105–113 dB/2m Full transistor FE218BH/DENSO No		
YF-12/NIKKO 3.0 A 1.15–1.25 Ω at 20 °C (68 °F) 105–113 dB/2m Full transistor FE218BH/DENSO No 75.0–95.0 cycles/min		
YF-12/NIKKO 3.0 A 1.15–1.25 Ω at 20 °C (68 °F) 105–113 dB/2m Full transistor FE218BH/DENSO No 75.0–95.0 cycles/min		
YF-12/NIKKO 3.0 A 1.15–1.25 $\Omega$ at 20 °C (68 °F) 105–113 dB/2m Full transistor FE218BH/DENSO No 75.0–95.0 cycles/min 10 W $\times$ 2.0 + 3.4 W		
YF-12/NIKKO 3.0 A 1.15–1.25 $\Omega$ at 20 °C (68 °F) 105–113 dB/2m Full transistor FE218BH/DENSO No 75.0–95.0 cycles/min 10 W × 2.0 + 3.4 W 5VX/SOMIC ISHIKAWA		
YF-12/NIKKO 3.0 A 1.15–1.25 $\Omega$ at 20 °C (68 °F) 105–113 dB/2m Full transistor FE218BH/DENSO No 75.0–95.0 cycles/min 10 W $\times$ 2.0 + 3.4 W		

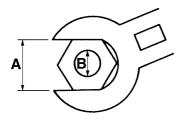
Starting circuit cut-off relay	
Model/manufacturer	G8R-30Y-V4/OMRON
Headlight relay	
Model/manufacturer	ACM33211M04/MATSUSHITA
Fuel pump relay	
Model/manufacturer	G8R-30Y-V4/OMRON
Fan motor relay	
Model/manufacturer	ACM33211M05/MATSUSHITA
Fuses	
Main fuse	50.0 A
Headlight fuse	15.0 A
Taillight fuse	7.5 A
Signaling system fuse	10.0 A
Ignition fuse	15.0 A
Radiator fan fuse	15.0 A × 2
Fuel injection system fuse	15.0 A
Backup fuse	7.5 A
Electric throttle valve fuse	7.5 A
Reserve fuse	15.0 A
Reserve fuse	10.0 A
Reserve fuse	7.5 A
Reserve fuse	15.0 A

## TIGHTENING TORQUES

#### EAS20330

# GENERAL TIGHTENING TORQUE SPECIFICATIONS

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



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

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

## ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Camshaft cap bolt (intake and exhaust)	M6	20	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Cylinder head stud bolt (exhaust pipe assembly)	M8	8	15 Nm (1.5 m·kg, 11 ft·lb)	
Cylinder head nut (1st)	M10	8	25 Nm (2.5 m·kg, 18 ft·lb)	-E
Cylinder head nut (final)	M10	8	42 Nm (4.2 m·kg, 30 ft·lb)	-C
Cylinder head cap nut (1st)	M10	2	30 Nm (3.0 m·kg, 22 ft·lb)	-E
Cylinder head cap nut (final)	M10	2	60 Nm (6.0 m·kg, 43 ft·lb)	
Cylinder head bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Spark plug	M10	4	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Cylinder head cover bolt	M6	6	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil check bolt	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Reed valve cover bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	-0
Camshaft sprocket bolt	M7	4	24 Nm (2.4 m·kg, 17 ft·lb)	
Coolant temperature sensor	M12	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Throttle body joint bolt	M6	8	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Connecting rod nut (1st)	M7	8	15 Nm (1.5 m·kg, 11 ft·lb)	See NOTE –-™
Connecting rod nut (final)	M7	8	Specified angle 175°–185°	See NOTE ⊸©
Generator rotor bolt	M12	1	70 Nm (7.0 m·kg, 50 ft·lb)	-E
Timing chain tensioner bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Thermostat cover bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Water jacket joint bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Water pump assembly bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	-5
Water pump housing cover bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil pump assembly bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil pan bolt	M6	13	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kg, 31 ft·lb)	
Oil filter cartridge bolt	M20	1	70 Nm (7.0 m·kg, 50 ft·lb)	
Oil filter cartridge	M20	1	17 Nm (1.7 m·kg, 12 ft·lb)	
Oil pump drive chain guide	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	-6
Oil pipe bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	-0
Oil cooler union bolt	M20	1	63 Nm (6.3 m·kg, 45 ft·lb)	(E
Upper air filter case to secondary injector holder bolt	M6	4	5 Nm (0.5 m·kg, 3.6 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Upper air filter case to lower air filter case bolt	M5	9	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Upper air filter case joint bolt	M5	6	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Secondary injector fuel rail	M6	2	5 Nm (0.5 m·kg, 3.6 ft·lb)	-15
Locknut (throttle cable)	M6	2	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Exhaust pipe assembly nut	M8	8	20 Nm (2.0 m·kg, 14 ft·lb)	
Exhaust pipe assembly bolt	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Exhaust pipe assembly bracket bolt (left lower side)	M8	1	34 Nm (3.4 m·kg, 24 ft·lb)	
Muffler clamp bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Muffler bolt	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Locknut (EXUP cable adjusting bolt)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
EXUP servo motor drive pulley bolt	M5	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
EXUP servo motor bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
EXUP servo motor bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
EXUP valve pulley cover bolt (front side)	M6	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	-6
EXUP valve pulley cover bolt (rear side)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	-6
EXUP valve nut	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Crankcase bolt	M8	2	See NOTE	l=115 mm (4.53 in) →€
Crankcase bolt	M8	8	See NOTE	l=85 mm (3.35 in) –
Crankcase bolt	M8	2	24 Nm (2.4 m·kg, 17 ft·lb)	l=65 mm (2.56 in) →€
Crankcase bolt	M6	15	10 Nm (1.0 m·kg, 7.2 ft·lb)	-E
Generator cover bolt	M6	9	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Clutch cover bolt	M6	7	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Clutch cover bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	Ð
Pickup rotor cover bolt	M6	7	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Timing mark accessing bolt	M8	1	15 Nm (1.5 m·kg, 11 ft·lb)	
Oil baffle plate 1 bolt	M6	1	12 Nm (1.2 m·kg, 8.7 ft·lb)	-0
Oil baffle plate 2 bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	-6
Stator coil assembly bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	-15
Stator coil assembly lead holder bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	đ

Item	Thread size	Q'ty	Tightening torque	Remarks
Drive sprocket cover bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Main gallery plug	M16	2	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Ventilation chamber cover bolt	M6	5	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil pipe	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	-6
Crankshaft position sensor bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	-0
Crankcase stud bolt	M10	10	See NOTE	
Pressure plate bolt	M6	6	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Clutch boss nut	M20	1	115 Nm (11.5 m·kg, 85 ft·lb)	Stake
Clutch boss plate stud bolt	M8	6	25 Nm (2.5 m·kg, 18 ft·lb)	-6
Drive sprocket nut	M20	1	85 Nm (8.5 m⋅kg, 61 ft⋅lb)	Stake
Main axle screw	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	Stake
Shift drum retainer bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Shift shaft spring stopper	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	-0
Shift arm bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Pickup rotor bolt	M8	1	35 Nm (3.5 m·kg, 25 ft·lb)	
Starter motor bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	-0
Neutral switch	M10	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Oil level switch bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Speed sensor bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Cylinder identification sensor bolt	M6	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	-0
Negative battery terminal/engine ground terminal bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
O <sub>2</sub> sensor	M18	1	45 Nm (4.5 m·kg, 32 ft·lb)	

#### NOTE: \_\_\_\_

#### Connecting rod nut

Tighten the connecting rod nuts to  $15 \text{ Nm} (1.5 \text{ m} \cdot \text{kg}, 11 \text{ ft} \cdot \text{lb})$ , and then tighten them further to reach the specified angle  $175^{\circ}$ – $185^{\circ}$ .

#### NOTE: \_\_\_\_

#### Crankcase bolt

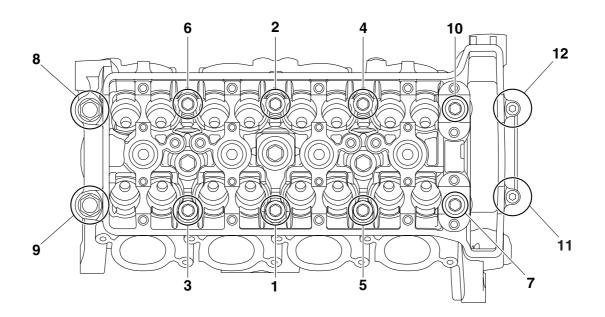
- 1. First, tighten the bolts to approximately 20 Nm (2.0 m·kg, 14 ft·lb) with a torque wrench.
- 2. Loosen all bolts one by one following the tightening order and then retighten the bolts 25 Nm (2.5 m·kg, 18 ft·lb) with a torque wrench.
- 3. Loosen all bolts one by one following the tightening order and then tighten them to 27 Nm (2.7 m·kg, 20 ft·lb) again.

#### NOTE: \_\_\_\_

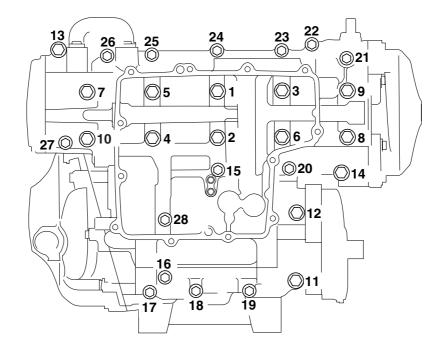
#### Crankcase stud bolt

Install the crankcase stud bolts (M10) so that their installed length is 68.2 mm (2.69 in).

Cylinder head tightening sequence:



#### Crankcase tightening sequence:



## CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Engine mounting bolt (front right side)	M10	2	45 Nm (4.5 m·kg, 32 ft·lb)	
Engine mounting bolt (front left side)	M10	2	45 Nm (4.5 m·kg, 32 ft·lb)	
Engine mounting nut (rear upper side)	M12	1	68 Nm (6.8 m·kg, 49 ft·lb)	
Engine mounting nut (rear lower side)	M12	1	68 Nm (6.8 m·kg, 49 ft·lb)	
Front wheel axle	M14	1	91 Nm (9.1 m·kg, 66 ft·lb)	
Front wheel axle pinch bolt	M8	4	21 Nm (2.1 m·kg, 15 ft·lb)	See NOTE
Front brake disc bolt	M6	10	18 Nm (1.8 m·kg, 13 ft·lb)	-
Rear wheel axle nut	M24	1	110 Nm (11.0 m·kg, 80 ft·lb)	
Rear wheel sprocket nut	M10	6	100 Nm (10.0 m·kg, 72 ft·lb)	-6
Rear brake disc bolt	M8	5	30 Nm (3.0 m·kg, 22 ft·lb)	-6
Front brake hose union bolt	M10	3	30 Nm (3.0 m·kg, 22 ft·lb)	
Front brake caliper bolt	M10	4	35 Nm (3.5 m·kg, 25 ft·lb)	
Brake caliper bleed screw (front and rear)	M8	3	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Front brake hose holder bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake hose union bolt	M10	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear brake caliper bolt	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	-15
Rear brake caliper bolt	M12	1	27 Nm (2.7 m·kg, 19 ft·lb)	
Rear brake pad pin	M10	1	17 Nm (1.7 m·kg, 12 ft·lb)	
Rear brake screw plug	-	1	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Handlebar pinch bolt	M8	2	32 Nm (3.2 m·kg, 23 ft·lb)	
Handlebar bolt	M6	2	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Front brake master cylinder bolt	M6	2	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Front brake master cylinder bleed screw	M8	1	6 Nm (0.6 m⋅kg, 4.3 ft⋅lb)	
Rearview mirror nut	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Clutch lever assembly bolt	M6	1	11 Nm (1.1 m·kg, 8.0 ft·lb)	
Clutch cable locknut (engine side)	M8	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Upper bracket pinch bolt	M8	2	26 Nm (2.6 m·kg, 19 ft·lb)	
Steering stem nut	M28	1	115 Nm (11.5 m·kg, 85 ft·lb)	
Lower ring nut (initial tightening torque)	M30	1	52 Nm (5.2 m·kg, 37 ft·lb)	See NOTE
Lower ring nut (final tightening torque)	M30	1	14 Nm (1.4 m·kg, 10 ft·lb)	See NOTE

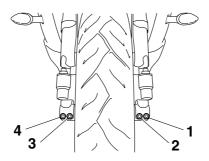
Item	Thread size	Q'ty	Tightening torque	Remarks
Lower bracket pinch bolt	M8	4	23 Nm (2.3 m⋅kg, 17 ft⋅lb)	See NOTE
Horn and front brake hose joint bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Front brake hose guide bolt	M5	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Lower bracket and front brake hose joint bracket bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Lower bracket cover and front brake hose joint bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front brake hose joint and front brake hose joint bracket bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Cap bolt	M47	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Cap bolt (damper rod assembly and nut)	M10	2	25 Nm (2.5 m⋅kg, 18 ft⋅lb)	
Damper rod assembly	M24	2	35 Nm (3.5 m·kg, 25 ft·lb)	
Front fender bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Relay arm and frame nut	M10	1	40 Nm (4.0 m·kg, 29 ft·lb)	
Connecting arm and relay arm nut	M12	2	40 Nm (4.0 m·kg, 29 ft·lb)	
Rear shock absorber assembly upper nut	M12	1	44 Nm (4.4 m·kg, 32 ft·lb)	
Rear shock absorber assembly lower nut	M12	1	40 Nm (4.0 m·kg, 29 ft·lb)	
Rear shock absorber assembly spacer bolt	M22	1	16 Nm (1.6 m⋅kg, 11 ft⋅lb)	
Rear shock absorber assembly bracket nut	M14	1	52 Nm (5.2 m·kg, 37 ft·lb)	
Swingarm pivot shaft	M32	1	16 Nm (1.6 m·kg, 11 ft·lb)	
Swingarm pivot shaft ring nut	M32	1	95 Nm (9.5 m·kg, 68 ft·lb)	
Swingarm pivot shaft nut	M22	1	70 Nm (7.0 m·kg, 50 ft·lb)	
Drive chain guide (swingarm side) bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Drive chain guard bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Drive chain adjusting locknut	M8	2	16 Nm (1.6 m·kg, 11 ft·lb)	
Drive chain adjusting bolt	M8	2	2 Nm (0.2 m·kg,1.4 ft·lb)	
Rear fender bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel pump bolt	M5	6	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Fuel tank upper cover and frame bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank bolt	M6	2	9 Nm (0.9 m·kg, 6.5 ft·lb)	
Fuel tank bracket and frame bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Fuel tank bracket and fuel tank bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Radiator bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Radiator and coupler holder bolt	M6	2	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Radiator bracket and radiator bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Radiator bracket and frame bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Radiator outlet hose holder bolt	M10	1	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Coolant reservoir bolt	M6	2	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Front cowling assembly bolt	M6	4	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Seat lock plate bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rider seat and frame	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Battery box and frame	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear upper cowling damper plate and frame	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
License plate light assembly bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rider footrest (left and right) as- sembly bolt	M8	4	28 Nm (2.8 m·kg, 20 ft·lb)	
Passenger footrest (left and right) bolt	M8	4	28 Nm (2.8 m·kg, 20 ft·lb)	
Rear brake fluid reservoir bracket bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake master cylinder bolt	M6	2	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Sidestand assembly and frame bolt	M8	3	26 Nm (2.6 m·kg, 19 ft·lb)	
Coupler holder (left and right) and frame bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Shift arm bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Locknut (shift rod upper side)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Locknut (shift rod lower side)	M8	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	

#### NOTE: \_\_\_\_

#### Front wheel axle pinch bolt

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



#### NOTE:

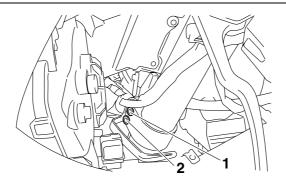
#### Lower ring nut

- 1. First, tighten the lower ring nut to approximately 52 Nm (5.2 m·kg, 37 ft·lb) with a torque wrench, then loosen the lower ring nut completely.
- 2. Retighten the lower ring nut to 14 Nm (1.4 m·kg, 10 ft·lb) with a torque wrench.

#### NOTE:

#### Lower bracket pinch bolt

Tighten each bolt to 23 Nm (2.3 m·kg, 17 ft·lb) in the order pinch bolt "1"  $\rightarrow$  pinch bolt "2"  $\rightarrow$  pinch bolt "1".



# LUBRICATION POINTS AND LUBRICANT TYPES

#### EAS20370 ENGINE

Lubrication point	Lubricant
Oil seal lips	
O-rings	
Bearings	
Crankshaft pins	(E)
Piston surface	C
Piston pins	
Connecting rod bolts and nuts	
Crankshaft journals	
Generator rotor bolt and washer	E
Camshaft cam lobes and camshaft journals	
Valve stems (intake and exhaust)	
Valve stem ends (intake and exhaust)	
Valve lifter surface	CE
Oil pump rotors (inner and outer) and oil pump housing	E
Oil strainer screen (inside oil strainer)	E
Oil strainer gasket	
Oil nozzle (O-ring)	
Starter clutch idle gear shaft	
Starter clutch roller and starter clutch idle gear outer surface	(E)
Primary driven gear inner surface	(E)
Clutch pull rod	
Transmission gears (wheel and pinion) and collars	
Main axle and drive axle	
Shift forks and shift fork guide bars	(E)
Shift shaft	(E)
Cylinder head cover mating surface	Yamaha bond No.1215 (Three Bond No.1215 <sup>®</sup> )
Cylinder head cover gasket	Bond TB1215B
Crankcase mating surface	Yamaha bond No.1215 (Three Bond No.1215 <sup>®</sup> ) Three Bond No.1280B

### LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication point	Lubricant
Crankshaft position sensor lead grommet	Yamaha bond No.1215 (Three Bond No.1215 <sup>®</sup> )
Stator coil lead grommet	Yamaha bond No.1215 (Three Bond No.1215 <sup>®</sup> )

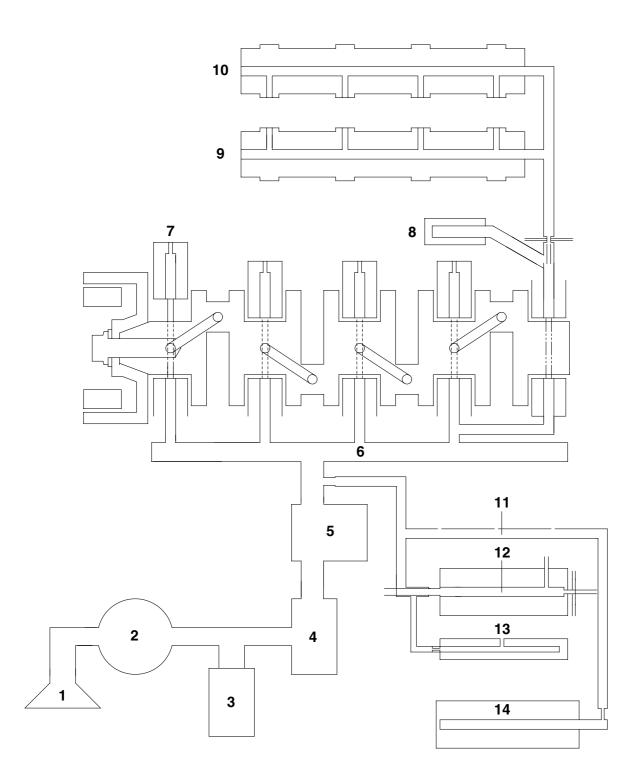
### LUBRICATION POINTS AND LUBRICANT TYPES

#### EAS20380 CHASSIS

Lubrication point	Lubricant
Steering bearings and upper bearing cover lip	
Lower bearing dust seal lip	
Tube guide (throttle grip) inner surface and throttle cables	
Brake lever pivoting point and metal-to-metal moving parts	
Clutch cable end	
Clutch lever pivoting point and metal-to-metal moving parts	
Relay arm, connecting arm and rear shock absorber spacer	
Swingarm pivot shaft	
Swingarm pivot shaft bearings	
Swingarm dust cover lips	
Swingarm pivot shaft nut	
Oil seals (rear shock absorber, relay arm and connecting arm)	
Seat lock lever pivoting point	
Sidestand pivoting point and metal-to-metal moving parts	
Sidestand switch striker and sidestand switch contact point	
Sidestand hook and spring	
Sidestand bracket and sidestand bolt	
Shift rod pivoting point	
Shift pedal pivoting point	
Brake pedal shaft pivoting point	
Front wheel oil seal lips (left and right)	
Front wheel axle bolt	
Rear wheel oil seal lips (left and right)	
Rear wheel drive hub oil seal	
Rear wheel drive hub mating surface	
Rear wheel axle	

## LUBRICATION SYSTEM CHART AND DIAGRAMS

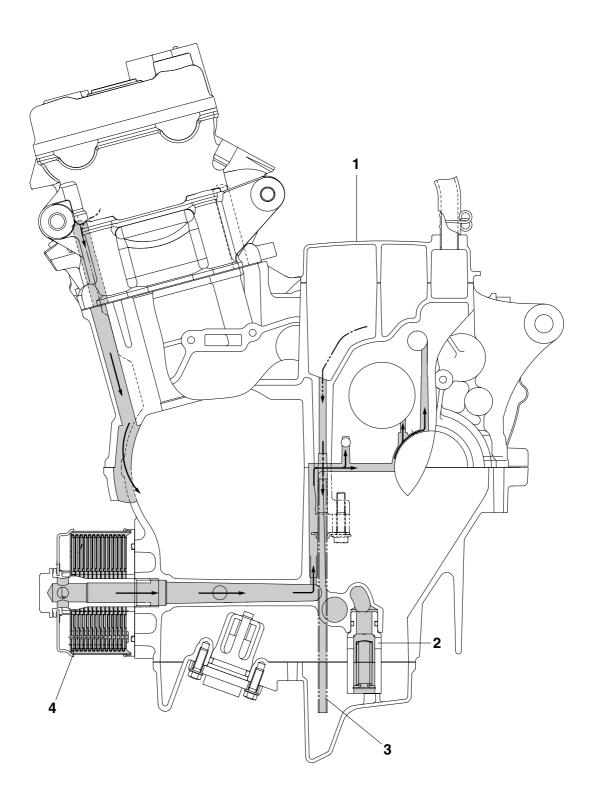
## ENGINE OIL LUBRICATION CHART



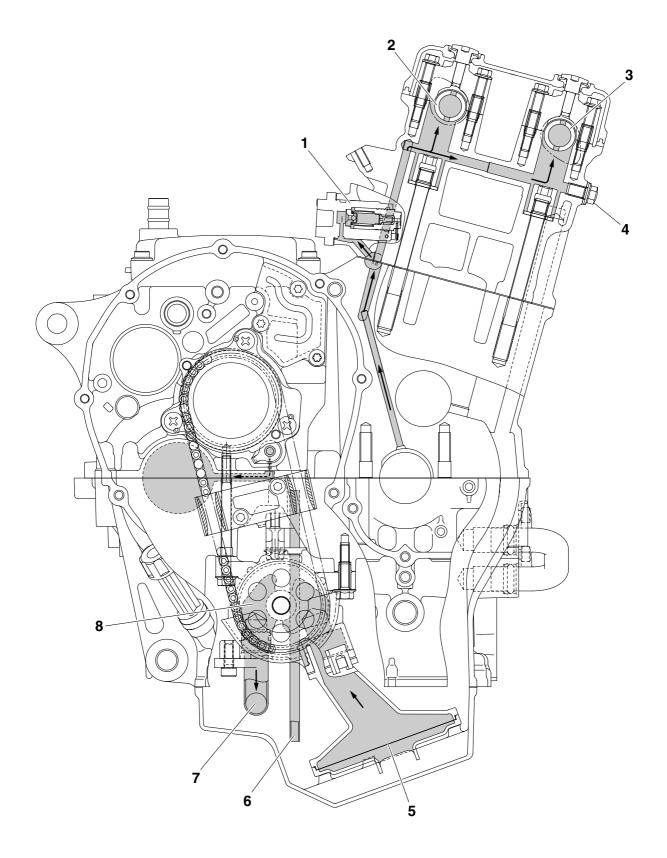
- 1. Oil strainer
- 2. Oil pump
- 3. Relief valve
- 4. Oil filter
- 5. Oil cooler
- 6. Main gallery
- 7. Oil nozzle
- 8. Timing chain tensioner
- 9. Intake camshaft
- 10. Exhaust camshaft
- 11. Oil pipe
- 12. Main axle
- 13. Shift fork
- 14. Drive axle

## LUBRICATION SYSTEM CHART AND DIAGRAMS

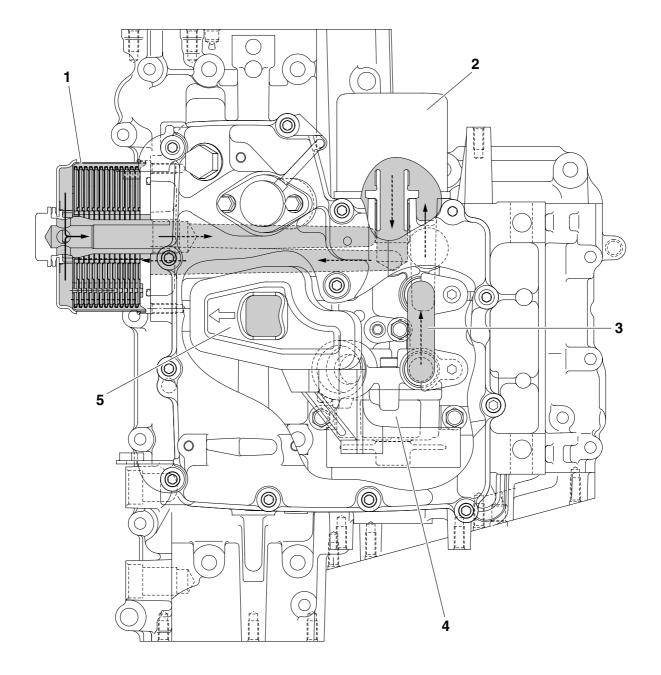
## LUBRICATION DIAGRAMS



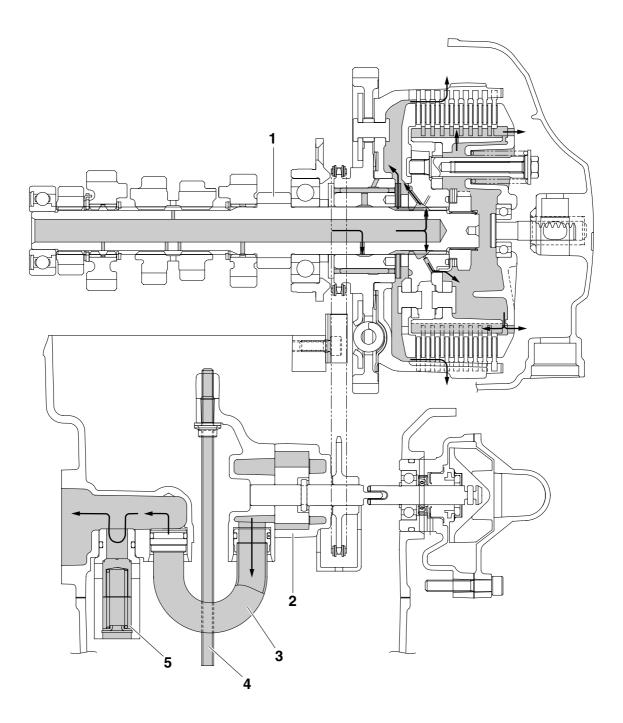
- 1. Ventilation chamber cover
- 2. Relief valve
- 3. Ventilation chamber oil drain pipe
- 4. Oil cooler



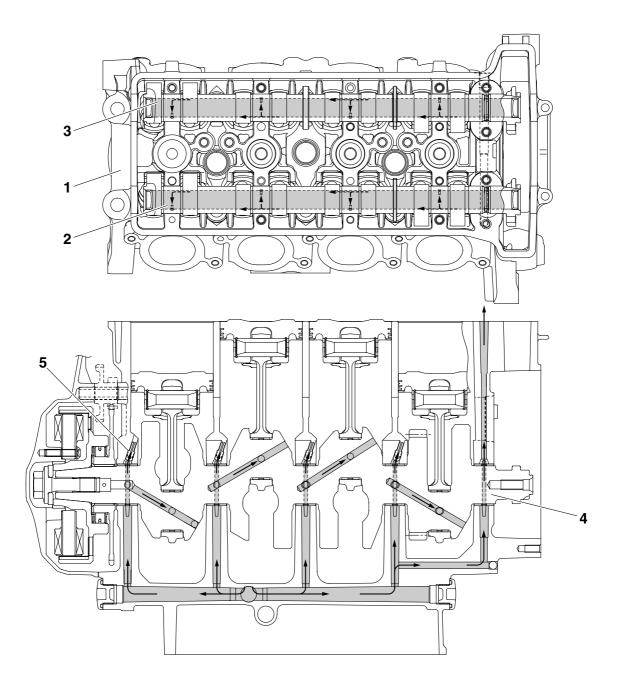
- 1. Timing chain tensioner
- 2. Intake camshaft
- 3. Exhaust camshaft
- 4. Oil check bolt
- 5. Oil strainer
- 6. Ventilation chamber oil drain pipe
- 7. Oil pipe
- 8. Oil pump



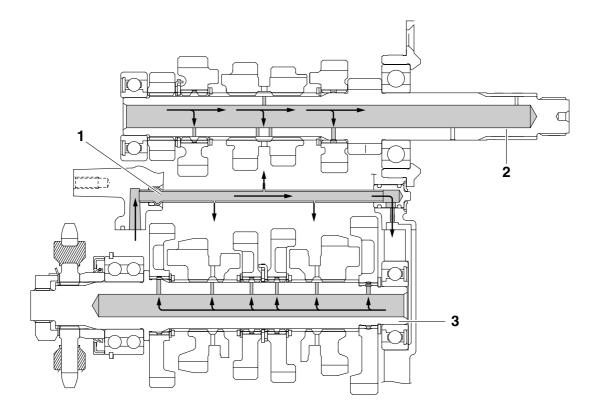
- 1. Oil cooler
- 2. Oil filter
- 3. Oil pipe
- 4. Oil pump
- 5. Oil strainer



- 1. Main axle
- 2. Oil pump
- 3. Oil pipe
- 4. Ventilation chamber oil drain pipe
- 5. Relief valve

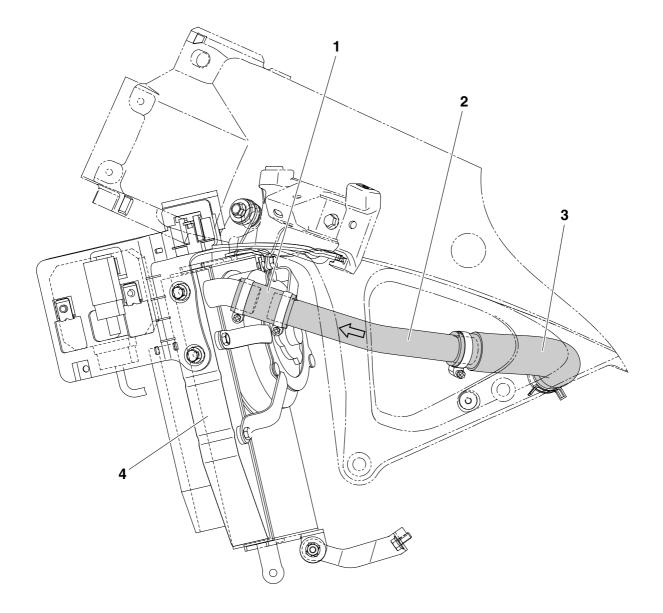


- 1. Cylinder head
- 2. Intake camshaft
- 3. Exhaust camshaft
- 4. Crankshaft
- 5. Oil nozzle

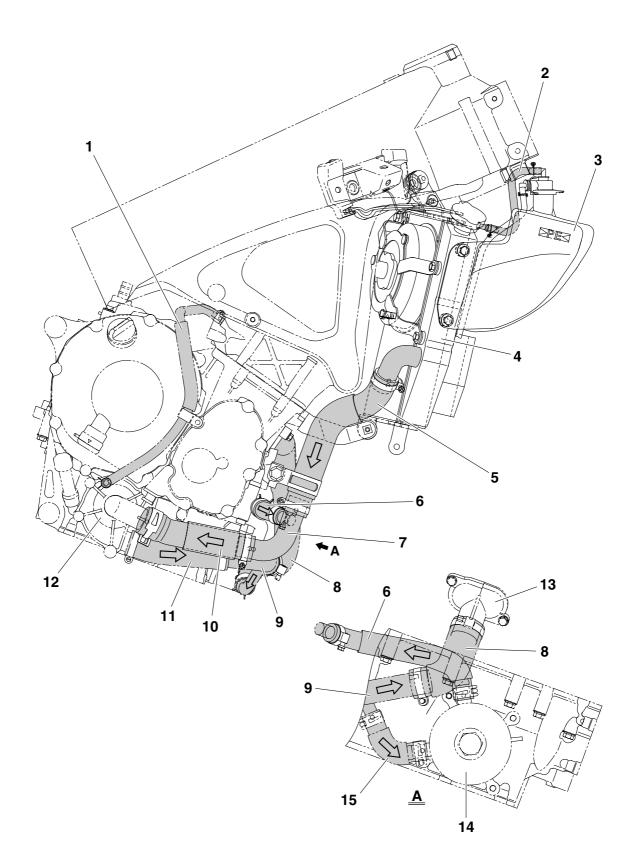


- 1. Oil pipe
- 2. Main axle
- 3. Drive axle

# COOLING SYSTEM DIAGRAMS

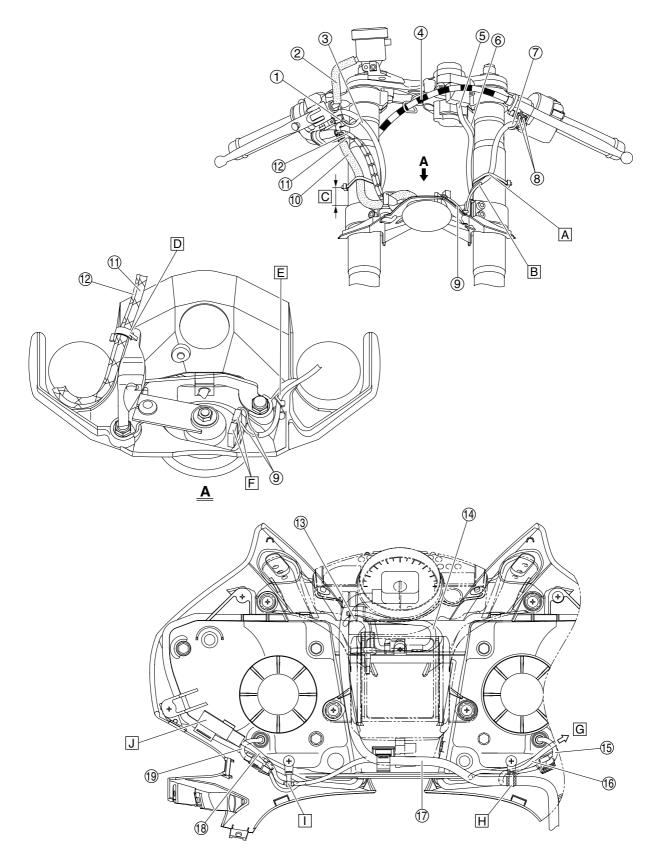


- 1. Radiator inlet hose
- 2. Radiator inlet pipe
- 3. Thermostat outlet hose
- 4. Radiator

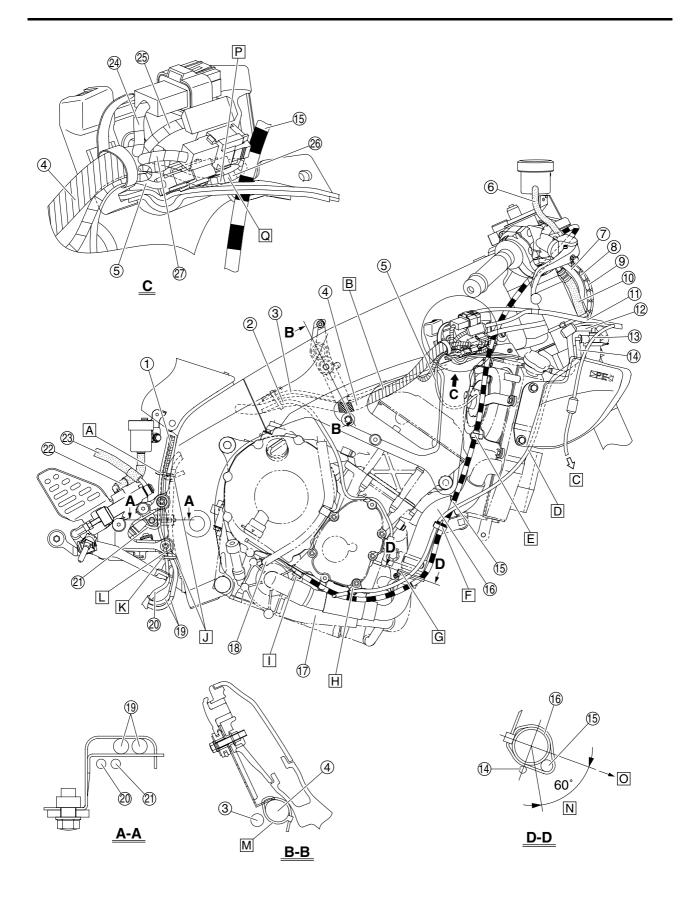


- 1. Water pump breather hose
- 2. Coolant reservoir hose
- 3. Coolant reservoir
- 4. Radiator
- 5. Radiator outlet hose
- 6. Oil cooler outlet hose
- 7. Radiator outlet pipe
- 8. Water jacket joint inlet hose
- 9. Water pump outlet pipe
- 10. Water pump inlet hose
- 11. Water pump outlet hose
- 12.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

# CABLE ROUTING

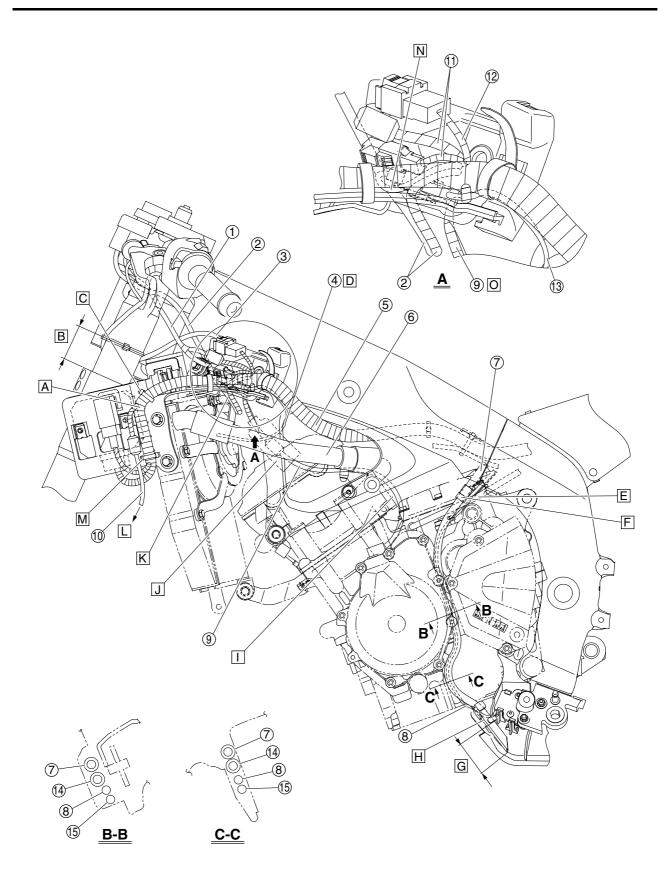


- 1. Front brake light switch lead
- 2. Front brake fluid reservoir hose
- 3. Right handlebar switch lead
- 4. Clutch cable
- 5. Immobilizer unit lead
- 6. Main switch lead
- 7. Left handlebar switch lead
- 8. Clutch switch lead
- 9. Horn lead
- 10. Front brake hose
- 11. Throttle cable (decelerator cable)
- 12. Throttle cable (accelerator cable)
- 13. Air temperature sensor lead
- 14. Auxiliary light lead
- 15. Headlight lead (low beam)
- 16. Headlight relay lead (on/off)
- 17. Headlight sub-wire-harness
- 18. Headlight relay lead (dimmer)
- 19. Headlight lead (high beam)
- A. Fasten the left handlebar switch lead on the front side of the front fork with a plastic locking tie. Face the end of the plastic locking tie outward, and then cut off the excess end of the tie to 2–10 mm (0.08–0.39 in).
- B. Be sure to position the plastic locking tie above where the horn leads branch off from the other leads.
- C. 40–50 mm (1.57–1.97 in)
- D. Pass the throttle cables through the guide on the lower bracket, making sure to route the decelerator cable above the accelerator cable as shown in the illustration.
- E. Fasten the horn leads with the holder on the lower bracket cover.
- F. Install the horn L-shaped connectors so that the leads are routed rearward.
- G. To the headlight relay (on/off)
- H. Fasten the wire harness at the white tape with a plastic locking tie.
- I. Fasten the headlight relay lead at the white tape with a plastic locking tie.
- J. Install the headlight relay (dimmer) completely onto the tab on the headlight assembly.

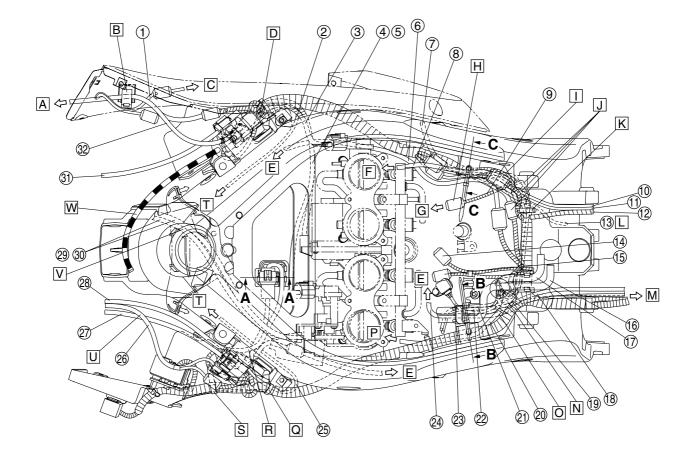


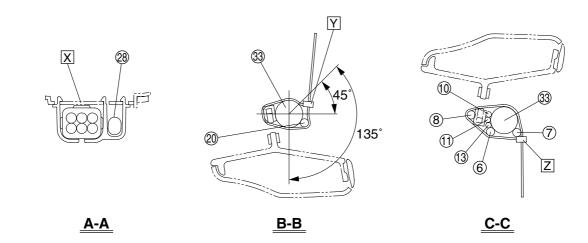
- 1. EXUP servo motor lead
- 2. Crankshaft position sensor lead
- 3. Ignition coil lead
- 4. Wire harness
- 5. Right radiator fan motor lead
- 6. Front brake fluid reservoir hose
- 7. Right handlebar switch lead
- 8. Throttle cable (accelerator cable)
- 9. Throttle cable (decelerator cable)
- 10. Front brake hose
- 11. Headlight sub-wire-harness
- 12. Coolant reservoir hose
- 13. Front right turn signal light lead
- 14. Coolant reservoir breather hose
- 15. Clutch cable
- 16. Radiator outlet hose
- 17. Water pump outlet hose
- 18. Water pump breather hose
- 19. EXUP cables
- 20. O<sub>2</sub> sensor lead
- 21. Rear brake light switch lead
- 22. Rear brake fluid reservoir hose
- 23. Rear brake hose
- 24. Headlight sub-wire-harness 2
- 25. Headlight sub-wire-harness 1
- 26. Right radiator fan motor sub-wire-harness
- 27. Right handlebar switch lead
- A. Fasten the EXUP cables, EXUP servo motor lead, and rear brake light switch lead with a plastic locking tie, making sure to fasten the tie on the metal tubes around the cables, 0–20 mm (0–0.79 in) from the ends of the tubes. Face the end of the plastic locking tie rearward, and then cut off the excess end of the tie to 2–4 mm (0.08–0.16 in).
- B. Route the wire harness on top of the heat protector, making sure to push the harness inward so that it does not protrude past the frame.
- C. To the front right turn signal light
- D. Route the coolant reservoir breather hose between the radiator and the coolant reservoir, then to the outside of the damper on the radiator.
- E. Fasten the clutch cable with the holder, making sure that the metal band around the cable is above the holder.
- F. Cross the coolant reservoir breather hose and clutch cable, and then fasten them with the holder, making sure to align the top of the holder with the bottom edge of the white paint mark on the cable.
- G. Fasten the clutch cable to the radiator outlet hose with the plastic band, making sure to position the band between the screw clamp and the hose protector. Install the plastic band with its buckle positioned toward the rear of the vehicle and its end facing inward.
- H. Fasten the coolant reservoir breather hose with the holder, making sure that the white paint mark on the hose is positioned to the rear of the holder.
- I. Pass the clutch cable through the guide on the engine.
- J. Make sure that the O<sub>2</sub> sensor lead and EXUP cables are not twisted or crossed between the plastic locking ties.

- K. Fasten the EXUP cables and  $O_2$  sensor lead with a plastic locking tie. Face the end of the plastic locking tie rearward, and then cut off the excess end of the tie to 2–4 mm (0.08–0.16 in).
- L. Be sure to position the plastic locking tie 0–20 mm (0-0.78 in) below the plastic locking tie fastened around the O<sub>2</sub> sensor lead.
- M. Pass a plastic locking tie through the bottom hole in the bracket, and then fasten the wire harness at the positioning tape with the tie. Face the end of the plastic locking tie downward, and then cut off the excess end of the tie to 2–10 mm (0.08–0.39 in).
- N. Fasten the clutch cable with the plastic band, making sure that the cable is positioned within the 60° angle shown in the illustration.
- O. Front
- P. Bend back the right radiator fan motor sub-wireharness as shown in the illustration, and then insert the projection on the coupler into the hole in the right coupler holder, making sure to route the lead to the inside of the coupler.
- Q. Route the right radiator fan motor sub-wireharness to the inside of the clutch cable.



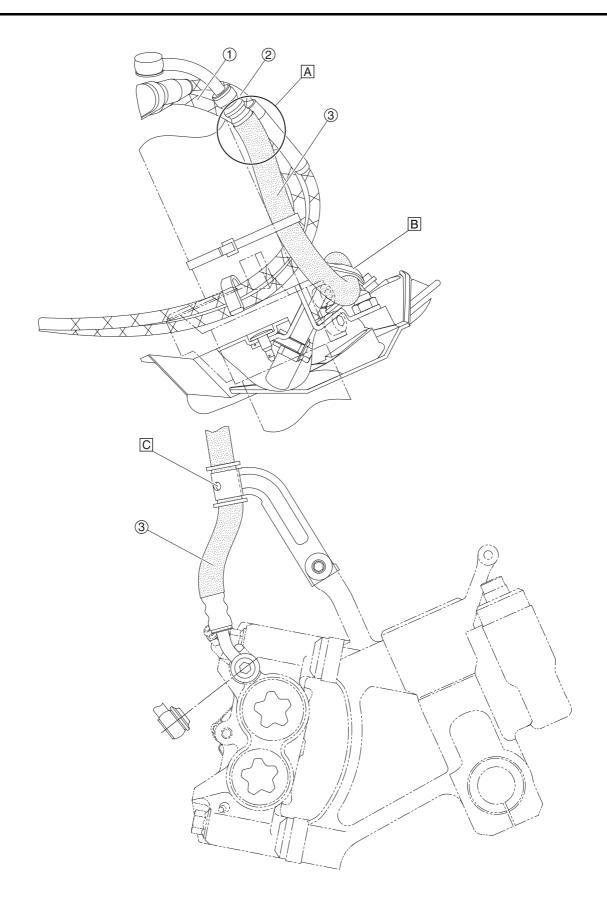
- 1. Main switch lead
- 2. Immobilizer unit lead
- 3. Left handlebar switch lead
- 4. Left radiator fan motor lead
- 5. Wire harness
- 6. Radiator inlet pipe
- 7. Fuel tank breather hose
- 8. Sidestand switch lead
- 9. AC magneto lead
- 10. Front left turn signal light lead
- 11. Main switch lead
- 12. Left handlebar switch lead
- 13. Left radiator fan motor lead
- 14. Fuel tank drain hose
- 15. Oil level switch lead
- A. Bend the wire harness so that it is routed along the rectifier/regulator holder and is aligned with the plastic locking tie installation locations.
- B. 45-55 mm (1.77-2.17 in)
- C. Pass a plastic locking tie through the holes in the coupler holder, and then fasten the wire harness with the tie.
- D. Pass the left radiator fan motor lead through the opening in the frame, and then route the lead under the wire harness.
- E. Pass the starter motor lead, speed sensor lead, sidestand switch lead, and oil level switch lead between the holder on the engine and the crankcase boss, making sure to route the starter motor lead to the outside of the other leads.
- F. Fasten the fuel tank drain hose and fuel tank breather hose with the holder, making sure to fasten the hoses below the holder on the engine.
- G. 30-50 mm (1.18-1.97 in)
- H. Pass the fuel tank drain hose, fuel tank breather hose, and sidestand switch lead through the guides on the sidestand shield, making sure to route the lead to the inside of the hoses.
- I. Pass the AC magneto lead between the frame and the throttle body, and then route it under the radiator inlet pipe.
- J. After connecting the AC magneto coupler, slide the cover over the coupler.
- K. Route the immobilizer unit lead to the rear of the lower protruding section of the coupler holder.
- L. To the front left turn signal light
- M. Pass a plastic locking tie through the holes in the coupler holder, and then fasten the wire harness with the tie, making sure to install the tie with its buckle positioned toward the rear of the vehicle and its end facing inward. Cut off the excess end of the plastic locking tie to 2–10 mm (0.08–0.39 in).
- N. Bend back the left radiator fan motor lead as shown in the illustration, and then insert the projection on the coupler into the hole in the left coupler holder. The lead may be routed to the inside or the outside of the coupler.
- O. Route the AC magneto lead under the left radiator fan motor lead.



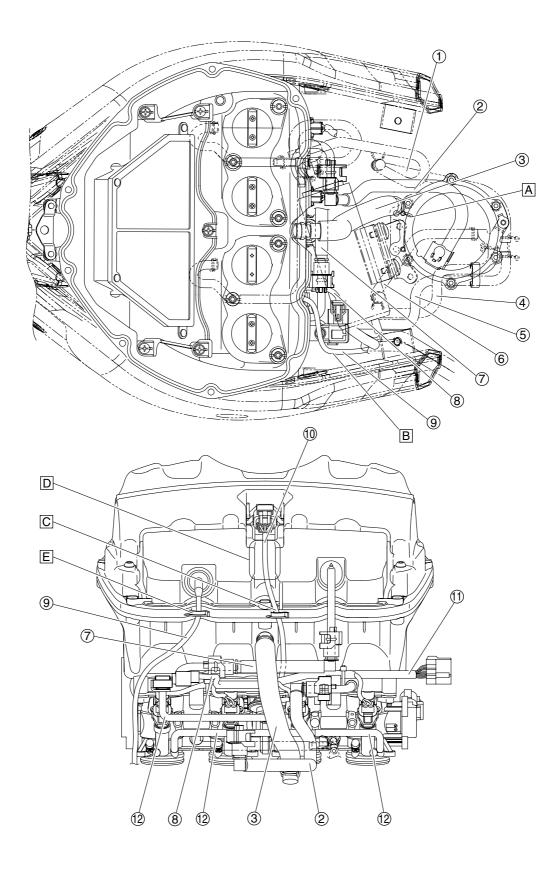


- 1. Front right turn signal light lead
- 2. Right radiator fan motor lead
- 3. Throttle position sensor (for throttle valves) lead
- 4. Throttle servo motor lead
- 5. Throttle position sensor (for throttle cable pulley) lead
- 6. Ignition coil lead
- 7. Crankshaft position sensor lead
- 8. Sub-wire-harness 2
- 9. Coolant temperature sensor lead
- 10. Rear brake light switch lead
- 11. O<sub>2</sub> sensor lead
- 12. EXUP servo motor lead
- 13. Neutral switch lead
- 14. Fuel pump coupler
- 15. Fuel sender coupler
- 16. Fuel tank breather hose
- 17. Fuel tank drain hose
- 18. Negative battery lead
- 19. Engine ground lead
- 20. Sub-wire-harness 3
- 21. Oil level switch lead
- 22. Sidestand switch lead
- 23. Speed sensor lead
- 24. Starter motor lead
- 25. Left radiator fan motor lead
- 26. Main switch lead
- 27. Left handlebar switch lead
- 28. Immobilizer unit lead
- 29. Throttle cable (accelerator cable)
- 30. Throttle cable (decelerator cable)
- 31. Right handlebar switch lead
- 32. Headlight sub-wire-harness 2
- 33. Wire harness
- A. To the headlight
- B. Fasten the headlight lead with the holder.
- C. To the front right turn signal light
- D. Insert the projection on the plastic band into the hole in the coupler holder, and then fasten the wire harness, right radiator fan motor lead, throttle position sensor (for throttle valves) lead, throttle servo motor lead, and throttle position sensor (for throttle cable pulley) lead with the band, making sure to route the right radiator fan motor lead to the inside of the wire harness and to face the end of the band upward.
- E. To the engine
- F. To the throttle bodies
- G. To the coolant temperature sensor
- H. Route the coolant temperature sensor lead above the crankshaft position sensor lead, neutral switch lead, oil level switch lead, and sidestand switch lead.
- I. Position the sub-wire harness 2 coupler on top of the wire harness.
- J. Route the oil level switch lead, speed sensor lead, and crankshaft position sensor lead under the wire harness.
- K. Insert the projection on the plastic locking tie that is fastened around the wire harness into the hole in the frame.

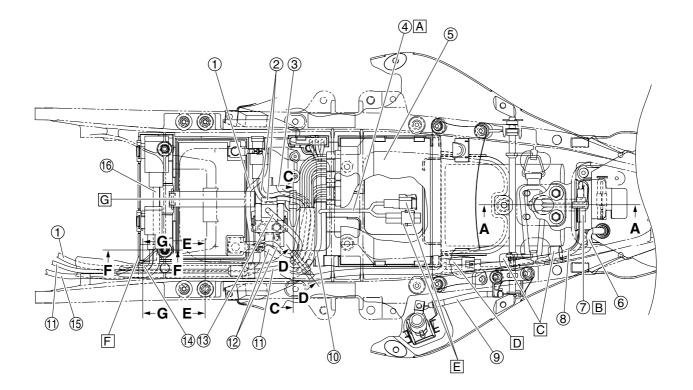
- L. Pass the neutral switch lead between the frame and the engine.
- M. To the ECU
- N. Install both the engine ground lead terminal and the negative battery lead terminal to the crankcase with the bolt. Make sure that the oil level switch lead and speed sensor lead are routed under the engine ground lead and negative battery lead, the leads are positioned on top of their terminals, and the terminals contact the stopper on the crankcase.
- O. Position the sub-wire-harness 3 coupler under the wire harness.
- P. To the secondary injectors
- Q. Insert the projection on the plastic band into the hole in the coupler holder, and then fasten the wire harness and left radiator fan motor lead with the band, making sure to face the end of the band upward.
- R. Route the immobilizer unit lead below the frame and throttle cables.
- S. Pass a plastic locking tie through the hole in the coupler holder, and then fasten the wire harness with the tie. Face the end of the plastic locking tie inward.
- T. To the radiator
- U. Either lead, the left handlebar switch lead or the main switch lead, may be routed on top.
- V. Route the throttle cables to the right of the projection on the center air baffle plate on top of the radiator, making sure not to twist them.
- W. Route the clutch cable above the right air baffle plate on top of the radiator, and then route it downward between the plate and the coupler holder.
- X. Fit the immobilizer unit coupler into the coupler holder with its projection positioned as shown in the illustration, and then install the holder onto the air induction system cover.
- Y. Pass a plastic locking tie through the hole in the stay on the frame from above, and then fasten the wire harness and sub-wire-harness 3 with the tie, making sure to fasten the lead within the 135° angle shown in the illustration. Face the end of the plastic locking tie inward.
- Z. Pass a plastic locking tie through the hole in the stay on the frame from above, and then fasten the leads shown in the illustration with the tie, making sure to fasten the sub-wire harness 2 above the stay and the other leads below. Face the end of the plastic locking tie inward.

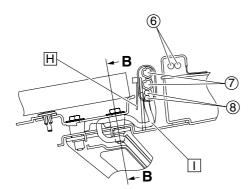


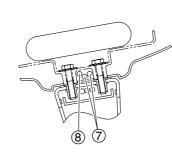
- 1. Throttle cable (decelerator cable)
- 2. Throttle cable (accelerator cable)
- 3. Front brake hose
- A. Pass the throttle cables between the front fork and the front brake hose.
- B. When installing the guide on the lower bracket, be sure to pass the front brake hose through it.
- Fasten the front brake hose with the holder, making sure that the paint mark on the hose is visible through the hole in the holder.

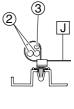


- 1. Fuel tank breather hose (fuel tank to hose joint)
- 2. Fuel hose (fuel tank to primary injector fuel rail)
- 3. Crankcase breather hose
- 4. Fuel tank overflow hose
- 5. Fuel tank breather hose
- 6. Fuel tank overflow hose (fuel tank to hose joint)
- 7. Fuel hose (primary injector fuel rail to secondary injector fuel rail)
- 8. Intake air pressure sensor lead
- 9. Sub-wire-harness 3
- 10. Atmospheric pressure sensor lead
- 11. Sub-wire-harness 2
- 12. Intake air pressure sensor hose
- A. Face the ends of the clamp rearward.
- B. Route the sub-wire-harness 3 to the left side of the intake air pressure sensor.
- C. Fasten the atmospheric pressure sensor lead with the holder on the air filter case.
- D. Route the atmospheric pressure sensor lead in the groove in the air filter case.
- E. Fasten the sub-wire-harness 3 with the holder on the air filter case.





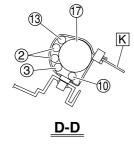


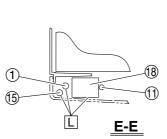


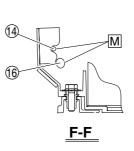


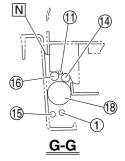


B-B









- 1. Negative battery lead
- 2. Main fuse leads
- 3. Lean angle sensor lead
- 4. Anti-theft alarm leads (OPTION)
- 5. ECU (engine control unit)
- 6. Tail/brake light lead
- 7. Turn signal light lead (right and left side)
- 8. License plate light lead
- 9. Seat lock cable
- 10. Fuse box lead
- 11. Sidestand switch lead
- 12. Positive battery lead
- 13. Starter relay lead
- 14. Turn signal/hazard relay lead
- 15. Starter motor lead
- 16. Relay unit lead
- 17. ECU lead
- 18. Wire harness
- A. Be sure not to pinch the immobilizer unit lead when installing the ECU.
- B. Connect the license plate light connectors and the turn signal light couplers.
- C. Fasten the wire harness and the tail/brake light lead with the holders on the frame.
- D. Connect the tail/brake light coupler, making sure to position it under the wire harness and between the battery box and the frame.
- E. Position the anti-theft alarm couplers (OPTION) between the ECU and the rear lower cowling.
- F. Do not route the turn signal/hazard relay lead or relay unit lead over the front of the battery box or the damper.
- G. Pass the negative battery lead between the battery band and the battery.
- H. Pass the plastic band through the hole in the rib on the rear lower cowling from the front, and then fasten the turn signal light couplers and license plate light connectors with the band. Place the end of the plastic band between the rear lower cowling and the frame.
- I. Pass the turn signal light leads and license plate light leads through the hole in the rib on the rear lower cowling.
- J. Face the end of the plastic band to the left.
- K. Cut off the excess end of the plastic locking tie to 0-20 mm (0-0.79 in).
- L. Be sure to route the wire harness above the negative battery lead and the starter motor lead.
- M. Route the turn signal/hazard relay lead and relay unit lead so that they are cushioned against the damper.
- N. Be sure not to pinch the leads between the battery cover and the frame.

# PERIODIC CHECKS AND ADJUSTMENTS

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# PERIODIC MAINTENANCE

# EAS20460

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

# PERIODIC MAINTENANCE AND LUBRICATION CHART

### NOTE:

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

NO. ITEM			ODOMETER READING (× 1000 km)					ANNU-	
NC	J.	IIEM	ITEM CHECK OR MAINTENANCE JOB	1	10	20	30	40	AL CHECK
1	*	Fuel line	Check fuel hoses for cracks or damage.		V				$\checkmark$
2	2 * Spark plugs		<ul><li>Check condition.</li><li>Clean and regap.</li></ul>		$\checkmark$		$\checkmark$		
			Replace.			$\checkmark$			
3	*	Valves	<ul><li>Check valve clearance.</li><li>Adjust.</li></ul>		Every 40000 km				
4	*	Air filter element	Replace.					$\checkmark$	
5		Clutch	<ul><li>Check operation.</li><li>Adjust.</li></ul>	$\checkmark$	$\checkmark$	V	$\checkmark$	V	
6	6 * Front brake		Check operation, fluid level and vehicle for fluid leakage.	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	V	$\checkmark$
			Replace brake pads.	Whenever worn to the limit					
7	*	Rear brake	Check operation, fluid level and vehicle for fluid leakage.	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
			Replace brake pads.	Whenever worn to the limit					
8	*	Broko bosos	Check for cracks or damage.		$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$
0		Brake hoses     • Replace.		Every 4 years					
9	*	Wheels	Check runout and for damage.						
10	*	Tires	<ul> <li>Check tread depth and for damage.</li> <li>Replace if necessary.</li> <li>Check air pressure.</li> <li>Correct if necessary.</li> </ul>		V	V	$\checkmark$	$\checkmark$	$\checkmark$
11	*	Wheel bearings	Check bearing for looseness or damage.						
12	*	Swinger	Check operation and for excessive play.						
12		Swingarm	Lubricate with lithium-soap-based grease.	Every 50000 km					
13		Drive chain	<ul> <li>Check chain slack, alignment and condition.</li> <li>Adjust and lubricate chain with a special O-ring chain lubricant thoroughly.</li> </ul>	Every 800 km and after washing the motor-cy- cle or riding in the rain					
14	*	Stooring boorings	Check bearing play and steering for roughness.		$\checkmark$			$\checkmark$	
14		Steering bearings	Lubricate with lithium-soap-based grease.	Every 20000 km					
15	*	Chassis fasteners	Make sure that all nuts, bolts and screws are prop- erly tightened.				$\checkmark$		
16		Sidestand	<ul><li>Check operation.</li><li>Lubricate.</li></ul>		$\checkmark$		$\checkmark$	V	$\checkmark$

# PERIODIC MAINTENANCE

NO. ITEM		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (× 1000 km)					ANNU-
				1	10	20	30	40	AL CHECK
17	*	Sidestand switch	Check operation.	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$
18	*	Front fork	Check operation and for oil leakage.		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
19	*	Shock absorber as- sembly	Check operation and shock absorber for oil leakage.		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
20	*	Rear suspension re- lay arm and connect- ing arm pivoting points	Check operation.		V			$\checkmark$	
21	*	Fuel injection system	Adjust synchronization.					$\checkmark$	$\checkmark$
22		Engine oil	<ul><li>Change.</li><li>Check oil level and vehicle for oil leakage.</li></ul>	$\checkmark$				$\checkmark$	$\checkmark$
23		Engine oil filter car- tridge	Replace.	$\checkmark$				$\checkmark$	
24	24 * Cooling system		Check coolant level and vehicle for coolant leakage.		$\checkmark$	$\checkmark$	$\checkmark$		
24		cooling system	Change.	Every 3 years					
25	*	Front and rear brake switches	Check operation.	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	V
26		Moving parts and ca- bles	Lubricate.					$\checkmark$	$\checkmark$
27	*	Throttle grip hous- ing and cable	<ul> <li>Check operation and free play.</li> <li>Adjust the throttle cable free play if necessary.</li> <li>Lubricate the throttle grip housing and cable.</li> </ul>		V	V	V	V	$\checkmark$
28	*	Air induction system	<ul> <li>Check the air cut-off valve, reed valve, and hose for damage.</li> <li>Replace any damaged parts if necessary.</li> </ul>		V	V	V	V	$\checkmark$
29	*	Muffler and exhaust pipe assembly	Check the screw clamp for looseness.	$\checkmark$				$\checkmark$	
30	*	Lights, signals and switches	<ul><li>Check operation.</li><li>Adjust headlight beam.</li></ul>	$\checkmark$					$\checkmark$

EAU18680

#### NOTE: \_\_\_\_

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

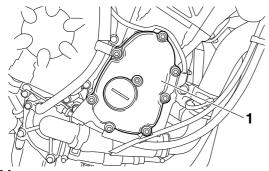
# ENGINE

# ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

#### NOTE:

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.
- 1. Remove:
  - Rider seat
  - Side cowlings
  - Bottom cowlings
  - Refer to "GENERAL CHASSIS" on page 4-1. • Fuel tank
  - Refer to "FUEL TANK" on page 7-1.
  - Air filter case Refer to "AIR FILTER CASE" on page 7-4.
  - Throttle body Refer to "THROTTLE BODIES" on page 7-7.
  - Air cut-off valve Refer to "AIR INDUCTION SYSTEM" on page 7-13.
  - Radiator
     Refer to "RADIATOR" on page 6-1.
- 2. Remove:
  - Ignition coils
  - Spark plugs
  - Cylinder head cover
- Refer to "CAMSHAFTS" on page 5-7. 3. Remove:
- Pickup rotor cover "1"



- 4. Measure:
  - Valve clearance
    - Out of specification  $\rightarrow$  Adjust.

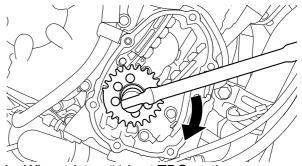


Valve clearance (cold) Intake

0.12–0.19 mm (0.0047–0.0075 in) Exhaust

0.16–0.23 mm (0.0063–0.0091 in)

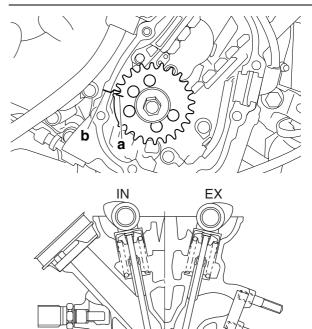
# a. Turn the crankshaft clockwise.



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

### NOTE:

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



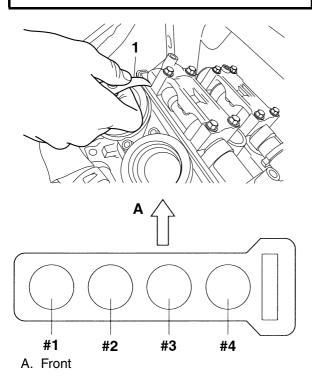
c. Measure the valve clearance with a thickness gauge "1".

NOTE: \_\_\_\_

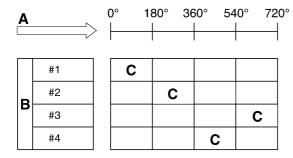
• If the valve clearance is incorrect, note the measured reading.

• Measure the valve clearance in the following sequence.

Valve clearance measuring sequence Cylinder #1  $\rightarrow$  #2  $\rightarrow$  #4  $\rightarrow$  #3



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



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

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

#### \*\*\*\*\*

- 5. Remove:
- Camshafts

#### NOTE: \_

- Refer to "CAMSHAFTS" on page 5-7.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

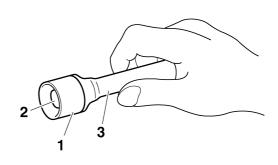
#### 6. Adjust:

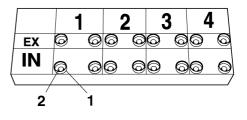
- Valve clearance
- \*\*\*\*\*
- a. Remove the valve lifter "1" and the valve pad "2" with a valve lapper "3".

Valve lapper
 90890-04101
 Valve lapping tool
 YM-A8998

#### NOTE: \_

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





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 = 0.23 mm (0.009 in)

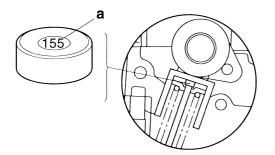
0.23 mm (0.009 in) – 0.20 mm (0.008 in) = 0.03 mm (0.001 in)

c. Check the thickness of the current valve pad. **NOTE:**\_\_\_\_\_

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

Example:

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



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

Example:

1.55 mm (0.061 in) + 0.03 mm (0.001 in) = 1.58 mm (0.062 in)

The valve pad number is 158.

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

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

#### NOTE: \_

Refer to the following table for the available valve pads.

Valve pad range	Nos. 150–240
Valve pad thickness	1.50–2.40 mm (0.0591–0.0945 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

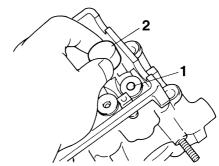
Example:

Valve pad number = 158 Rounded value = 160 New valve pad number = 160

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

#### NOTE: \_

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



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



# 10 Nm (1.0 m·kg, 7.2 ft·lb)

Camshaft cap bolt

### NOTE:

- Refer to "CAMSHAFTS" on page 5-7.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshaft marks with the camshaft cap marks.
- Turn the crankshaft clockwise several full turns to seat the parts.
- h. Measure the valve clearance again.
- i. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

### \*\*\*\*\*

- 7. Install:
- All removed parts

#### NOTE:

For installation, reverse the removal procedure.

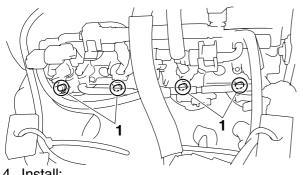
# SYNCHRONIZING THE THROTTLE BODIES

Prior to synchronizing the throttle bodies, the valve clearance and the engine idling speed should be properly adjusted.

1. Stand the vehicle on a level surface.

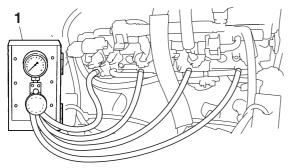
Place the vehicle on a suitable stand.

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



- 4. Install:
  - Vacuum gauge "1"
- Digital tachometer

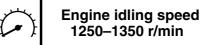
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456



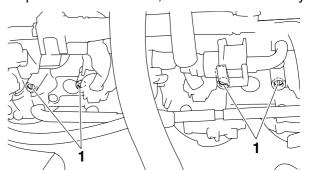
- 5. Install:
  - Fuel tank
- Refer to "FUEL TANK" on page 7-1. 6. Adjust:
  - Throttle body synchronization

# Basic procedure

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



# b. Turn the bypass air screw "1" with a white paint mark out a little, and then turn it in fully.



c. Using the throttle body that has the bypass air screw with a white paint mark as the standard, turn the bypass air screws without white paint marks in or out to the adjust the other throttle bodies.

### NOTE:

- If more than one throttle body has a bypass air screw with a white paint mark, use the one with the lowest vacuum pressure as the standard.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If an air screw was removed, turn the screw 3/4 turn in and be sure to synchronize the throttle body.



#### Intake vacuum 20.0 kPa (5.9 inHg) (150 mmHg)

#### NOTE:

- The difference in vacuum pressure between two throttle bodies should not exceed 1.33 kPa (10 mmHg).
- If you are unable to adjust the throttle body synchronization using this procedure, use the following procedure instead.

\*\*\*\*\*

# Alternate procedure

#### NOTE:

Use this alternate procedure if you are unable to adjust the throttle body synchronization using the basic procedure.

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



#### Engine idling speed 1250–1350 r/min

- b. Turn all of the bypass air screws in fully.
- c. Using the throttle body with the lowest vacuum pressure as the standard, turn out the bypass air screws of the other throttle bodies to adjust them.

NOTE:

- Do not turn out the bypass air screw of the throttle body with the lowest vacuum pressure.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If an air screw was removed, turn the screw 3/4 turn in and be sure to synchronize the throttle body.



Intake vacuum 20.0 kPa (5.9 inHg) (150 mmHg)

#### NOTE:

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

#### \*\*\*\*\*

- 7. Stop the engine and remove the measuring equipment.
- 8. Allow the engine to cool, and then start the engine and check that the engine speed does not rise abnormally high.
- 9. Adjust:
- Throttle cable free play Refer to "ADJUSTING THE THROTTLE CA-BLE FREE PLAY" on page 3-8.



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

10.Install:

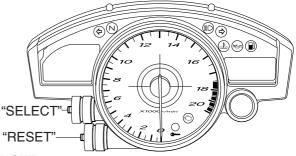
• Caps

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

# ADJUSTING THE EXHAUST GAS VOLUME NOTE: \_\_\_\_\_

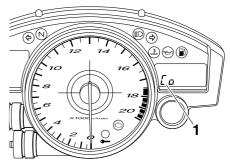
Be sure to set the CO density level to standard, and then adjust the exhaust gas volume.

- 1. Turn the main switch to "OFF".
- 2. Simultaneously press and hold the "SE-LECT" and "RESET" buttons, turn the main switch to "ON", and continue to press the buttons for 8 seconds or more.



NOTE:

- All displays on the meter disappear except the odometer/trip meter/fuel reserve trip meter/stopwatch display.
- "dIAG" appears on the odometer/trip meter/fuel reserve trip meter/stopwatch LCD.
- Press the "SELECT" button to select the CO adjustment mode "Co" "1" or the diagnostic mode "dIAG".



4. After selecting "Co", simultaneously press the "SELECT" and "RESET" buttons for 2 seconds or more to active the CO adjustment mode.

### NOTE:

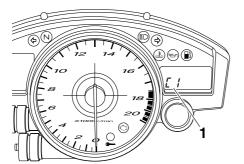
When changing the CO adjustment volume with the engine running, be sure to start the engine after step 4.

5. Press the "SELECT" and "RESET" buttons to select a cylinder "1".

#### NOTE:

The selected cylinder number appears on the odometer/trip meter/fuel reserve trip meter/stop-watch LCD.

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



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

#### NOTE: \_

The CO adjustment volume appears on the odometer/trip meter/fuel reserve trip meter/stop-watch LCD.

- To decrease the CO adjustment volume, press the "RESET" button.
- To increase the CO adjustment volume, press the "SELECT" button.
- 8. Release the button to execute the selection.
- 9. Simultaneously press the "SELECT" and
- "RESET" buttons to return to the cylinder selection (step 5).
- 10.Turn the main switch to "OFF" to cancel the CO adjustment mode.

# ADJUSTING THE THROTTLE CABLE FREE PLAY

#### NOTE:\_

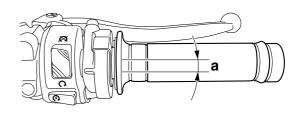
EAS20630

Prior to adjusting the throttle cable free play, the engine idling speed and carburetor synchronization should be adjusted properly.

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



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



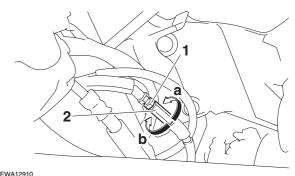
- 2. Adjust:
- Throttle cable free play
- \*\*\*\*
- a. Loosen the locknut "1".
- b. Turn the adjusting nut "2" in direction "a" or "b" until the specified throttle cable free play is obtained.

Direction "a"

Throttle cable free play is increased. Direction "b"

Throttle cable free play is decreased.

c. Tighten the locknut "1".



# 

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

#### \*\*\*\*\*

#### EAS2

### CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

- 1. Remove:
  - Rider seat
  - Refer to "GENERAL CHASSIS" on page 4-1. • Fuel tank

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

- Air filter case
- Refer to "AIR FILTER CASE" on page 7-4. • Air induction system solenoid
- Air induction system solehold
   Refer to "AIR INDUCTION SYSTEM" on page 7-13.
- 2. Remove:
  - Ignition coils
  - Spark plugs

# CAUTION:

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

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

### Manufacturer/model NGK/CR10EK

- 4. Check:
- Electrode "1"
- Damage/wear  $\rightarrow$  Replace the spark plug. • Insulator "2"

Abnormal color  $\rightarrow$  Replace the spark plug. Normal color is medium-to-light tan.

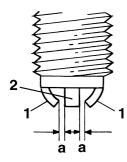
- 5. Clean:
- Spark plug

(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 0.6–0.7 mm (0.024–0.028 in)



- 7. Install:
  - Spark plugs
  - Ignition coils



Spark plug 13 Nm (1.3 m·kg, 9.4 ft·lb)

# NOTE:

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

### 8. Install:

- Air induction system solenoid Refer to "AIR INDUCTION SYSTEM" on page 7-13.
- Air filter case Refer to "AIR FILTER CASE" on page 7-4.
  Fuel tank
- Refer to "FUEL TANK" on page 7-1.
- Rider seat Refer to "GENERAL CHASSIS" on page 4-1.

EAS20710

### MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

### NOTE: \_\_\_\_

Insufficient compression pressure will result in a loss of performance.

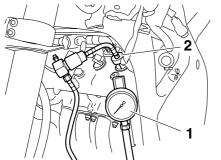
- 1. Measure:
  - Valve clearance Out of specification → Adjust. Refer to "ADJUSTING THE VALVE CLEAR-ANCE" on page 3-3.
- 2. Start the engine, warm it up for several minutes, and then turn it off.
- 3. Remove:
  - Side cowlings
  - Bottom cowlings
  - Refer to "GENERAL CHASSIS" on page 4-1. • Radiator
  - Refer to "RADIATOR" on page 6-1.
- 4. Remove:
  - Ignition coils
  - Spark plugs

# ECA13340

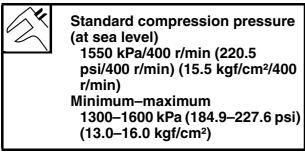
Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.

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

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



- 6. Measure:
- Compression pressure
  - Out of specification  $\rightarrow$  Refer to steps (c) and (d).



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

a. Set the main switch to "ON".

b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

#### EWA12940

#### To prevent sparking, ground all spark plug leads before cranking the engine.

#### NOTE:

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm<sup>2</sup>, 14 psi).

c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.

Carbon deposits  $\rightarrow$  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 Piston ring(s) wear or

oil	damage $\rightarrow$ Repair.
Same as without oil	Pistons, valves, cylin- der head gasket or piston ring(s) possi- bly defective $\rightarrow$ Re- pair.

### 

7. Install:

oil

- Spark plugs
- Ignition coils



### 8. Install:

- Radiator
  - Refer to "RADIATOR" on page 6-1.
- Bottom cowlings
- Side cowlings Refer to "GENERAL CHASSIS" on page 4-1.

#### EAS20730 CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

NOTE:

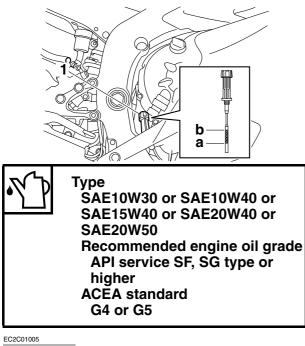
- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.
- 2. Start the engine, warm it up for several minutes. and then turn it off.
- 3. Remove:
- Dipstick "1"
- 4. Check:
- Engine oil level

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

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

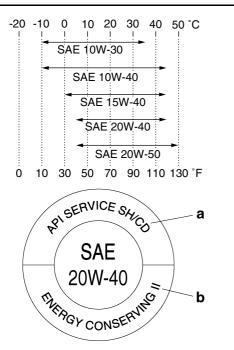
### NOTE:

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



CAUTION:

- Since engine oil also lubricates the clutch, 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 "a" or higher, and do not use oils labeled "ENERGY CONSERV-ING II" "b".
- Do not allow foreign materials to enter the crankcase.



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

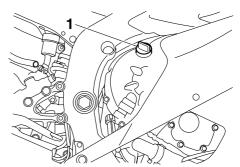
#### NOTE: \_

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

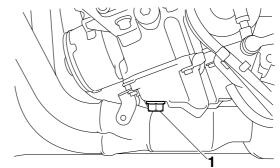
- 7. Install:
- Dipstick

#### EAS20780 CHANGING THE ENGINE OIL

- 1. Start the engine, warm it up for several minutes, and then turn it off.
- 2. Remove:
  - Left lower side cowling
- Left bottom cowling Refer to "GENERAL CHASSIS" on page 4-1.
- 3. Place a container under the engine oil drain bolt.
- 4. Remove:
  - Engine oil filler cap "1"



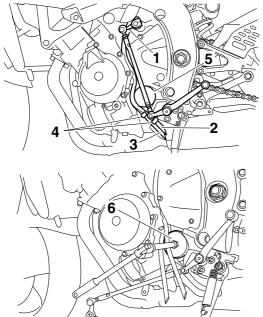
- 5. Remove:
- Engine oil drain bolt "1" (along with the gasket)



- 6. Drain:
  - Engine oil (completely from the crankcase)
- 7. If the oil filter cartridge is also to be replaced, perform the following procedure.
- \*\*\*\*
- a. Remove the shift arm "1".
- b. Pull the fuel tank breather hose "2" and fuel tank over flow hose "3" upward to remove them from the guide "4".

c. Remove the oil filter cartridge "5" with an oil filter wrench "6".



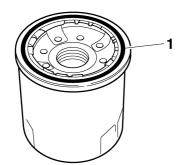


d. Lubricate the Ö-ring "1" of the new oil filter cartridge with a thin coat of engine oil.

# CAUTION:

EC2C01006

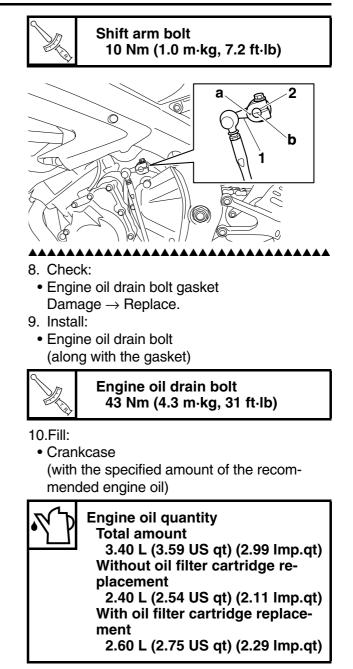
Make sure the O-ring "1" is positioned correctly in the groove of the oil filter cartridge.



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

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

- f. Insert the fuel tank breather hose and fuel tank overflow hose into the guide and place them in their original position.
- g. Install the shift arm "1" by aligning the match mark "a" on the shift arm with the match mark "b" on the shift shaft "2".



- 11.Install:
  - Engine oil filler cap
- 12.Start the engine, warm it up for several minutes, and then turn it off.
- 13.Check:
- Engine
  - (for engine oil leaks)
- 14.Check:
  - Engine oil level Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-10.

# MEASURING THE ENGINE OIL PRESSURE

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

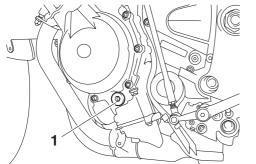
# CAUTION:

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:
  - Left lower side cowling
  - Left bottom cowling
- Refer to "GENERAL CHASSIS" on page 4-1. 4. Remove:
- Main gallery bolt "1"

# WARNING

The engine, muffler and engine oil are extremely hot.

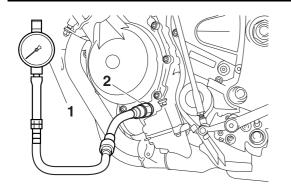


# 5. Install:

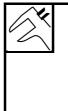
- Oil pressure gauge set "1"
- Oil pressure adapter H "2"



Oil pressure gauge set 90890-03120 Oil pressure adapter H 90890-03139



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



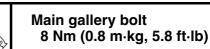
Oil pressure (hot) 80.0 kPa/1300 r/min (11.6 psi/1300 r/min) (0.80 kgf/cm<sup>2</sup>/1300 r/min) Oil temperature 82–92 °C (180–198 °F)

Out of specification  $\rightarrow$  Adjust.

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

### 7. Install:

Main gallery bolt



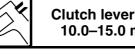
### 8. Install:

- Left bottom cowling
- Left lower side cowling

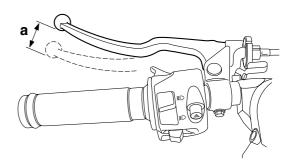
Refer to "GENERAL CHASSIS" on page 4-1.

# 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

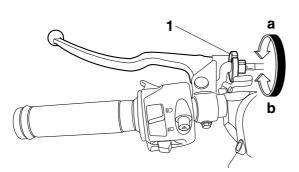
### Handlebar side

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.



#### NOTE:

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.

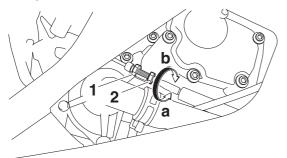
# -----

### 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.

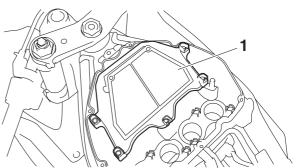
Direction "a" Clutch lever free play is increased. Direction "b" Clutch lever free play is decreased.

#### c. Tighten the locknut "1".



### REPLACING THE AIR FILTER ELEMENT

- 1. Remove:
- Rider seat Refer to "GENERAL CHASSIS" on page 4-1.
- Fuel tank Refer to "FUEL TANK" on page 7-1.
- Upper air filter case Refer to "AIR FILTER CASE" on page 7-4.
- 2. Remove:
- Air filter element "1"



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

#### NOTE:

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

#### CAUTION:

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

#### NOTE:

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

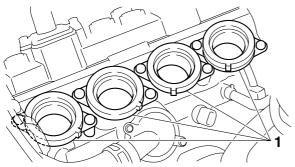
- 5. Install:
- Upper air filter case
- Refer to "AIR FILTER CASE" on page 7-4. • Fuel tank
  - Refer to "FUEL TANK" on page 7-1.
- Rider seat Refer to "GENERAL CHASSIS" on page 4-1.

#### EAS21010

#### CHECKING THE THROTTLE BODY JOINTS

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

- 1. Remove:
  - Rider seat
  - Refer to "GENERAL CHASSIS" on page 4-1. • Fuel tank
  - Refer to "FUEL TANK" on page 7-1.
- Air filter case Refer to "AIR FILTER CASE" on page 7-4.
- Throttle body Refer to "THROTTLE BODIES" on page 7-7.
- 2. Check:
  - Throttle body joints "1" Cracks/damage → Replace.



- 3. Install:
  - Throttle body Refer to "THROTTLE BODIES" on page 7-7.
  - Air filter case Refer to "AIR FILTER CASE" on page 7-4.
  - Fuel tank
    - Refer to "FUEL TANK" on page 7-1.

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

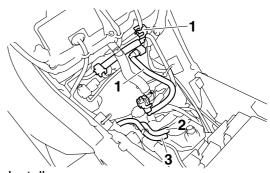
### CHECKING THE FUEL LINE

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

- 1. Remove:
- Rider seat
   Befor to "GEI
- Refer to "GENERAL CHASSIS" on page 4-1. • Fuel tank
  - Refer to "FUEL TANK" on page 7-1.
- 2. Check:
  - Fuel hoses "1"
  - Vacuum hoses
  - Overflow hose "2"
  - Breather hose "3" Cracks/damage  $\rightarrow$  Replace. Loose connection  $\rightarrow$  Connect properly.

### CAUTION:

Make sure the fuel tank breather hose is routed correctly.



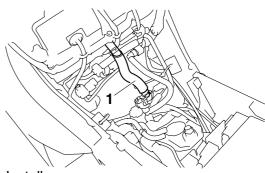
- 3. Install:
  - Fuel tank
    - Refer to "FUEL TANK" on page 7-1.
  - Rider seat Refer to "GENERAL CHASSIS" on page 4-1.

#### CHECKING THE CRANKCASE BREATHER HOSE

- 1. Remove:
- Rider seat
- Refer to "GENERAL CHASSIS" on page 4-1. • Fuel tank
  - Refer to "FUEL TANK" on page 7-1.
- 2. Check:
- Crankcase breather hose "1" Cracks/damage  $\rightarrow$  Replace. Loose connection  $\rightarrow$  Connect properly.

#### CAUTION:

# Make sure the crankcase breather hose is routed correctly.



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

### ENGINE

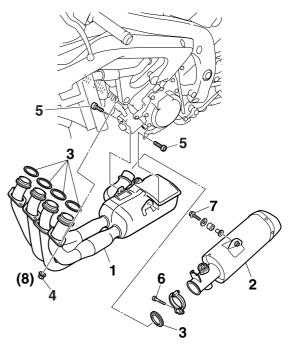
#### EAS21080 CHECKING THE EXHAUST SYSTEM

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

- 1. Remove:
  - Side cowlings
  - Bottom cowlings Refer to "GENERAL CHASSIS" on page 4-1.
- 2. Check:
  - Exhaust pipe assembly "1"
  - Muffler "2" Cracks/damage  $\rightarrow$  Replace.
  - Gaskets "3"
    - Exhaust gas leaks  $\rightarrow$  Replace.
- 3. Check:
  - **Tightening torque**
  - Exhaust pipe assembly and cylinder head nuts "4"
  - · Exhaust pipe assembly and exhaust pipe assembly bracket bolts "5"
  - Exhaust pipe assembly and muffler bolt "6"
  - Muffler and right rider footrest bracket bolt "7"



Exhaust pipe assembly and cylinder head nut 20 Nm (2.0 m·ka. 14 ft·lb) Exhaust pipe assembly and exhaust pipe assembly bracket bolt 20 Nm (2.0 m·kg, 14 ft·lb) Exhaust pipe assembly and muffler bolt 10 Nm (1.0 m·kg, 7.2 ft·lb) Muffler and right rider footrest bracket bolt 20 Nm (2.0 m·kg, 14 ft·lb)

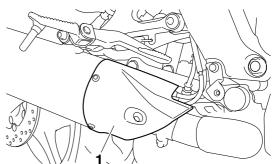


- 4. Install:
- Bottom cowlings

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

#### EAS21100

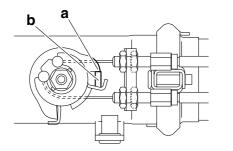
- **ADJUSTING THE EXUP CABLES** 1. Remove:
- EXUP valve pulley cover "1"



- 2. Check:
- EXUP system operation
- a. Activate the diagnostic mode and select the diagnostic code number "53". Refer to "FUEL INJECTION SYSTEM" on page 8-33.
- b. Set the engine stop switch to " $\bigcirc$ ".
- c. Check that the EXUP valve operates properly.

#### NOTE: \_

Check that the projection "a" on the EXUP valve pulley contacts the stopper "b" (fully open position). If the projection does not contact the stopper, adjust the EXUP cable free play.



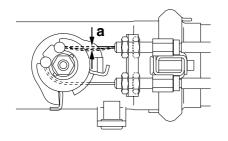
#### \*\*\*\*\*

- 3. Check:
  - EXUP cable free play (at the EXUP valve pulley) "a"

Out of specification  $\rightarrow$  Adjust.

K

EXUP cable free play (at the EXUP valve pulley) 1.5 mm (0.06 in) or less



- 4. Adjust:
- EXUP cable free play
- \*\*\*\*
- a. Loosen the locknuts "1" and "2".
- b. Turn the adjusting bolt "3" in direction "a" or "b" until the specification.

Direction "a" Free play is increased. Direction "b" Free play is decreased.



EXUP cable free play (at the EXUP valve pulley) c: 1.5 mm (0.06 in) or less

c. Tighten the locknut "1" to specification.



### Locknut (EXUP cable adjusting bolt)

7 Ńm (0.7 m·kg, 5.1 ft·lb)

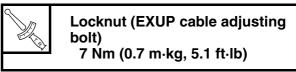
d. Turn the adjusting bolt "4" in direction "a" or "b" until the specification.

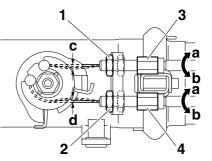
Direction "a" Free play is increased. Direction "b" Free play is decreased.



EXUP cable free play (at the EXUP valve pulley) d: 1.5 mm (0.06 in) or less

e. Tighten the locknut "2" to specification.

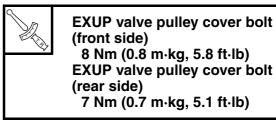




f. Repeat steps (2) and (3).

\*\*\*\*\*

- 5. Install:
  - EXUP valve pulley cover



#### 

**CHECKING THE COOLANT LEVEL** 1. Stand the vehicle on a level surface.

NOTE:

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

#### 2. Check:

Coolant level

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

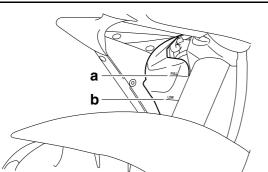
Below the minimum level mark  $\rightarrow$  Remove the coolant reservoir cap, add the recommended coolant to the proper level.

#### NOTE:

To access the coolant reservoir cap, remove the right side panel. Refer to "GENERAL CHASSIS" on page 4-1.

### CAUTION:

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



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

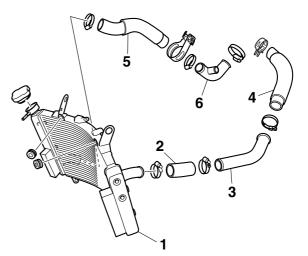
#### NOTE:

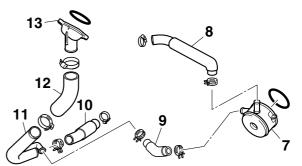
Before checking the coolant level, wait a few minutes until it settles.

### CHECKING THE COOLING SYSTEM

- 1. Remove:
- Side cowlings
- Bottom cowlings Refer to "GENERAL CHASSIS" on page 4-1.
- Exhaust pipe assembly Refer to "ENGINE REMOVAL" on page 5-1.
- 2. Check:
  - Radiator "1"
  - Radiator inlet hose "2"
  - Radiator inlet pipe "3"

- Thermostat outlet hose "4"
- Radiator outlet hose "5"
- Radiator outlet pipe "6"
- Oil cooler "7"
- Oil cooler outlet hose "8"
- Oil cooler inlet hose "9"
- Water pump outlet hose "10"
- Water pump inlet hose
- Water pump outlet pipe "11"
- Water jacket joint inlet hose "12"
- Water jacket joint "13" Cracks/damage → Replace. Refer to "RADIATOR" on page 6-1 and "OIL COOLER" on page 6-4.





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

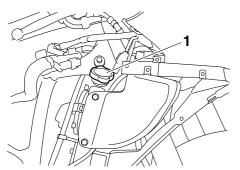
#### EAS21130 CHANGING THE COOLANT

- 1. Remove:
  - Right side panel
  - Right upper side cowling
  - Right lower side cowling
- Right bottom cowling
- Refer to "GENERAL CHASSIS" on page 4-1. 2. Remove:
- Radiator cap "1"

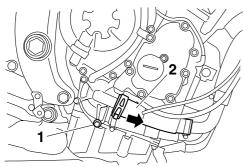
### WARNING

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

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

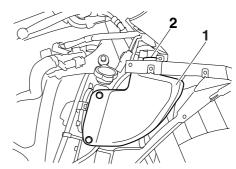


- 3. Remove:
- Coolant drain bolt (water pump) "1" (along with the copper washer)
- 4. Disconnect:
  - Water pump inlet hose "2"



- 5. Drain:
  - Coolant (from the engine and radiator)

- 6. Remove:
- Coolant reservoir "1"
- Coolant reservoir cap "2"



- 7. Drain:
  - Coolant (from the coolant reservoir)
- 8. Install:
- Coolant reservoir
- 9. Connect:
- Water pump inlet hose
- 10.Install:
  - Coolant drain bolt (water pump)

(along with the copper washer New )

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

11.Fill:

• Cooling system

(with the specified amount of the recommended coolant)

**Recommended antifreeze** High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines Mixing ratio 1:1 (antifreeze:water) Radiator capacity (including all routes) 2.30 L (2.43 US qt) (2.02 Imp.qt) Coolant reservoir capacity (up to the maximum level mark) 0.25 L (0.26 US qt) (0.22 Imp.qt)

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

#### 

 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.

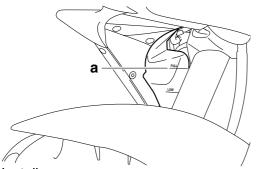
### CAUTION:

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

12.Install:

- Radiator cap
- 13.Fill:
  - · Coolant reservoir

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



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

#### NOTE: \_

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

#### 17.Install:

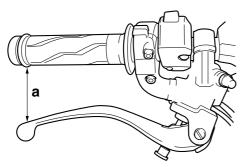
- Right bottom cowling
- Right lower side cowling
- Right upper side cowling
- Right side panel Refer to "GENERAL CHASSIS" on page 4-1.

# CHASSIS

#### EAS21150

#### ADJUSTING THE FRONT DISC BRAKE

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

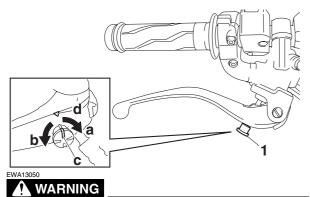


#### \*\*\*\*\*

- a. Push the brake lever forward.
- b. Turn the adjusting knob "1" in direction "a" or "b" until the brake lever is in the desired position.

Direction "a" Brake lever distance is increased. Direction "b" Brake lever distance is decreased.

c. Align the mark "c" on the adjusting knob with the mark "d" on the brake lever.



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

### CAUTION:

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

#### \*\*\*\*

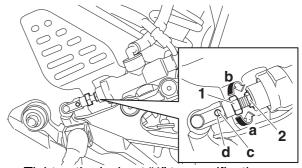
### ADJUSTING THE REAR DISC BRAKE

- 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.

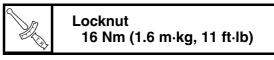
Direction "a" Brake pedal is raised. Direction "b" Brake pedal is lowered.

### EWA13070

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.



### 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 and could result in loss of control and possibly an accident. Therefore, check and, if necessary, bleed the brake system.

### CAUTION:

After adjusting the installed rear master cylinder length, make sure there is no brake drag.

#### \*\*\*\*\*

2. Adjust:

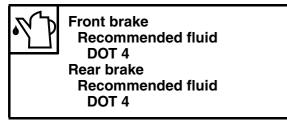
• Rear brake light switch Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-23.

EAS21240

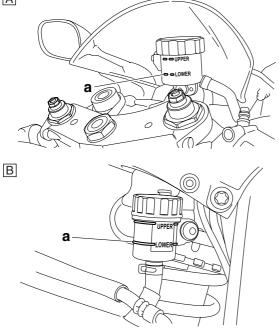
#### CHECKING THE BRAKE FLUID LEVEL

- 1. Stand the vehicle on a level surface.
- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.
- 2. Check:
  - Brake fluid level

Below the minimum level mark "a"  $\rightarrow$  Add the recommended brake fluid to the proper level.



Α



- A. Front brake
- B. Rear brake

### 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.

### CAUTION:

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

#### NOTE:

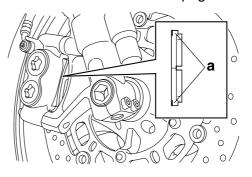
In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

EAS21250

#### CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

- 1. Operate the brake.
- 2. Check:
  - Front brake pad Wear indicators "a" almost touch the brake disc → Replace the brake pads as a set. Refer to "FRONT BRAKE" on page 4-17.



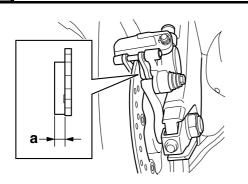
### CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

- 1. Operate the brake.
- 2. Check:
  - Rear brake pad Wear limit "a" reached  $\rightarrow$  Replace the brake pads as a set.

Refer to "REAR BRAKE" on page 4-29.

#### Limit 1.0 mm (0.04 in)

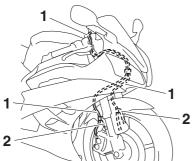


#### EAS21280

#### **CHECKING THE FRONT BRAKE HOSES**

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

- 1. Check:
  - Brake hoses "1" Cracks/damage/wear  $\rightarrow$  Replace.
- 2. Check:
  - Brake hose holders "2" Loose  $\rightarrow$  Tighten the holder bolt.



- 3. Hold the vehicle upright and apply the brake several times.
- 4. Check:
- Brake hoses Brake fluid leakage  $\rightarrow$  Replace the damaged hose.

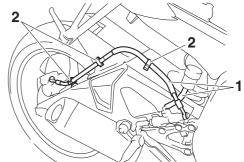
Refer to "FRONT BRAKE" on page 4-17.

#### FAS21290

#### CHECKING THE REAR BRAKE HOSES

- 1. Check:
- Brake hoses "1" Cracks/damage/wear  $\rightarrow$  Replace.

- 2. Check:
- Brake hose holders "2" Loose connection  $\rightarrow$  Connect.



- 3. Hold the vehicle upright and apply the brake several times.
- 4. Check:
- Brake hoses

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

Refer to "REAR BRAKE" on page 4-29.

#### EAS21330 ADJUSTING THE REAR BRAKE LIGHT SWITCH

#### NOTE:

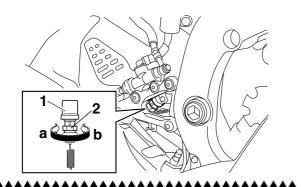
The rear brake light switch is operated by movement of the brake pedal. The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.

- 1. Check:
- Rear brake light operation timing Incorrect  $\rightarrow$  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.

### **CHASSIS**



#### EAS21360 BLEEDING THE HYDRAULIC BRAKE

#### SYSTEM EWA13100

#### **WARNING**

Bleed the hydraulic brake system whenever:

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

#### NOTE:

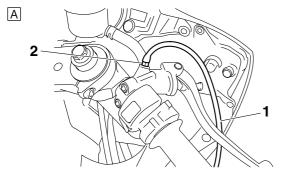
- Be careful not to spill any brake fluid or allow the brake fluid reservoir to overflow.
- When bleeding the hydraulic brake system, make sure there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic brake system, considerably lengthening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

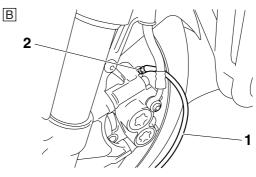
#### 1. Bleed:

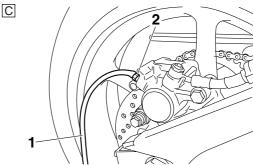
• Hydraulic brake system

#### \*\*\*\*

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







- A. Front brake master cylinder
- B. Front brake caliper
- C. Rear brake caliper

#### NOTE:\_

The bleeding order of the front hydraulic brake system is the following:

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

#### NOTE:

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

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



Bleed screw (front brake master

cylinder) 6 Nm (0.6 m·kg, 4.3 ft·lb) Bleed screw (front brake caliper) 5 Nm (0.5 m·kg, 3.6 ft·lb) Bleed screw (rear brake caliper) 5 Nm (0.5 m·kg, 3.6 ft·lb)

 k. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
 Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-22.

### WARNING

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

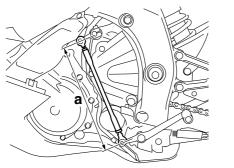
#### 

# ADJUSTING THE SHIFT PEDAL

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

- 1. Remove:
- Left lower side cowling Refer to "GENERAL CHASSIS" on page 4-1.
- 2. Measure:
  - Installed shift rod length "a" Incorrect  $\rightarrow$  Adjust.





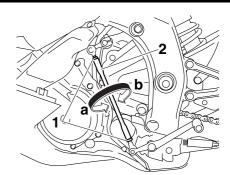
- 3. Adjust:
- Installed shift rod length

\*\*\*\*\*

- a. Loosen both locknuts "1".
- b. Turn the shift rod "2" in direction "a" or "b" until the specified installed shift rod length is obtained.

#### **Direction "a"**

Installed shift rod length increases. Direction "b" Installed shift rod length decreases.



c. Tighten both locknuts to specification.



Locknut (shift rod upper side) 7 Nm (0.7 m·kg, 5.1 ft·lb) Locknut (shift rod lower side) 10 Nm (1.0 m·kg, 7.2 ft·lb)

d. Make sure the installed shift rod length is within specification.

#### \*\*\*\*\*

- 4. Install:
- Left lower side cowling Refer to "GENERAL CHASSIS" on page 4-1.

# ADJUSTING THE DRIVE CHAIN SLACK

#### CAUTION:

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

1. Stand the vehicle on a level surface.

#### 

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

#### NOTE:

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

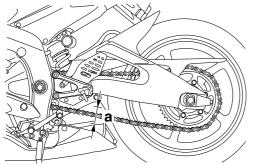
- 2. Check:
  - Drive chain slack "a" Out of specification → Adjust.

# K

#### Drive chain slack 35.0–45.0 mm (1.38–1.77 in)

#### NOTE:

Measure the drive chain slack halfway between the drive axle and the rear wheel axle.

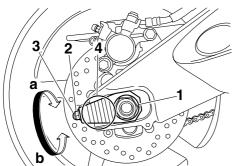


- 3. Adjust:
- Drive chain slack
- \*\*\*\*\*
- a. Loosen the wheel axle nut "1".
- b. Loosen both locknuts "2".
- c. Turn both adjusting bolts "3" in direction "a" or "b" until the specified drive chain slack is obtained.

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

#### NOTE:

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



d. Tighten the wheel axle nut to specification.

Wheel axle nut 110 Nm (11.0 m·kg, 80 ft·lb)

e. Tighten the drive chain adjusting bolts in direction "a" to specification.



#### Drive chain adjusting bolt 2 Nm (0.2 m·kg, 1.4 ft·lb)

f. Tighten the locknuts to specification.



Drive chain adjusting locknut 16 Nm (1.6 m·kg, 11 ft·lb)

#### \*\*\*\*\*

### LUBRICATING THE DRIVE CHAIN

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

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



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

#### EAS21500

# CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

#### 

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

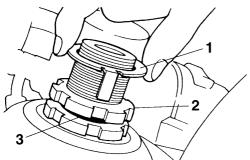
#### NOTE: \_

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

- 2. Check:
  - Steering head Grasp the bottom of the front fork legs and gently rock the front fork.
     Binding/looseness → Adjust the steering head.
- 3. Remove:
  - Upper bracket Refer to "STEERING HEAD" on page 4-54.

#### 4. Adjust:

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



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

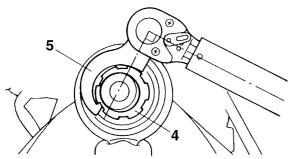


Steering nut wrench 90890-01403 Spanner wrench YU-33975

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

#### NOTE:

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



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

### WARNING

Do not overtighten the lower ring nut.

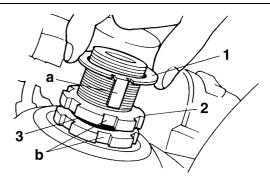


Lower ring nut (final tightening torque) 14 Nm (1.4 m·kg, 10 ft·lb)

- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
   Refer to "STEERING HEAD" on page 4-54.
- e. Install the rubber washer "3".
- f. Install the upper ring nut "2".
- g. Finger tighten the upper ring nut "2", then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- h. Install the lock washer "1".

#### NOTE:

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



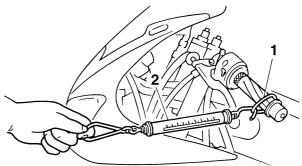
#### \*\*\*\*\*

- 5. Install:
- Upper bracket Refer to "STEERING HEAD" on page 4-54.
- 6. Measure:
- Steering head tension

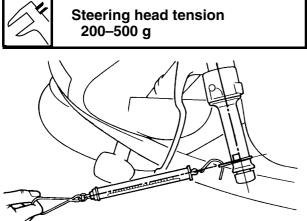
# NOTE:\_\_\_\_\_

Make sure all of the cables and wires are properly routed.

- a. Point the front wheel straight ahead.
- b. Install a plastic locking tie "1" loosely around the end of the handlebar as shown.
- c. Hook a spring gauge "2" onto the plastic locking tie.



d. Hold the spring gauge at a 90° angle from the handlebar, pull the spring gauge, and then record the measurement when the handlebar starts to run.



- e. Řepeat the above procedure on the opposite handlebar.
- f. If the steering head tension is out of specification (both handlebars should be within specification), remove the upper bracket and loosen or tighten the lower ring nut.
- g. Reinstall the upper bracket and measure the steering head tension again as described above.
- h. Repeat the above procedure until the steering head tension is within specification.
- Grasp the bottom of the front fork legs and gently rock the front fork.
   Binding/looseness → Adjust the steering head.

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

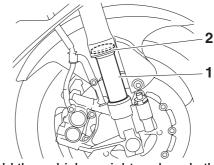
#### EAS21530 CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

#### 

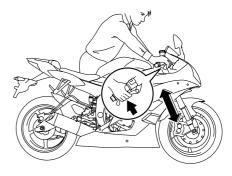
Securely support the vehicle so that there is no danger of it falling over.

- 2. Check:
  - Inner tube "1" Damage/scratches  $\rightarrow$  Replace.
  - Oil seal "2" Oil leakage  $\rightarrow$  Replace.



- 3. Hold the vehicle upright and apply the front brake.
- 4. Check:
  - Front fork operation Push down hard on the handlebar several times and check if the front fork rebounds smoothly.

Rough movement  $\rightarrow$  Repair. Refer to "FRONT FORK" on page 4-44.



EAS21580

#### ADJUSTING THE FRONT FORK LEGS

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

#### 

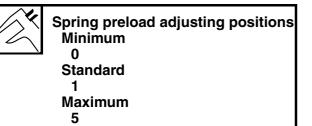
- Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.
- Securely support the vehicle so that there is no danger of it falling over.

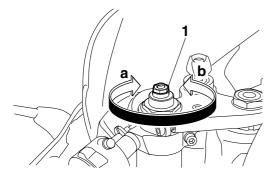
### Spring preload

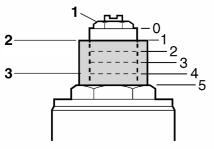
#### CAUTION:

- Grooves are provided to indicate the adjustment position.
- Never go beyond the maximum or minimum adjustment positions.
- 1. Adjust:
  - Spring preload
- \*\*\*\*\*
- a. Turn the adjusting bolt "1" in direction "a" or "b".

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







- 2. Current setting
- 3. Cap bolt collar

#### **\*\*\*\***

### Rebound damping

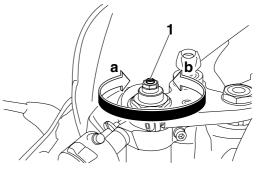
#### CAUTION:

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" (turn in) Rebound damping is increased (suspension is harder). Direction "b" (turn out)
- Rebound damping is decreased (suspension is softer).
- Rebound damping adjusting positions Minimum 17 click(s) out\* Standard 15 click(s) out\* Maximum 1 click(s) out\*

\* With the adjusting screw fully turned in



#### \*\*\*\*\*

### Compression damping

CAUTION:

Never go beyond the maximum or minimum adjustment positions.

- 1. Adjust:
- Compression damping (fast compression damping)

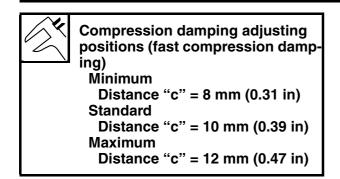
#### \*\*\*\*\*

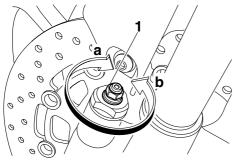
a. Turn the adjusting bolt "1" in direction "a" or "b".

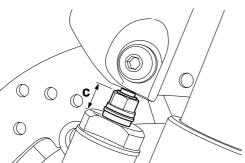
#### **Direction "a"**

Compression damping is increased (suspension is harder). Direction "b" Compression damping is decreased

(suspension is softer).





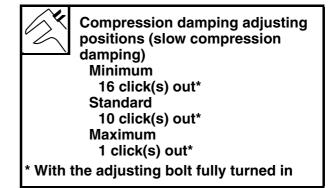


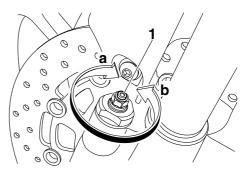
### 2. Adjust:

- · Compression damping (slow compression damping)
- a. Turn the adjusting bolt "1" in direction "a" or "b".

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

Compression damping is decreased (suspension is softer).





EAS21610

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY EWA13120

#### 

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

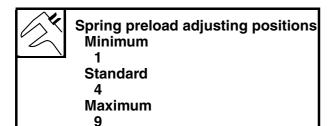
#### Spring preload -ECA13590

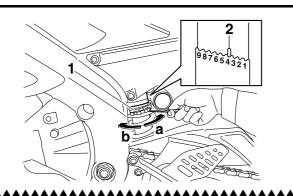
CAUTION:

Never go beyond the maximum or minimum adjustment positions.

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

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





#### **Rebound damping**

### CAUTION:

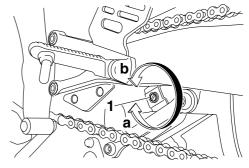
Never go beyond the maximum or minimum adjustment positions.

- 1. Adjust:
- Rebound damping
- a. Turn the adjusting screw "1" in direction "a" or "b".

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

Rebound damping adjusting positions Minimum 20 click(s) out\* Standard 10 click(s) out\* Maximum 3 click(s) out\*

\* With the adjusting screw fully turned in



#### \*\*\*\*\*

#### Compression damping

### CAUTION:

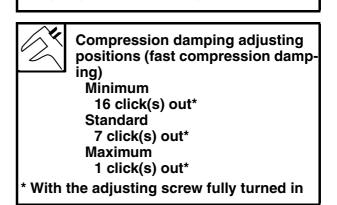
Never go beyond the maximum or minimum adjustment positions.

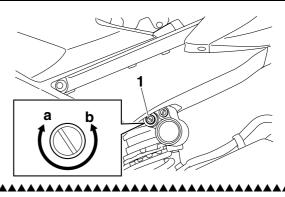
- 1. Adjust:
- Compression damping (fast compression damping)

#### \*\*\*\*\*

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

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



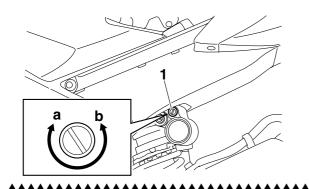


- 2. Adjust:
- Compression damping (slow compression damping)
- \*\*\*\*
- a. Turn the adjusting screw "1" in direction "a" or "b".

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

Compression damping adjusting positions (slow compression damping) Minimum 24 click(s) out\* Standard 15 click(s) out\* Maximum 1 click(s) out\*

\* With the adjusting screw fully turned in

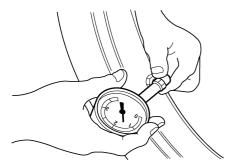


### CHECKING THE TIRES

The following procedure applies to both of the tires.

- 1. Check:
- Tire pressure

Out of specification  $\rightarrow$  Regulate.



### WARNING

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

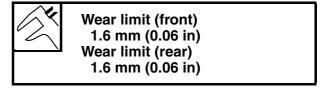
Tire air pressure (measured on cold tires) Loading condition 0-90 kg (0-198 lb) Front 250 kPa (36 psi) (2.50 kgf/cm<sup>2</sup>) Rear 250 kPa (36 psi) (2.50 kgf/cm<sup>2</sup>) Loading condition 90-193 kg (198-425 lb) Front 250 kPa (36 psi) (2.50 kgf/cm<sup>2</sup>) Rear 290 kPa (42 psi) (2.90 kgf/cm<sup>2</sup>) **High-speed riding** Front 250 kPa (36 psi) (2.50 kgf/cm<sup>2</sup>) Rear 250 kPa (36 psi) (2.50 kgf/cm<sup>2</sup>) Maximum load 193 kg (425 lb) Total weight of rider, passenger, cargo and accessories

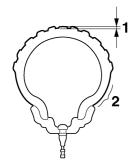
WARNING

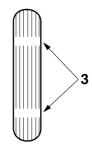
It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.

- 2. Check:
- Tire surfaces

Damage/wear  $\rightarrow$  Replace the tire.



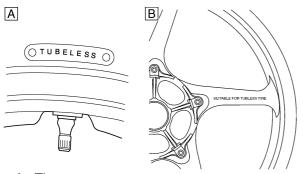




- 1. Tire tread depth
- 2. Side wall
- 3. Wear indicator

### WARNING

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



A. Tire

В.	Wheel	

Tube wheel	Tube tire only	
Tubeless wheel	Tube or tubeless tire	

### EWA14090

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 DUNLOP/D209F PT Manufacturer/model MICHELIN/Pilot POWER P

#### Rear tire

Size 180/55 ZR17M/C (73W) Manufacturer/model DUNLOP/D209PT Manufacturer/model MICHELIN/Pilot POWER

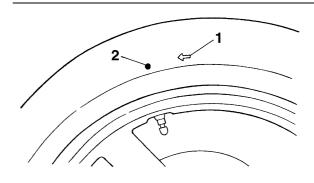
#### WARNING

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

#### NOTE:

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

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



#### CHECKING THE WHEELS

The following procedure applies to both of the wheels.

- 1. Check:
- Wheel
  - $\text{Damage/out-of-round} \rightarrow \text{Replace}.$

### WARNING

Never attempt to make any repairs to the wheel.

#### NOTE:\_

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

# CHECKING AND LUBRICATING THE CABLES

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

### 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  $\rightarrow$  Replace.
- 2. Check:
  - Cable operation

Rough movement  $\rightarrow$  Lubricate.



Recommended lubricant Engine oil or a suitable cable lubricant

#### NOTE:

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

### LUBRICATING THE LEVERS

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



EAS21710

Recommended lubricant Lithium-soap-based grease

#### LUBRICATING THE PEDALS

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



Recommended lubricant Lithium-soap-based grease

### LUBRICATING THE SIDESTAND

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

Recommended lubricant Lithium-soap-based grease

### LUBRICATING THE REAR SUSPENSION

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



Recommended lubricant Lithium-soap-based grease

## ELECTRICAL SYSTEM

#### EAS21760

#### CHECKING AND CHARGING THE BATTERY

Refer to "ELECTRICAL COMPONENTS" on page 8-87.

### CHECKING THE FUSES

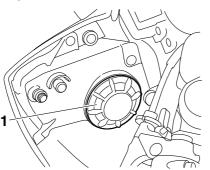
Refer to "ELECTRICAL COMPONENTS" on page 8-87.

#### EAS21790

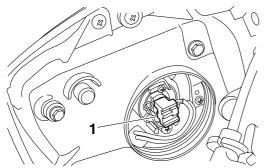
#### **REPLACING THE HEADLIGHT BULBS**

The following procedure applies to both of the headlight bulbs.

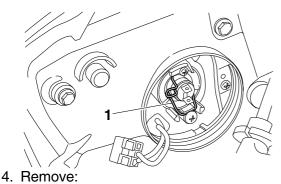
- 1. Remove:
  - Headlight bulb cover "1"



- 2. Disconnect:
- Headlight coupler "1"



- 3. Detach:
  - Headlight bulb holder "1"



Headlight bulb

### WARNING

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

5. Install:

Headlight bulb New
Secure the new headlight bulb with the headlight bulb holder.

### CAUTION:

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.

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

FAS21810

• Headlight bulb cover

#### **ADJUSTING THE HEADLIGHT BEAMS**

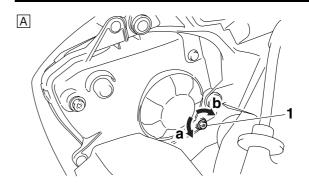
The following procedure applies to both of the headlights.

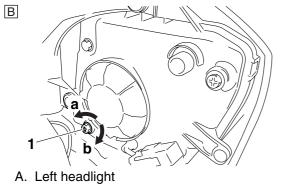
- 1. Adjust:
- Headlight beam (vertically)

#### \*\*\*

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

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



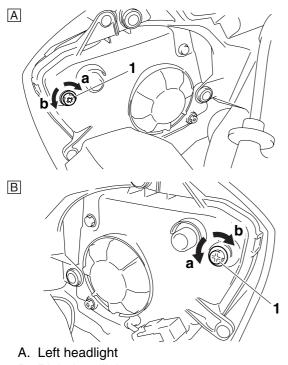


B. Right headlight

#### \*\*\*\*\*

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

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



B. Right headlight



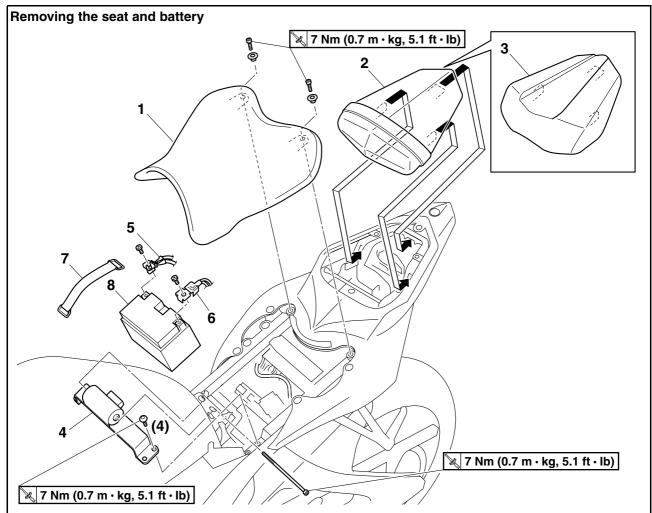
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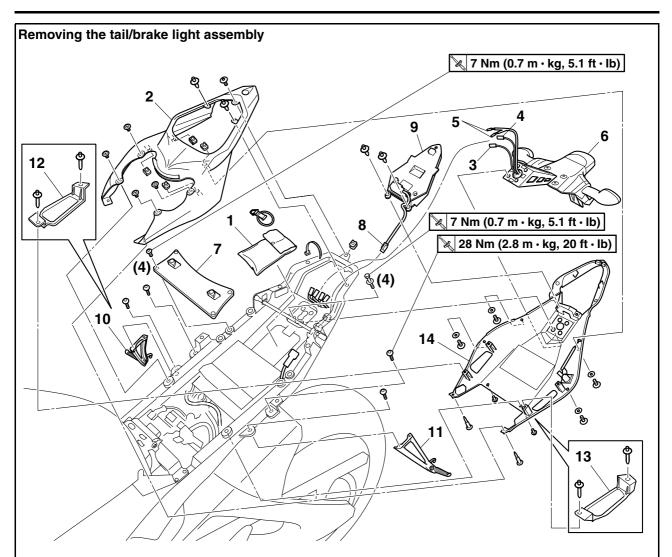
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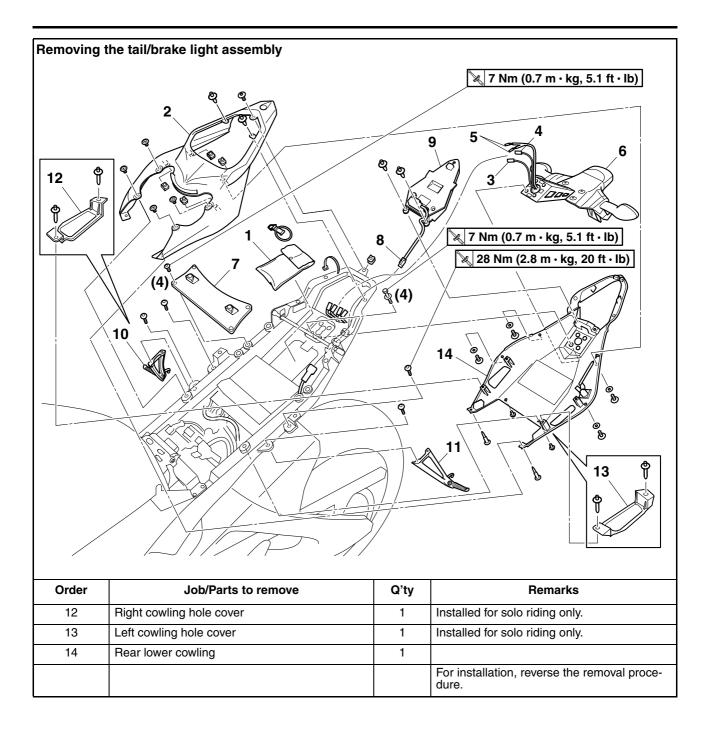
# GENERAL CHASSIS

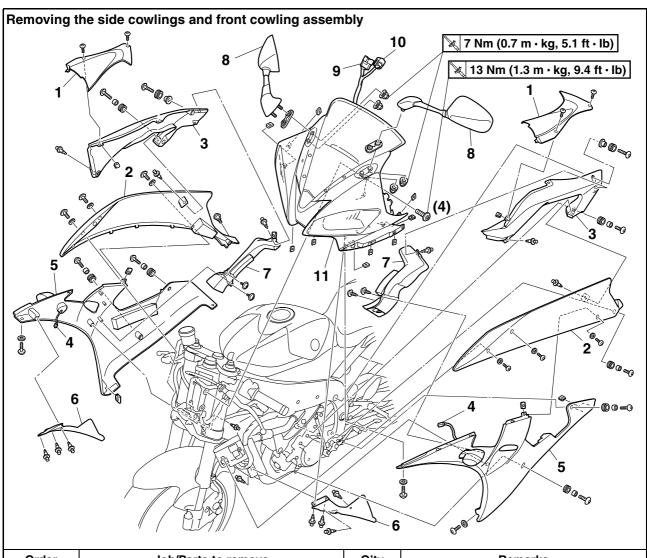


Order	Job/Parts to remove	Q'ty	Remarks
1	Rider seat	1	
			CAUTION:
2	Passenger seat	1	Install the passenger seat replacement cover if the vehicle is registered for only a solo rider.
3	Passenger seat replacement cover	1	Installed for solo riding only.
4	Fuel tank bracket	1	
5	Negative battery lead	1	Disconnect.
6	Positive battery lead	1	Disconnect.
7	Battery band	1	
8	Battery	1	
			For installation, reverse the removal proce- dure.



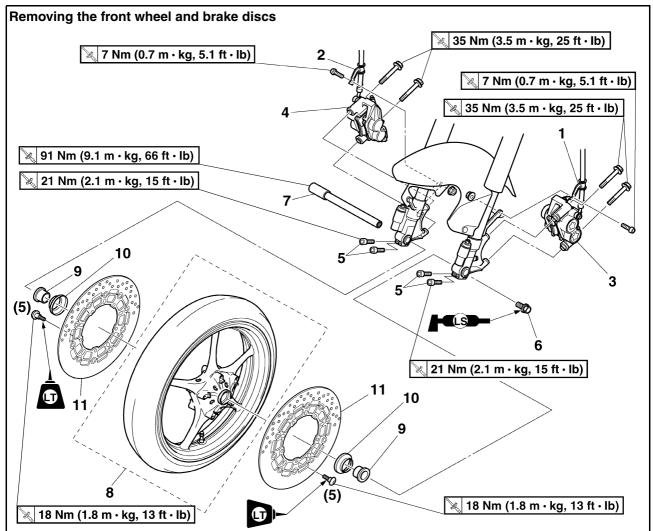
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/Passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Owner's tool kit	1	
2	Rear upper cowling	1	
3	Rear right turn signal light coupler	1	Disconnect.
4	Rear left turn signal light coupler	1	Disconnect.
5	License plate light connector	2	Disconnect.
6	License plate light assembly	1	
7	Rear upper cowling damper plate	1	
8	Tail/brake light coupler	1	Disconnect.
9	Tail/brake light assembly	1	
10	Right passenger footrest	1	CAUTION: Install the cowling hole cover if the vehi cle is registered for only a solo rider.
11	Left passenger footrest	1	CAUTION: Install the cowling hole cover if the vehi cle is registered for only a solo rider.





Order	Job/Parts to remove	Q'ty	Remarks
1	Side panel	2	
2	Upper side cowling	2	
3	Lower side cowling	2	
4	Front turn signal light coupler	2	Disconnect.
5	Bottom cowling	2	
6	Bottom cowling inner panel	2	
7	Air intake duct	2	
8	Rearview mirror	2	
9	Headlight sub-wire harness 1 coupler	1	Disconnect.
10	Headlight sub-wire harness 2 coupler	1	Disconnect.
11	Front cowling assembly	1	
			For installation, reverse the removal proce- dure.

# FRONT WHEEL



Order	Job/Parts to remove	Q'ty	Remarks
			NOTE:
			Place the vehicle on a suitable stand so that the front wheel is elevated.
1	Left front brake hose holder	1	
2	Right front brake hose holder	1	
3	Left front brake caliper	1	
4	Right front brake caliper	1	
5	Front wheel axle pinch bolt	4	Loosen.
6	Front wheel axle bolt	1	
7	Front wheel axle	1	
8	Front wheel	1	
9	Collar	2	
10	Dust cover	2	
11	Front brake disc	2	
			For installation, reverse the removal proce- dure.

### **FRONT WHEEL**

Disassemb	bling the front wheel		
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	2	
2	Wheel bearing	2	
3	Spacer	1	
			For assembly, reverse the disassembly pro- cedure.

### REMOVING THE FRONT WHEEL

1. Stand the vehicle on a level surface.

#### 

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

#### NOTE:

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

- 2. Remove:
- Left brake caliper
- Right brake caliper

#### NOTE:

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

### DISASSEMBLING THE FRONT WHEEL

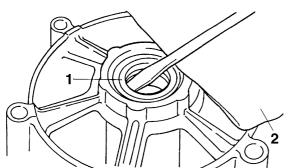
- 1. Remove:
  - Oil seals
  - Wheel bearings

#### \*\*\*\*\*

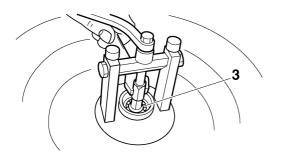
- a. Clean the outside of the front wheel hub.b. Remove the oil seals "1" with a flat-head
- screwdriver.

#### NOTE:

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



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

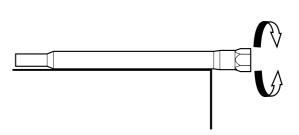


#### EAS21920 CHECKING THE FRONT WHEEL

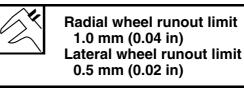
- 1. Check:
- Wheel axle Roll the wheel axle on a flat surface. Bends  $\rightarrow$  Replace.

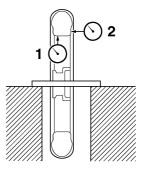
#### WARNING

Do not attempt to straighten a bent wheel axle.



- 2. Check:
- Tire
- Front wheel Damage/wear → Replace. Refer to "CHECKING THE TIRES" on page 3-32 and "CHECKING THE WHEELS" on page 3-33.
- 3. Measure:
  - Radial wheel runout "1"
- Lateral wheel runout "2"
   Over the specified limits → Replace.





- 4. Check:
  - Wheel bearings

Front wheel turns roughly or is loose  $\rightarrow$  Replace the wheel bearings.

Oil seals

Damage/wear  $\rightarrow$  Replace.



EAS21960

#### ASSEMBLING THE FRONT WHEEL

1. Install:

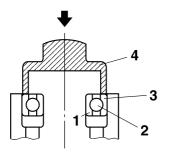
- Wheel bearings New
- Oil seals New
- ·····
- a. Install the new wheel bearings and oil seals in the reverse order of disassembly.

### CAUTION:

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

#### NOTE:

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



### 

### ADJUSTING THE FRONT WHEEL STATIC BALANCE

#### NOTE:

- 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.

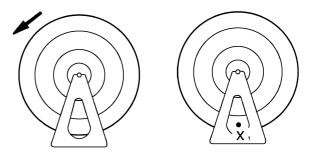
#### 1. Remove:

- Balancing weight(s)
- 2. Find:
  - Front wheel's heavy spot

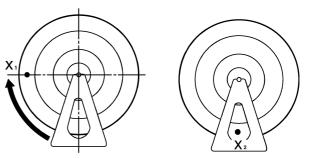
#### NOTE: \_

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 (d) through (f) 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".

\_\_\_\_\_

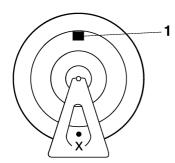
- 3. Adjust:
  - Front wheel static balance

#### \*\*\*\*\*

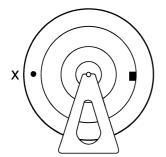
a. Install a balancing weight "1" onto the rim exactly opposite the heavy spot "X".

#### NOTE:

Start with the lightest weight.



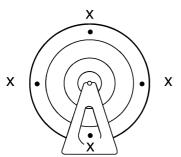
b. Turn the front wheel 90° so that the heavy spot is positioned as shown.



- 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.

### CHECKING THE FRONT BRAKE DISCS

Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-22.

#### EAS22000

# INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)

The following procedure applies to both of the brake discs.

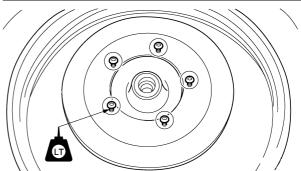
- 1. Install:
- Front brake disc



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

#### NOTE:

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 4-22.

- 3. Lubricate:
- Oil seal lips



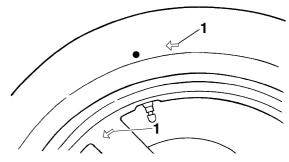
Recommended lubricant Lithium-soap-based grease

4. Install:

• Front wheel

#### NOTE:\_

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



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



Front wheel axle

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

## CAUTION:

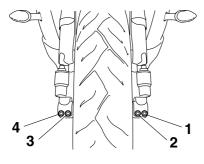
Before tightening the wheel axle, push down hard on the handlebar several times and check if the front fork rebounds smoothly.

### NOTE:

Lubricate the front wheel axle bolt mating surfaces with lithium-soap-based grease.

\*\*\*\*

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



### \*\*\*\*\*

### 6. Install:

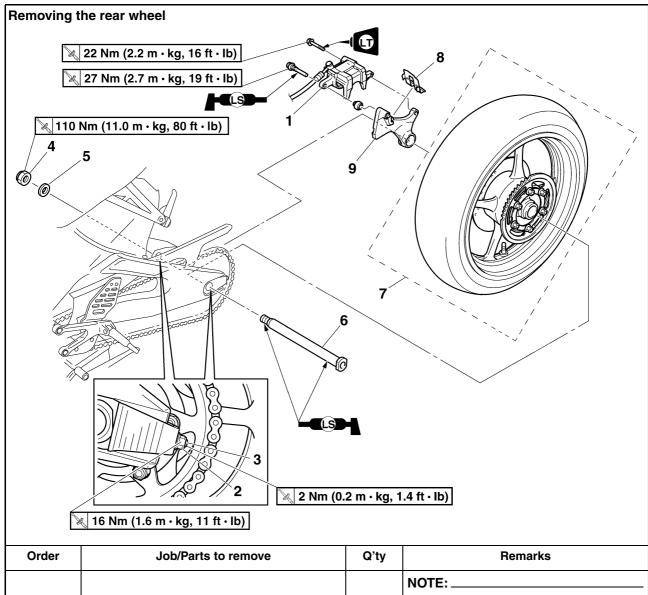
Front brake calipers



Front brake caliper bolt 35 Nm (3.5 m·kg, 25 ft·lb) EWA13500

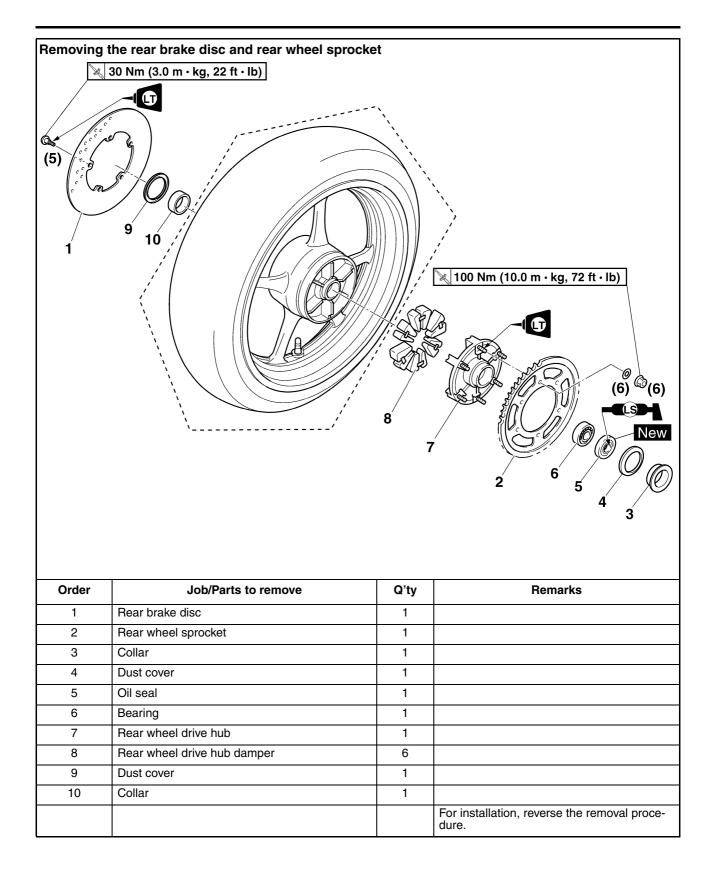
Make sure the brake hose is routed properly.

# REAR WHEEL



			NOTE:
			Place the vehicle on a suitable stand so that the rear wheel is elevated.
1	Rear brake caliper	1	
2	Drive chain adjusting locknut	2	Loosen.
3	Drive chain adjusting bolt	2	Loosen.
4	Rear wheel axle nut	1	
5	Washer	1	
6	Rear wheel axle	1	
7	Rear wheel	1	
8	Brake pad spring	1	
9	Rear brake caliper bracket	1	
			For installation, reverse the removal proce- dure.

## **REAR WHEEL**



## **REAR WHEEL**

Disassemt	bling the rear wheel		
Order	Job/Parts to remove	Q'ty	Remarks
1	Collar	1	
2	Bearing	1	
3	Spacer	1	
4	Oil seal	1	
5	Circlip	1	
6	Bearing	1	For assembly, reverse the disassembly pro- cedure.

## REMOVING THE REAR WHEEL

1. Stand the vehicle on a level surface.

## 

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

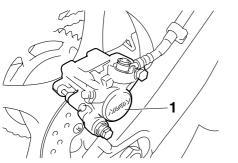
## NOTE:

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

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

## NOTE:\_

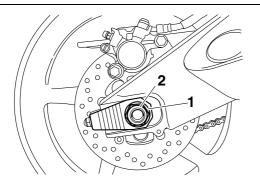
Do not depress the brake pedal when removing the brake caliper.



- 3. Remove:
  - Rear wheel axle nut "1"
  - Rear wheel axle "2"
  - Rear wheel

## NOTE:

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



### EAS22080

## DISASSEMBLING THE REAR WHEEL

- 1. Remove:
  - Oil seals
  - Wheel bearings Refer to "DISASSEMBLING THE FRONT WHEEL" on page 4-7.

#### EAS22090 CHECKING THE REAR WHEEL

- 1. Check:
  - Rear wheel axle
  - Rear wheel
  - Wheel bearings
  - Oil seals Refer to "CHECKING THE FRONT WHEEL" on page 4-7.
- 2. Check:
- Tire
- Rear wheel Damage/wear → Replace. Refer to "CHECKING THE TIRES" on page 3-32 and "CHECKING THE WHEELS" on page 3-33.
- 3. Measure:
  - Radial wheel runout
- Lateral wheel runout Refer to "CHECKING THE FRONT WHEEL" on page 4-7.



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

## CHECKING THE REAR BRAKE CALIPER BRACKET

- 1. Check:
- Rear brake caliper bracket Cracks/damage  $\rightarrow$  Replace.

# CHECKING THE REAR WHEEL DRIVE HUB

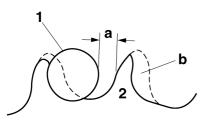
- 1. Check:
  - Rear wheel drive hub Cracks/damage  $\rightarrow$  Replace.
  - Rear wheel drive hub dampers Damage/wear  $\rightarrow$  Replace.

EAS22120

# CHECKING AND REPLACING THE REAR WHEEL SPROCKET

- 1. Check:
  - Rear wheel sprocket More than 1/4 tooth "a" wear → Replace the rear wheel sprocket.
     Replace the rear wheel sprock

Bent teeth  $\rightarrow$  Replace the rear wheel sprocket.



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

## a. Remove the self-locking nuts and the rear

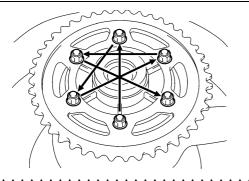
- wheel sprocket.
- b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
- c. Install the new rear wheel sprocket.



Rear wheel sprocket self-locking nut 100 Nm (10.0 m·kg, 72 ft·lb)

### NOTE:

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



## FAS22140

## **ASSEMBLING THE REAR WHEEL**

- 1. Install:
  - Wheel bearings New
- Oil seals New Refer to "ASSEMBLING THE FRONT WHEEL" on page 4-8.

## ADJUSTING THE REAR WHEEL STATIC BALANCE

### NOTE:

- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.
- 1. Adjust:
- Rear wheel static balance Refer to "ADJUSTING THE FRONT WHEEL STATIC BALANCE" on page 4-8.

ET2C01004

## CHECKING THE REAR BRAKE DISC

Refer to "CHECKING THE REAR BRAKE DISC" on page 4-34.

# INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

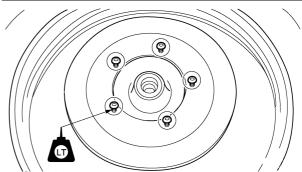
- 1. Install:
- Rear brake disc



Rear brake disc bolt 30 Nm (3.0 m·kg, 22 ft·lb) LOCTITE<sup>®</sup>

## NOTE:

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

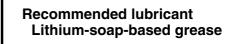


2. Check:

• Rear brake disc Refer to "CHECKING THE REAR BRAKE DISC" on page 4-34.

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

Collars



- 4. Adjust:
  - Drive chain slack Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-25.

K

Drive chain slack 35.0-45.0 mm (1.38-1.77 in)

- 5. Install:
  - Rear brake caliper

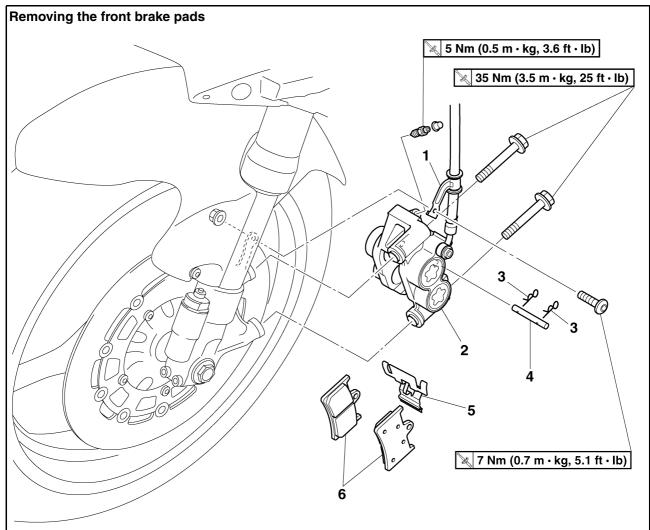


Rear brake caliper bolt (M12) 27 Nm (2.7 m·kg, 19 ft·lb) Rear brake caliper bolt (M8) 22 Nm (2.2 m·kg, 16 ft·lb) LOCTITE<sup>®</sup>

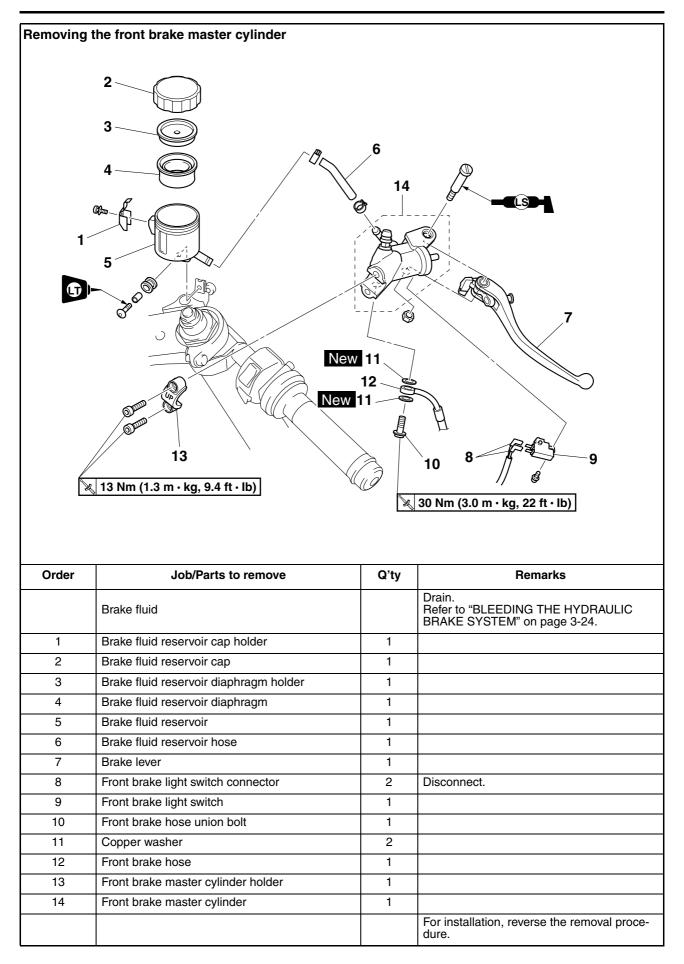
EWA13500 WARNING

Make sure the brake hose is routed properly.

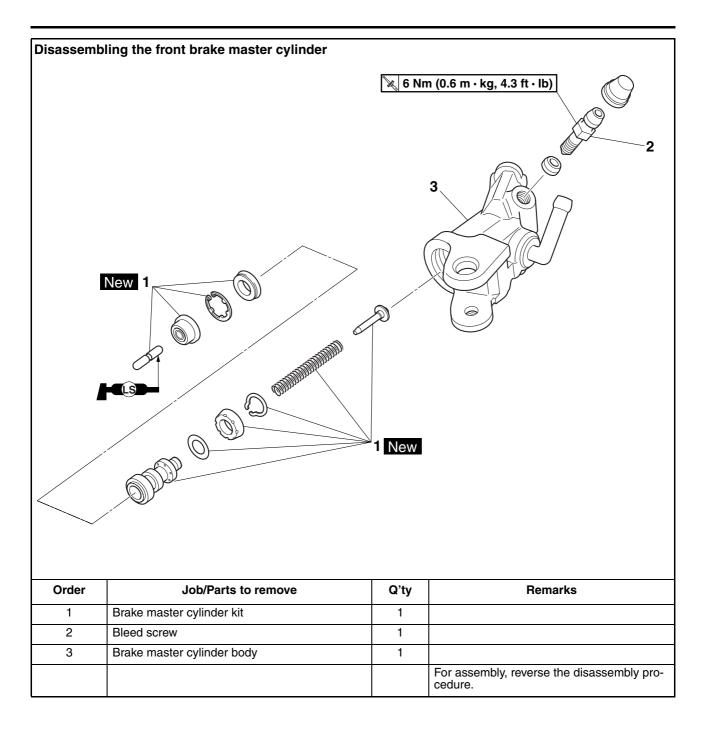
# FRONT BRAKE

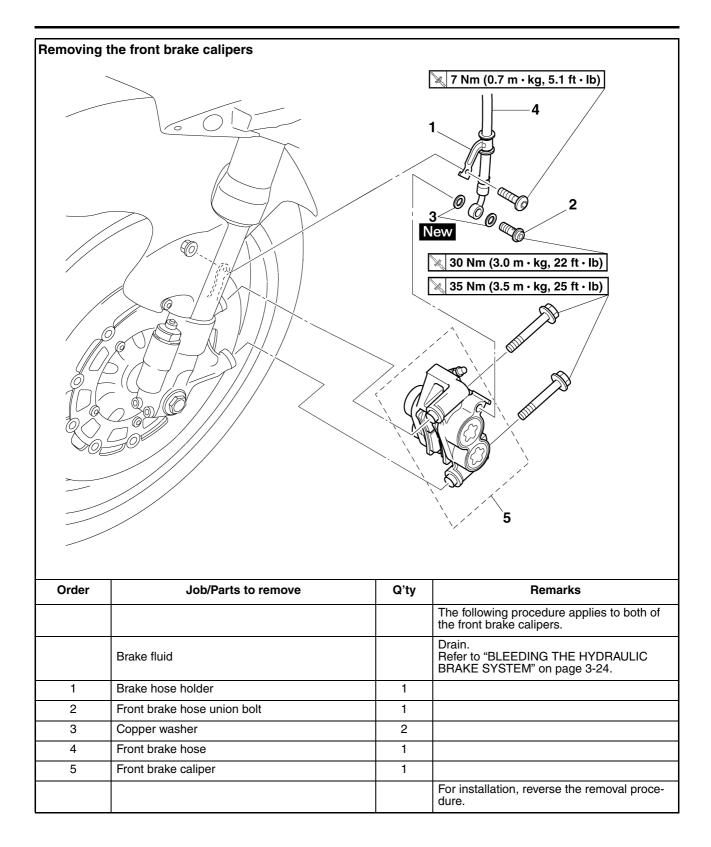


Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake hose holder	1	
2	Front brake caliper	1	
3	Brake pad clip	2	
4	Brake pad pin	1	
5	Brake pad spring	1	
6	Front brake pad	2	
			For installation, reverse the removal proce- dure.

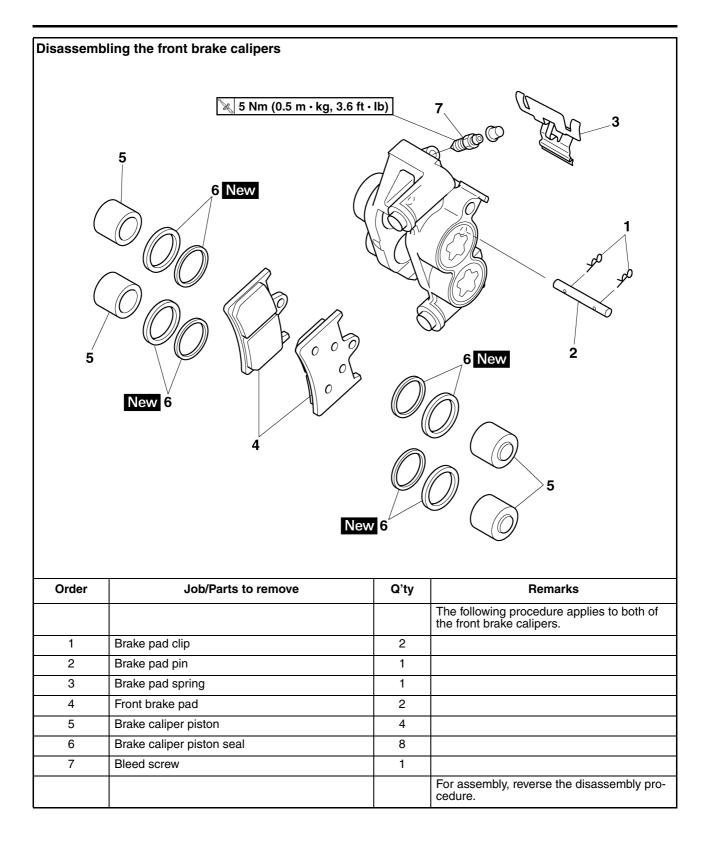


## **FRONT BRAKE**





## **FRONT BRAKE**



## EAS22220

## WARNING

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

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

#### EAS22240 CHECKING THE FRONT BRAKE DISCS

The following procedure applies to both brake discs.

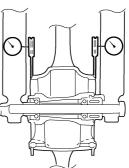
- 1. Remove:
- Front wheel Refer to "FRONT WHEEL" on page 4-5.
- 2. Check:
  - Brake disc
    - $\mathsf{Damage/galling} \to \mathsf{Replace}.$
- 3. Measure:
  - Brake disc deflection
    - Out of specification  $\rightarrow$  Correct the brake disc deflection or replace the brake disc.



Brake disc deflection limit 0.10 mm (0.0039 in)

## \*\*\*\*\*

- a. Place the vehicle on a suitable stand so that the front wheel is elevated.
- b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
- c. Remove the brake caliper.
- d. Hold the dial gauge at a right angle against the brake disc surface.

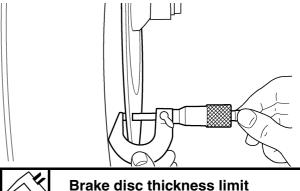


e. Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.

### \_\_\_\_\_

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

Out of specification  $\rightarrow$  Replace.





- 5. Adjust:
  - Brake disc deflection

\*\*\*\*\*

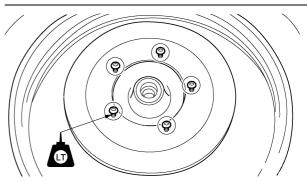
- a. Remove the brake disc.
- b. Rotate the brake disc by one bolt hole.

4.0 mm (0.16 in)

c. Install the brake disc.

## NOTE:

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





### Brake disc bolt 18 Nm (1.8 m·kg, 13 ft·lb) LOCTITE<sup>®</sup>

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

\*\*\*\*\*

- 6. Install:
- Front wheel Refer to "FRONT WHEEL" on page 4-5.

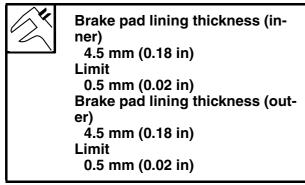
## REPLACING THE FRONT BRAKE PADS

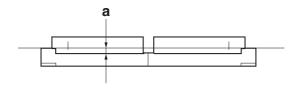
The following procedure applies to both brake calipers.

## NOTE: \_\_\_\_

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

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





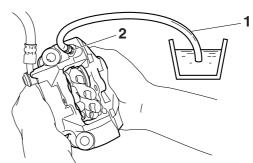
- 2. Install:
  - Brake pads
  - Brake pad spring

## NOTE: \_

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

## 

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



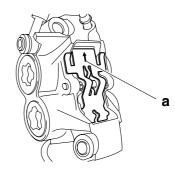
c. Tighten the bleed screw.



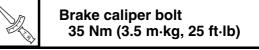
d. Install new brake pads and a new brake pad spring.

### NOTE:

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



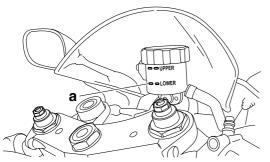
- \*\*\*\*\*
- 3. Install:
  - Brake pad pin
  - Brake pad clips
  - Front brake caliper



4. Check:

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

# Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-22.



- 5. Check:
- Brake lever operation

Soft or spongy feeling  $\rightarrow$  Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-24.

EAS22300

## **REMOVING THE FRONT BRAKE CALIPERS**

The following procedure applies to both of the brake calipers.

### NOTE:

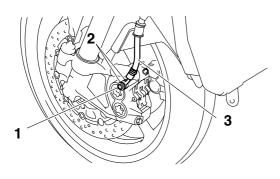
Before removing the brake caliper, drain the brake fluid from the entire brake system.

### 1. Remove:

- Front brake hose union bolt "1"
- Copper washers "2"
- Front brake hose "3"

### NOTE:

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



#### EAS22360

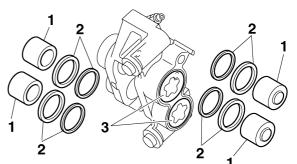
## DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

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

## WARNING

Do not loosen the bolts "3".

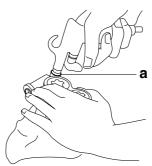


### \*\*\*\*\*

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

## 

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



b. Remove the brake caliper piston seals.

## \*\*\*\*

## **CHECKING THE FRONT BRAKE CALIPERS**

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

1. Check:

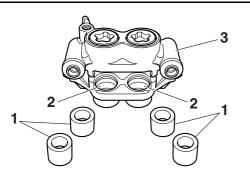
E462230

 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.

## 

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



#### EAS22410

## ASSEMBLING THE FRONT BRAKE CALIPERS

## 

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



Recommended fluid DOT 4

## INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

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



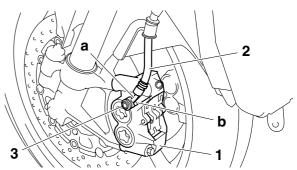
Front brake hose union bolt 30 Nm (3.0 m·kg, 22 ft·lb)

## 

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-47.

## ECA14170

When installing the brake hose onto the brake caliper "1", make sure the brake pipe "a" touches the projection "b" on the brake caliper.



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



## Front brake caliper bolt 35 Nm (3.5 m·kg, 25 ft·lb)

Refer to "REPLACING THE FRONT BRAKE PADS" on page 4-23.

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



Recommended 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.

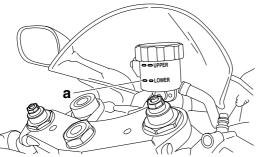
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point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

## CAUTION:

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

- 5. Bleed:
  - Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-24.
- 6. Check:
  - Brake fluid level

Below the minimum level mark "a"  $\rightarrow$  Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-22.



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

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-24.

EAS22490

# REMOVING THE FRONT BRAKE MASTER CYLINDER

### NOTE:

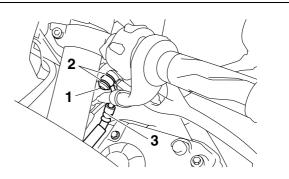
Before removing the front brake master cylinder, drain the brake fluid from the entire brake system.

## 1. Remove:

- Front brake hose union bolt "1"
- Copper washers "2"
- Front brake hoses "3"

### NOTE: \_

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



## CHECKING THE FRONT BRAKE MASTER CYLINDER

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

## ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

## WARNING

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

Recommended fluid DOT 4

#### EAS22540 INSTALLING THE FRONT BRAKE MASTER CYLINDER

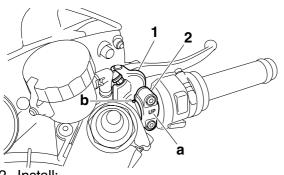
- 1. Install:
  - Front brake master cylinder "1"
  - Front brake master cylinder holder "2"



Front brake master cylinder holder bolt 13 Nm (1.3 m·kg, 9.4 ft·lb)

NOTE: \_

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



- 2. Install:
  - Front brake hose "1"
  - Copper washers "2" New
  - Front brake hose union bolt "3"

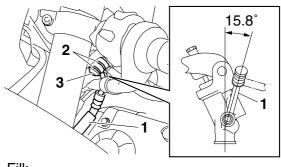
Front brake hose union bolt 30 Nm (3.0 m·kg, 22 ft·lb)

## WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-47.

NOTE:

- Install the brake hose at a 15.8° angle to the front brake master cylinder as shown in the illustration.
- While holding the brake hose, tighten the union bolt.
- Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



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

Recommended fluid DOT 4

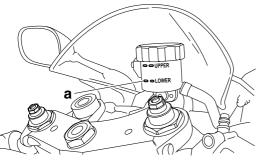
## WARNING

- 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.

## CAUTION:

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

- 4. Bleed:
  - Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-24.
- 5. Check:
  - Brake fluid level Below the minimum level mark "a" → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-22.

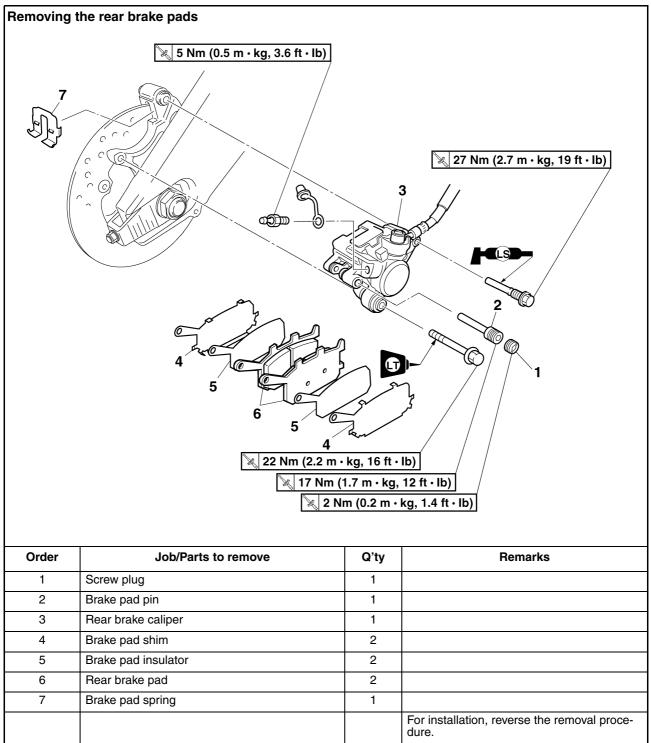


6. Check:

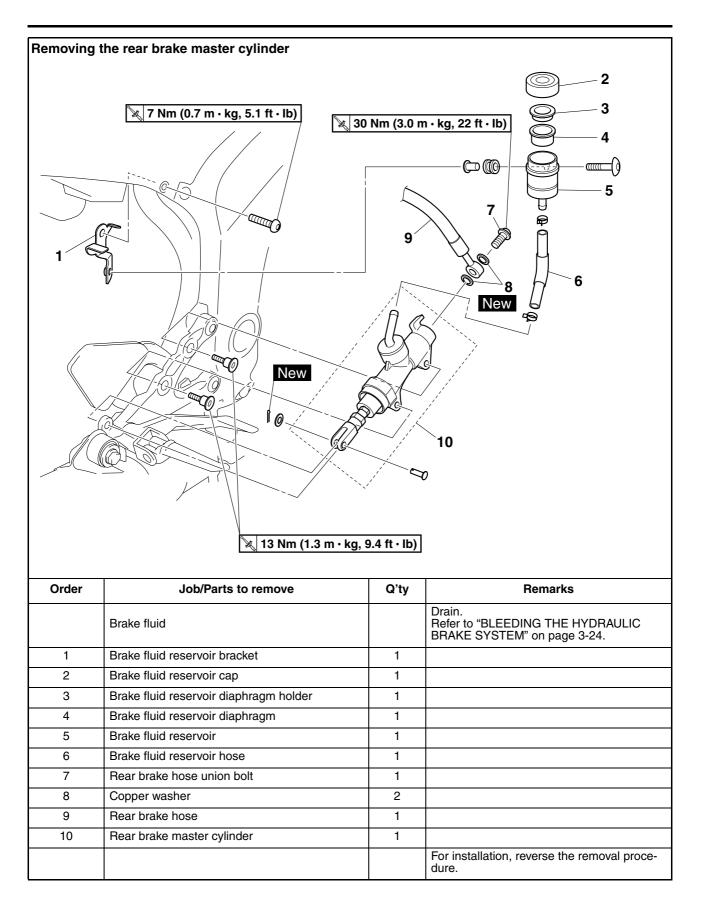
 Brake lever operation Soft or spongy feeling → Bleed the brake system.
 Refer to "BLEEDING THE HYDRAULIC

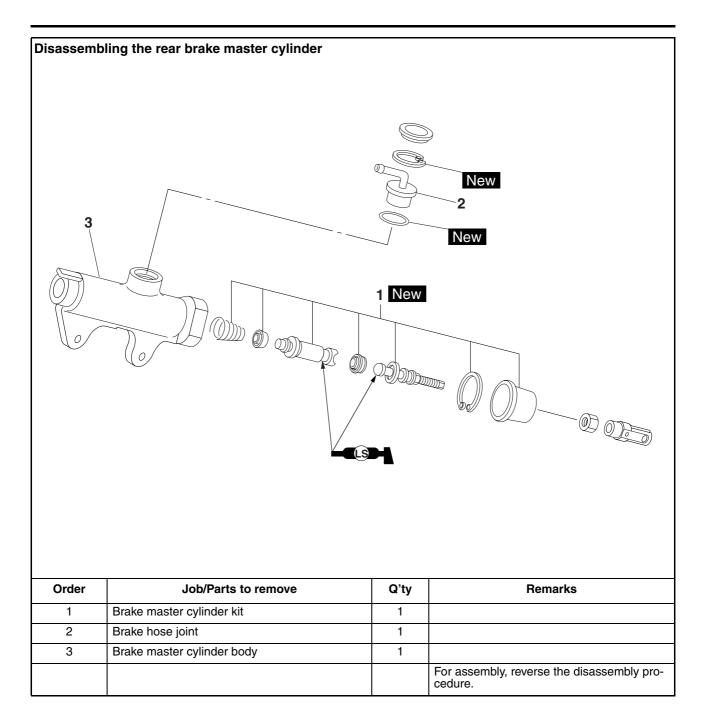
BRAKE SYSTEM" on page 3-24.

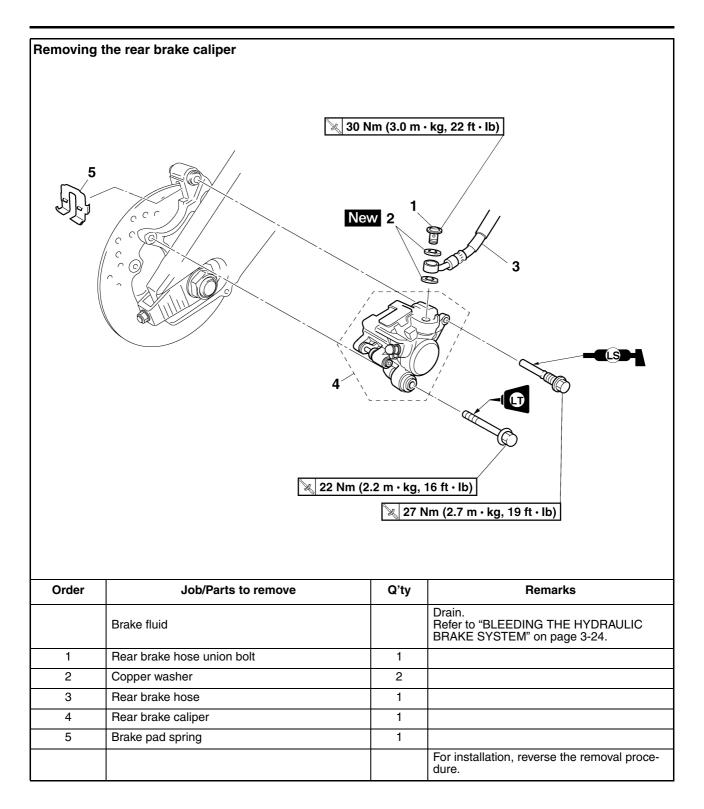
# REAR BRAKE



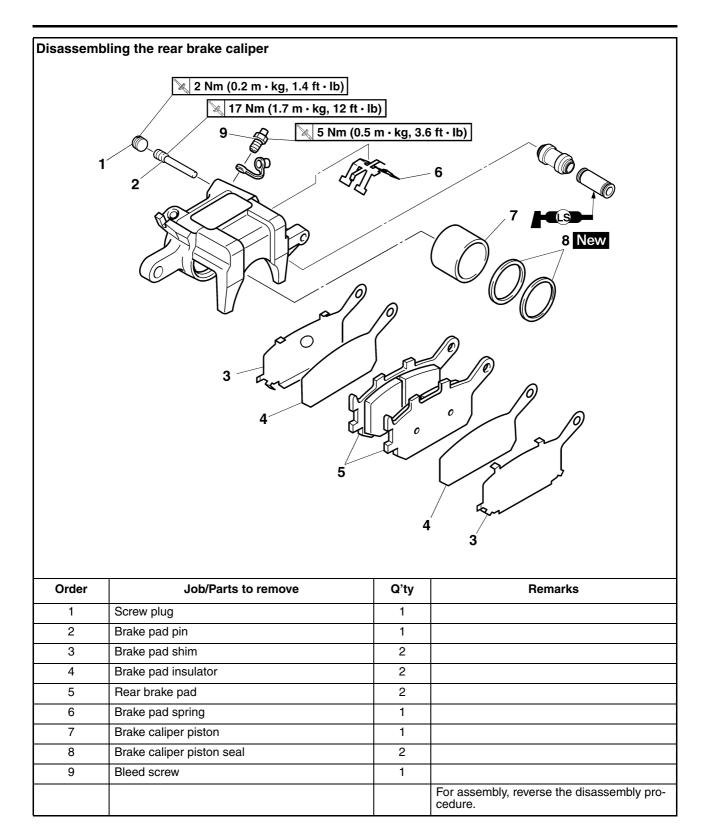
## **REAR BRAKE**







## **REAR BRAKE**



#### EAS22560 INTRODUCTION EWA14100

## 

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

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

#### EAS22570 **CHECKING THE REAR BRAKE DISC**

- 1. Remove:
  - Rear wheel
- Refer to "REAR WHEEL" on page 4-11. 2. Check:
- Brake disc

Damage/galling  $\rightarrow$  Replace.

- 3. Measure:
  - Brake disc deflection Out of specification  $\rightarrow$  Correct the brake disc deflection or replace the brake disc. **Refer to "CHECKING THE FRONT BRAKE** DISCS" on page 4-22.



## Brake disc deflection limit 0.15 mm (0.0059 in)

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

Out of specification  $\rightarrow$  Replace. **Refer to "CHECKING THE FRONT BRAKE** 

DISCS" on page 4-22.

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

- 5. Adjust:
  - Brake disc deflection **Refer to "CHECKING THE FRONT BRAKE** DISCS" on page 4-22.



Rear brake disc bolt 30 Nm (3.0 m·kg, 22 ft·lb) **LOCTITE<sup>®</sup>** 

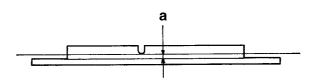
6. Install:

 Rear wheel Refer to "REAR WHEEL" on page 4-11.

## **REPLACING THE REAR BRAKE PADS** NOTE:

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

- 1. Measure:
  - Brake pad wear limit "a" Out of specification  $\rightarrow$  Replace the brake pads as a set.
  - Brake pad lining thickness (inner) 6.0 mm (0.24 in) Limit 1.0 mm (0.04 in) Brake pad lining thickness (outer) 6.0 mm (0.24 in) Limit 1.0 mm (0.04 in)



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

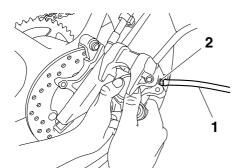
Brake pad spring

### NOTE:

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

### \*\*\*\*\*

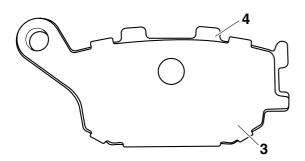
- a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.
- b. Loosen the bleed screw and push the brake caliper piston into the brake caliper with your finger.



c. Tighten the bleed screw.

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

d. Install a new brake pad insulator and new brake pad shim "3" onto each new brake pad "4".



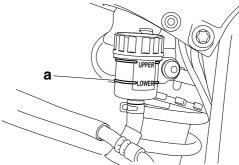
### \*\*\*\*\*

- 3. Install:
  - Rear brake caliper
  - Brake pad pin
  - Screw plug



Rear brake caliper bolt (M12) 27 Nm (2.7 m·kg, 19 ft·lb) Rear brake caliper bolt (M8) 22 Nm (2.2 m·kg, 16 ft·lb) LOCTITE<sup>®</sup>

- 4. Check:
- Brake fluid level Below the minimum level mark "a" → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-22.



- 5. Check:
  - Brake pedal operation Soft or spongy feeling  $\rightarrow$  Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-24.

### EAS22590

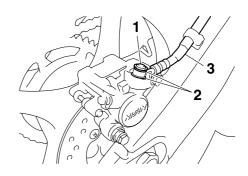
# REMOVING THE REAR BRAKE CALIPER

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

- 1. Remove:
  - Rear brake hose union bolt "1"
- Copper washers "2"
- Rear brake hose "3"

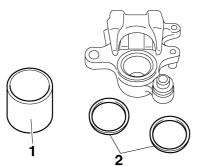
### NOTE:

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



## DISASSEMBLING THE REAR BRAKE CALIPER

- 1. Remove:
- Brake caliper piston "1"
- Brake caliper piston seals "2"

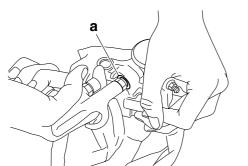


### \*\*\*\*\*

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 seals.

#### 

## CHECKING THE REAR BRAKE CALIPER

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

### 1. Check:

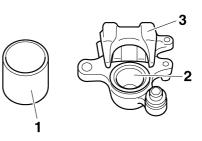
- Brake caliper piston "1" Rust/scratches/wear → Replace the brake caliper pistons.
- Brake caliper cylinder "2"
   Scratches/wear → Replace the brake caliper assembly.

- Brake caliper body "3" Cracks/damage → Replace the brake caliper assembly.
- Brake fluid delivery passages (brake caliper body)

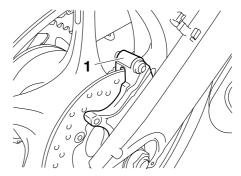
 $Obstruction \rightarrow Blow \ out \ with \ compressed \ air.$ 

## 

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



- 2. Check:
- Brake caliper bracket "1" Cracks/damage → Replace.



## ASSEMBLING THE REAR BRAKE CALIPER EWA13620

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

## Recommended fluid DOT 4

4-36

#### EAS22670 INSTALLING THE REAR BRAKE CALIPER

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



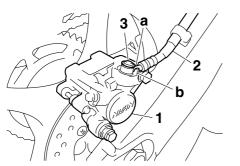
Rear brake hose union bolt 30 Nm (3.0 m·kg, 22 ft·lb)

## WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-47.

## ECA14170

When installing the brake hose onto the brake caliper "1", make sure the brake pipe "a" touches the projection "b" on the brake caliper.



- 2. Remove:
- Rear brake caliper
- 3. Install:
  - Rear brake pads
  - Brake pad springs
  - Brake pad pin
  - Rear brake caliper Refer to "REPLACING THE REAR BRAKE PADS" on page 4-34.

Rear brake caliper bolt (M12) 27 Nm (2.7 m·kg, 19 ft·lb) Rear brake caliper bolt (M8) 22 Nm (2.2 m·kg, 16 ft·lb) LOCTITE<sup>®</sup>

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



Recommended fluid DOT 4

## 

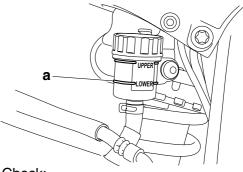
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

## CAUTION:

ECA13540

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

- 5. Bleed:
  - Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-24.
- 6. Check:
  - Brake fluid level Below the minimum level mark "a" → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-22.



- 7. Check:
  - Brake pedal operation Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC

BRAKE SYSTEM" on page 3-24.

## REMOVING THE REAR BRAKE MASTER CYLINDER

## NOTE:

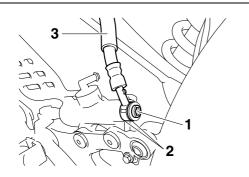
Before removing the rear brake master cylinder, drain the brake fluid from the entire brake system.

## 1. Remove:

- Rear brake hose union bolt "1"
- Copper washers "2"
- Rear brake hose "3"

### NOTE:

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



## EAS22720

### CHECKING THE REAR BRAKE MASTER CYLINDER

### 1. Check:

- Brake master cylinder Damage/scratches/wear  $\rightarrow$  Replace.
- Brake fluid delivery passages (brake master cylinder body)
   Obstruction → Blow out with compressed air.
- 2. Check:Brake master cylinder kit
- Damage/scratches/wear  $\rightarrow$  Replace. 3. Check:
- Brake fluid reservoir Cracks/damage → Replace.
- Brake fluid reservoir diaphragm Cracks/damage  $\rightarrow$  Replace.
- 4. Check:
  - Rear brake hose
  - Brake fluid reservoir hose Cracks/damage/wear  $\rightarrow$  Replace.

## ASSEMBLING THE REAR BRAKE MASTER CYLINDER

## 

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



## INSTALLING THE REAR BRAKE MASTER CYLINDER

- 1. Install:
  - Rear brake hose "1"
  - Copper washers "2" New
  - Rear brake hose union bolt "3"



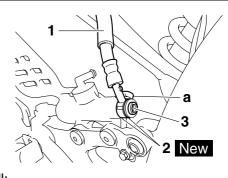
Rear brake hose union bolt 30 Nm (3.0 m⋅kg, 22 ft⋅lb)

## WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-47.

#### ECA14160 CAUTION:

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



2. Fill:

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

Recommended fluid DOT 4

## EWA13090

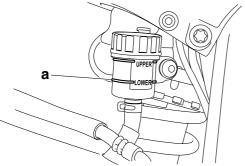
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

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

- 3. Bleed:
  - Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-24.
- 4. Check:

 Brake fluid level Below the minimum level mark "a" → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-22.



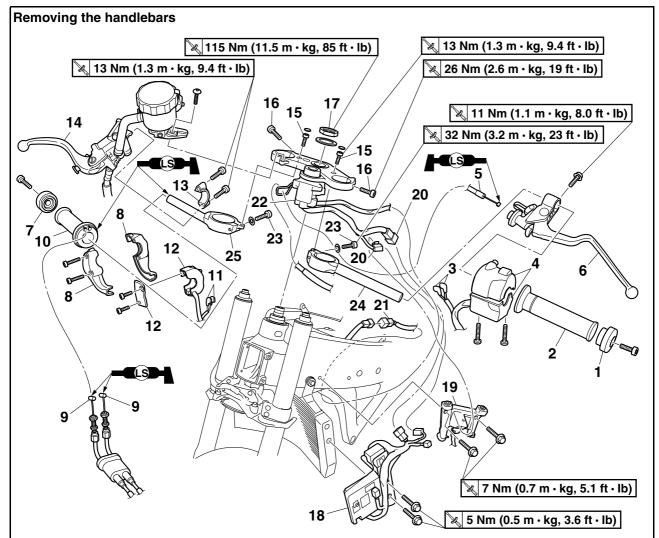
5. Check:

 Brake pedal operation Soft or spongy feeling → Bleed the brake system.
 Refer to "BLEEDING THE HYDRAULIC

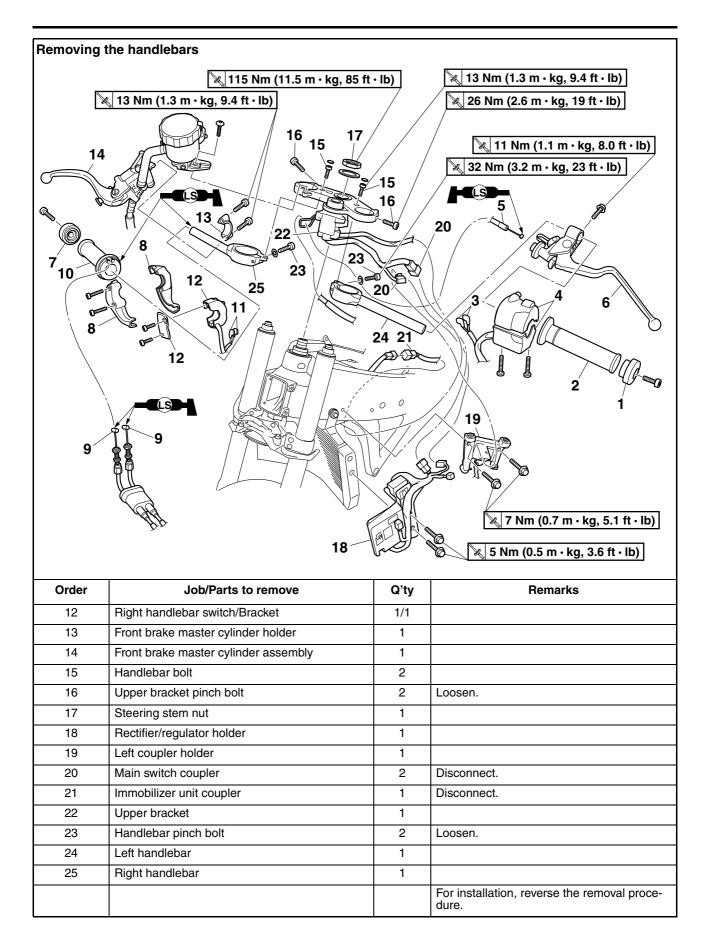
BRAKE SYSTEM" on page 3-24.

- 6. Adjust:
- Brake pedal position Refer to "ADJUSTING THE REAR DISC BRAKE" on page 3-21.
- 7. Adjust:
- Rear brake light operation timing Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-23.

# HANDLEBARS



Order	Job/Parts to remove	Q'ty	Remarks
	Left side panel/Left upper side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-4.
	Air induction system cover		Refer to "AIR INDUCTION SYSTEM" on page 7-13.
1	Left grip end	1	
2	Handlebar grip	1	
3	Clutch switch connector	2	Disconnect.
4	Left handlebar switch	1	
5	Clutch cable	1	Disconnect.
6	Clutch lever assembly	1	
7	Right grip end	1	
8	Throttle cable housing	2	
9	Throttle cable	2	Disconnect.
10	Throttle grip	1	
11	Front brake light switch connector	2	Disconnect.



## REMOVING THE HANDLEBARS

1. Stand the vehicle on a level surface.

## 

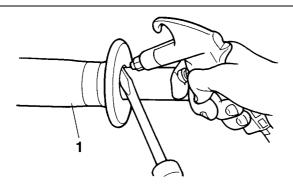
# Securely support the vehicle so that there is no danger of it falling over.

## 2. Remove:

• Handlebar grip "1"

## NOTE: \_

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



#### EAS22890

## **CHECKING THE HANDLEBARS**

- 1. Check:
  - Left handlebar
  - Right handlebar Bends/cracks/damage → Replace.

## WARNING

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

### EAS22900

## **INSTALLING THE HANDLEBARS**

1. Stand the vehicle on a level surface.

## 

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

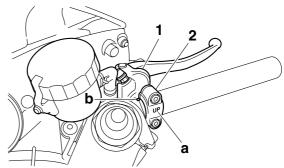
- 2. Install:
- Front brake master cylinder "1"
- Front brake master cylinder holder "2"

Front brake master cylinder holder bolt 13 Nm (1.3 m·kg, 9.4 ft·lb)

### NOTE:

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

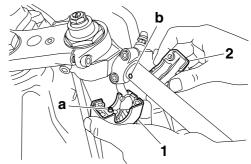
- Align the mating surfaces of the brake master cylinder holder with the punch mark "b" on the handlebar.
- First, tighten the upper bolt, then the lower bolt.



- 3. Install:
  - Right handlebar switch "1"
  - Right handlebar switch bracket "2"

### NOTE:

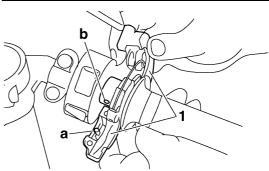
Align the projection "a" on the right handlebar switch with the hole "b" on the right handlebar.



- 4. Install:
  - Throttle grip
  - Throttle cables
- Throttle cable housings "1"

### NOTE:

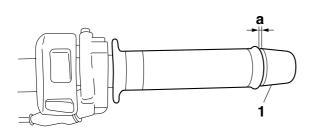
Align the projection "a" on the throttle cable housing with the hole "b" in the right handlebar.



5. Install:Right grip end "1"

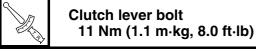
## NOTE: \_\_\_\_

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



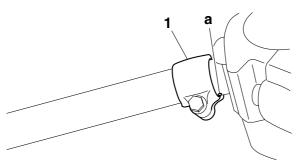
## 6. Install:

• Clutch lever assembly "1"



## NOTE:

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

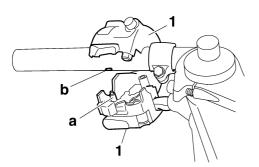


## 7. Install:

• Left handlebar switch "1"

## NOTE:

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



- 8. Install:
  - Handlebar grip "1"
  - Left grip end "2"

### \*\*\*\*

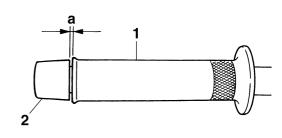
- a. Apply a thin coat of rubber adhesive onto the end of the left handlebar.
- b. Slide the handlebar grip over the end of the left handlebar.
- c. Wipe off any excess rubber adhesive with a clean rag.

## WARNING

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

## NOTE:\_

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



## \*\*\*\*\*

- 9. Check:
  - Cable routing

## NOTE: \_

Make sure the immobilizer unit lead, main switch lead, brake hoses, throttle cables, clutch cable, and handlebar switch leads are routed properly. Refer to "CABLE ROUTING" on page 2-47.

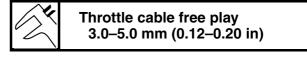
10.Adjust:

• Clutch cable free play Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-13.

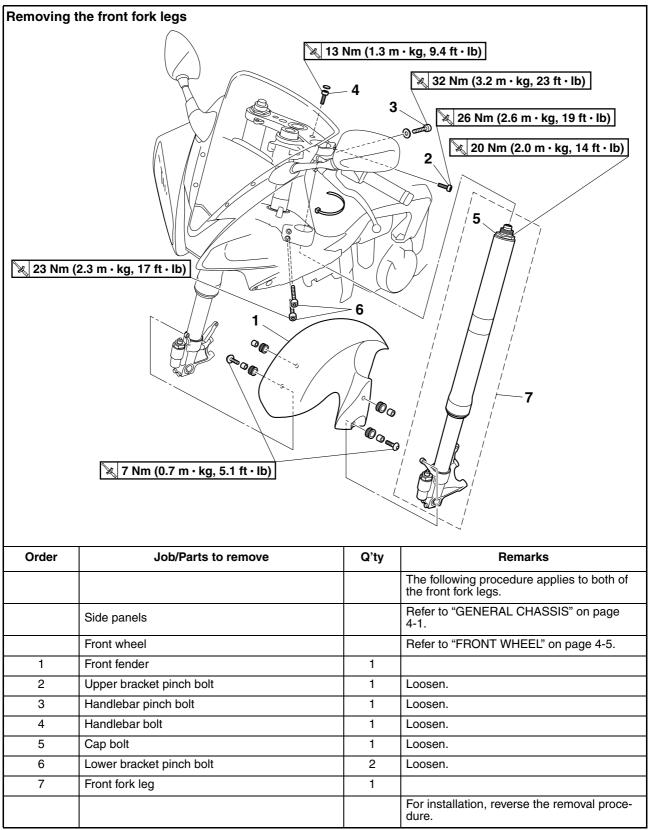


Clutch lever free play 10.0–15.0 mm (0.39–0.59 in)

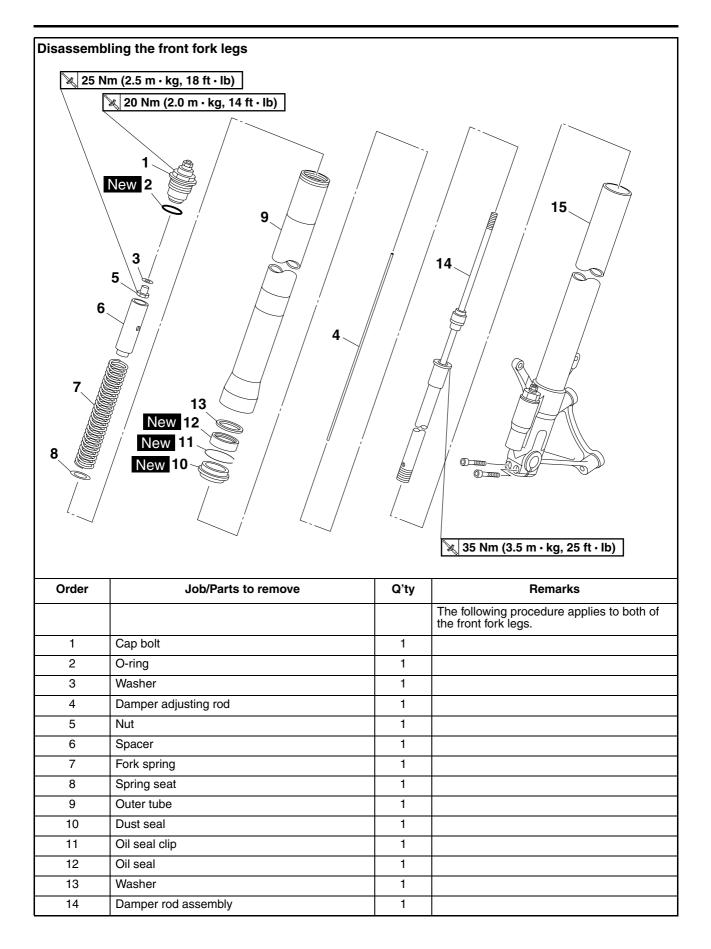
- 11.Adjust:
- Throttle cable free play Refer to "ADJUSTING THE THROTTLE CA-BLE FREE PLAY" on page 3-8.



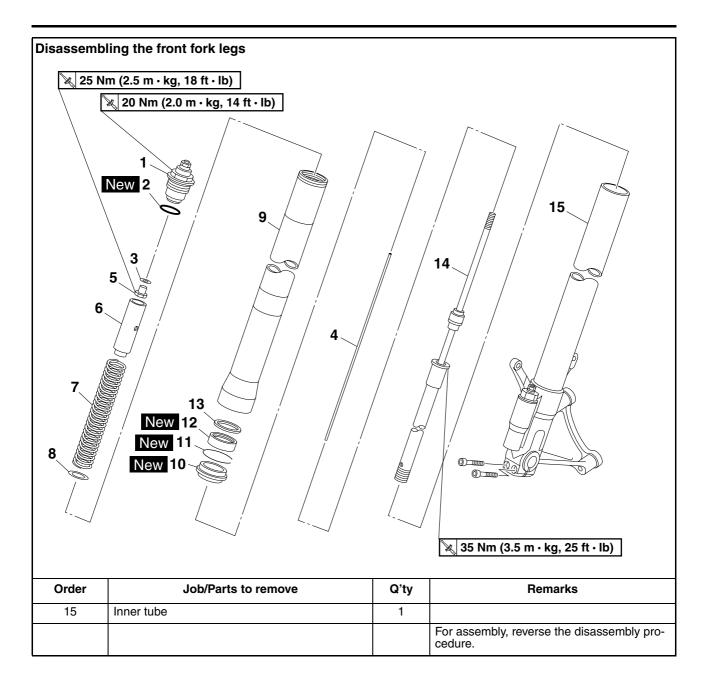
# FRONT FORK



## **FRONT FORK**



## **FRONT FORK**



# REMOVING THE FRONT FORK LEGS

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

1. Stand the vehicle on a level surface.

# WARNING

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

### NOTE:

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

- 2. Loosen:
  - Upper bracket pinch bolt "1"
  - Handlebar pinch bolt "2"
  - Handlebar bolt "3"
  - Cap bolt "4"
- Lower bracket pinch bolts "5"

## WARNING

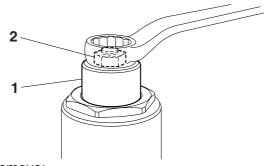
## Before loosening the upper and lower bracket pinch bolts, support the front fork leg.



#### EAS22990 DISASSEMBLING THE FRONT FORK LEGS

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

1. Position the collar "1" as shown in the illustration by turning the spring preload adjusting bolt "2" counterclockwise until it stops.

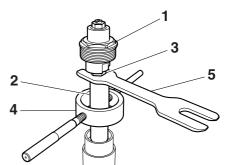


- 2. Remove:
  - Cap bolt "1" (from the damper adjusting rod)
  - Spacer "2"
  - Nut "3"
- \*\*\*\*
- a. Press down on the spacer with the fork spring compressor "4".
- b. Install the rod holder "5" between the nut "3" and the spacer "2".

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

### NOTE: \_

Use the side of the rod holder that is marked "B".



c. Hold the spring preload adjusting bolt "6" and loosen the nut "3".

## CAUTION:

When loosening the nut "3", be sure not to break the projections "a" on the collar "7" of the cap bolt "1".

## NOTE: \_

Loosen the nut using a proper tool that has a thickness of 3 mm (0.12 in) or less.

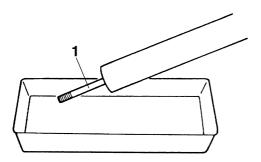
- d. Remove the cap bolt.
- e. Remove the rod holder and fork spring compressor.
- f. Remove the nut and spacer.

### \*\*\*\*

- 3. Drain:
- Fork oil

### NOTE: \_

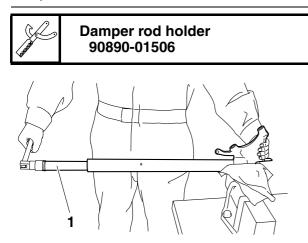
Stroke the damper rod "1" several times while draining the fork oil.



- 4. Remove:
- Damper rod assembly

### NOTE:

Remove the damper rod assembly with the damper rod holder "1".



- 5. Remove:
  - Oil seal clip "1" (with a flat-head screwdriver)



EAS23010

## **CHECKING THE FRONT FORK LEGS**

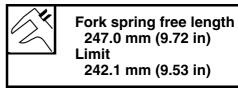
The following procedure applies to both of the front fork legs.

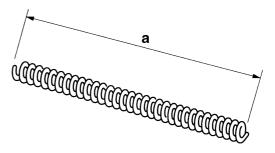
- 1. Check:
  - Inner tube
  - Outer tube
  - Bends/damage/scratches  $\rightarrow$  Replace.

## 

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

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

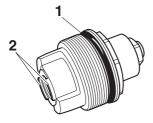




- 3. Check:
  - Damper rod Damage/wear → Replace.
     Obstruction → Blow out all of the oil passages with compressed air.
- Damper adjusting rod Bends/damage  $\rightarrow$  Replace.

# CAUTION:

- The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.
- 4. Check:
  - Cap bolt O-ring "1" Damage/wear → Replace.
  - Cap bolt collar projections "2" Cracks/damage → Replace.



### EAS23040

## ASSEMBLING THE FRONT FORK LEGS

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

## 

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

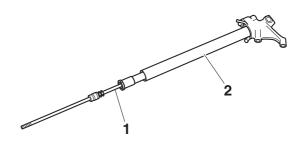
### NOTE:

- When assembling the front fork leg, be sure to replace the following parts:
  - Oil seal
  - Dust seal
  - O-ring
- Before assembling the front fork leg, make sure all of the components are clean.
- 1. Install:
  - Damper rod assembly "1"
  - Inner tube "2"

ECA14210

### CAUTION:

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



- 2. Lubricate:
  - Inner tube's outer surface

- 3. Tighten:
- Damper rod assembly

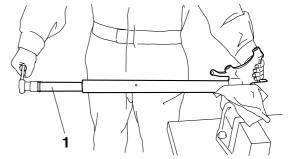


Damper rod assembly 35 Nm (3.5 m·kg, 25 ft·lb)

### NOTE:

Tighten the damper rod assembly with the damper rod holder "1".





- 4. Install:
  - Dust seal "1" New
  - Oil seal clip "2" New
  - Oil seal "3" New
  - Washer "4"
- EC2C01012

## CAUTION:

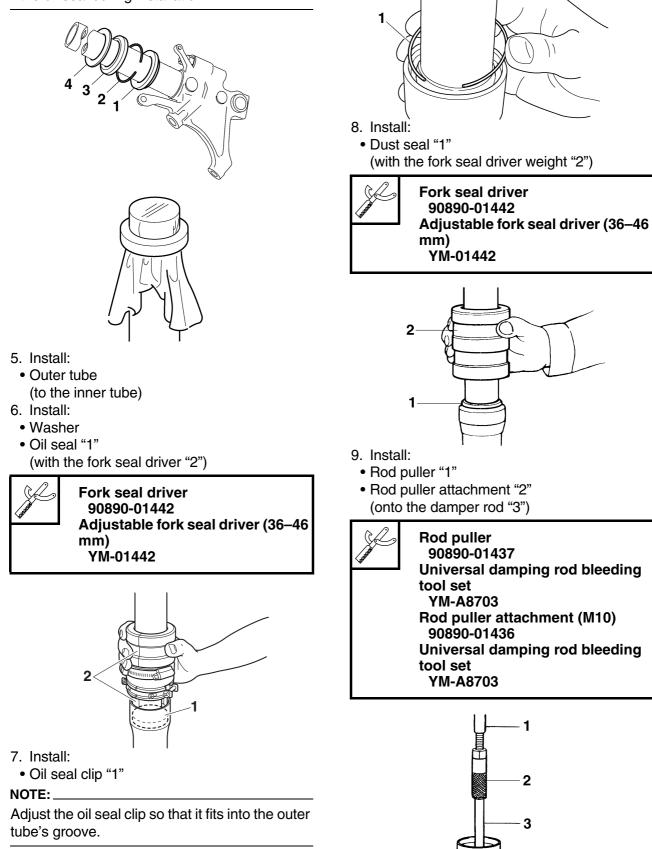
# Make sure the numbered side of the oil seal faces bottom side.

### NOTE: \_

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

# **FRONT FORK**

• Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.



# **FRONT FORK**

10.Fully compress the front fork leg. 11.Fill:

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



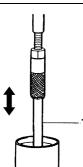
Quantity 465.0 cm<sup>3</sup> (15.72 US oz) (16.37 Imp.oz) Recommended oil Ohlins R & T43

## CAUTION:

- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.
- 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.

### NOTE: \_

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.

### NOTE:

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

14.Measure:

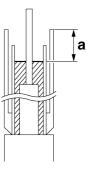
Front fork leg oil level "a"

(from the top of the outer tube, with the outer tube fully compressed and without the fork spring)

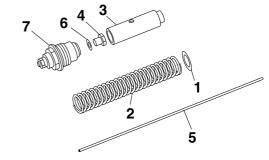
Out of specification  $\rightarrow$  Correct.



Level 108.0 mm (4.25 in)



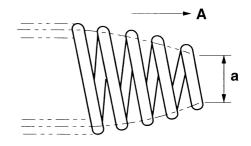
- 15.Install:
  - Spring seat "1"
  - Fork spring "2"
  - Spacer "3"
  - Nut "4"
  - Damper adjusting rod "5"
- Washer "6"
- Cap bolt "7" (with O-ring)



- a. Remove the rod puller attachment.
- b. Install the spring seat.
- c. Install the fork spring.

### NOTE:

Install the spring with the smaller pitch "a" facing up "A".



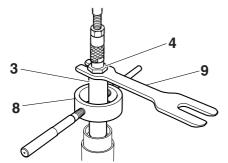
- d. Install the spacer.
- e. Install the nut.
- f. Reinstall the rod puller attachment.
- g. Press down on the spacer with the fork spring compressor "8".
- h. Pull up the rod puller and install the rod holder"9" between the nut "4" and the spacer "3".



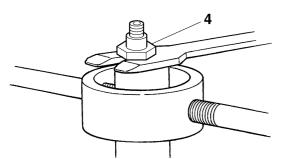
**Rod puller** 90890-01437 Universal damping rod bleeding tool set YM-A8703 Rod puller attachment (M10) 90890-01436 Universal damping rod bleeding tool set YM-A8703 Fork spring compressor 90890-01441 YM-01441 Rod holder 90890-01434 Damper rod holder double ended YM-01434

### NOTE:\_

Use the side of the rod holder that is marked "B".



- i. Remove the rod puller and rod puller attachment.
- j. Install the nut "4" all the way onto the damper rod assembly.



- k. Install the damper adjusting rod.
- I. Install the washer and cap bolt, and then finger tighten the cap bolt.
- m. Hold the nut and tighten the spring preload adjusting bolt "10" into the cap bolt to specification.

## 

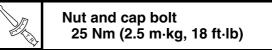
Always use a new cap bolt O-ring.

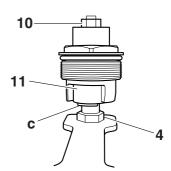
# CAUTION:

When tightening the spring preload adjusting bolt "10" into the cap bolt, be sure not to break the projections "c" on the collar "11".

### NOTE:

Hold the nut "4" using a proper tool that has a thickness of 3 mm (0.12 in) or less.





n. Remove the rod holder and fork spring compressor.

### \*\*\*\*\*

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

### NOTE:

Temporarily tighten the cap bolt.

## 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.

## WARNING

Make sure the brake hoses are routed properly.

### NOTE: \_

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

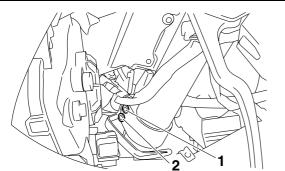
- 2. Tighten:
  - Lower bracket pinch bolts "1" and "2"



Lower bracket pinch bolt 23 Nm (2.3 m·kg, 17 ft·lb)

## NOTE: \_

Tighten each bolt to 23 Nm (2.3 m·kg, 17 ft·lb) in the order pinch bolt "1"  $\rightarrow$  pinch bolt "2"  $\rightarrow$  pinch bolt "1".



- 3. Tighten:
- Cap bolt "1"



20 Nm (2.0 m·kg, 14 ft·lb)

Cap bolt

Handlebar bolt "2"

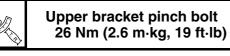
Handlebar bolt 13 Nm (1.3 m·kg, 9.4 ft·lb)

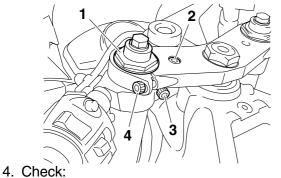
• Handlebar pinch bolt "3"



Handlebar pinch bolt 32 Nm (3.2 m·kg, 23 ft·lb)

• Upper bracket pinch bolt "4"





Cable routing

## NOTE:

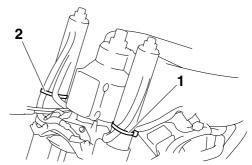
Make sure the brake hose, throttle cables, clutch cable, and handlebar switch leads are routed properly. Refer to "CABLE ROUTING" on page 2-47.

- 5. Install:
- Plastic locking tie "1"

• Plastic locking tie "2"

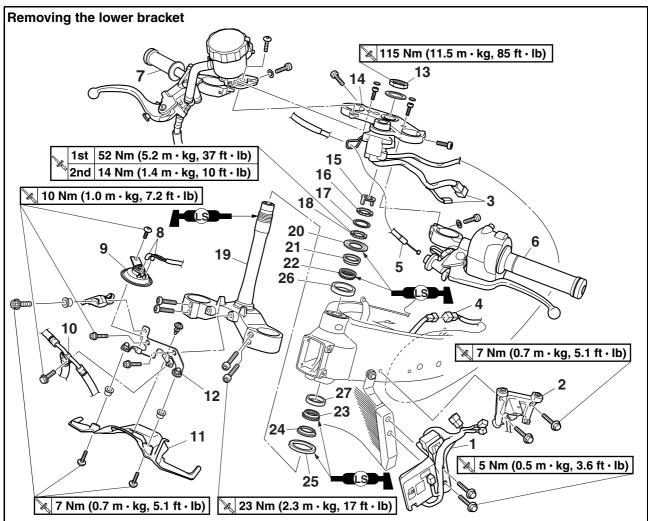
### NOTE:

- Fasten the left handlebar switch lead to the left front fork leg with the plastic locking tie.
- Fasten the front brake hose to the right front fork leg with the plastic locking tie.

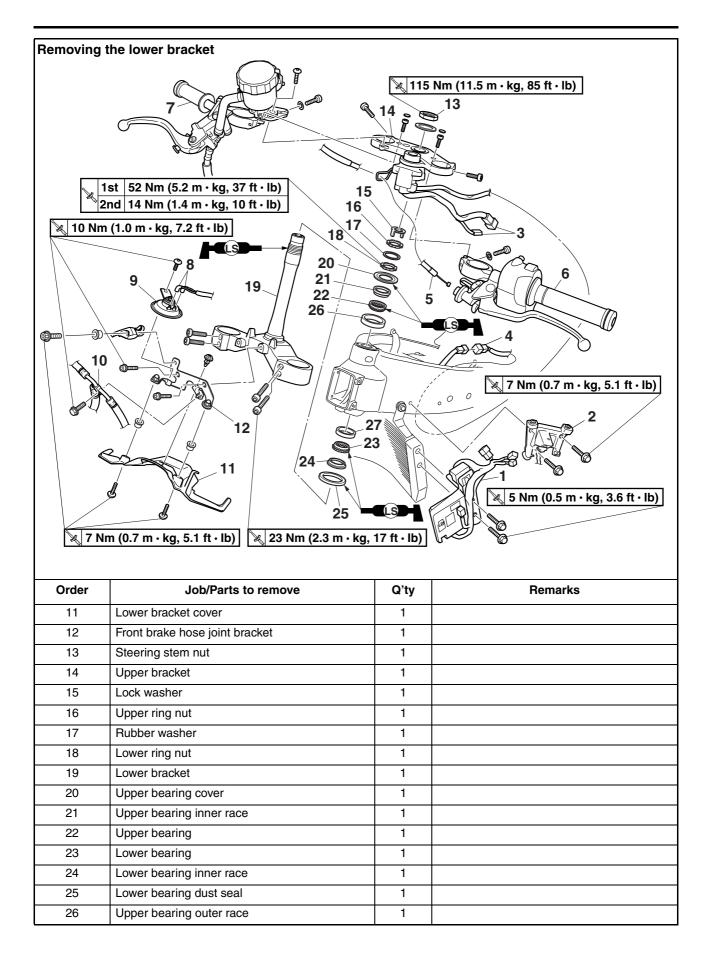


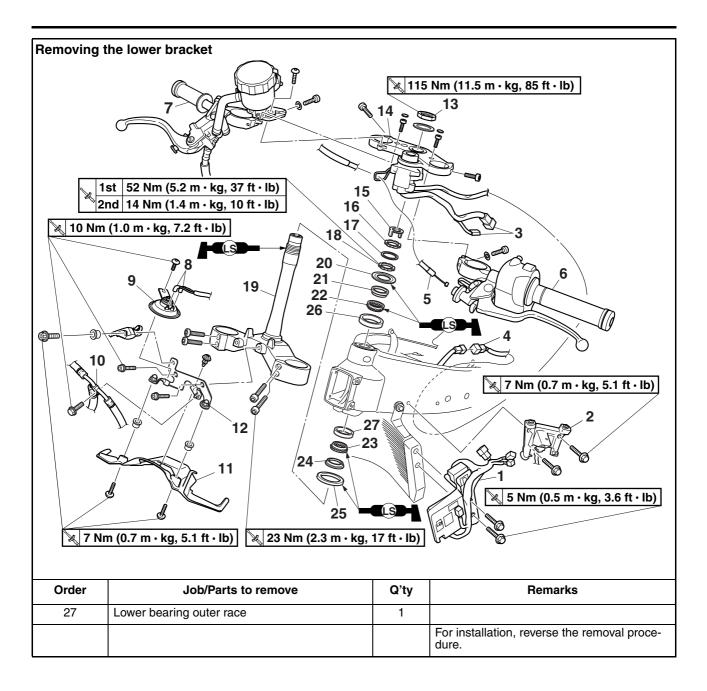
- 6. Adjust:
  - Spring preload
  - Rebound damping
  - Compression damping Refer to "ADJUSTING THE FRONT FORK LEGS" on page 3-28.

# STEERING HEAD



Order	Job/Parts to remove	Q'ty	Remarks
	Front cowling assembly		Refer to "GENERAL CHASSIS" on page 4-1.
	Front fork legs		Refer to "FRONT FORK" on page 4-44.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-4.
	Air induction system cover		Refer to "AIR INDUCTION SYSTEM" on page 7-13.
1	Rectifier/regulator holder	1	
2	Left coupler holder	1	
3	Main switch coupler	2	Disconnect.
4	Immobilizer unit coupler	1	Disconnect.
5	Clutch cable	1	Disconnect.
6	Left handlebar assembly	1	
7	Right handlebar assembly	1	
8	Horn connector	2	Disconnect.
9	Horn	1	
10	Front brake hose joint	1	





# REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

## 

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

- 2. Remove:
  - Upper ring nut "1"
- Rubber washer
- Lower ring nut "2"
- Lower bracket
- EWA13730

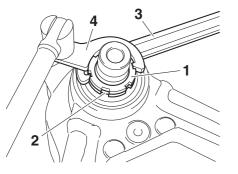
## 

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

### NOTE:

Hold the lower ring nut with the ring nut wrench "3", and then remove the upper ring nut with the steering nut wrench "4".





### EAS23120

## CHECKING THE STEERING HEAD

- 1. Wash:
- Bearings
- Bearing races

### Recommended cleaning solvent Kerosene

- 2. Check:
- Bearings
- Bearing races Damage/pitting  $\rightarrow$  Replace.

- 3. Replace:
- Bearings
- Bearing races

### \*\*\*\*\*

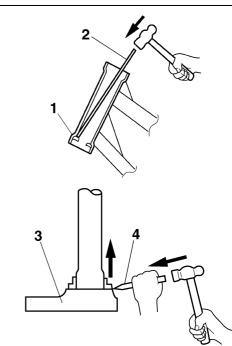
- a. Remove the bearing race from the steering head pipe "1" with a long rod "2" and hammer.
- b. Remove the bearing race from the lower bracket "3" with a floor chisel "4" and hammer.
- c. Install new bearing races.

# CAUTION:

If the bearing race is not installed properly, the steering head pipe could be damaged.

### NOTE: \_

Always replace the bearings and bearing races as a set.



### \*\*\*\*\*

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

### AS23140

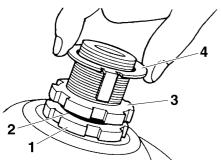
## INSTALLING THE STEERING HEAD

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



## 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 3-26.



- 3. Install:
  - Upper bracket
  - Steering stem nut
  - Right handlebar assembly
  - Left handlebar assembly

## NOTE:

Temporarily tighten the steering stem nut and handlebar bolts.

- 4. Install:
  - Front fork legs

Refer to "FRONT FORK" on page 4-44.

## NOTE:

Temporarily tighten the lower bracket pinch bolts.

- 5. Tighten:
- Steering stem nut

Steering stem nut 115 Nm (11.5 m·kg, 85 ft·lb)

6. Install:

• Front brake hose joint bracket "1"



Front brake hose joint bracket bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

Lower bracket cover "2"

Lower bracket cover bolt

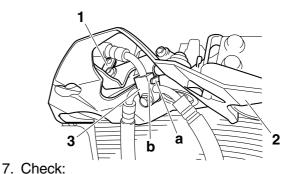
7 Nm (0.7 m·kg, 5.1 ft·lb)

• Front brake hose joint "3"

Front brake hose joint bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

## NOTE: \_

Make sure that the tab "a" on the front brake hose joint bracket contacts the side "b" of the front brake hose joint.

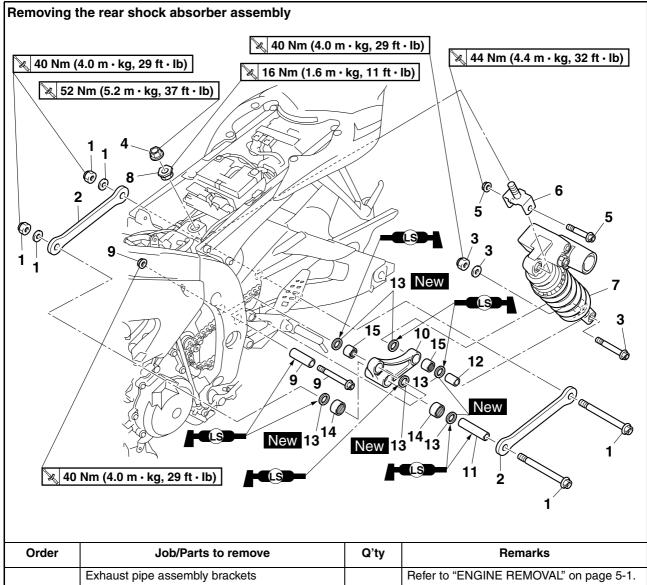


Cable routing

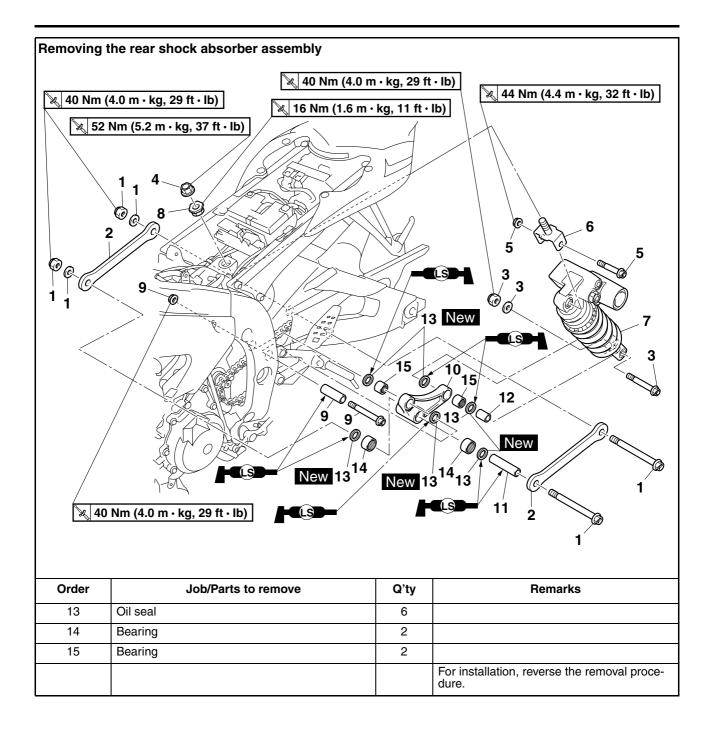
## NOTE:

Make sure the immobilizer unit lead, main switch lead, brake hoses, throttle cables, clutch cable, and handlebar switch leads are routed properly. Refer to "CABLE ROUTING" on page 2-47.

# REAR SHOCK ABSORBER ASSEMBLY



Oraci		Gity	nomanto
	Exhaust pipe assembly brackets		Refer to "ENGINE REMOVAL" on page 5-1.
	Rear wheel		Refer to "REAR WHEEL" on page 4-11.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Connecting arm nut/Washer/Bolt	2/2/2	
2	Connecting arm	2	
3	Rear shock absorber assembly lower nut/Wash- er/Bolt	1/1/1	
4	Rear shock absorber assembly bracket nut	1	
5	Rear shock absorber assembly upper nut/Bolt	1/1	
6	Rear shock absorber assembly bracket	1	
7	Rear shock absorber assembly	1	
8	Spacer bolt	1	
9	Relay arm nut/Bolt/Spacer	1/1/1	
10	Relay arm	1	
11	Spacer	1	
12	Spacer	1	



#### EAS23180 HANDLING THE REAR SHOCK ABSORBER EWA13740

## 

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

- Do not tamper or attempt to open the rear shock absorber.
- Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.
- Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.

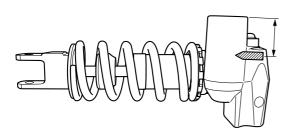
#### EAS23190

## **DISPOSING OF A REAR SHOCK ABSORBER**

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 50 mm (1.97 in) from its end as shown.

## 

Wear eye protection to prevent eye damage from released gas or metal chips.



EAS23230

### REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

## WARNING

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

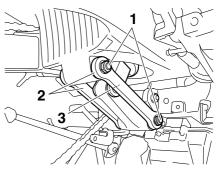
### NOTE: \_

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

### 2. Remove:

- Connecting arm bolts "1"
- Connecting arms "2"
- Rear shock absorber assembly lower bolt "3" NOTE:

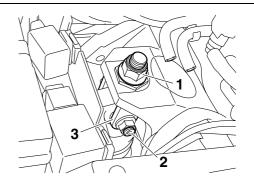
While removing the connecting arm bolts, hold the swingarm so that it does not drop down.



- 3. Remove:
  - Rear shock absorber assembly bracket nut "1"
  - Rear shock absorber assembly upper bolt "2"
  - Rear shock absorber assembly bracket "3"
  - Rear shock absorber assembly

### NOTE:

Lower the swingarm, and then remove the rear shock absorber assembly from between the swingarm and frame.



## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Check:
  - Rear shock absorber rod Bends/damage → Replace the rear shock absorber assembly.
  - Rear shock absorber Gas leaks/oil leaks → Replace the rear shock

absorber assembly.

Spring

- Bushing Damage/wear → Replace.
   Spacer
- Damage/scratches  $\rightarrow$  Replace.
- Bolts Bends/damage/wear  $\rightarrow$  Replace.

# CHECKING THE CONNECTING ARM AND RELAY ARM

- 1. Check:
- Connecting arms
- Relay arm
  - $\mathsf{Damage/wear} \to \mathsf{Replace}.$
- 2. Check:
  - Bearings
  - Oil seals

Damage/pitting  $\rightarrow$  Replace.

- 3. Check:
  - Spacers
     Damage/scratches → Replace.

### EAS23270

## INSTALLING THE RELAY ARM

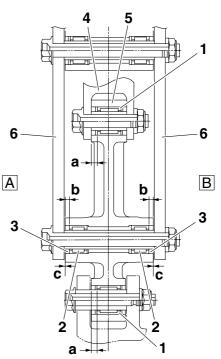
- 1. Lubricate:
  - Spacers
  - Bearings

## Recommended lubricant Lithium-soap-based grease

- 2. Install:
  - Bearings "1", "2" (to the relay arm)
  - Oil seals "3"



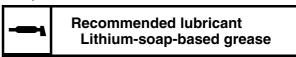
Installed depth of bearing "a" 4.5 mm (0.18 in) Installed depth of bearing "b" 3.5 mm (0.14 in) Installed depth of oil seal "c" 1.0 mm (0.04 in)



- 4. Rear shock absorber
- 5. Relay arm
- 6. Connecting arms
- A. Left side
- B. Right side

#### EAS23310 INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Lubricate:
- Spacer



- 2. Tighten:
  - Relay arm nut



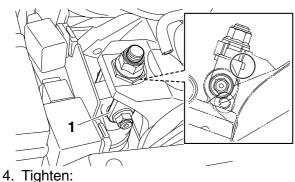
Relay arm nut 40 Nm (4.0 m·kg, 29 ft·lb)

- 3. Install:
  - Spacer bolt
  - Rear shock absorber assembly
- Rear shock absorber assembly bracket "1"

### NOTE: \_

Be sure to fit the projection on either side of the rear shock absorber assembly bracket into the indentation in the frame.

## REAR SHOCK ABSORBER ASSEMBLY



Spacer bolt

Spacer bolt 16 Nm (1.6 m·kg, 11 ft·lb)

• Rear shock absorber assembly lower nut



Rear shock absorber assembly lower nut 40 Nm (4.0 m·kg, 29 ft·lb)

• Rear shock absorber assembly upper nut



Rear shock absorber assembly upper nut 44 Nm (4.4 m·kg, 32 ft·lb)

• Rear shock absorber assembly bracket nut



Rear shock absorber assembly bracket nut 52 Nm (5.2 m·kg, 37 ft·lb)

- 5. Install:
- Connecting arms

### NOTE:

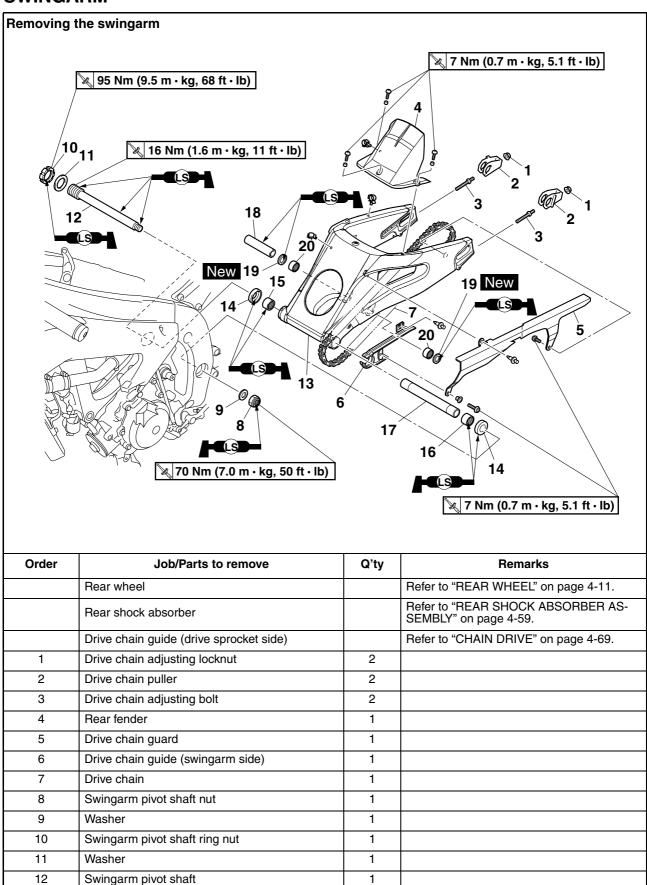
When installing the connecting arms, lift up the swingarm.

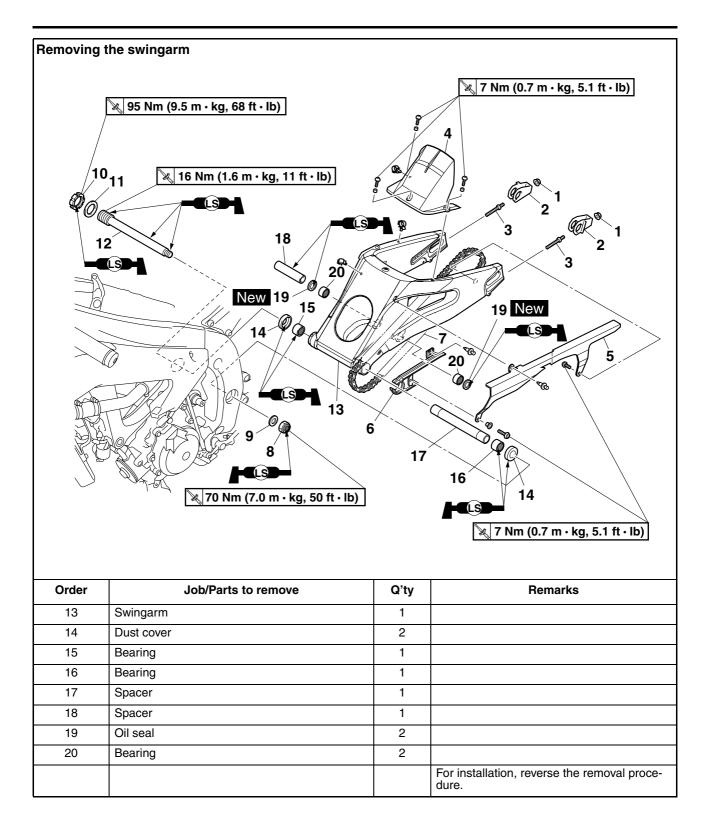
- 6. Tighten:
  - Connecting arm nuts



Connecting arm nuts 40 Nm (4.0 m·kg, 29 ft·lb)

# SWINGARM





# REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

## 

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

## NOTE:

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

- 2. Measure:
  - Swingarm side play
  - Swingarm vertical movement
- \*\*\*\*\*
- a. Measure the tightening torque of the pivot shaft nut, pivot shaft ring nut, and pivot shaft.



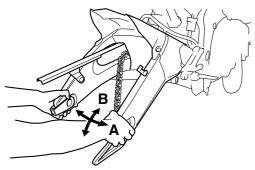
Swingarm pivot shaft nut 70 Nm (7.0 m·kg, 50 ft·lb) Swingarm pivot shaft ring nut 95 Nm (9.5 m·kg, 68 ft·lb) Swingarm pivot shaft 16 Nm (1.6 m·kg, 11 ft·lb)

- b. Measure the swingarm side play "A" by moving the swingarm from side to side.
- c. If the swingarm side play is out of specification, check the spacers, bearings, washers, and dust covers.



Swingarm side play (at the end of the swingarm) 1.0 mm (0.04 in)

d. Check the swingarm vertical movement "B" by moving the swingarm up and down. If swingarm vertical movement is not smooth or if there is binding, check the spacers, bearings, washers, and dust covers.



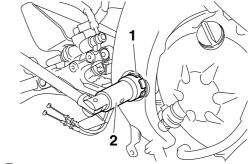
- \*\*\*\*\*
- 3. Remove:
  - Drive chain Refer to "REMOVING THE DRIVE CHAIN" on page 4-70.

- 4. Remove:
- Swingarm pivot shaft ring nut "1"

### NOTE: \_

Loosen the swingarm pivot shaft ring nut with the ring nut wrench "2".



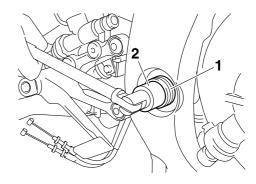


- 5. Remove:
- Swingarm pivot shaft "1"

## NOTE: \_

Loosen the swingarm pivot shaft with the damper rod holder (24 mm) "2".





## CHECKING THE SWINGARM

- 1. Check:
- Swingarm

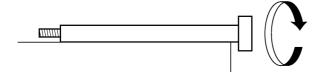
Bends/cracks/damage  $\rightarrow$  Replace.

- 2. Check:
  - Pivot shaft Roll the pivot shaft on a flat surface. Bends  $\rightarrow$  Replace.
    - $Denus \rightarrow Replace$

## 

Do not attempt to straighten a bent pivot shaft.

## SWINGARM



- 3. Wash:
  - Pivot shaft
  - Dust covers
  - Spacers
  - Washers
  - Bearings

## Recommended cleaning solvent Kerosene

- 4. Check:
  - Dust covers
  - Spacers
  - Oil seals Damage/wear  $\rightarrow$  Replace.

 Bearings Damage/pitting → Replace.

#### EAS23380 INSTALLING THE SWINGARM

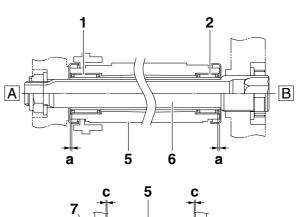
- 1. Lubricate:
  - Bearings
  - Spacers
  - Dust covers
  - Pivot shaft

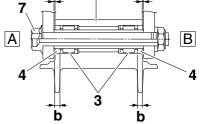
### Recommended lubricant Lithium-soap-based grease

- 2. Install:
  - Bearing "1"
  - Bearing "2"
  - Bearings "3"
  - Oil seals "4"



Installed depth of bearing "a" 0–1.0 mm (0–0.04 in) Installed depth of bearing "b" 4.0 mm (0.16 in) Installed depth of oil seal "c" 1.0 mm (0.04 in)





- 5. Swingarm
- 6. Swingarm pivot shaft
- 7. Bolt
- A. Left side
- B. Right side
- 3. Install:
  - Swingarm pivot shaft "1"

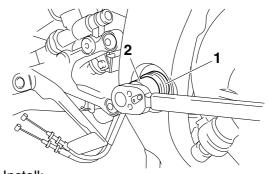


Swingarm pivot shaft 16 Nm (1.6 m·kg, 11 ft·lb)

### NOTE: \_\_\_\_

Tighten the swingarm pivot shaft with the damper rod holder (24 mm) "2".





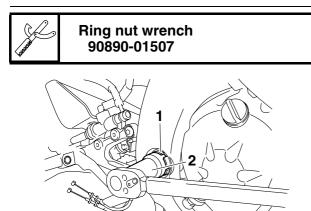
4. Install:Swingarm pivot shaft ring nut "1"



### Swingarm pivot shaft ring nut 95 Nm (9.5 m·kg, 68 ft·lb)

## NOTE: \_

- Lubricate the swingarm pivot ring nut threads and mating surfaces with lithium-soap-based grease.
- Tighten the swingarm pivot shaft ring nut with the ring nut wrench "2".



- 5. Install:
  - Swingarm pivot shaft nut

### NOTE: \_

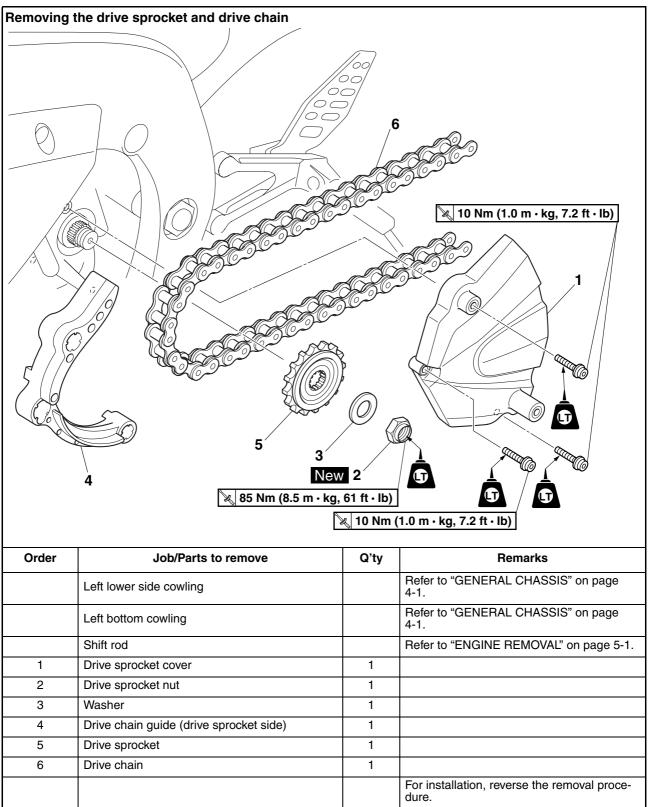
Lubricate the swingarm pivot shaft nut threads and mating surfaces with lithium-soap-based grease.

- 6. Adjust:
- Drive chain slack
  - Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-25.



Drive chain slack 35.0–45.0 mm (1.38–1.77 in)

# CHAIN DRIVE



# REMOVING THE DRIVE CHAIN

1. Stand the vehicle on a level surface.

## 

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

### NOTE:

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

- 2. Remove:
- Drive chain

(with the drive chain cutter)

### NOTE:

Only cut the drive chain if it or the swingarm is to be replaced.

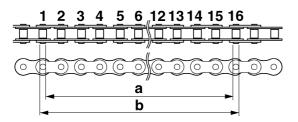
# CHECKING THE DRIVE CHAIN

- 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)

## \*\*\*\*\*

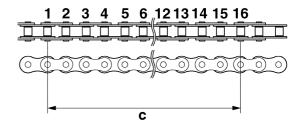
a. Measure the length "a" between the inner sides of the pins and the length "b" between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.



b. Calculate the length "c" of the 15-link section of the drive chain using the following formula. Drive chain 15-link section length "c" = (length "a" between pin inner sides + length "b" between pin outer sides)/2

### NOTE:

- 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.



### \*\*\*\*\*

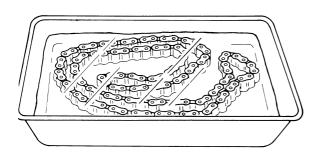
- 2. Check:
  - Drive chain Stiffness  $\rightarrow$  Clean and lubricate or replace.

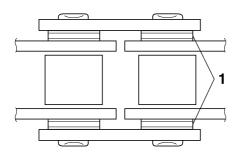


- 3. Clean:
- Drive chain
- \*\*\*\*
- a. Wipe the drive chain with a clean cloth.
- b. Put the drive chain in kerosene and remove any remaining dirt.
- c. Remove the drive chain from the kerosene and completely dry it.

## CAUTION:

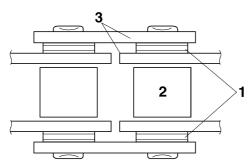
- This vehicle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.
- Do not soak the drive chain in kerosene for more than ten minutes, otherwise the Orings can be damaged.





### **\*\*\*\***

- 4. Check:
  - O-rings "1"
     Damage → Replace the drive chain.
  - Drive chain rollers "2" Damage/wear  $\rightarrow$  Replace the drive chain.
  - Drive chain side plates "3" Damage/wear → Replace the drive chain. Cracks → Replace the drive chain and make sure the battery breather hose is properly routed away from the drive chain and below the swingarm.



- 5. Lubricate:
- Drive chain

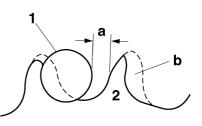


Recommended lubricant Engine oil or chain lubricant suitable for O-ring chains

#### EAS23400 CHECKING THE DRIVE SPROCKET

1. Check:

 Drive sprocket More than 1/4 tooth "a" wear → Replace the drive chain sprockets as a set.
 Bent teeth → Replace the drive chain sprockets as a set.



- b. Correct
- 1. Drive chain roller
- 2. Drive chain sprocket

EAS23470

## CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-14.

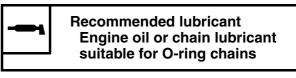
## CHECKING THE REAR WHEEL DRIVE HUB

Refer to "CHECKING THE REAR WHEEL DRIVE HUB" on page 4-14.

EAS28800

## INSTALLING THE DRIVE CHAIN

- 1. Lubricate:
  - Drive chain



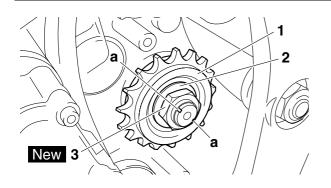
- 2. Install:
  - Drive sprocket "1"
  - Washer "2"
- Drive sprocket nut "3" New

NOTE:\_

- While applying the rear brake, tighten the drive sprocket nut.
- Stake the drive sprocket nut "3" at a cutout "a" in the drive axle.

Drive sprocket nut 85 Nm (8.5 m·kg, 61 ft·lb) LOCTITE<sup>®</sup>

## **CHAIN DRIVE**



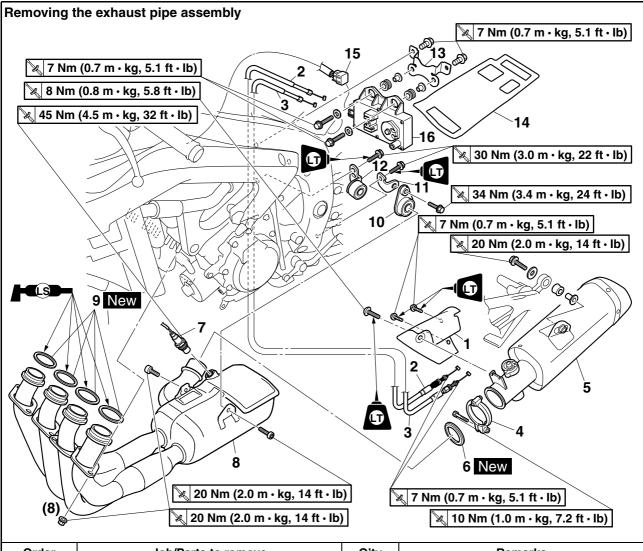
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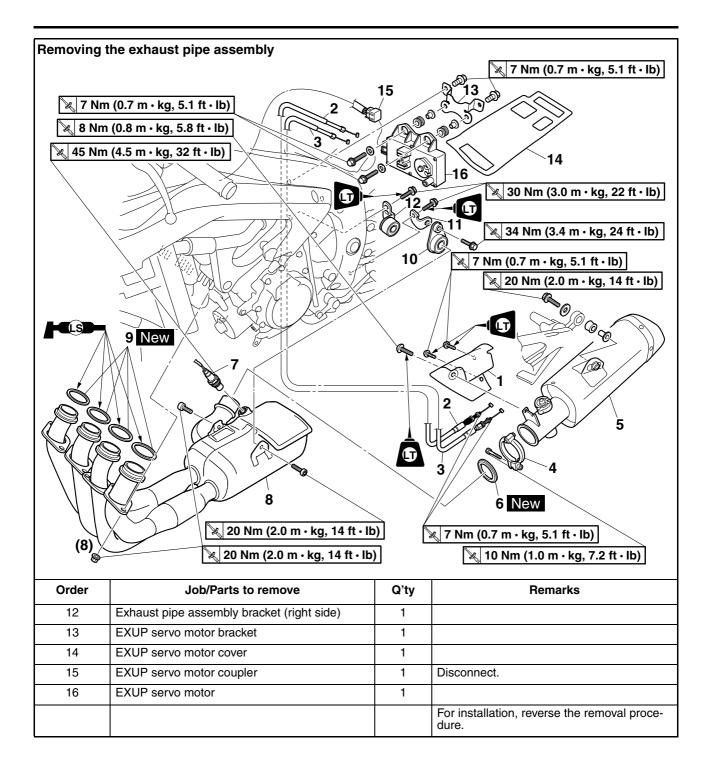
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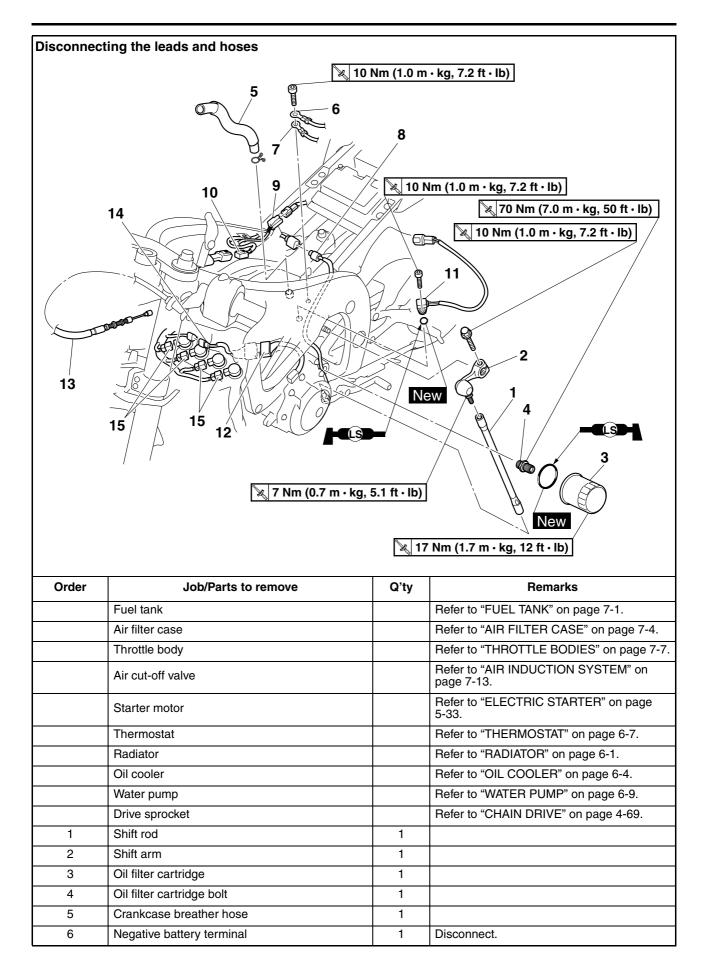
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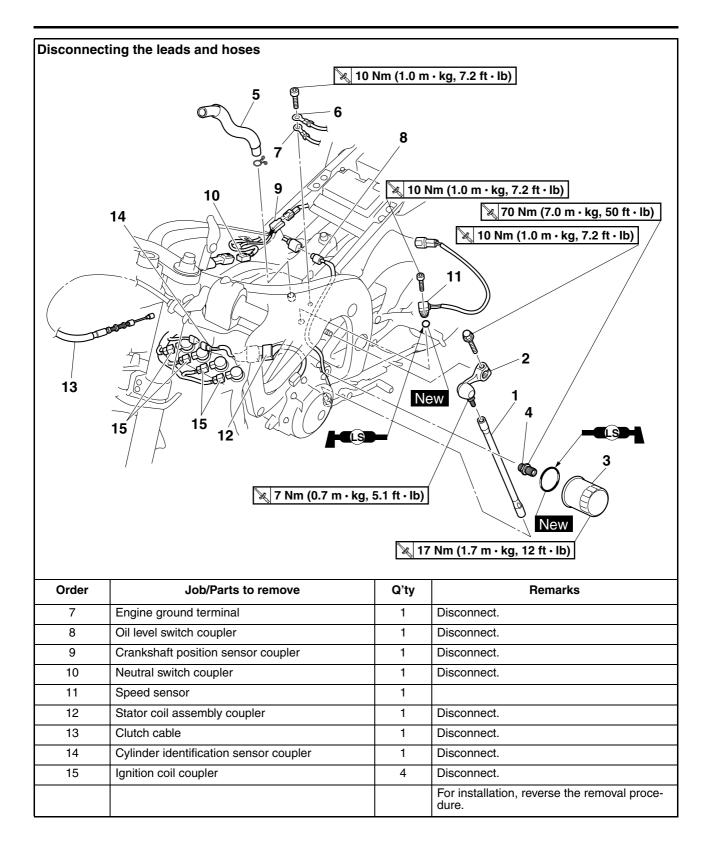
# ENGINE REMOVAL

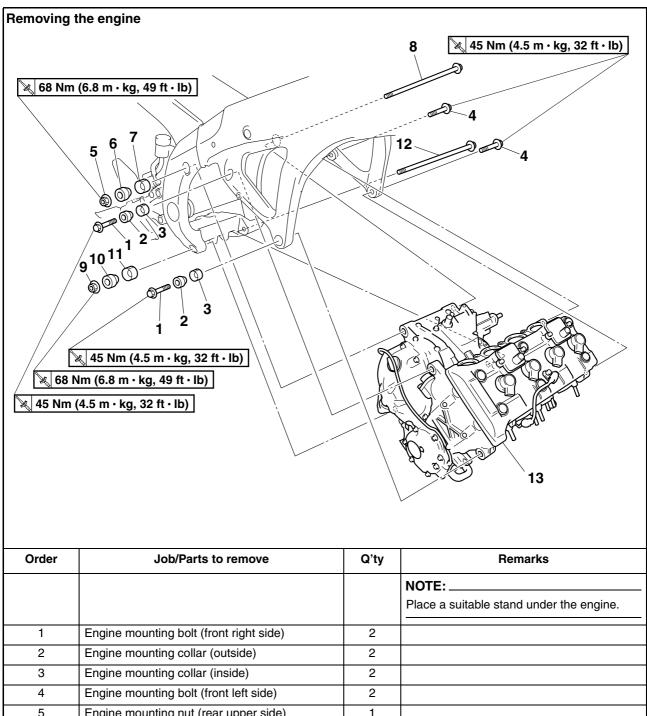


Order	Job/Parts to remove	Q'ty	Remarks
	Lower side cowlings		Refer to "GENERAL CHASSIS" on page 4-1.
	Bottom cowlings		Refer to "GENERAL CHASSIS" on page 4-1.
	Radiator bracket		Refer to "RADIATOR" on page 6-1.
1	EXUP valve pulley cover	1	
2	EXUP cable	1	Black adjusting bolt
3	EXUP cable	1	
4	Clamp	1	
5	Muffler	1	
6	Gasket	1	
7	O <sub>2</sub> sensor	1	
8	Exhaust pipe assembly	1	
9	Gasket	4	
10	Exhaust pipe assembly bracket (left lower side)	1	
11	Exhaust pipe assembly bracket (left upper side)	1	









4	Engine mounting bolt (front left side)	2	
5	Engine mounting nut (rear upper side)	1	
6	Engine mounting collar (outside)	1	
7	Engine mounting collar (inside)	1	
8	Engine mounting bolt (rear upper side)	1	
9	Engine mounting nut (rear lower side)	1	
10	Engine mounting collar (outside)	1	
11	Engine mounting collar (inside)	1	
12	Engine mounting bolt (rear lower side)	1	
13	Engine	1	
			For installation, reverse the removal proce- dure.

#### EAS23720 INSTALLING THE ENGINE

- 1. Install:
  - Engine "1"
  - Engine mounting bolt (rear lower side) "2"
  - Engine mounting bolt (rear upper side) "3"
  - Engine mounting collars (inside) "4"
  - Engine mounting collars (outside) "5"
  - Engine mounting nut (rear lower side) "6" (temporarily tighten)
  - Engine mounting nut (rear upper side) "7" (temporarily tighten)
  - Engine mounting bolts (front left side) "8" (temporarily tighten)
  - Engine mounting collars (inside) "9"
  - Engine mounting collars (outside) "10"
  - Engine mounting bolts (front right side) "11" (temporarily tighten)

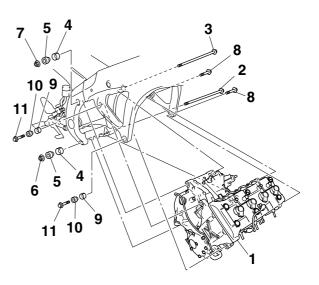
#### NOTE:\_

- Be sure to pass the drive axle through the drive chain when installing the engine "1".
- Do not fully tighten the bolts and nuts.

#### 2. Tighten:

- Engine mounting nut (rear lower side) "6"
- Engine mounting nut (rear upper side) "7"
- Engine mounting bolts (front left side) "8"
- Engine mounting bolts (front right side) "11"

	Engine mounting nut (rear lower side)
$\mathbf{\gamma}$	68 Nm (6.8 m⋅kg, 49 ft⋅lb)
	Engine mounting nut (rear upper side)
	68 Nm (6.8 m⋅kg, 49 ft⋅lb)
	Engine mounting bolt (front left side)
	45 Nm (4.5 m⋅kg, 32 ft⋅lb)
	Engine mounting bolt (front right side)
	45 Ńm (4.5 m⋅kg, 32 ft⋅lb)



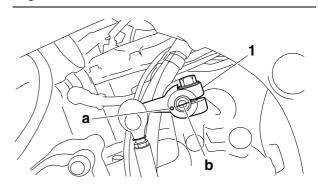
- 3. Install:
- Shift arm "1"

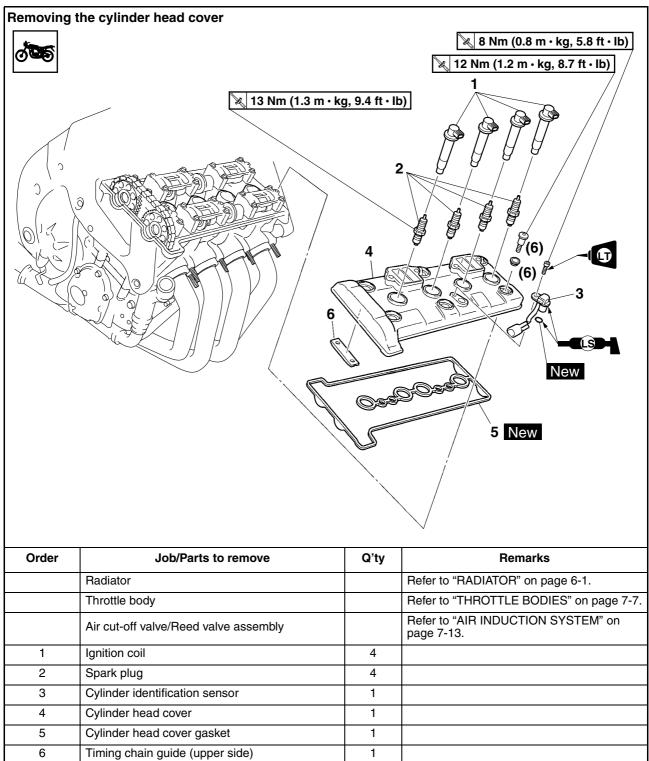


Shift arm bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

#### NOTE:

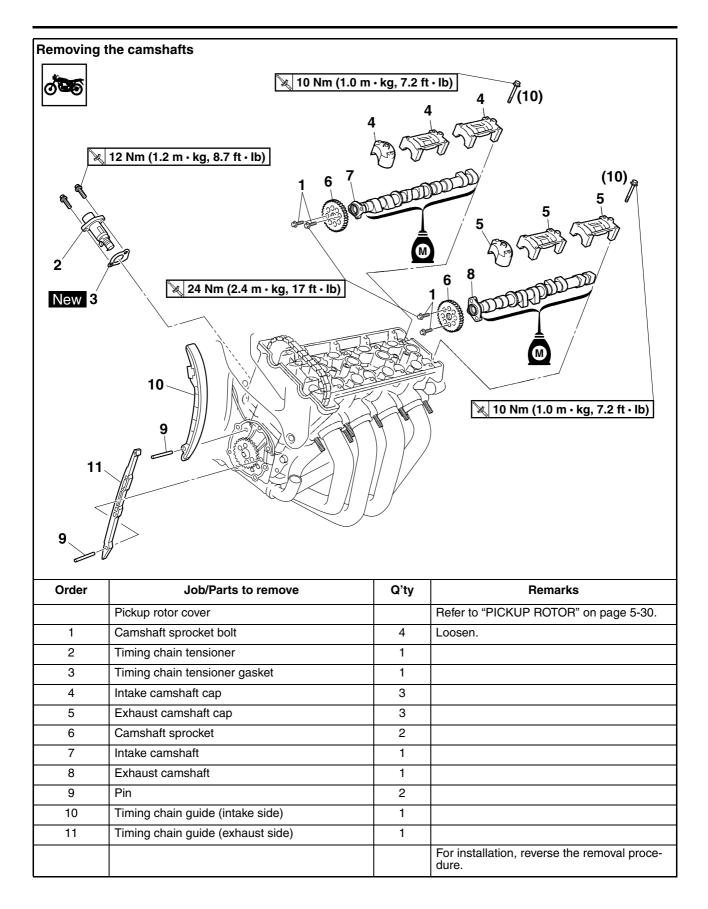
Install the shift arm "1" with its punch mark "a" aligned with the notch "b" in end of the shift shaft.





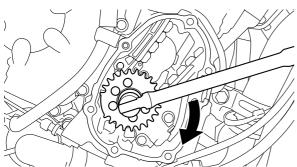
For installation, reverse the removal proce-

dure.

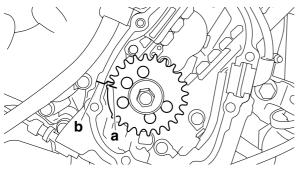


### REMOVING THE CAMSHAFTS

- 1. Remove:
- Pickup rotor cover Refer to "PICKUP ROTOR" on page 5-30.
- 2. Align:
- TDC mark on the pickup rotor (with the crankcase mating surface)
- a. Turn the crankshaft clockwise.

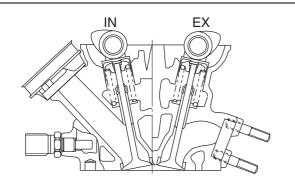


b. When piston #1 is at TDC on the compression stroke, align the TDC mark "a" on the pickup rotor with the crankcase mating surface "b".



#### NOTE:

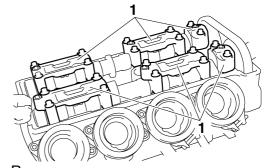
TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.



- 3. Remove:
- Camshaft caps "1"

### CAUTION:

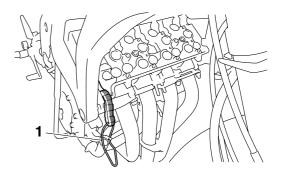
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a crisscross pattern, working from the outside in.



- 4. Remove:
- Intake camshaft
- Exhaust camshaft

#### NOTE:

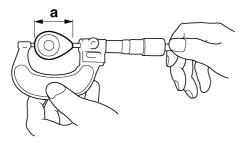
To prevent the timing chain from falling into the crankcase, fasten it with a wire "1".

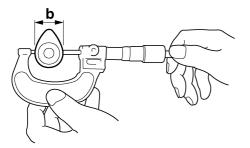


- CHECKING THE CAMSHAFTS
- 1. Check:
- Camshaft lobes
  - Blue discoloration/pitting/scratches  $\rightarrow$  Replace the camshaft.
- 2. Measure:
  - Camshaft lobe dimensions "a" and "b" Out of specification → Replace the camshaft.



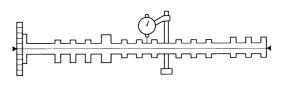
Camshaft lobe dimensions Intake A 33.725-33.875 mm (1.3278-1.3337 in) Limit 33.675 mm (1.3258 in) Intake B 25.225-25.325 mm (0.9931-0.9970 in) Limit 25.175 mm (0.9911 in) Exhaust A 32.925-33.075 mm (1.2963-1.3022 in) Limit 32.875 mm (1.2943 in) Exhaust B 25.082-25.182 mm (0.9875-0.9914 in) Limit 25.032 mm (0.9855 in)





- 3. Measure:
  - Camshaft runout Out of specification  $\rightarrow$  Replace.

Camshaft runout limit 0.030 mm (0.0012 in)

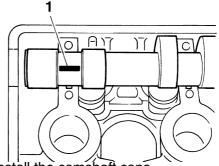


4. Measure:

 Camshaft-journal-to-camshaft-cap clearance Out of specification → Measure the camshaft journal diameter.



- a. Install the camshaft into the cylinder head
- (without the camshaft caps).
- b. Position a strip of Plastigauge<sup>®</sup> "1" onto the camshaft journal as shown.



c. Install the camshaft caps.

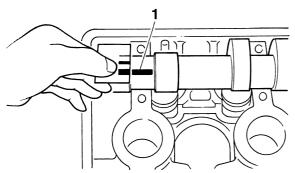
#### NOTE:

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge<sup>®</sup>.



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

d. Remove the camshaft caps and then measure the width of the Plastigauge  $^{\ensuremath{\mathbb{R}}}$  "1".

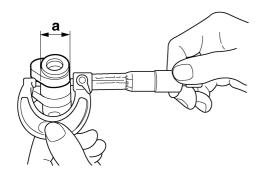


#### \*\*\*\*\*

- 5. Measure:
  - Camshaft journal diameter "a" Out of specification → Replace the camshaft. Within specification → Replace the cylinder head and the camshaft caps as a set.



Camshaft journal diameter 22.459–22.472 mm (0.8842– 0.8847 in)



#### EAS23870

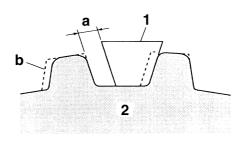
### CHECKING THE TIMING CHAIN, CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES

1. Check:

 Timing chain "1"
 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"  $\rightarrow$  Replace the

camshaft sprocket and the timing chain as a set.



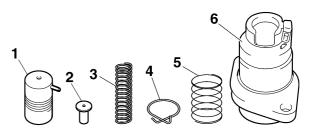
- a. 1/4 tooth
- b. Correct
- 1. Timing chain roller
- 2. Camshaft sprocket
- 3. Check:
  - Timing chain guide (exhaust side)
  - Timing chain guide (intake side)
- Timing chain guide (upper side)
   Damage/wear → Replace the defective part(s).

### CHECKING THE TIMING CHAIN TENSIONER

- 1. Remove:
- Timing chain tensioner rod "1"
- Timing chain tensioner spring seat "2"
- Timing chain tensioner inner spring "3"
- Timing chain tensioner outer spring "5"
- Timing chain tensioner housing "6"

#### NOTE:

Squeeze the timing chain tensioner clip "4", and then remove the timing chain tensioner springs and timing chain tensioner rod.



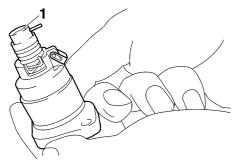
- 2. Check:
- Timing chain tensioner housing
- Timing chain tensioner rod
- Timing chain tensioner spring seat
- Timing chain tensioner springs Damage/wear  $\rightarrow$  Replace the as a set.
- 3. Assemble:
  - Timing chain tensioner springs
- Timing chain tensioner spring seat
- Timing chain tensioner rod

#### NOTE: \_

Prior to installing the timing chain tensioner rod, drain the engine oil from the timing chain tensioner housing.

#### \*\*\*\*

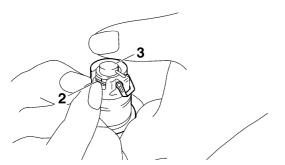
a. Install the timing chain tensioner springs, timing chain tensioner spring seat, and timing chain tensioner rod "1".



b. Squeeze the timing chain tensioner clip "2", and then push the timing chain tensioner rod "3" into the timing chain tensioner housing.

#### NOTE:

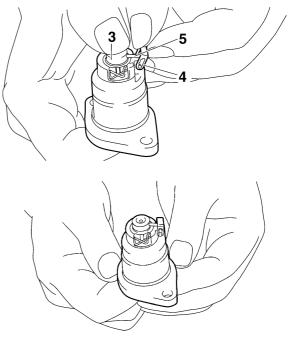
Do not release the timing chain tensioner clip while pushing the rod into the housing, otherwise the rod may be ejected.



c. Hook the clip "4" to the timing chain tensioner rod "3".

#### NOTE:\_

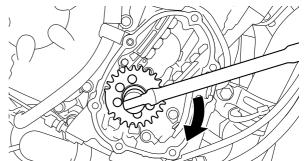
Hook the timing chain tensioner rod pin "5" to the center of the clip "4". After the installation, check that the clip "4" can come off by its own weight by pushing the timing chain tensioner rod "3" at the position of installation.



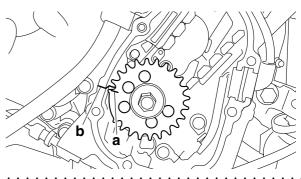
#### \*\*\*\*\*

#### INSTALLING THE CAMSHAFTS

- 1. Align:
  - TDC mark on the pickup rotor (with the crankcase mating surface)
- \*\*\*\*\*
- a. Turn the crankshaft clockwise.



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



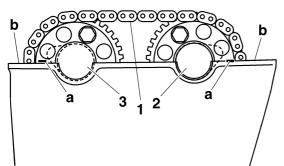
5-12

#### 2. Install:

- Timing chain "1"
- Exhaust camshaft "2"
- Intake camshaft "3" (with the camshaft sprockets temporarily tightened)

#### NOTE: \_

- Make sure the match marks "a" on the camshaft sprockets are aligned with the cylinder head edge "b".
- Be sure to install the timing chain so that the exhaust side of the chain is taut and the intake side is slack.



- 3. Install:
  - Intake camshaft caps
  - Exhaust camshaft caps

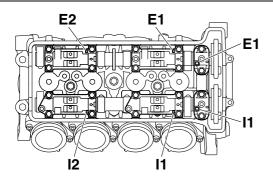
#### NOTE:

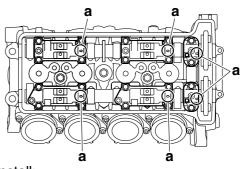
• Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:

"I1", "I2": Intake

"E1", "E2": Exhaust

• Make sure the arrow mark "a" on each camshaft points towards the right side of the engine.





4. Install:

Camshaft cap bolts

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

### CAUTION:

The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.

#### NOTE: \_

Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

#### 5. Install:

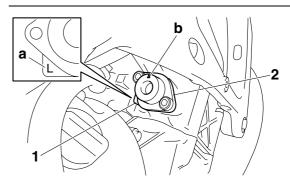
- Timing chain tensioner gasket "1" New
- Timing chain tensioner "2"



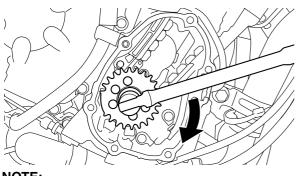
Timing chain tensioner bolt 12 Nm (1.2 m·kg, 8.7 ft·lb)

#### NOTE:

- Be sure to install the timing chain tensioner gasket so that its section with the "L" mark "a" is protruding from the lower left side of the timing chain tensioner.
- The arrow mark "b" on the timing chain tensioner should face up.



6. Rotate the crankshaft a few times to release the timing chain tensioner rod.



#### NOTE

If the engine is not disassembled, set the engine stop switch to " $\boxtimes$ ", and then crank the engine a few times by pressing the start switch for approximately 0.5–1.0 second each time.

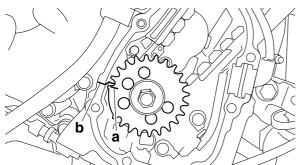
7. Check that the timing chain is taut. If the chain is slack, reinstall the timing chain tensioner.

#### NOTE:

If the engine is not disassembled, start the engine and check for any abnormal noise. If any abnormal noise is heard, reinstall the timing chain tensioner.

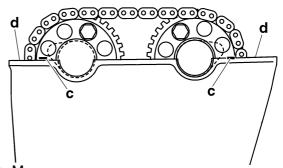
- 8. Check:
- TDC mark "a"

Make sure the TDC mark on the pickup rotor is aligned with the crankcase mating surface "b".



 Camshaft sprocket match mark "c" Make sure the marks on the camshaft sprockets are aligned with the edge of the cylinder head "d".

Out of alignment  $\rightarrow$  Adjust. Refer to the installation steps above.



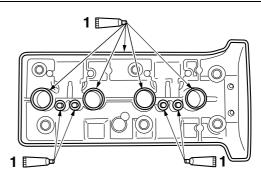
- 9. Measure:
- Valve clearance Out of specification → Adjust. Refer to "ADJUSTING THE VALVE CLEAR-ANCE" on page 3-3.
- 10.Install:
  - Cylinder head cover gasket New
  - Cylinder head cover

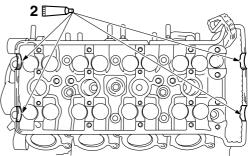


Cylinder head cover bolt 12 Nm (1.2 m·kg, 8.7 ft·lb)

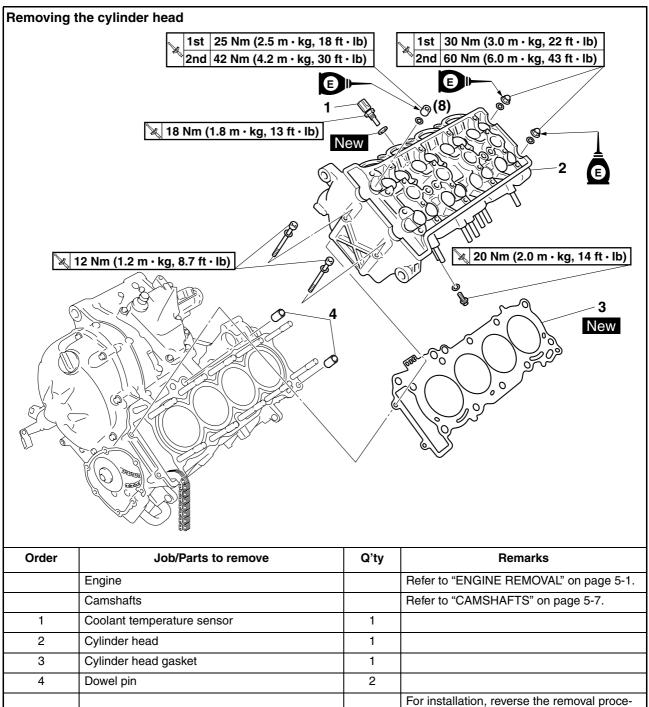
#### NOTE: \_

- Apply bond TB1541B "1" onto the mating surfaces of the cylinder head cover and cylinder head cover gasket.
- Apply bond TB1215B "2" onto the mating surfaces of the cylinder head cover gasket and cylinder head.
- Tighten the cylinder head cover bolts stages and in a crisscross pattern.





## CYLINDER HEAD



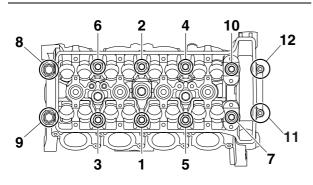
dure.

### REMOVING THE CYLINDER HEAD

- 1. Remove:
  - Cylinder head bolts
  - Cylinder head nuts

#### NOTE:

- Loosen the nuts, cap nuts, and bolts in decreasing numerical order (refer to the numbers in the illustration).
- Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.



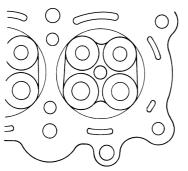
#### EAS24160

- CHECKING THE CYLINDER HEAD 1. Eliminate:
- Combustion chamber carbon deposits (with a rounded scraper)

#### NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

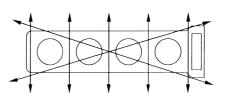
- Spark plug bore threads
- Valve seats



- 2. Check:
- Cylinder head
- Damage/scratches → Replace. • Cylinder head water jacket
- Mineral deposits/rust  $\rightarrow$  Eliminate.
- 3. Measure:
  - Cylinder head warpage Out of specification → Resurface the cylinder head.

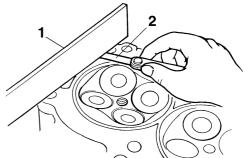


#### Warpage limit 0.05 mm (0.0020 in)



#### \*\*\*\*\*

a. Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



- b. Measure the warpage.
- c. If the limit is exceeded, resurface the cylinder head as follows.
- d. Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

#### NOTE: \_

To ensure an even surface, rotate the cylinder head several times.

#### \*\*\*\*\*

- EAS24240 INSTALLING THE CYLINDER HEAD
- 1. Install:
- Cylinder head

#### NOTE:

Pass the timing chain through the timing chain cavity.

- 2. Tighten:
- Cylinder head nuts "1"-"7", "10"



Cylinder head nut (1st) 25 Nm (2.5 m·kg, 18 ft·lb) Cylinder head nut (final) 42 Nm (4.2 m·kg, 30 ft·lb)

• Cylinder head cap nuts "8", "9"



Cylinder head cap nut (1st) 30 Nm (3.0 m·kg, 22 ft·lb) Cylinder head cap nut (final) 60 Nm (6.0 m·kg, 43 ft·lb)

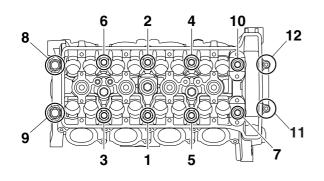
• Cylinder head bolts "11", "12"



Cylinder head bolt 12 Nm (1.2 m·kg, 8.7 ft·lb)

#### NOTE: \_

Tighten the cylinder head nuts, cap nuts, and bolts in the proper tightening sequence as shown and torque them in two stages.



#### VALVES AND VALVE SPRINGS Removing the valves and valve springs E 2 M \_3 3 69 4 0 1 New 9 E Μ 5 2 3 3-10 -M 4 Ø New 9 6 M 10 M 12 11 8 7 M

Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-15.
1	Valve lifter	16	
2	Valve pad	16	
3	Valve cotter	32	
4	Upper spring seat	16	
5	Intake valve spring	8	
6	Exhaust valve spring	8	
7	Intake valve	8	
8	Exhaust valve	8	
9	Valve stem seal	16	
10	Lower spring seat	16	
11	Intake valve guide	8	
12	Exhaust valve guide	8	
			For installation, reverse the removal proce- dure.

### REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

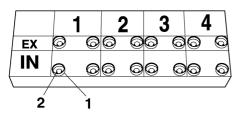
#### NOTE:

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"

#### NOTE:

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

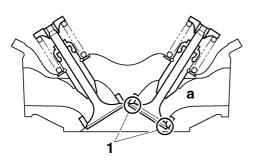
Leakage at the valve seat  $\rightarrow$  Check the valve face, valve seat, and valve seat width. Refer to "CHECKING THE VALVE SEATS" on page 5-21.

#### \*\*\*\*\*

- a. Pour a clean solvent "a" into the intake and exhaust ports.
- b. Check that the valves properly seal.

#### NOTE:

There should be no leakage at the valve seat "1".



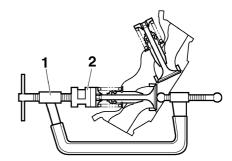
#### 3. Remove:

Valve cotters "1"

#### NOTE:\_

Remove the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".

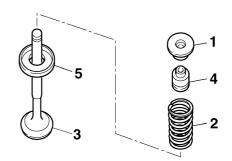
Valve spring compressor 90890-04019 YM-04019 Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108



- 4. Remove:
- Upper spring seat "1"
- Valve spring "2"
- Valve "3"
- Valve stem seal "4"
- Lower spring seat "5"

#### NOTE:

Identify the position of each part very carefully so that it can be reinstalled in its original place.



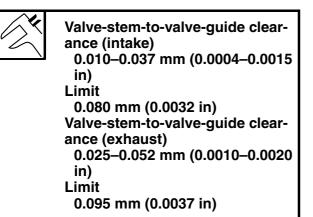
EAS24290

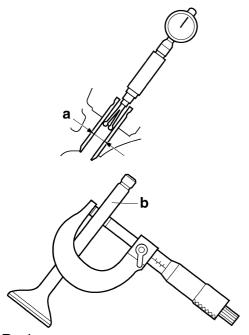
# CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

### **VALVES AND VALVE SPRINGS**

- 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"





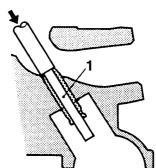
- 2. Replace:
- Valve guide

#### NOTE:

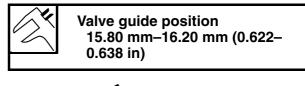
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100  $^{\circ}$ C (212  $^{\circ}$ F) in an oven.

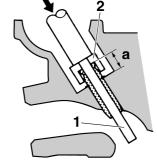
#### \*\*\*\*\*

a. Remove the valve guide with the valve guide remover "1".

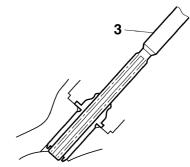


b. Install the new valve guide with the valve guide installer "2" and valve guide remover "1".





- 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.



#### NOTE:

After replacing the valve guide, reface the valve seat.

### VALVES AND VALVE SPRINGS

 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

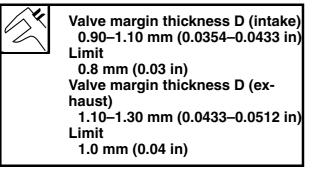
#### \*\*\*\*\*

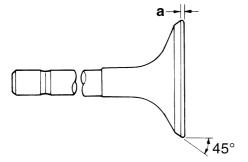
- 3. Eliminate:
  - Carbon deposits (from the valve face and valve seat)
- 4. Check:
  - Valve face

Pitting/wear → Grind the valve face.
Valve stem end Mushroom shape or diameter larger than the

body of the valve stem  $\rightarrow$  Replace the valve. 5. Measure:

 Valve margin thickness D "a" Out of specification → Replace the valve.



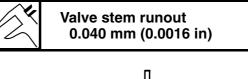


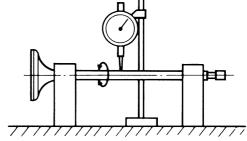
- 6. Measure:
- Valve stem runout Out of specification  $\rightarrow$  Replace the valve.

#### NOTE: \_

• When installing a new valve, always replace the valve guide.

• If the valve is removed or replaced, always replace the valve stem seal.

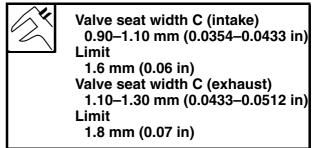


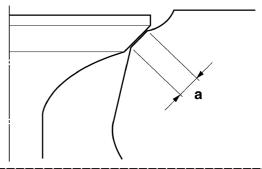


#### EAS24300 CHECKING THE VALVE SEATS

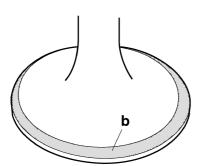
The following procedure applies to all of the valves and valve seats.

- 1. Eliminate:
- Carbon deposits (from the valve face and valve seat)
- 2. Check:
  - Valve seat Pitting/wear  $\rightarrow$  Replace the cylinder head.
- 3. Measure:
  - Valve seat width C "a" Out of specification → Replace the cylinder head.





a. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



- b. Install the valve into the cylinder head.
- c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- d. Measure the valve seat width.

#### NOTE:

Where the valve seat and valve face contacted one another, the blueing will have been removed.

#### \*\*\*\*\*

- 4. Lap:
  - Valve face
  - Valve seat

#### NOTE:\_

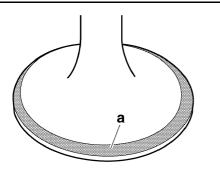
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

#### \*\*\*\*

a. Apply a coarse lapping compound "a" to the valve face.

#### CAUTION:

Do not let the lapping compound enter the gap between the valve stem and the valve guide.



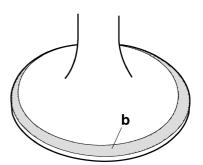
- b. Apply molybdenum disulfide oil onto the valve stem.
- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

#### NOTE: \_

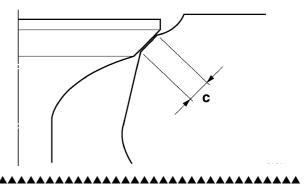
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



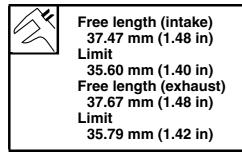
- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width "c" again. If the valve seat width is out of specification, reface and lap the valve seat.

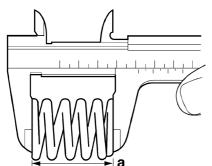


**CHECKING THE VALVE SPRINGS** The following procedure applies to all of the valve springs.

### **VALVES AND VALVE SPRINGS**

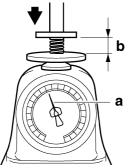
- 1. Measure:
  - Valve spring free length "a" Out of specification → Replace the valve spring.





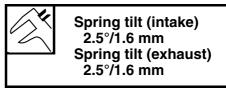
- 2. Measure:
  - Compressed valve spring force "a" Out of specification → Replace the valve spring.

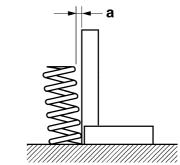
Installed compression spring force (intake) 166.00–190.00 N (37.32–42.71 lb) (16.93–19.37 kgf) Installed compression spring force (exhaust) 165.00–189.00 N (37.09–42.49 lb) (16.83–19.27 kgf) Installed length (intake) 32.80 mm (1.29 in) Installed length (exhaust) 32.80 mm (1.29 in)



b. Installed length

- 3. Measure:
- Valve spring tilt "a" Out of specification → Replace the valve spring.





### CHECKING THE VALVE LIFTERS

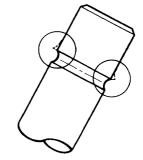
The following procedure applies to all of the valve lifters.

- 1. Check:
  - Valve lifter Damage/scratches → Replace the valve lifters and cylinder head.

### EAS24340 INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

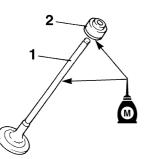
- 1. Deburr:
  - Valve stem end (with an oil stone)



- 2. Lubricate:
- Valve stem "1"
- Valve stem seal "2"
  - (with the recommended lubricant)



### **VALVES AND VALVE SPRINGS**

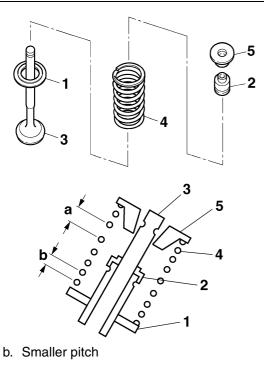


#### 3. Install:

- Lower spring seat "1"
- Valve stem seal "2"
- Valve "3"
- Valve spring "4"
- Upper spring seat "5" (into the cylinder head)

#### NOTE:

- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch "a" facing up.



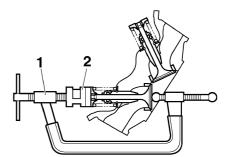
#### 4. Install:

• Valve cotters "1"

#### NOTE:

Install the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".

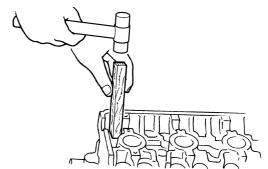
- Valve spring compressor 90890-04019 YM-04019 Valve spring compressor 90890-04109 Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm
  - YM-04108



 To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

#### CAUTION:

Hitting the valve tip with excessive force could damage the valve.



- 6. Lubricate:
  - Valve lifter (with the recommended lubricant)



- 7. Install:
  - Valve pad
  - Valve lifter

#### NOTE: \_

• The valve lifter must move smoothly when rotated with a finger. • Each valve lifter and valve pad must be reinstalled in its original position.

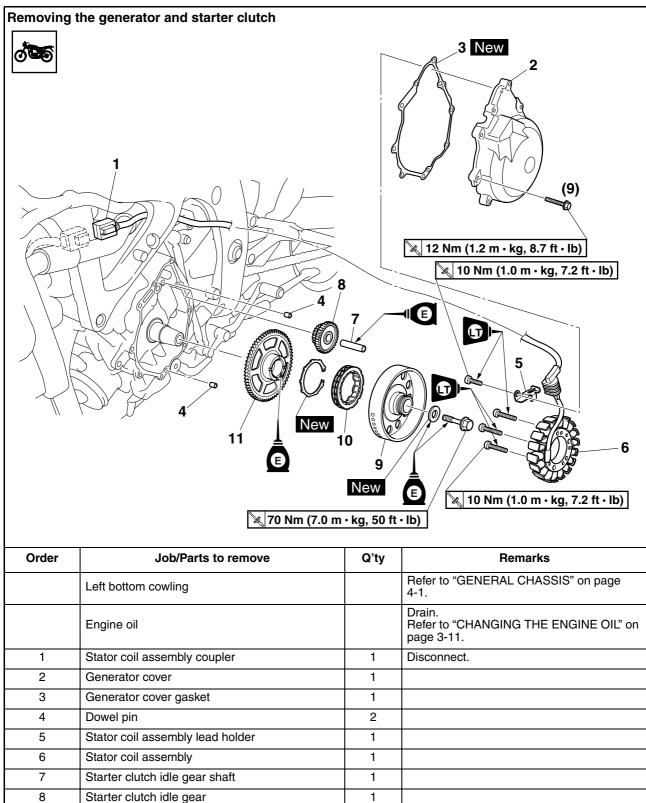
## GENERATOR AND STARTER CLUTCH

9

10

Generator rotor

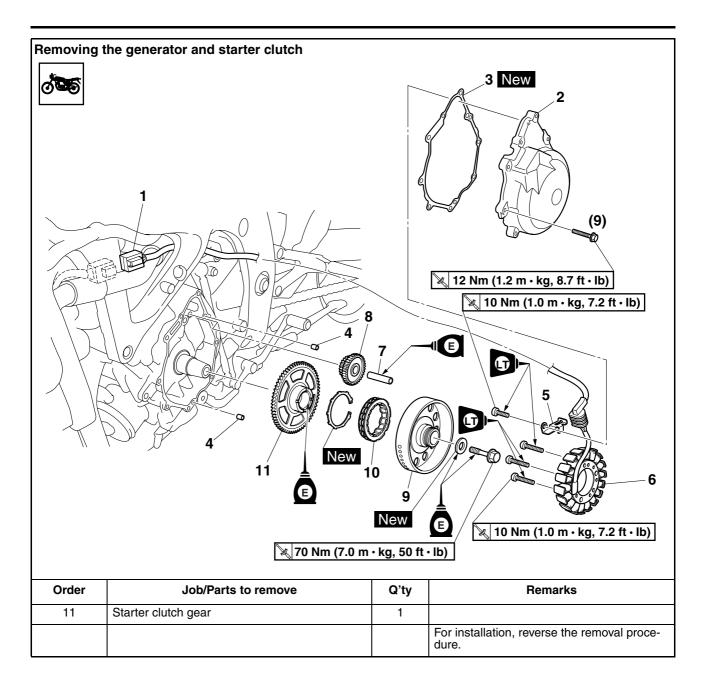
Starter clutch



1

1

### **GENERATOR AND STARTER CLUTCH**



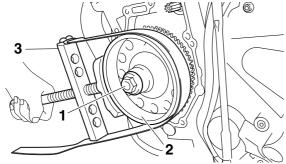
## REMOVING THE GENERATOR

- 1. Remove:
  - Generator rotor bolt "1"
  - Washer

#### NOTE: \_

While holding the generator rotor "2" with the sheave holder "3", loosen the generator rotor bolt.

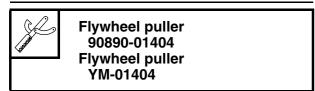


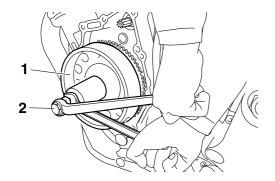


2. Remove:
Generator rotor "1" (with the flywheel puller "2")

### CAUTION:

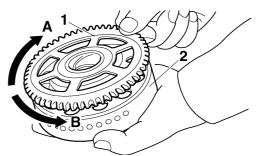
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set's center bolt and the crankshaft.





#### EAS24570 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's contacting surfaces Damage/pitting/wear → Replace the starter clutch gear.
- 4. Check:
- Starter clutch operation
- \*\*\*\*
- a. Install the starter clutch gear "1" onto the generator 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.



#### 

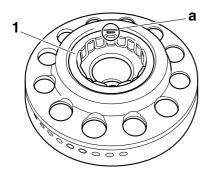
#### EAS24600 INSTALLING THE STARTER CLUTCH

- 1. Install:
- Starter clutch "1"

#### NOTE:

Be sure to install the starter clutch so that its side with the arrow mark "a" is facing inward, away from the rotor.

### **GENERATOR AND STARTER CLUTCH**



#### EAS24500

#### INSTALLING THE GENERATOR

- 1. Install:
- Generator rotor
- Washer New
- Generator rotor bolt

#### NOTE:\_

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.
- 2. Tighten:
- Generator rotor bolt "1"

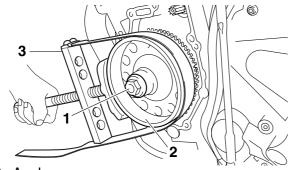


#### Generator rotor bolt 70 Nm (7.0 m·kg, 50 ft·lb)

#### NOTE:\_\_

While holding the generator rotor "2" with the sheave holder "3", tighten the generator rotor bolt.

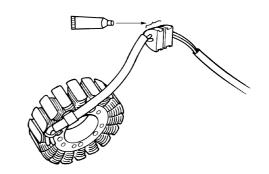




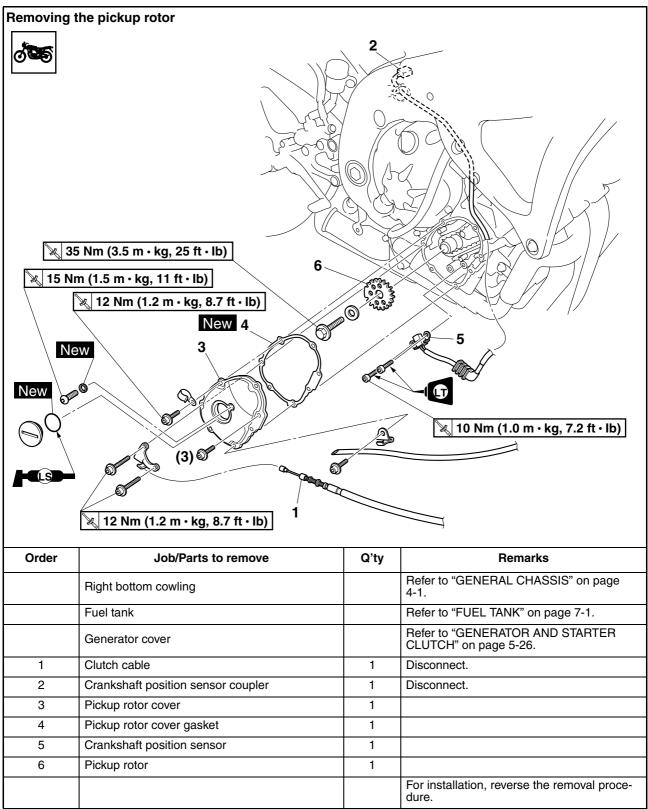
3. Apply:Sealant

(onto the stator coil assembly lead grommet)

Yamaha bond No. 1215 90890-85505 (Three Bond No.1215<sup>®</sup>)



## PICKUP ROTOR



## REMOVING THE PICKUP ROTOR

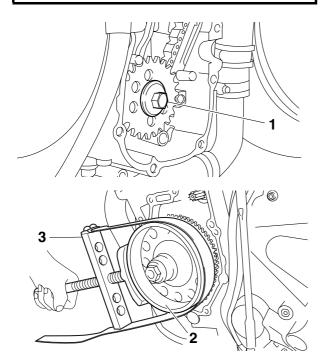
- 1. Remove:
  - Pickup rotor bolt "1"
  - Washer
  - Pickup rotor

#### NOTE: \_

While holding the generator rotor "2" with the rotor sheave holder "3", loosen the pickup rotor bolt.



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

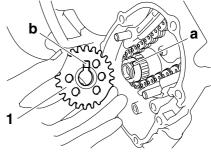


#### EAS24540

- **INSTALLING THE PICKUP ROTOR** 1. Install:
- Pickup rotor "1"
- Washer
- Pickup rotor bolt

#### NOTE:\_

When installing the pickup rotor, align the groove "a" in the crankshaft with the projection "b" on the pickup rotor.

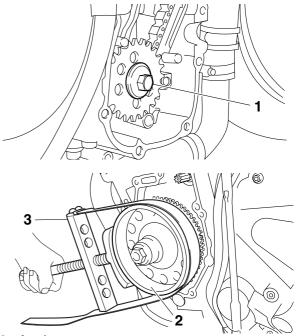


- 2. Tighten:
- Pickup rotor bolt "1"

#### NOTE: \_

While holding the generator rotor "2" with the sheave holder "3", tighten the pickup rotor bolt.

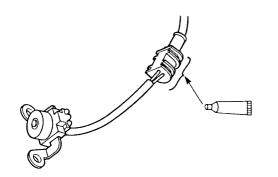




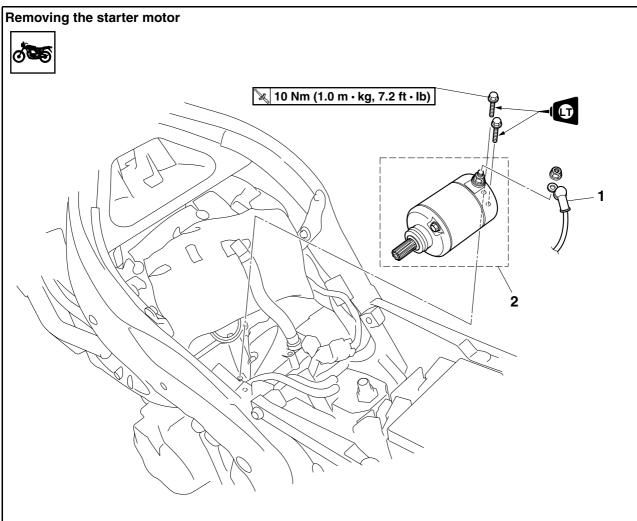
- 3. Apply:
  - Sealant (onto the crankshaft position sensor lead grommet)



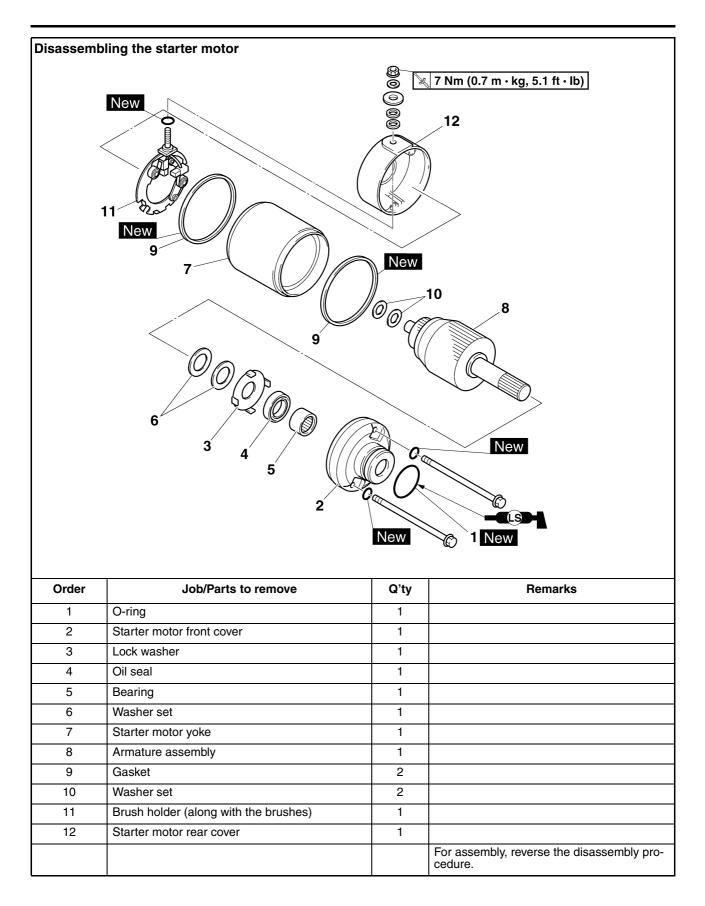
Yamaha bond No. 1215 90890-85505 (Three Bond No.1215<sup>®</sup>)



## ELECTRIC STARTER



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-4.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Thermostat		Refer to "THERMOSTAT" on page 6-7.
1	Starter motor lead	1	
2	Starter motor assembly	1	
			For installation, reverse the removal proce- dure.



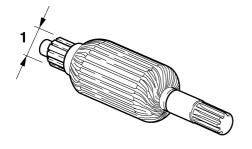
### **ELECTRIC STARTER**

## CHECKING THE STARTER MOTOR

- 1. Check:
- Commutator Dirt  $\rightarrow$  Clean with 600 grit sandpaper.
- 2. Measure:
  - Commutator diameter "1" Out of specification → Replace the starter motor.



Limit 27.0 mm (1.06 in)



- 3. Measure:
- Mica undercut "a"

Out of specification  $\rightarrow$  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)

#### NOTE:

The mica of the commutator must be undercut to ensure proper operation of the commutator.



- 4. Measure:
- Armature assembly resistances (commutator and insulation)
   Out of specification → Replace the starter motor.

#### \*\*\*\*

a. Measure the armature assembly resistances with the pocket tester.

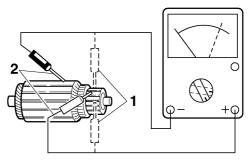


0

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

Armature coil Commutator resistance "1" 0.0012–0.0022 Ω at 20 °C (68 °F) Insulation resistance "2" Above 1 MΩ at 20 °C (68 °F)

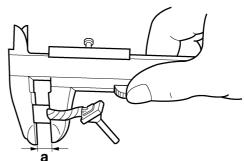
b. If any resistance is out of specification, replace the starter motor.



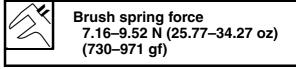
#### \*\*\*\*\*

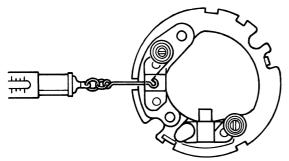
- 5. Measure:
  - Brush length "a"
     Out of specification → Replace the brushes as a set.





- 6. Measure:
  - Brush spring force Out of specification → Replace the brush springs as a set.





- 7. Check:
- Gear teeth

Damage/wear  $\rightarrow$  Replace the gear.

- 8. Check:
  - Bearing

 Oil seal Damage/wear → Replace the defective part(s).

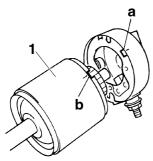
EAS24800

#### ASSEMBLING THE STARTER MOTOR

- 1. Install:
- Starter motor yoke "1"

#### NOTE: \_

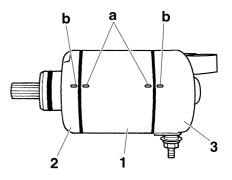
Align the tab "a" on the brush holder with the slot "b" in the starter motor yoke.



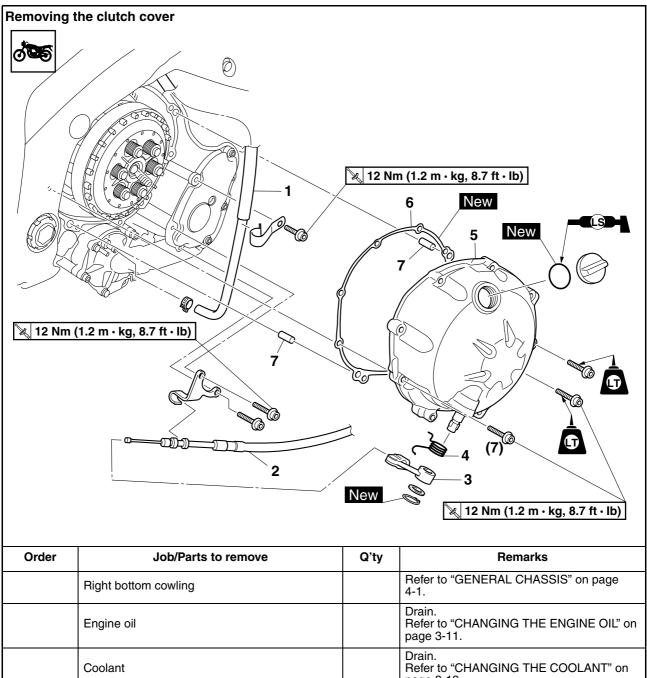
- 2. Install:
  - Starter motor yoke "1"
  - Starter motor front cover "2"
  - Starter motor rear cover "3"

#### NOTE: \_

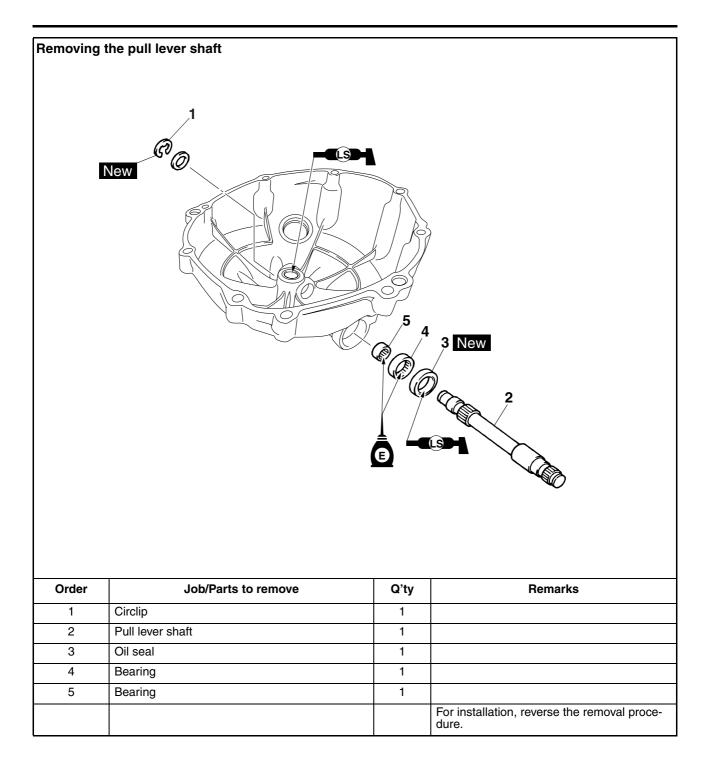
Align the match marks "a" on the starter motor yoke with the match marks "b" on the front and starter motor rear covers.

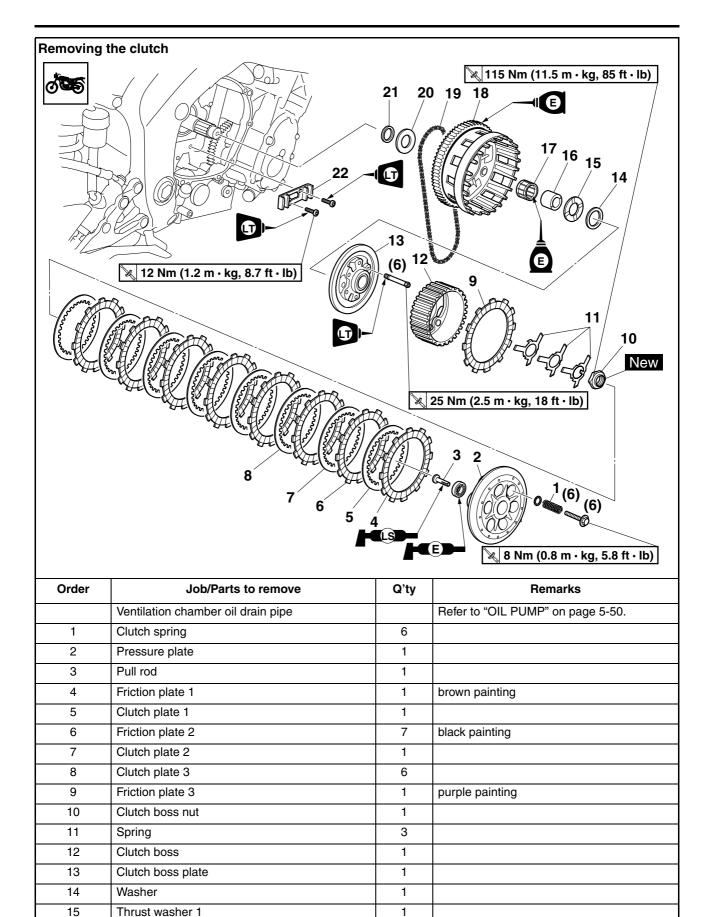


# CLUTCH



	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
1	Water pump breather hose	1	Disconnect.
2	Clutch cable	1	Disconnect.
3	Pull lever	1	
4	Pull lever spring	1	
5	Clutch cover	1	
6	Clutch cover gasket	1	
7	Dowel pin	2	
			For installation, reverse the removal proce- dure.

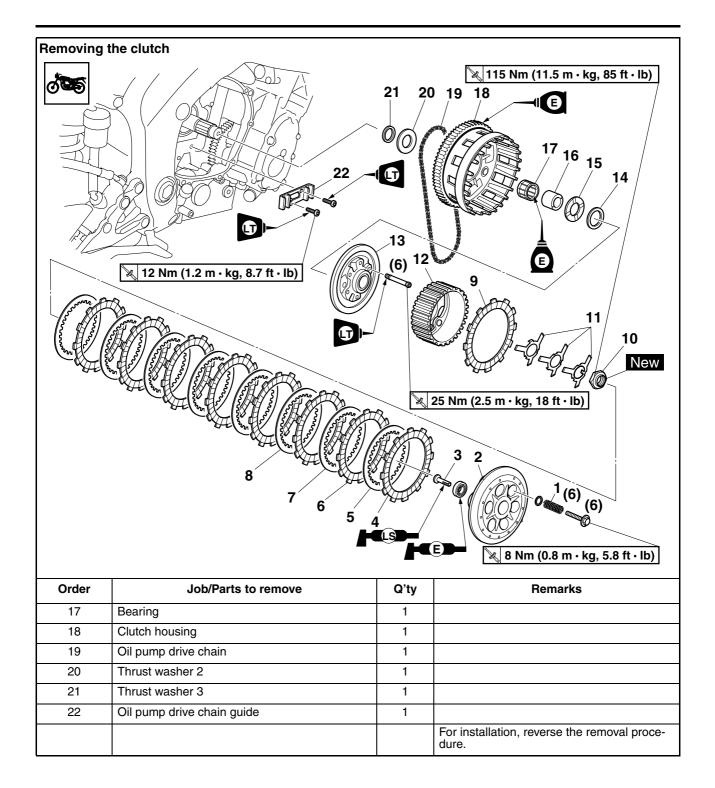




1

16

Spacer



## REMOVING THE CLUTCH

- 1. Remove:
  - Friction plates
  - Clutch plates

#### NOTE: \_

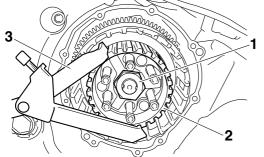
Be sure to mark the friction plates and clutch plates or note the position of each part so that they are installed in their original positions.

- 2. Loosen:
- Clutch boss nut "1"

#### NOTE:

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

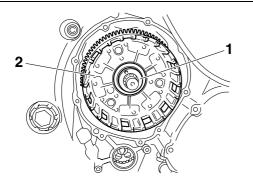




- 3. Remove:
  - Spacer "1"
  - Bearing
  - Clutch housing "2"
  - Oil pump drive chain

#### NOTE:

Remove the spacer and bearing from the main axle, then remove the oil pump drive chain from the oil pump driven sprocket, and then remove the clutch housing and oil pump drive chain from the main axle.



### CHECKING THE FRICTION PLATES

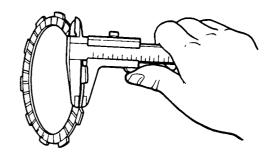
The following procedure applies to all of the friction plates.

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

#### NOTE:

Measure the friction plate at four places.





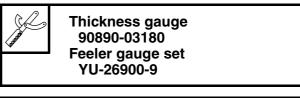
### CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

- 1. Check:
- Clutch plate

 $\label{eq:def-Damage} \ensuremath{\mathsf{Damage}} \to \ensuremath{\mathsf{Replace}} \ensuremath{\mathsf{the}} \ensuremath{\mathsf{clutch}} \ensuremath{\mathsf{plates}} \ensuremath{\mathsf{as}} \ensure$ 

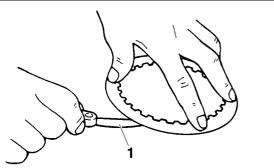
- 2. Measure:
  - Clutch plate warpage (with a surface plate and thickness gauge "1") Out of specification → Replace the clutch plates as a set.



Clutch plate thickness 1.90–2.10 mm (0.075–0.083 in) Warpage limit 0.10 mm (0.0039 in)

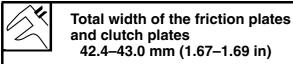
#### NOTE: \_

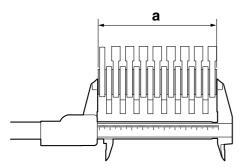
The clutch plate thickness specification listed above is for the plates with the standard thickness only. If a clutch plate with one of the other two plate thicknesses is installed, use 1.50–1.70 mm (0.059–0.067 in) or 2.20–2.40 mm (0.086– 0.094 in) for the specification according to the plate.



- 3. Measure:
  - Total width "a" of the friction plates and clutch plates

Out of specification  $\rightarrow$  Adjust.





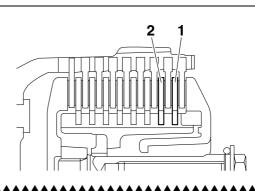
- a. Adjust the total width by replacing the clutch plate "1" and, if necessary, clutch plate "2".
- b. Select the clutch plate from the following table.

Clutch plate "1"					
Part No. Thickness					
168-16325-00	1.6 mm (0.063 in)				
3J2-16324-00	2.0 mm (0.079 in)	STD			
168-16324-00	2.3 mm (0.091 in)				

Clutch plate "2"					
Part No. Thickness					
3J2-16324-00	2.0 mm (0.079 in)	STD			
168-16324-00 2.3 mm (0.091 in)					

#### NOTE:\_

When adjusting the clutch assembly width (by replacing the clutch plate(s)), be sure to replace the clutch plate "1" first. After replacing the clutch plate "1", if specifications cannot be met, replace the clutch plate "2".



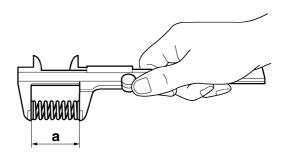
### CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

- 1. Check:
  - Clutch spring Damage  $\rightarrow$  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 55.00 mm (2.17 in) Minimum length 54.00 mm (2.13 in)

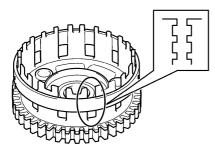


#### EAS25150 **CHECKING THE CLUTCH HOUSING**

- 1. Check:
  - Clutch housing dogs Damage/pitting/wear  $\rightarrow$  Deburr the clutch housing dogs or replace the clutch housing.

#### NOTE:

Pitting on the clutch housing dogs will cause erratic clutch operation.



- 2. Check:
- Bearing

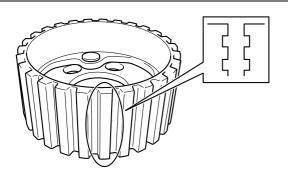
Damage/wear  $\rightarrow$  Replace the bearing and clutch housing.

#### EAS25160 CHECKING THE CLUTCH BOSS

- 1. Check:
  - Clutch boss splines Damage/pitting/wear  $\rightarrow$  Replace the clutch boss.

#### NOTE:

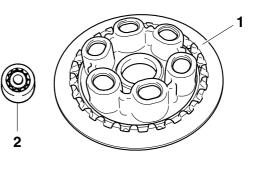
Pitting on the clutch boss splines will cause erratic clutch operation.



#### EAS25170

#### CHECKING THE PRESSURE PLATE 1. Check:

- Pressure plate "1"
- Cracks/damage  $\rightarrow$  Replace. Bearing "2"
- Damage/wear  $\rightarrow$  Replace.



#### EAS25200 **CHECKING THE PRIMARY DRIVE GEAR** 1. Check:

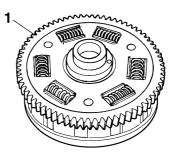
• Primary drive gear Damage/wear  $\rightarrow$  Replace the clutch housing and crankshaft as a set.

Excessive noise during operation  $\rightarrow$  Replace the clutch housing and crankshaft as a set.

#### EAS25210 CHECKING THE PRIMARY DRIVEN GEAR

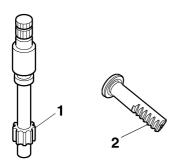
- 1. Check:
  - Primary driven gear "1" Damage/wear  $\rightarrow$  Replace the clutch housing

and crankshaft as a set. Excessive noise during operation  $\rightarrow$  Replace the clutch housing and crankshaft as a set.



#### EAS25220 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 pinion gear as a set.



2. Check: Bearing

Damage/wear  $\rightarrow$  Replace.

#### ET2C01011

#### CHECKING THE OIL PUMP DRIVE SPROCKET AND OIL PUMP DRIVE CHAIN

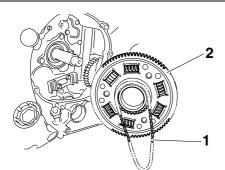
- 1. Check:
  - Oil pump drive sprocket Cracks/damage/wear  $\rightarrow$  Replace the clutch housing, oil pump drive chain, and oil pump driven sprocket as a set.
- 2. Check:
  - Oil pump drive chain Damage/stiffness  $\rightarrow$  Replace the clutch housing, oil pump drive chain, and oil pump driven sprocket as a set.

#### EAS25270 **INSTALLING THE CLUTCH**

- 1. Install:
  - Oil pump drive chain "1"
  - Clutch housing "2"

#### NOTE:

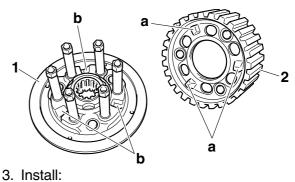
- Install the oil pump drive chain onto the clutch housing, and then install the chain onto the oil pump driven sprocket while installing the clutch housing onto the main axle.
- Make sure that the oil pump drive chain passes through the oil pump drive chain guide.



- 2. Install:
  - Clutch boss plate "1"
  - Clutch boss "2"

#### NOTE: \_

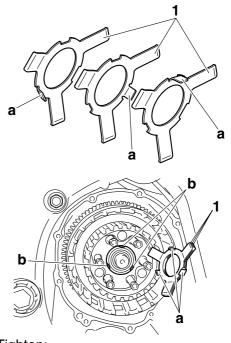
Fit the projections "a" on the clutch boss into the grooves "b" in the clutch boss plate.



Springs "1"

#### NOTE:

- Stack the springs on top of each other, making sure that the tab "a" on each spring is in a different position.
- Fit the tabs "a" on the springs into the grooves "b" in the clutch boss plate.



4. Tighten:

Clutch boss nut "1" New

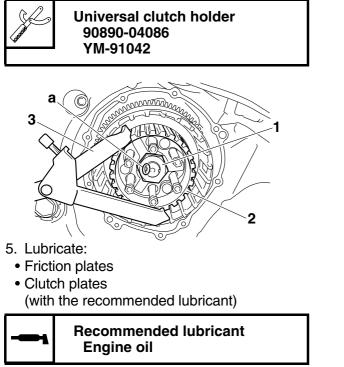
Clutch boss nut

115 Nm (11.5 m·kg, 85 ft·lb)

#### NOTE: \_

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

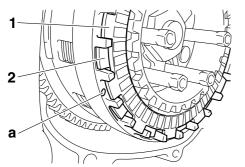
• Stake the clutch boss nut at a cutout "a" in the main axle.



- 6. Install:
  - Friction plates
  - Clutch plates

#### NOTE:

- 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.

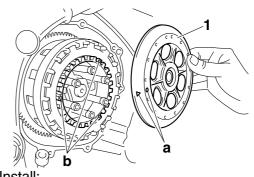


#### 7. Install:

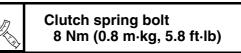
Pressure plate "1"

#### NOTE:

Align the punch marks "a" in the pressure plate with one of the three punch marks "b" in the clutch boss.

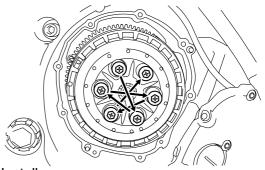


- 8. Install:
  - Seat plate
  - Clutch springs
  - Clutch spring bolts

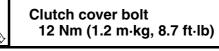


#### NOTE:

Tighten the clutch spring bolts in stages and in a crisscross pattern.



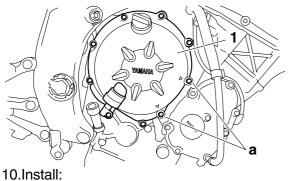
- 9. Install:
  - Dowel pins
  - Clutch cover gasket New
  - Clutch cover "1"



#### NOTE: \_

- Position the pull rod so that the teeth "a" face towards the rear of the vehicle. Then, install the clutch cover.
- Apply locking agent (LOCTITE<sup>®</sup>) to the threads of only the clutch cover bolts "a" shown in the illustration.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.

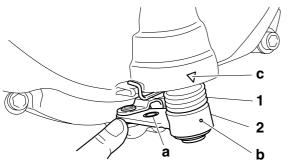
# **CLUTCH**



- Pull lever spring "1"
- Pull lever "2"
- Washer
- Circlip New

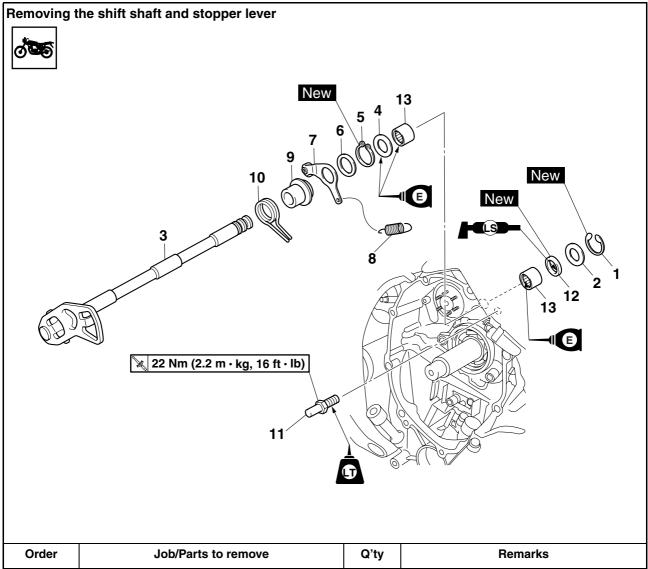
#### NOTE: \_

- Make sure that the mark "a" on the pull lever is facing up.
- When installing the pull lever, push it and check that its punch mark "b" aligns with the mark "c" on the clutch cover. Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.



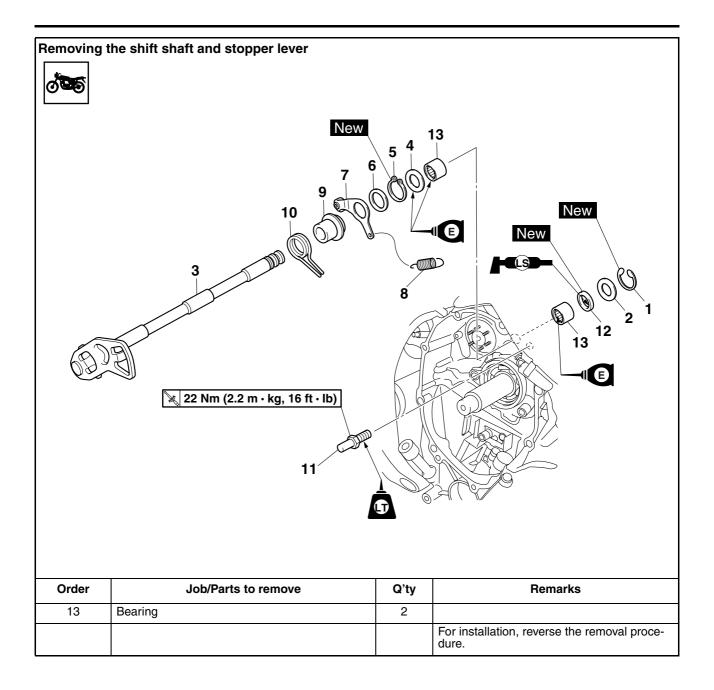
- 11.Adjust:
- Clutch cable free play Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-13.

#### EAS25410 SHIFT SHAFT



Order	Job/Parts to remove	Q'ty	Remarks
	Shift arm		Refer to "ENGINE REMOVAL" on page 5-1.
	Clutch housing		Refer to "CLUTCH" on page 5-37.
1	Circlip	1	
2	Washer	1	
3	Shift shaft	1	
4	Washer	1	
5	Circlip	1	
6	Washer	1	
7	Stopper lever	1	
8	Stopper lever spring	1	
9	Spacer	1	
10	Shift shaft spring	1	
11	Shift shaft spring stopper	1	
12	Oil seal	1	

## SHIFT SHAFT



#### EAS25420 CHECKING THE SHIFT SHAFT

- 1. Check:
  - Shift shaft Bends/damage/wear  $\rightarrow$  Replace.
  - Shift shaft spring Damage/wear → Replace.

## CHECKING THE STOPPER LEVER

- 1. Check:
  - Stopper lever Bends/damage  $\rightarrow$  Replace. Roller turns roughly  $\rightarrow$  Replace the stopper lever.
  - Stopper lever spring Damage/wear  $\rightarrow$  Replace.

#### EAS25450 INSTALLING THE SHIFT SHAFT

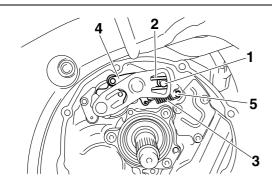
- 1. Install:
  - Shift shaft spring stopper "1"
- Shift shaft assembly
- Shift shaft spring "2"



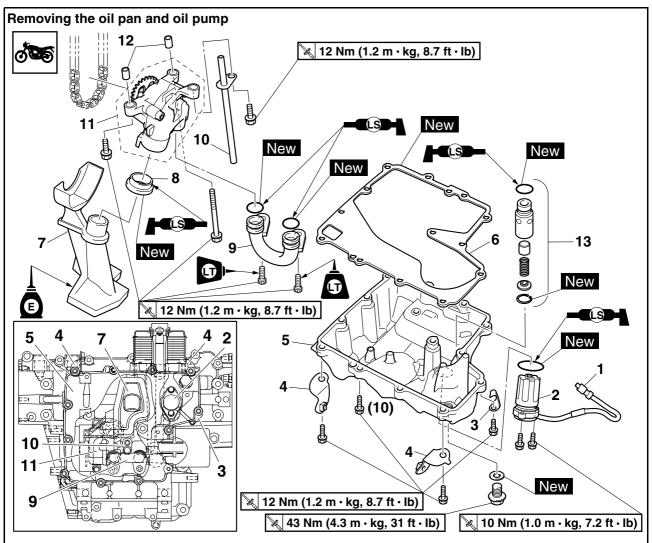
Shift shaft spring stopper 22 Nm (2.2 m·kg, 16 ft·lb) LOCTITE<sup>®</sup>

#### NOTE:

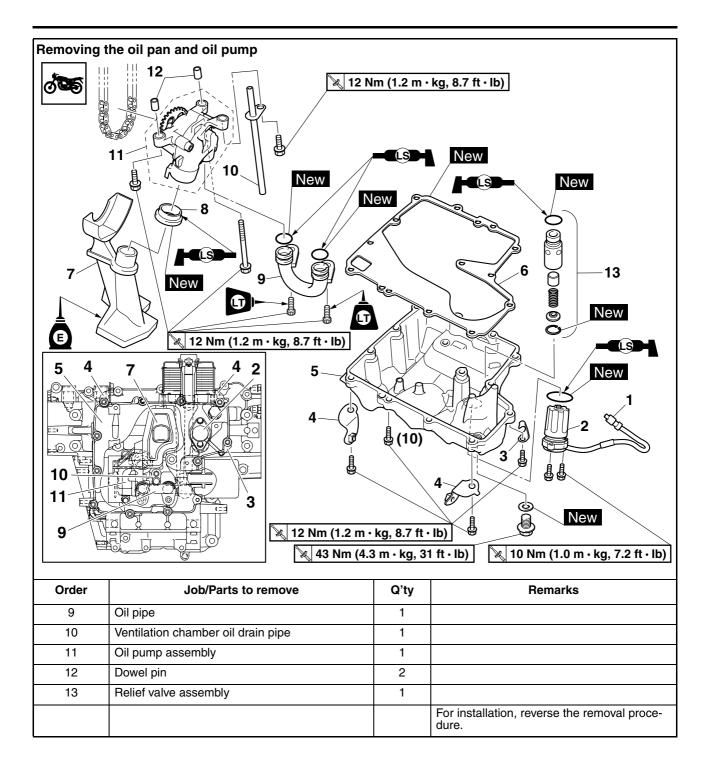
- Lubricate the oil seal lips with lithium-soapbased grease.
- Hook the end of the shift shaft spring onto the shift shaft spring stopper.
- Hook the ends of the stopper lever spring "3" onto the stopper lever "4" and the crankcase boss "5".
- Mesh the stopper lever with the shift drum segment assembly.



# OIL PUMP



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-11.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-1.
	Water pump		Refer to "WATER PUMP" on page 6-9.
	Clutch housing		Refer to "CLUTCH" on page 5-37.
1	Oil level switch coupler	1	Disconnect.
2	Oil level switch	1	
3	Oil level switch lead holder	1	
4	Bottom cowling bracket	2	
5	Oil pan	1	
6	Oil pan gasket	1	
7	Oil strainer	1	
8	Oil strainer gasket	1	



## **OIL PUMP**

Disassem	bling the oil pump		
8		4	Interview         Nm (1.0 m · kg, 7.2 ft · lb)
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump housing cover	1	
2	Pin	2	
3	Oil pump inner rotor	1	
4	Oil pump outer rotor	1	
5	Pin	1	
6	Washer	1	
7	Oil pump housing	1	
8	Oil pump driven sprocket	1	For assembly, reverse the disassembly pro- cedure.

# REMOVING THE OIL PAN

- 1. Remove:
  - Oil level switch lead holder
  - Bottom cowling brackets
  - Oil pan
  - Oil pan gasket

#### NOTE:

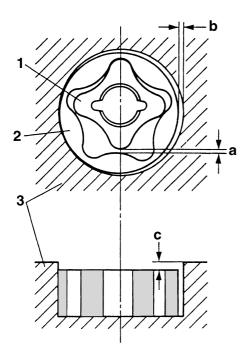
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

#### EAS24960

#### CHECKING THE OIL PUMP

- 1. Check:
  - Oil pump driven sprocket
  - Oil pump housing
  - Oil pump housing cover Cracks/damage/wear → Replace the defective part(s).
- 2. Measure:
  - Inner-rotor-to-outer-rotor-tip clearance "a"
  - Outer-rotor-to-oil-pump-housing clearance "b"
  - Oil-pump-housing-to-inner-rotor-and-outerrotor clearance "c"

Out of specification  $\rightarrow$  Replace the oil pump.

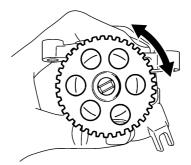


- 1. Inner rotor
- 2. Outer rotor
- 3. Oil pump housing



Inner-rotor-to-outer-rotor-tip clearance Less than 0.12 mm (0.0047 in) Limit 0.20 mm (0.0079 in) Outer-rotor-to-oil-pump-housing clearance 0.090-0.150 mm (0.0035-0.0059 in) Limit 0.220 mm (0.0087 in) Oil-pump-housing-to-inner-andouter-rotor clearance 0.06-0.11 mm (0.0024-0.0043 in) Limit 0.18 mm (0.0071 in)

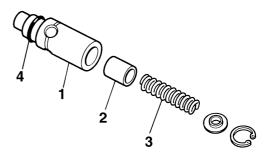
- 3. Check:
  - Oil pump operation Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



#### EAS24970 CHECKING THE RELIEF VALVE

- 1. Check:
- Relief valve body "1"
- Relief valve "2"
- Spring "3"
- O-ring "4"

Damage/wear  $\rightarrow$  Replace the defective part(s).



# CHECKING THE OIL PIPES

The following procedure applies to all of the oil delivery pipes.

- 1. Check:
  - Ventilation chamber oil drain pipe
  - Oil pipe
    - $\mathsf{Damage} \to \mathsf{Replace}.$

Obstruction  $\rightarrow$  Wash and blow out with compressed air.

#### EAS24990

#### **CHECKING THE OIL STRAINER**

- 1. Check:
  - Oil strainer
    - Damage  $\rightarrow$  Replace.

Contaminants  $\rightarrow$  Clean with solvent.

# ASSEMBLING THE OIL PUMP

- 1. Lubricate:
- Inner rotor
- Outer rotor
- Oil pump shaft

(with the recommended lubricant)

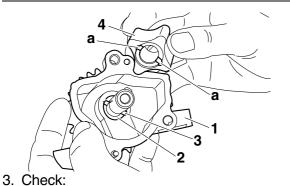


Recommended lubricant Engine oil

- 2. Install:
  - Oil pump driven sprocket
  - Oil pump housing "1"
  - Washer "2"
  - Pin "3"
- Oil pump inner rotor "4"
- Oil pump outer rotor

#### NOTE:

When installing the inner rotor, align the pin "3" in the oil pump shaft with the groove "a" in the inner rotor "4".



 Oil pump operation Refer to "CHECKING THE OIL PUMP" on page 5-53.

#### EAS25050 INSTALLING THE OIL PAN

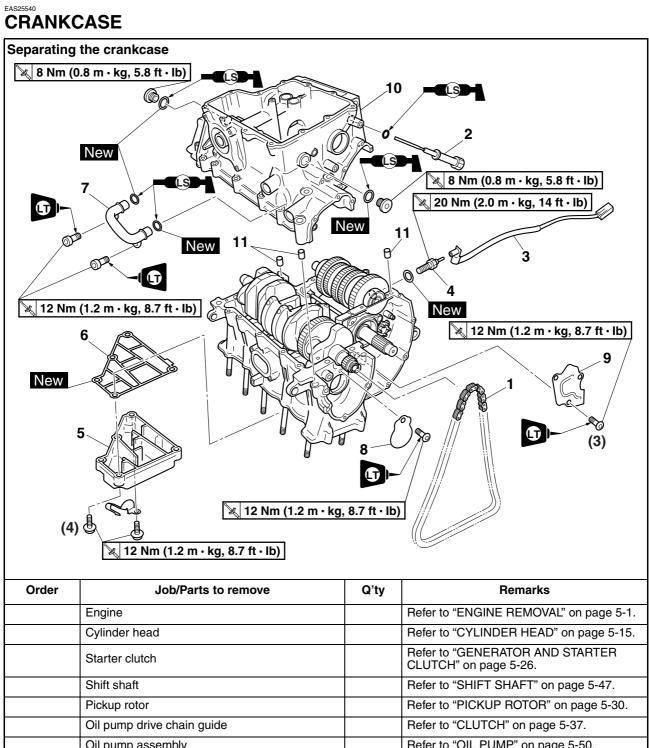
- 1. Install:
- Oil pan gasket New
- Oil pan
- Bottom cowling brackets
- Oil level switch lead holder



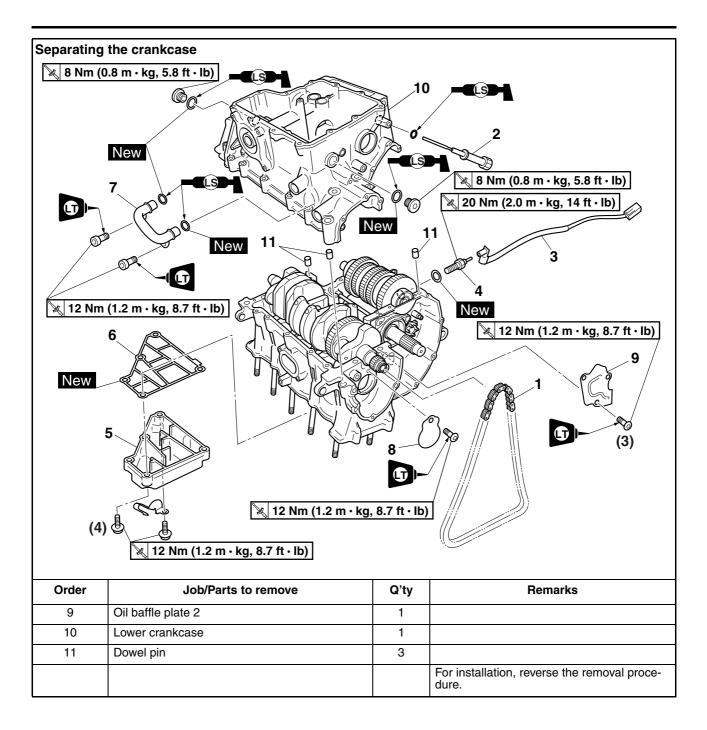
Oil pan bolt 12 Nm (1.2 m⋅kg, 8.7 ft⋅lb)

#### NOTE:

Tighten the oil pan bolts in stages and in a crisscross pattern.



	Oil pump drive chain guide		Refer to "CLUTCH" on page 5-37.
	Oil pump assembly		Refer to "OIL PUMP" on page 5-50.
1	Timing chain	1	
2	Dipstick	1	
3	Neutral switch lead	1	
4	Neutral switch	1	
5	Ventilation chamber cover	1	
6	Ventilation chamber cover gasket	1	
7	Oil pipe	1	
8	Oil baffle plate 1	1	

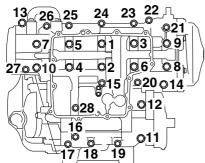


#### EAS25550 DISASSEMBLING THE CRANKCASE

- 1. Place the engine upside down.
- 2. Remove:
- Crankcase bolts

#### NOTE:

- Loosen each bolt 1/4 of a turn at a time. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.
  - M8 × 115 mm bolts: "8", "9"
  - M8 × 85 mm bolts: "1"-"7", "10"
  - M8 × 65 mm bolts: "11", "12"
  - M6 × 80 mm bolt: "28"
  - M6 × 65 mm shoulder bolts: "13", "14"
  - M6 × 65 mm bolts: "16", "20", "21"
  - M6 × 55 mm bolts: "15", "22"–"27"
  - M6 × 45 mm bolts: "17"–"19"



- 3. Remove:
- Lower crankcase

## CAUTION:

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.

#### EAS25580

#### **CHECKING THE CRANKCASE**

- 1. Thoroughly wash the crankcase halves in a mild solvent.
- 2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
- 3. Check:
  - Crankcase
    - $\label{eq:cracks} \mbox{Cracks/damage} \rightarrow \mbox{Replace}.$
  - Oil delivery passages Obstruction  $\rightarrow$  Blow out with compressed air.

# CHECKING THE OIL PIPE

- 1. Check:
- Oil pipe
- Damage  $\rightarrow$  Replace. Obstruction  $\rightarrow$  Wash and blow out with compressed air.

#### EAS25620 CHECKING THE TIMING CHAIN

Refer to "CAMSHAFTS" on page 5-7.

# ASSEMBLING THE CRANKCASE

- 1. Lubricate:
- Crankshaft journal bearings (with the recommended lubricant)



#### Recommended lubricant Engine oil

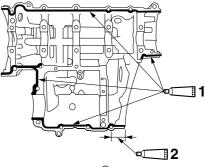
- 2. Apply:
- Sealant

(onto the crankcase mating surfaces)

Yamaha bond No. 1215 90890-85505 (Three Bond No.1215<sup>®</sup>)

#### NOTE: \_

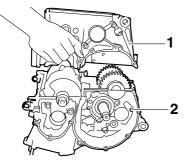
Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2–3 mm (0.08–0.12 in) of the crankshaft journal bearings.



- 1. Three Bond No.1215<sup>®</sup>
- 2. Three Bond No.1280B
- 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")

# CAUTION:

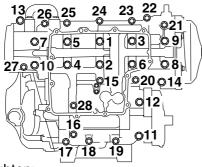
Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.



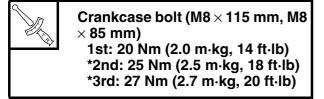
- 6. Install:
- Crankcase bolts

#### NOTE:

- Lubricate the bolts "1"-"10" thread part and washers with engine oil.
- Lubricate the bolts "11"-"28" thread part and mating surfaces with engine oil.
- Finger tighten the crankcase bolts.
  - M8 × 115 mm bolts: "8", "9"
  - M8 × 85 mm bolts: "1"-"7", "10"
  - $\bullet$  M8  $\times$  65 mm bolts: "11", "12"
  - M6 × 80 mm bolt: "28"
  - M6  $\times$  65 mm shoulder bolts: "13", "14"
  - M6 × 65 mm bolts: "16", "20", "21"
  - M6 × 55 mm bolts: "15", "22"–"27"
  - M6 × 45 mm bolts: "17"--"19"



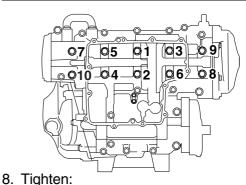
- 7. Tighten:
- Crankcase bolts "1"-"10"



\*Loosen all bolts following the tightening order and then tighten to specification torque.

#### NOTE:\_

Tighten the bolts in the tightening sequence cast on the crankcase.



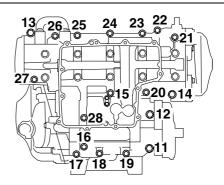
Crankcase bolts "11"–"28"



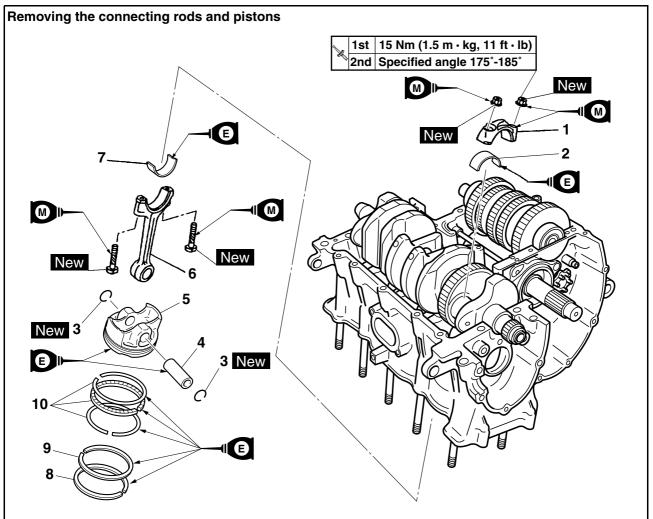
Crankcase bolt (M8  $\times$  65 mm) 24 Nm (2.4 m·kg, 17 ft·lb) Crankcase bolt (M6) 10 Nm (1.0 m·kg, 7.2 ft·lb)

#### NOTE:\_

Tighten the bolts in the tightening sequence cast on the crankcase.



# CONNECTING RODS AND PISTONS



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-55.
1	Connecting rod cap	4	
2	Big end lower bearing	4	
3	Piston pin clip	8	
4	Piston pin	4	
5	Piston	4	
6	Connecting rod	4	
7	Big end upper bearing	4	
8	Top ring	4	
9	2nd ring	4	
10	Oil ring	4	
			For installation, reverse the removal proce- dure.

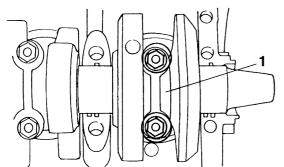
#### EAS26030 **REMOVING THE CONNECTING RODS AND** PISTONS

The following procedure applies to all of the connecting rods and pistons.

- 1. Remove:
- Connecting rod cap "1"

#### NOTE:

Identify the position of each connecting rod so that it can be reinstalled in its original place.



- 2. Remove:
  - Big end bearings

(from the connecting rods and connecting rod caps)

#### NOTE:

Identify the position of each big end bearing so that it can be reinstalled in its original place.

- 3. Remove:
  - Piston pin clips "1"
  - Piston pin "2"
  - Piston "3"
  - Connecting rod "4"

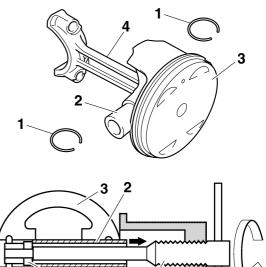
#### ECA13810 **CAUTION:**

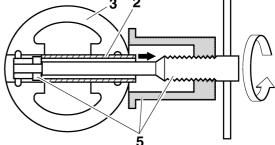
#### Do not use a hammer to drive the piston pin out.

#### NOTE:

- · For reference during installation, put an identification mark on each piston crown.
- Before removing the piston pin, deburr the piston pin clip's groove and the piston's pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set "5".

Piston pin puller set 90890-01304 **Piston pin puller** YU-01304

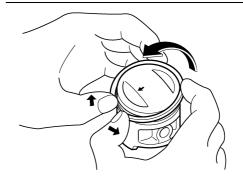




- 4. Remove:
  - Top ring
  - 2nd ring
  - Oil ring

#### NOTE:

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



#### EAS24410 CHECKING THE CYLINDERS AND PISTONS

The following procedure applies to all of the cylinders and pistons.

- 1. Check:
  - Piston wall
  - Cylinder wall Vertical scratches  $\rightarrow$  Rebore or 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.

#### NOTE:\_

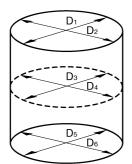
Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

> Bore 67.000–67.010 mm (2.6378– 2.6382 in) Taper limit 0.050 mm (0.0020 in) Out of round limit 0.050 mm (0.0020 in)

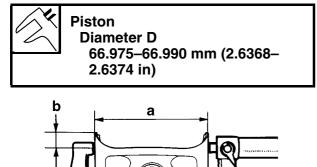
"C" = maximum of  $D_1 - D_6$ 

"T" = maximum of  $D_1$  or  $D_2$  - maximum of  $D_5$  or  $D_6$ 

"R" = maximum of  $D_1$ ,  $D_3$  or  $D_5$  - minimum of  $D_2$ ,  $D_4$  or  $D_6$ 



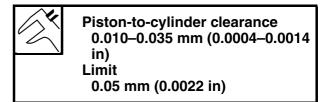
- b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.
- c. Measure piston skirt diameter D "a" with the micrometer.





b. 10 mm (0.39 in) from the bottom edge of the piston

- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.
- Piston-to-cylinder clearance = Cylinder bore "C" -Piston skirt diameter "D"



f. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.

#### \*\*\*\*\*

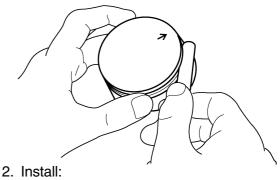
#### CHECKING THE PISTON RINGS

- 1. Measure:
- Piston ring side clearance Out of specification → Replace the piston and piston rings as a set.

#### NOTE:

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.



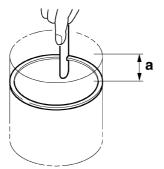


 Piston ring (into the cylinder)

# **CONNECTING RODS AND PISTONS**

#### NOTE:

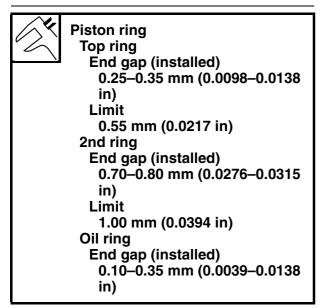
Level the piston ring into the cylinder with the piston crown.



- a. 5 mm (0.20 in)
- 3. Measure:
  - Piston ring end gap Out of specification → Replace the piston ring.

#### NOTE:

The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.



EAS24440

#### **CHECKING THE PISTON PINS**

The following procedure applies to all of the piston pins.

- 1. Check:
- Piston pin Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
- 2. Measure:
  - Piston pin outside diameter "a"
     Out of specification → Replace the piston pin.

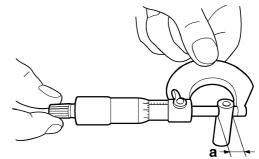


Piston pin outside diameter 14.991–15.000 mm (0.5902–

0.5906 in)

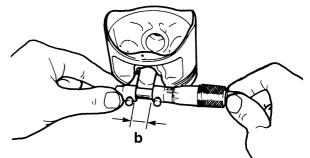
Limit

14.971 mm (0.5894 in)



- 3. Measure:
  - Piston pin bore diameter "b" Out of specification  $\rightarrow$  Replace the piston.





- 4. Calculate:
- Piston-pin-to-piston-pin-bore clearance Out of specification → Replace the piston pin and piston as a set.
- Piston-pin-to-piston-pin-bore clearance = Piston pin bore diameter "b" -Piston pin outside diameter "a"

# K

Piston-pin-to-piston-pin-bore clearance 0.002–0.022 mm (0.00007– 0.00068 in)

# CHECKING THE CONNECTING RODS

- 1. Measure:
- Crankshaft-pin-to-big-end-bearing clearance Out of specification → Replace the big end bearings.

Oil clearance (using plastigauge<sup>®</sup>) 0.037–0.061 mm (0.0015–0.0024 in)

The following procedure applies to all of the connecting rods.

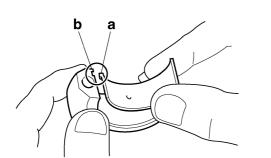
#### CAUTION:

Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

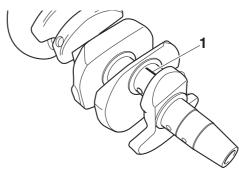
- a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
- b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

#### NOTE:

Align the projections "a" on the big end bearings with the notches "b" in the connecting rod and connecting rod cap.



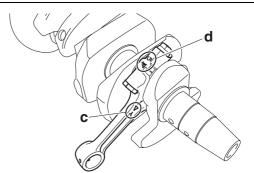
c. Put a piece of Plastigauge<sup>®</sup> "1" on the crankshaft pin.



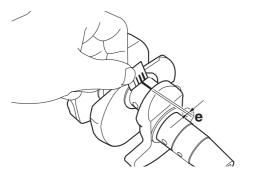
d. Assemble the connecting rod halves.

NOTE: \_

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads and nut seats with molybdenum disulfide grease.
- Make sure the "Y" mark "c" on the connecting rod faces towards the left side of the crank-shaft.
- Make sure the characters "d" on both the connecting rod and connecting rod cap are aligned.



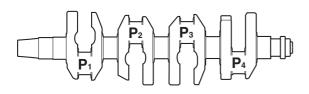
- e. Tighten the connecting rod nuts. Refer to "INSTALLING THE CONNECTING RODS AND PISTONS" on page 5-64.
- f. Remove the connecting rod and big end bearings.
   Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-60.
- g. Measure the compressed Plastigauge<sup>®</sup> width "e" on the crankshaft pin.
   If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.

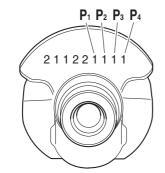


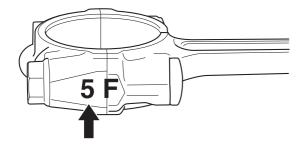
- \*\*\*\*\*
- 2. Select:
- Big end bearings (P<sub>1</sub>-P<sub>4</sub>)

#### NOTE:

- The numbers stamped into the crankshaft web and the numbers on the connecting rods are used to determine the replacement big end bearing sizes.
- P<sub>1</sub>-P<sub>4</sub> refer to the bearings shown in the crankshaft illustration.







For example, if the connecting rod  $P_1$  and the crankshaft web  $P_1$  numbers are 5 and 1 respectively, then the bearing size for  $P_1$  is:

P<sub>1</sub> (connecting rod) - P<sub>1</sub> (crankshaft)

5 - 1 = 4 (green)

- A

Bearing color code 1.Blue 2.Black 3.Brown 4.Green

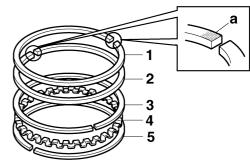
#### INSTALLING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the pistons and connecting rods.

- 1. Install:
  - Top ring "1"
  - 2nd ring "2"
- Upper oil ring rail "3"
- Oil ring expander "4"
- Lower oil ring rail "5"

#### NOTE: \_

Be sure to install the piston rings so that the manufacturer's marks or numbers "a" face up.

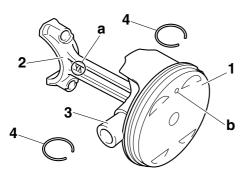


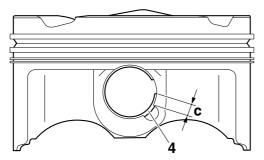
- 2. Install:
  - Piston "1"
    - (onto the respective connecting rod "2")
  - Piston pin "3"
- Piston pin clips "4" New

#### NOTE:

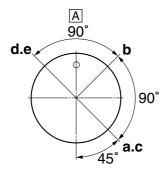
- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark "a" on the connecting rod left when the punch mark "b" on the piston is pointing up. Refer to the illustration.
- Install the piston pin clips, so that the clip ends are 3 mm (0.12 in) "c" or more from the cutout in the piston.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).

# **CONNECTING RODS AND PISTONS**





- 3. Offset:
- Piston ring end gaps



- a. Top ring
- b. Upper oil ring rail
- c. Oil ring expander
- d. 2nd ring
- e. Lower oil ring rail
- A. Exhaust side
- 4. Lubricate:
  - Piston
  - Piston rings
  - Cylinder

(with the recommended lubricant)

#### Recommended lubricant Engine oil

- 5. Lubricate:
  - Bolt threads
  - Nut seats (with the recommended lubricant)

# \_\_\_\_\_

#### Recommended lubricant Molybdenum disulfide oil

6. Lubricate:

- Crankshaft pins
- Big end bearings
- Connecting rod inner surface (with the recommended lubricant)

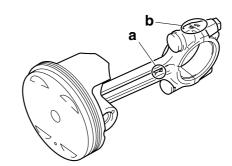


7. Install:

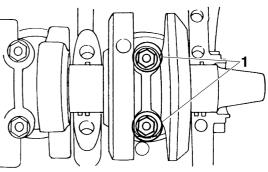
- Big end bearings
- Connecting rod and piston assembly
  Connecting rod cap

NOTE: \_

- Align the projections on the big end bearings with the notches in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- While compressing the piston rings one hand, install the connecting rod assembly into the cylinder with the other hand.
- Make sure the "Y" marks "a" on the connecting rods face towards the left side of the crank-shaft.
- Make sure the characters "b" on both the connecting rod and connecting rod cap are aligned.



- 8. Tighten:
- Connecting rod nuts "1"



#### EW2C01007

#### 

Replace the connecting rod bolts and nuts with new ones.

#### NOTE:

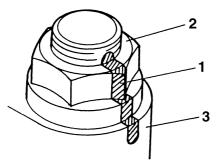
Tighten the connecting rod nuts using the following procedure.

a. Tighten the connecting rod nuts with a torque wrench.



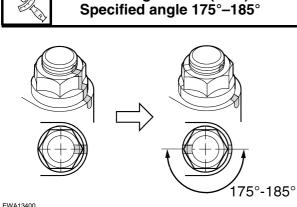
#### Connecting rod nut (1st) 15 Nm (1.5 m·kg, 11 ft·lb)

b. Put a mark "1" on the corner of the connecting rod nut "2" and the connecting rod "3".



c. Tighten the connecting rod nuts further to reach the specified angle 175°–185°.

Connecting rod nut (final)



#### 

If the connecting rod nut is tightened more than the specified angle, do not loosen the nut and then retighten it. Instead, replace the connecting rod bolt and nut with a new one and perform the procedure again.

CAUTION:

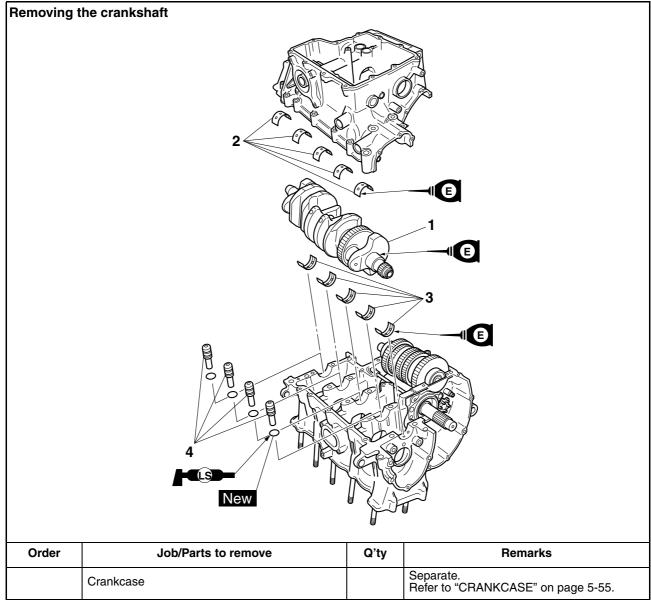
Do not use a torque wrench to tighten the connecting rod nut to the specified angle.

#### NOTE: \_

On a hexagonal nut, note that the angle from one corner to another is  $60^{\circ}$ .

#### \*\*\*\*\*

# CRANKSHAFT



Order	Job/Parts to remove	Qiy	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-55.
	Connecting rod caps		Refer to "CONNECTING RODS AND PIS- TONS" on page 5-59.
1	Crankshaft	1	
2	Crankshaft journal lower bearing	5	
3	Crankshaft journal upper bearing	5	
4	Oil nozzle	4	
			For installation, reverse the removal proce- dure.

# REMOVING THE CRANKSHAFT JOURNAL BEARINGS

- 1. Remove:
  - Crankshaft journal lower bearings (from the lower crankcase)
  - Crankshaft journal upper bearings (from the upper crankcase)

#### NOTE:

Identify the position of each crankshaft journal bearing so that it can be reinstalled in its original place.

#### ET2C01018

#### CHECKING THE OIL NOZZLES

The following procedure applies to all of the oil nozzles.

- 1. Check:
- Oil nozzle
- Damage/wear  $\rightarrow$  Replace the oil nozzle. • O-ring

 $\text{Damage/wear} \rightarrow \text{Replace}.$ 

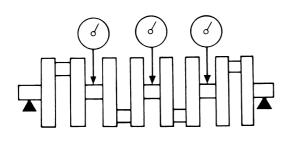
• Oil passage Obstruction  $\rightarrow$  Blow out with compressed air.

#### CHECKING THE CRANKSHAFT AND CONNECTING RODS

- 1. Measure:
- Crankshaft runout Out of specification → Replace the crankshaft.

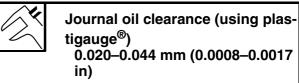


Runout limit C 0.030 mm (0.0012 in)



- 2. Check:
  - Crankshaft journal surfaces
- Crankshaft pin surfaces
- Bearing surfaces Scratches/wear  $\rightarrow$  Replace the crankshaft.

- 3. Measure:
- Crankshaft-journal-to-crankshaft-journalbearing clearance
   Out of specification → Replace the crankshaft journal bearings.



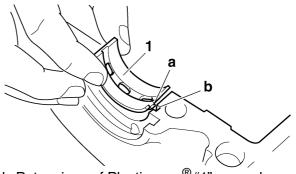
# CAUTION:

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaftjournal-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 crank-case.

#### NOTE:

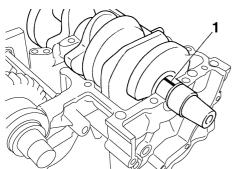
Align the projections "a" on the crankshaft journal upper bearings with the notches "b" in the upper crankcase.



d. Put a piece of Plastigauge<sup>®</sup> "1" on each crankshaft journal.

NOTE:

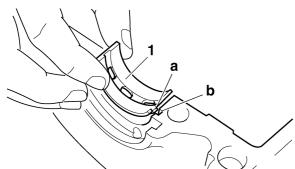
Do not put the Plastigauge<sup>®</sup> over the oil hole in the crankshaft journal.



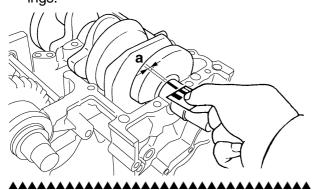
e. Install the crankshaft journal lower bearings "1" into the lower crankcase and assemble the crankcase halves.

#### NOTE:

- Align the projections "a" of the crankshaft journal lower bearings with the notches "b" in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



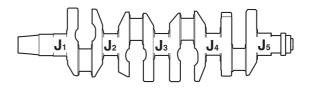
- f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.
   Refer to "CRANKCASE" on page 5-55.
- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- Measure the compressed Plastigauge<sup>®</sup> width "a" on each crankshaft journal. If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.

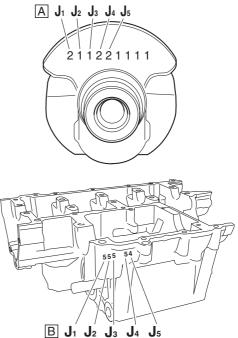


- 4. Select:
- Crankshaft journal bearings (J1-J5)

#### NOTE: \_

- 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>5</sub> refer to the bearings shown in the crankshaft illustration.
- If J<sub>1</sub>–J<sub>5</sub> are the same, use the same size for all of the bearings.





For example, if the crankcase  $J_1$  and crankshaft web  $J_1$  numbers are 6 and 2 respectively, then the bearing size for  $J_1$  is:

J<sub>1</sub> (crankcase) - J<sub>1</sub> (crankshaft web)

6 - 2 = 4 (green)

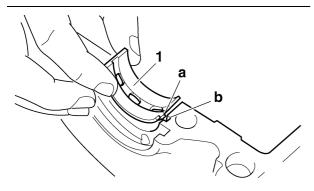
Bearing color code 1.Blue 2.Black 3.Brown 4.Green 5.Yellow

#### EAS26200 INSTALLING THE CRANKSHAFT

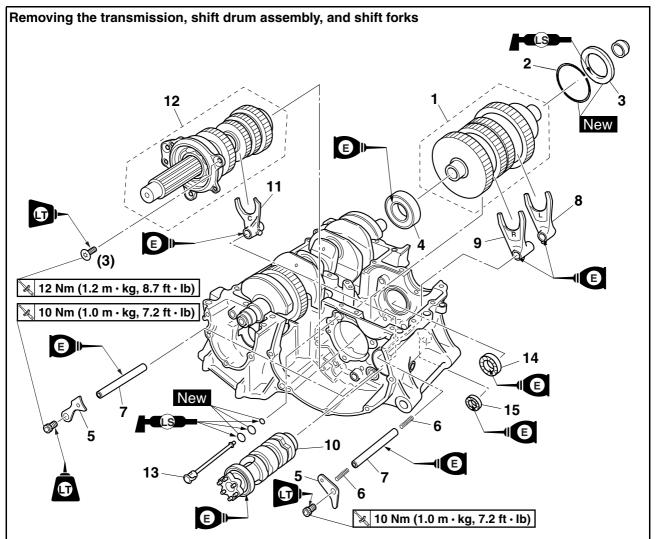
- 1. Install:
  - Crankshaft journal upper bearings (into the upper crankcase)
  - Crankshaft journal lower bearings (into the lower crankcase)

#### NOTE:

- Align the projections "a" on the crankshaft journal bearings "1" with the notches "b" in the crankcases.
- Be sure to install each crankshaft journal bearing in its original place.

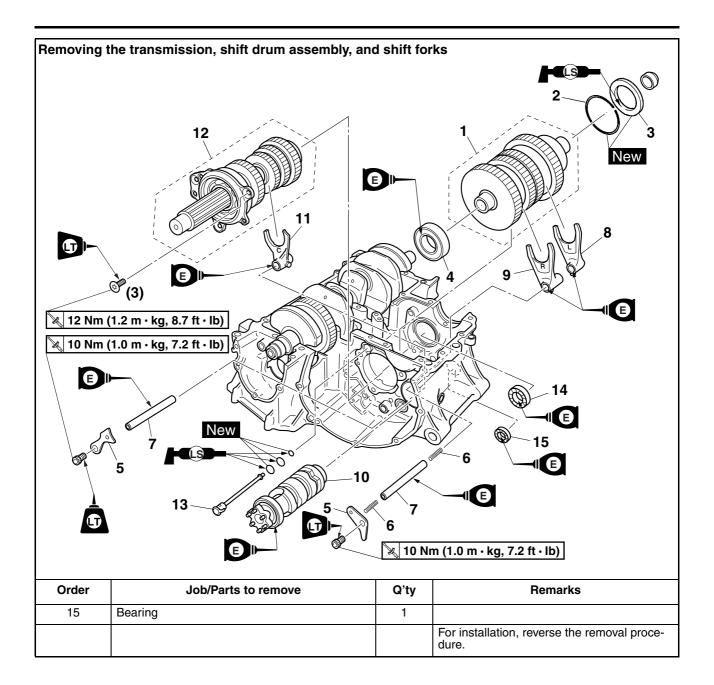


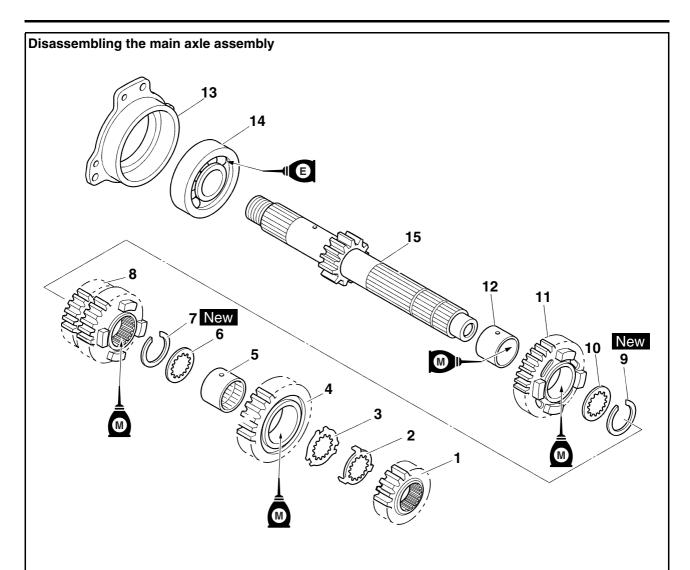
# TRANSMISSION



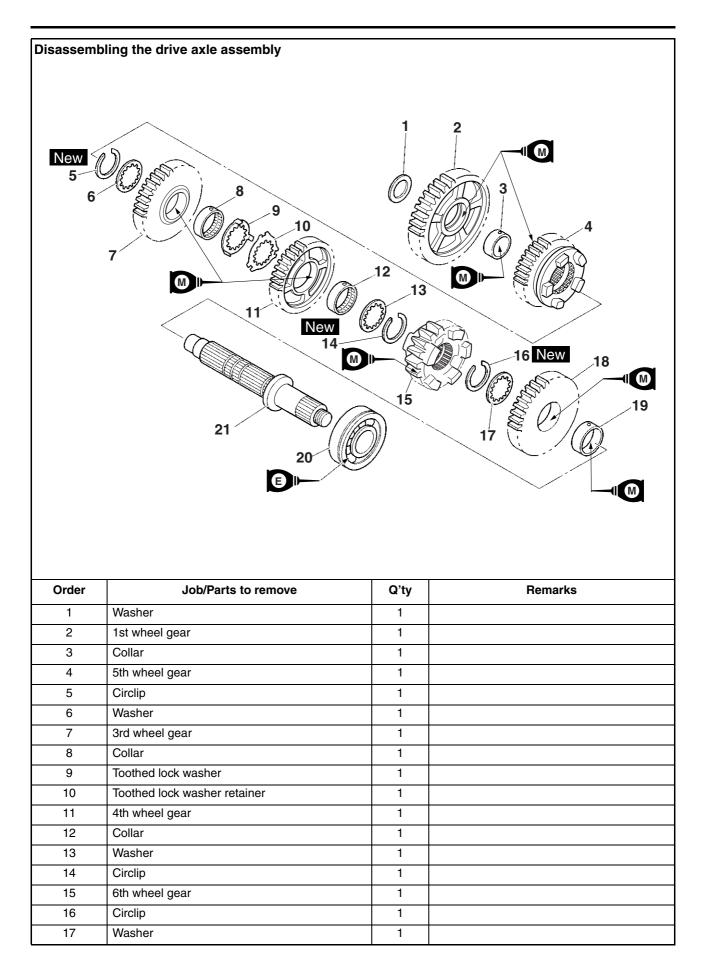
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-55.
1	Drive axle assembly	1	
2	Circlip	1	
3	Oil seal	1	
4	Bearing	1	
5	Shift drum retainer	2	
6	Spring	2	
7	Shift fork guide bar	2	
8	Shift fork-L	1	
9	Shift fork-R	1	
10	Shift drum assembly	1	
11	Shift fork-C	1	
12	Main axle assembly	1	
13	Oil pipe	1	
14	Bearing	1	

### TRANSMISSION

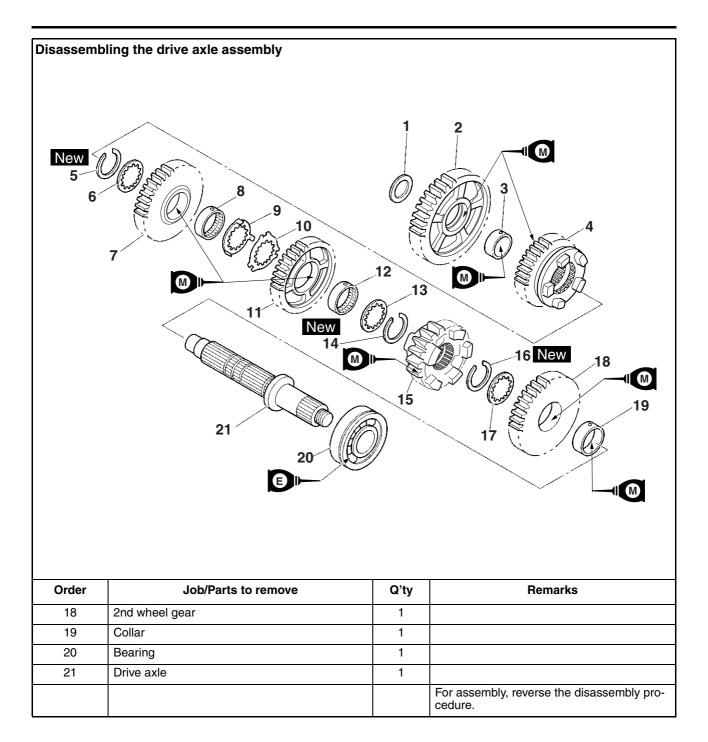




Order	Job/Parts to remove	Q'ty	Remarks
1	2nd pinion gear	1	
2	Toothed lock washer	1	
3	Toothed lock washer retainer	1	
4	6th pinion gear	1	
5	Collar	1	
6	Washer	1	
7	Circlip	1	
8	3rd/4th pinion gear	1	
9	Circlip	1	
10	Washer	1	
11	5th pinion gear	1	
12	Collar	1	
13	Bearing housing	1	
14	Bearing	1	
15	Main axle/1st pinion gear	1	
			For assembly, reverse the disassembly pro- cedure.

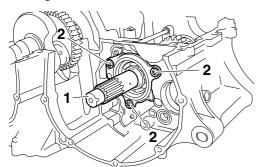


### TRANSMISSION

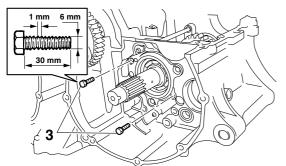


#### ET2C01014 **REMOVING THE TRANSMISSION**

- 1. Remove:
- Main axle assembly "1"
- \*\*\*\*\*
- a. Remove the main axle assembly bearing housing bolts "2"



b. Insert two bolts "3" of the proper size, as shown in the illustration, into the main axle assembly bearing housing.



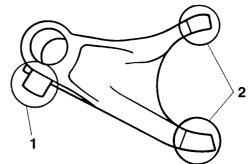
- c. Tighten the bolts until they contact the crankcase surface.
- d. Continue tightening the bolts until the main axle assembly comes free from the upper crankcase.

\*\*\*\*\*

#### EAS26260 **CHECKING THE SHIFT FORKS**

The following procedure applies to all of the shift forks.

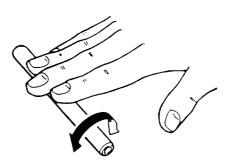
- 1. Check:
  - Shift fork cam follower "1"
  - Shift fork pawl "2" Bends/damage/scoring/wear  $\rightarrow$  Replace the shift fork.



- 2. Check:
- · Shift fork guide bar Roll the shift fork guide bar on a flat surface. Bends  $\rightarrow$  Replace.

#### 

Do not attempt to straighten a bent shift fork guide bar.



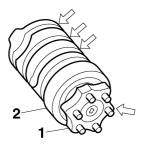
- 3. Check:
  - Shift fork movement (along the shift fork guide bar) Rough movement  $\rightarrow$  Replace the shift forks and shift fork guide bar as a set.



EAS26270

- CHECKING THE SHIFT DRUM ASSEMBLY
- 1. Check:
  - Shift drum groove Damage/scratches/wear  $\rightarrow$  Replace the shift drum assembly.
  - Shift drum segment "1" Damage/wear  $\rightarrow$  Replace the shift drum assembly.

 Shift drum bearing "2" Damage/pitting → Replace the shift drum assembly.



#### EAS26300

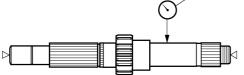
#### CHECKING THE TRANSMISSION

- 1. Measure:
  - Main axle runout (with a centering device and dial gauge "1") Out of specification → Replace the main axle.



Main axle runout limit 0.02 mm (0.0008 in)

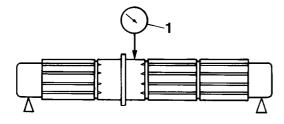




- 2. Measure:
- Drive axle runout

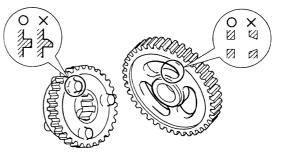
(with a centering device and dial gauge "1") Out of specification  $\rightarrow$  Replace the drive axle.

#### Drive axle runout limit 0.02 mm (0.0008 in)



- 3. Check:
  - Transmission gears Blue discoloration/pitting/wear → Replace the defective gear(s).

- Transmission gear dogs
- Cracks/damage/rounded edges  $\rightarrow$  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  $\rightarrow$  Replace.

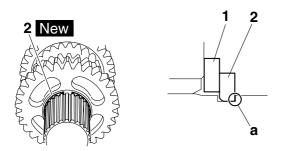
# ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

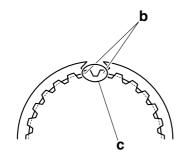
- 1. Install:
- Toothed washer "1"
- Circlip "2" New

NOTE:

- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the toothed washer and gear.
- Install the circlip so that both ends "b" rest on the sides of a spline "c" with both axles aligned.

## TRANSMISSION



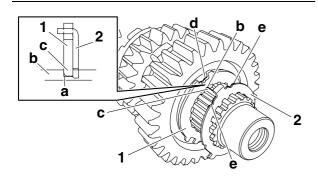


#### 2. Install:

- Toothed lock washer retainer "1"
- Toothed lock washer "2"

#### NOTE:

- With the toothed lock washer retainer "1" in the groove "a" in the axle, align the projection "c" on the retainer with an axle spline "b", and then install the toothed lock washer "2".
- Be sure to align the projection on the toothed lock washer that is between the alignment marks "e" with the alignment mark "d" on the retainer.



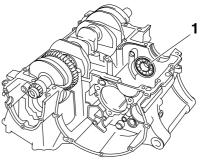
#### ET2C01016

#### INSTALLING THE TRANSMISSION

- 1. Install:
  - Bearing "1"

#### NOTE:

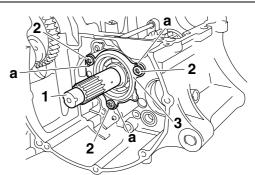
Face the seal side of the bearing to the outside and install it close to the right side end of the crankcase.



- 2. Install:
- Main axle assembly "1"

#### NOTE:

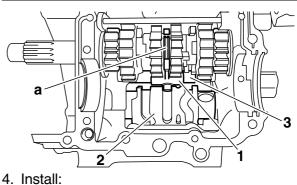
Stake the main axle assembly bearing housing bolts "2" at a cutout "a" in the main axle assembly bearing housing "3".



- 3. Install:
  - Shift fork-C "1"
  - Shift drum assembly "2"
  - Shift fork guide bar "3"

#### NOTE:

- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: "R", "C", "L".
- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork-C into the groove "a" in the 3rd and 4th pinion gear on the main axle.



- . Instal
- Shift fork-R "1"
- Shift fork-L "2"

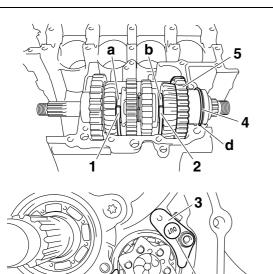
- Shift fork guide bar
- Springs
- Shift drum retainers "3"
- Bearing
- Oil seal
- Circlip "4"
- Drive axle assembly "5"



Shift drum retainer bolt 10 Nm (1.0 m·kg, 7.2 ft·lb) LOCTITE<sup>®</sup>

NOTE: \_

- 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.
- Make sure that the drive axle bearing circlip "4" is inserted into the grooves "d" in the upper crankcase.



C

## **COOLING SYSTEM**

RADIATOR	6-1
CHECKING THE RADIATOR	
INSTALLING THE RADIATOR	6-3
OIL COOLER	6-4
CHECKING THE OIL COOLER	6-6
INSTALLING THE OIL COOLER	6-6
THERMOSTAT	6-7
CHECKING THE THERMOSTAT	6-8
INSTALLING THE THERMOSTAT	6-8
WATER PUMP	6-9
CHECKING THE WATER PUMP	6-10
INSTALLING THE WATER PUMP	

## RADIATOR

9

10

11

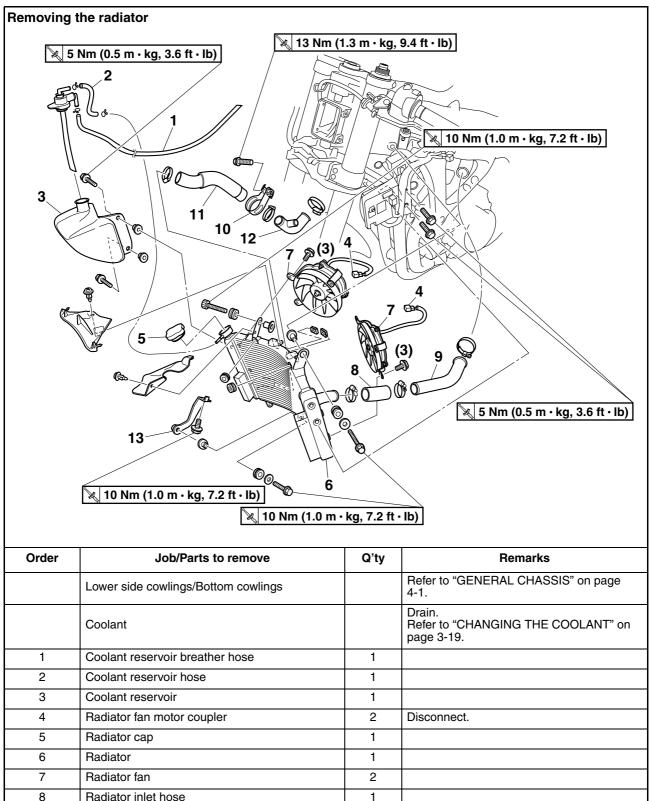
12

Radiator inlet pipe

Radiator outlet hose

Radiator outlet pipe

Radiator outlet hose holder



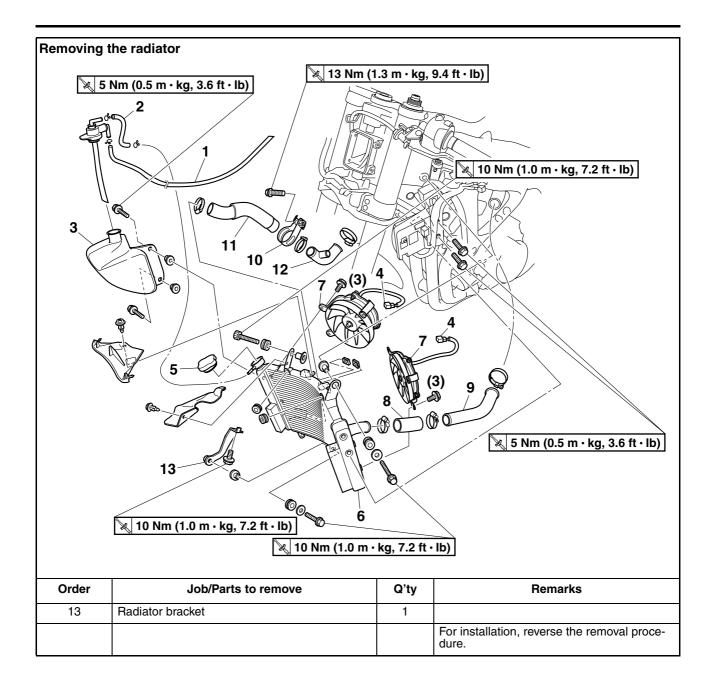
1

1

1

1

### RADIATOR

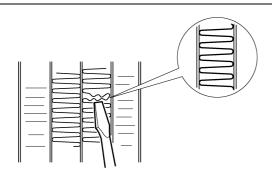


#### EAS26390 CHECKING THE RADIATOR

- 1. Check:
  - Radiator fins Obstruction  $\rightarrow$  Clean. Apply compressed air to the rear of the radiator.
    - Damage  $\rightarrow$  Repair or replace.

#### NOTE:

Straighten any flattened fins with a thin, flat-head screwdriver.



- 2. Check:
  - Radiator hoses
  - Radiator pipes Cracks/damage  $\rightarrow$  Replace.
- 3. Measure:
  - Radiator cap opening pressure Below the specified pressure  $\rightarrow$  Replace the radiator cap.

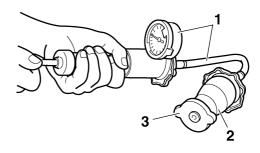


Radiator cap opening pressure 107.9–137.3 kPa (15.6–19.9 psi) (1.08-1.37 kgf/cm<sup>2</sup>)

\*\*\*

a. Install the radiator cap tester "1" and radiator cap tester adapter "2" to the radiator cap "3".

Ļ	Radiator cap tester 90890-01325 Radiator pressure tester YU-24460-01 Radiator cap tester adapter 90890-01352 Radiator pressure tester adapter
	Radiator pressure tester adapter YU-33984



b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

#### \*\*\*\*\*

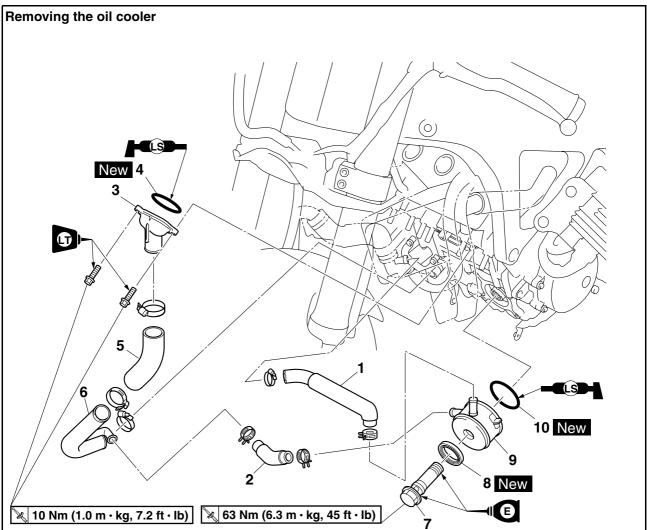
- 4. Check:
  - Radiator fan Damage  $\rightarrow$  Replace. Malfunction  $\rightarrow$  Check and repair. Refer to "COOLING SYSTEM" on page 8-29.

### **INSTALLING THE RADIATOR**

- 1. Fill:
  - Cooling system (with the specified amount of the recommended coolant) Refer to "CHANGING THE COOLANT" on page 3-19.
- 2. Check:
  - Cooling system Leaks  $\rightarrow$  Repair or replace any faulty part.
- 3. Measure:
  - Radiator cap opening pressure Below the specified pressure  $\rightarrow$  Replace the radiator cap. Refer to "CHECKING THE RADIATOR" on page 6-3.

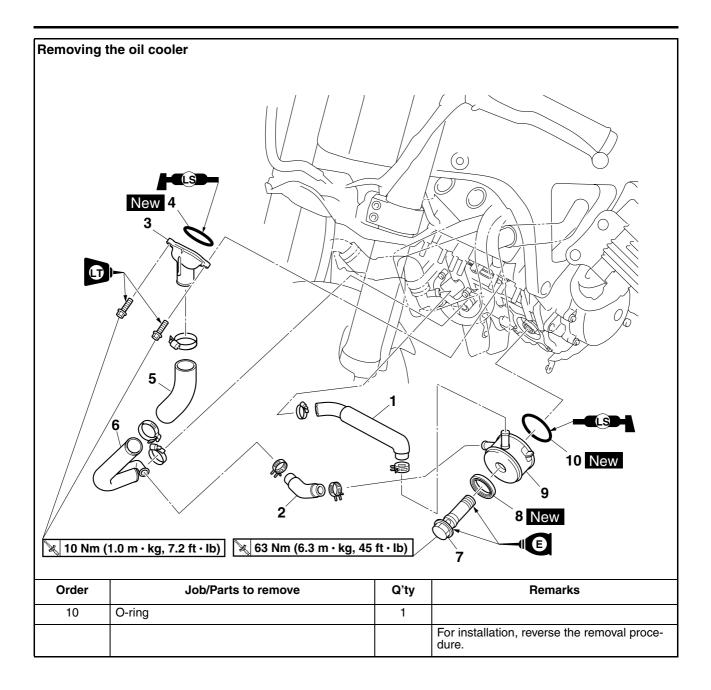
6-3

#### EAS26410 OIL COOLER



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-11.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-1.
1	Oil cooler outlet hose	1	
2	Oil cooler inlet hose	1	
3	Water jacket joint	1	
4	O-ring	1	
5	Water jacket joint inlet hose	1	
6	Water pump outlet pipe	1	
7	Oil cooler union bolt	1	
8	Gasket	1	
9	Oil cooler	1	

### **OIL COOLER**



#### EAS26420 CHECKING THE OIL COOLER

- 1. Check:
  - Oil cooler Cracks/damage  $\rightarrow$  Replace.
- 2. Check:
  - Oil cooler inlet hose
- Oil cooler outlet hose
- Water jacket joint hose Cracks/damage/wear  $\rightarrow$  Replace.
- 3. Check:
- Water jacket joint pipe Damage → Replace.
   Obstruction → Wash and blow out with compressed air.
- INSTALLING THE OIL COOLER

EAS26430

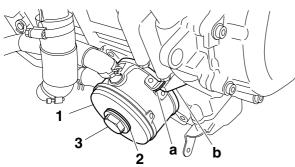
- 1. Clean:
- Mating surfaces of the oil cooler and the crankcase (with a cloth dampened with lacquer thinner)
- 2. Install:
  - O-ring New
  - Oil cooler "1"
  - Gasket "2" New
  - Oil cooler union bolt "3"



#### Oil cooler union bolt 63 Nm (6.3 m·kg, 43 ft·lb)

#### NOTE:

- Before installing the oil cooler, lubricate the its union bolt with a thin coat of engine oil.
- Make sure the O-ring is positioned properly.
- Make sure the projection "a" on the oil cooler touches the projection "b" on the crankcase.



3. Fill:

 Cooling system (with the specified amount of the recommended coolant) Refer to "CHANGING THE COOLANT" on page 3-19. Crankcase

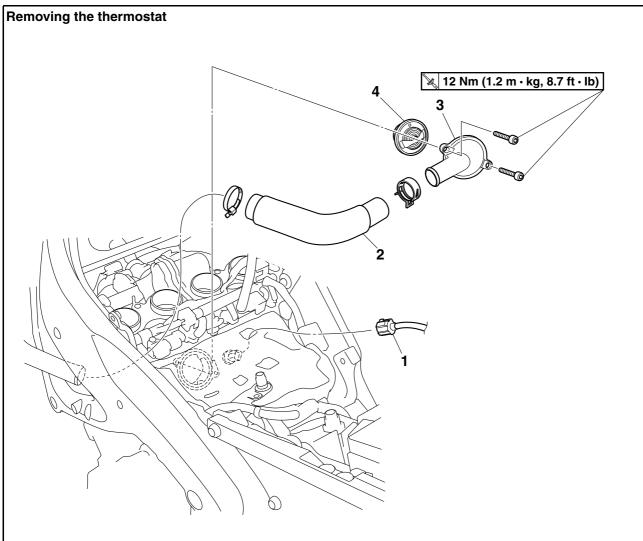
(with the specified amount of the recommended engine oil) Refer to "CHANGING THE ENGINE OIL" on page 3-11.

- 4. Check:
  - Cooling system
     Leaks → Repair or replace any faulty part.
- 5. Measure:

 Radiator cap opening pressure Below the specified pressure → Replace the radiator cap.

Refer to "CHECKING THE RADIATOR" on page 6-3.

## THERMOSTAT



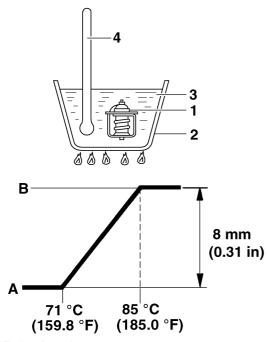
Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "AIR FILTER CASE" on page 7-4.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
1	Coolant temperature sensor coupler	1	Disconnect.
2	Thermostat outlet hose	1	
3	Thermostat cover	1	
4	Thermostat	1	
			For installation, reverse the removal proce dure.

## CHECKING THE THERMOSTAT

- 1. Check:
  - Thermostat Does not open at 71–85 °C (159.8–185.0 °F)
     → Replace.



- a. Suspend the thermostat "1" in a container "2" filled with water.
- b. Slowly heat the water "3".
- c. Place a thermometer "4" in the water.
- d. While stirring the water, observe the thermostat and thermometer's indicated temperature.



#### A. Fully closed

B. Fully open

#### NOTE: \_

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

#### \*\*\*\*\*

- 2. Check:
- Thermostat cover Cracks/damage  $\rightarrow$  Replace.

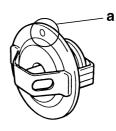
#### EAS26480

#### INSTALLING THE THERMOSTAT

- 1. Install:
  - Thermostat

#### NOTE: \_

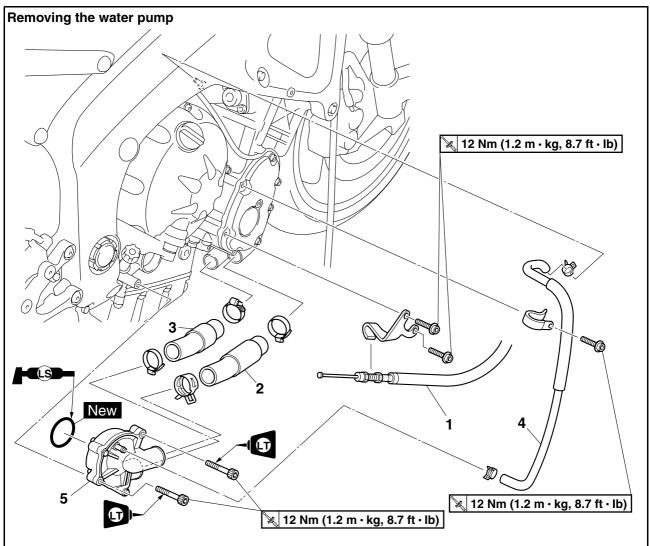
Install the thermostat with its breather hole "a" facing up.



- 2. Fill:
  - Cooling system (with the specified amount of the recommended coolant) Refer to "CHANGING THE COOLANT" on page 3-19.
- 3. Check:
  - Cooling system Leaks  $\rightarrow$  Repair or replace any faulty part.
- 4. Measure:

 Radiator cap opening pressure Below the specified pressure → Replace the radiator cap.
 Refer to "CHECKING THE RADIATOR" on page 6-3.

## WATER PUMP



Order	Job/Parts to remove	Q'ty	Remarks
			It is not necessary to remove the water pump unless the coolant level is extremely low or the coolant contains engine oil.
	Right bottom cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-4.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
1	Clutch cable	1	Disconnect.
2	Water pump inlet hose	1	
3	Water pump outlet hose	1	
4	Water pump breather hose	1	
5	Water pump assembly	1	
			For installation, reverse the removal proce dure.

#### EAS26540 **CHECKING THE WATER PUMP**

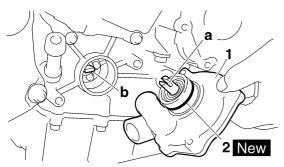
- 1. Check:
  - Water pump assembly Cracks/damage  $\rightarrow$  Replace.
- 2. Check:
  - Water pump inlet hose
  - Water pump outlet hose
  - Water pump breather hose Cracks/damage/wear  $\rightarrow$  Replace.

## EAS26590 INSTALLING THE WATER PUMP

- 1. Install:
  - Water pump assembly "1"
  - O-ring "2" New

#### NOTE:

- Align the slit "a" on the impeller shaft with the projection "b" on the oil pump shaft.
- Lubricate the O-ring with a thin coat of lithiumsoap-based grease.



- 2. Fill:
  - Cooling system

(with the specified amount of the recommended coolant) Refer to "CHANGING THE COOLANT" on page 3-19.

- 3. Check:
  - · Cooling system Leaks  $\rightarrow$  Repair or replace the faulty part.
- 4. Measure:

 Radiator cap opening pressure Below the specified pressure  $\rightarrow$  Replace the radiator cap. Refer to "CHECKING THE RADIATOR" on

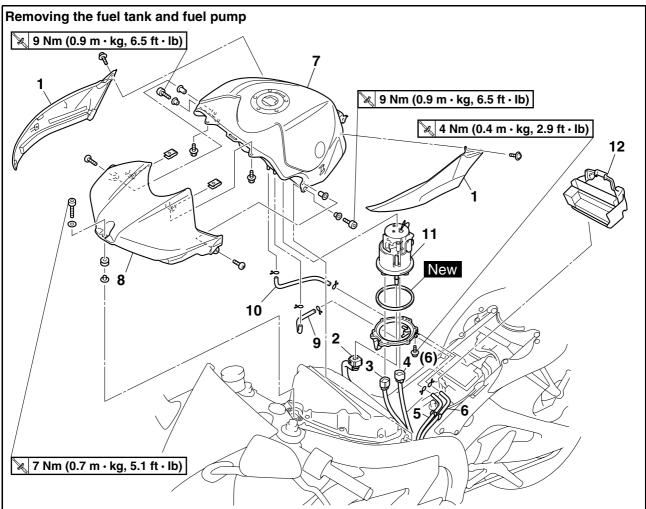
page 6-3.

### WATER PUMP

## **FUEL SYSTEM**

FUEL TANK	
REMOVING THE FUEL TANK	7-2
REMOVING THE FUEL PUMP	
CHECKING THE FUEL PUMP BODY	7-2
CHECKING THE FUEL PUMP OPERATION	7-2
INSTALLING THE FUEL PUMP	7-2
INSTALLING THE FUEL TANK	7-3
AIR FILTER CASE	
REMOVING THE FUEL HOSE (PRIMARY INJECTOR FUEL	
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CHECKING THE SECONDARY INJECTORS	7-6
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INSTALLING THE THROTTLE BODY JOINTS	7 1 1
INSTALLING THE THIOTTLE BODT JOINTS	
AIR INDUCTION SYSTEM	

## FUEL TANK



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/Fuel tank bracket		Refer to "GENERAL CHASSIS" on page 4-1.
1	Fuel tank side cover	2	
2	Fuel hose (fuel tank to primary injector fuel rail)	1	Disconnect.
3	Fuel sender coupler	1	Disconnect.
4	Fuel pump coupler	1	Disconnect.
5	Fuel tank overflow hose	1	Disconnect.
6	Fuel tank breather hose	1	Disconnect.
7	Fuel tank	1	
8	Fuel tank upper cover	1	
9	Fuel tank overflow hose (fuel tank to hose joint)	1	
10	Fuel tank breather hose (fuel tank to hose joint)	1	
11	Fuel pump	1	
12	Battery cover	1	
			For installation, reverse the removal proce- dure.

## REMOVING THE FUEL TANK

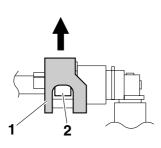
- 1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
- 2. Remove:
  - Fuel hose (fuel tank to primary injector rail)

#### WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

#### NOTE:

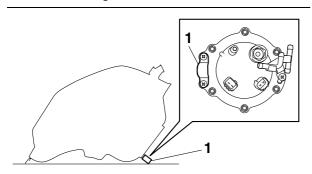
- To remove the fuel hose from the fuel pump, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, press the two buttons "2" on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.



- 3. Remove:
- Fuel tank

#### NOTE:

Place the fuel tank on a level surface, resting on its end and the bracket "1" as shown in the illustration. Make sure that the fuel pipe does not contact the ground; otherwise, the fuel pump could be damaged.



## REMOVING THE FUEL PUMP

1. Remove:

• Fuel pump

#### CAUTION:

- Do not drop the fuel pump or give it a strong shock.
- Do not touch the base section of the fuel sender.

#### EAS26670

#### CHECKING THE FUEL PUMP BODY

- 1. Check:
  - Fuel pump body Obstruction  $\rightarrow$  Clean. Cracks/damage  $\rightarrow$  Replace fuel pump assembly.
- 2. Check:
- Diaphragms and gaskets Tears/fatigue/cracks → Replace fuel pump assembly.

### CHECKING THE FUEL PUMP OPERATION

- 1. Check:
  - Fuel pump operation Refer to "CHECKING THE FUEL PUMP" on page 8-108.

#### EAS26710 INSTALLING THE FUEL PUMP

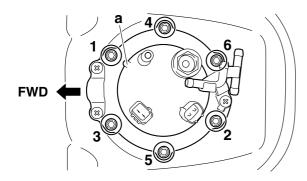
- 1. Tighten:
  - Fuel pump

Fuel pump bolt 4 Nm (0.4 m·kg, 2.9 ft·lb)

#### NOTE:

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump as shown in the illustration.
- Align the projection "a" on the fuel pump with the slot in the fuel pump bracket.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.

## **FUEL TANK**

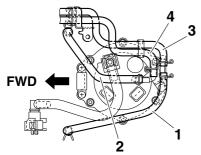


ET2C01010

#### **INSTALLING THE FUEL TANK**

1. Connect:

- Fuel tank breather hose (fuel tank to hose joint) "1"
- Fuel tank overflow hose (fuel tank to hose joint) "2"
- Fuel tank breather hose "3"
- Fuel tank overflow hose "4"



2. Connect:

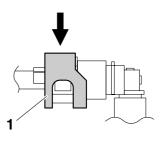
• Fuel hose (fuel tank to primary injector rail)

#### CAUTION:

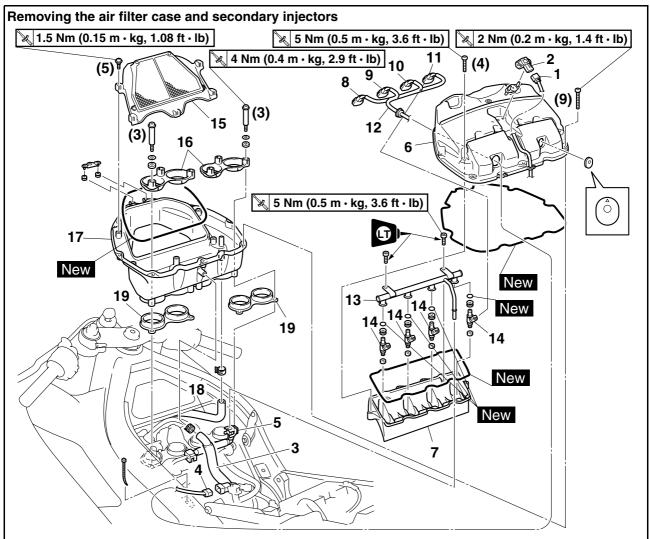
When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

NOTE:

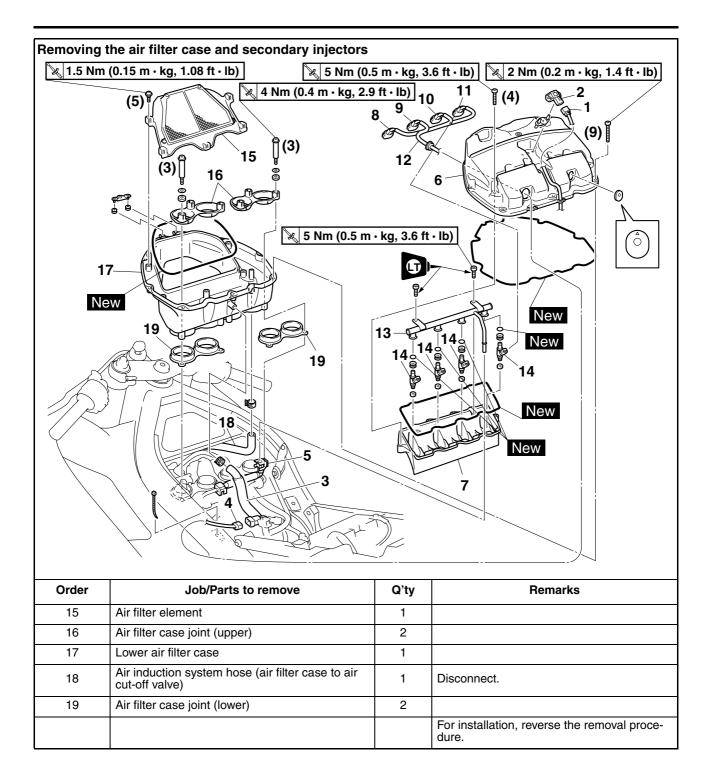
- Install the fuel hose securely onto the fuel pump until a distinct "click" is heard.
- To install the fuel hose onto the fuel pump, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown.



## AIR FILTER CASE



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Atmospheric pressure sensor coupler	1	Disconnect.
2	Atmospheric pressure sensor	1	
3	Crankcase breather hose	1	Disconnect.
4	Sub-wire harness 3 coupler	1	Disconnect.
5	Fuel hose (primary injector fuel rail to second- ary injector fuel rail)	1	Disconnect.
6	Upper air filter case	1	
7	Secondary injector holder	1	
8	Cylinder-#1 secondary injector coupler	1	Disconnect.
9	Cylinder-#2 secondary injector coupler	1	Disconnect.
10	Cylinder-#3 secondary injector coupler	1	Disconnect.
11	Cylinder-#4 secondary injector coupler	1	Disconnect.
12	Sub-wire harness 3	1	
13	Secondary injector fuel rail	1	
14	Secondary injector	4	



#### REMOVING THE FUEL HOSE (PRIMARY INJECTOR FUEL RAIL TO SECONDARY INJECTOR FUEL RAIL)

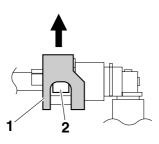
- 1. Remove:
  - Fuel hose (primary injector fuel rail to secondary injector fuel rail)

#### 

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

#### NOTE:

- To remove the fuel hose from the secondary injector fuel rail, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, press the two buttons "2" on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.



ET2C01017

### CHECKING THE SECONDARY INJECTORS

- 1. Check:
  - Injectors
     Damage → Replace.

ET2C01006

#### INSTALLING THE FUEL HOSE (PRIMARY INJECTOR FUEL RAIL TO SECONDARY INJECTOR FUEL RAIL)

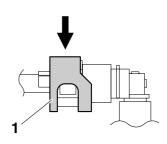
- 1. Connect:
- Fuel hose (primary injector fuel rail to secondary injector fuel rail)

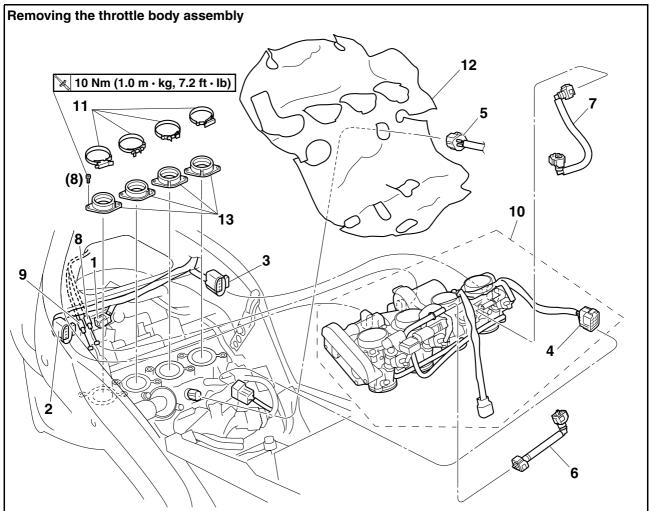
## CAUTION:

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.

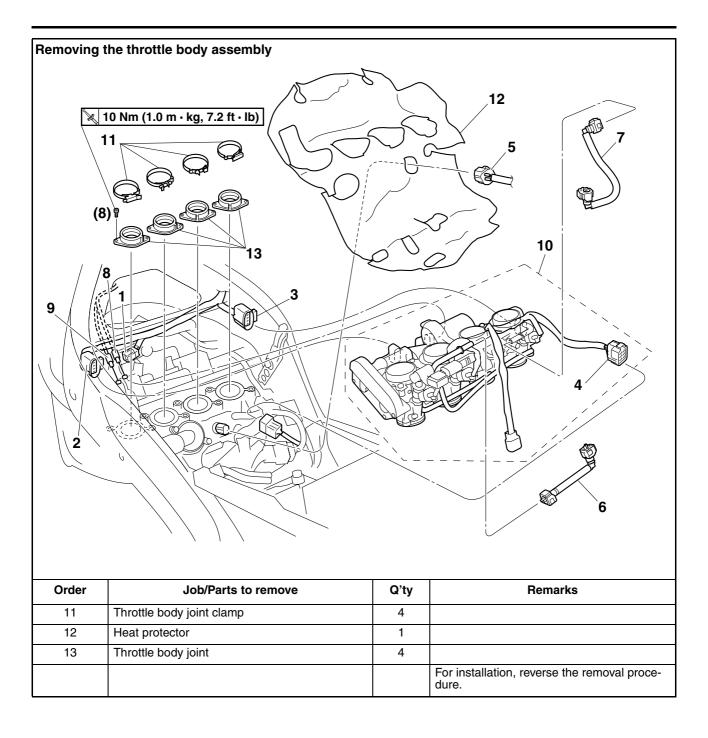
#### NOTE: \_

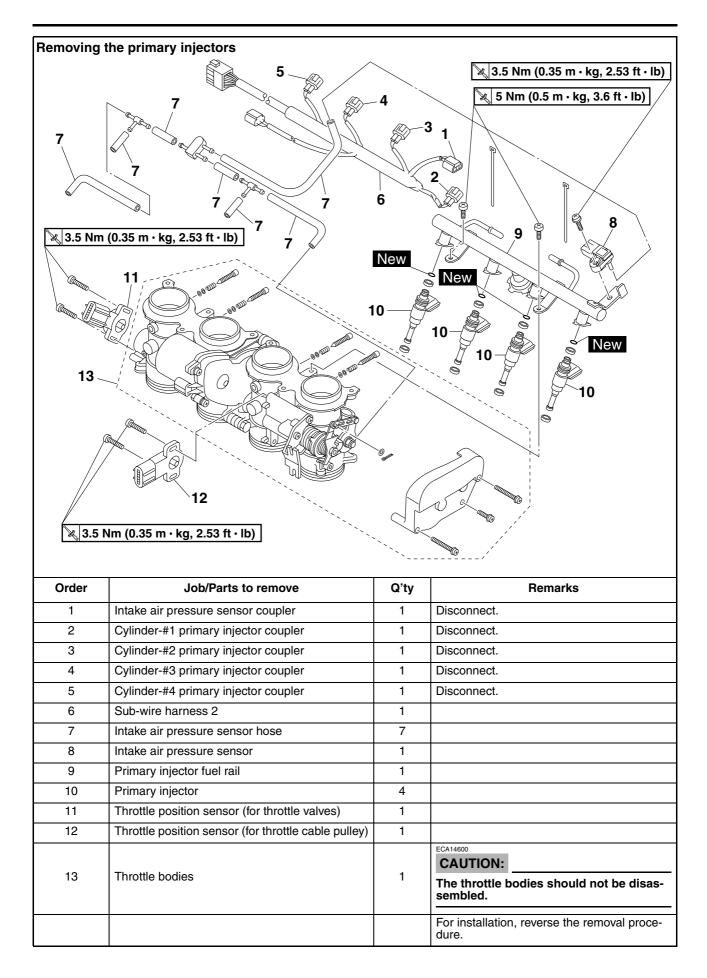
- Install the fuel hose securely onto the secondary injector fuel rail until a distinct "click" is heard.
- To install the fuel hose onto the secondary injector fuel rail, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown.





Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-4.
	Air induction system cover		Refer to "AIR INDUCTION SYSTEM" on page 7-13.
1	Throttle servo motor coupler	1	Disconnect.
2	Throttle position sensor (for throttle cable pulley) coupler	1	Disconnect.
3	Throttle position sensor (for throttle valves) coupler	1	Disconnect.
4	Sub-wire harness 2 coupler	1	Disconnect.
5	Coolant temperature sensor coupler	1	Disconnect.
6	Fuel hose (primary injector fuel rail to second- ary injector fuel rail)	1	
7	Fuel hose (fuel tank to primary injector fuel rail)	1	
8	Throttle cable (decelerator cable)	1	
9	Throttle cable (accelerator cable)	1	
10	Throttle body assembly	1	





## CHECKING THE PRIMARY INJECTORS

- Check:
   Injectors
  - $\mathsf{Damage} \to \mathsf{Replace}.$

#### CHECKING THE THROTTLE BODIES

1. Check:

EAS26990

- Throttle bodies Cracks/damage → Replace the throttle bodies as a set.
- 2. Check:
  - Fuel passages Obstructions  $\rightarrow$  Clean.

#### \*\*\*\*

 a. Wash the throttle bodies in a petroleumbased solvent.
 Do not use any caustic carburetor cleaning

solution.

b. Blow out all of the passages with compressed air.

#### \*\*\*\*\*

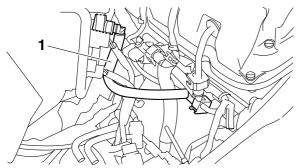
#### EAS27010

#### CHECKING THE FUEL PRESSURE

- 1. Check:
- Fuel pressure
- a. Remove the rider seat.
- Refer to "GENERAL CHASSIS" on page 4-1.
- b. Disconnect the fuel hose (fuel tank to primary injector fuel rail) "1" from the primary injector fuel rail.

### 

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

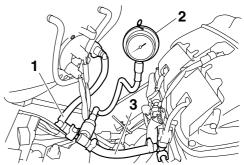


c. Connect the pressure gauge "2" and adapter "3" to the fuel hose (fuel tank to primary injector fuel rail).

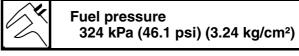


#### Pressure gauge 90890-03153

Pressure gauge YU-03153 Fuel pressure adapter 90890-03176 YM-03176



- d. Start the engine.
- e. Measure the fuel pressure.



 $\label{eq:Faulty} \ensuremath{\mathsf{Faulty}} \to \ensuremath{\mathsf{Replace}} \ensuremath{\mathsf{the}} \ensuremath{\mathsf{fuel}} \ensuremath{\mathsf{pump}}.$ 

#### 

#### ET2C01007

#### ADJUSTING THE THROTTLE POSITION SENSOR (FOR THROTTLE VALVES)

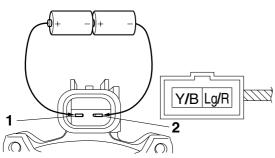
- 1. Check:
  - Throttle position sensor (for throttle valves) Refer to "CHECKING THE THROTTLE PO-SITION SENSOR (FOR THROTTLE VALVES)" on page 8-107.
- 2. Adjust:
  - Throttle position sensor angle
- \*\*\*\*\*
- a. Connect the two C size batteries to the throttle servo motor terminal as shown.

Positive battery lead

- light green/red terminal "1"
- Negative battery lead vellow/red terminal "2"

## CAUTION:

Do not use a 12 V battery to operate the throttle valves.



- b. Check that the throttle valves are fully closed.
- c. Connect the throttle position sensor coupler to the throttle position sensor.
- d. Connect the digital circuit tester to the throttle position sensor.
- Positive tester probe white terminal "1"
- Negative tester probe black/blue terminal "2"



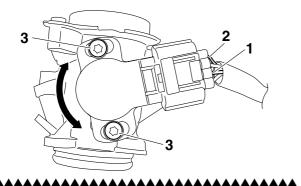
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927

- e. Measure the throttle position sensor voltage.
- f. Adjust the throttle position sensor angle so that the voltage is within the specified range.



Output voltage 0.635–0.645 V

 g. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws "3".



## ADJUSTING THE THROTTLE POSITION SENSOR (FOR THROTTLE CABLE PULLEY)

#### 1. Check:

• Throttle position sensor (for throttle cable pulley)

Refer to "CHECKING THE THROTTLE PO-SITION SENSOR (FOR THROTTLE CABLE PULLEY)" on page 8-107.

- 2. Adjust:
- Throttle position sensor angle
- \*\*\*\*\*
- a. Connect the throttle position sensor coupler to the throttle position sensor.
- b. Connect the digital circuit tester to the throttle position sensor.

• Positive tester probe

- blue terminal "1"
- Negative tester probe
- black/blue terminal "2"



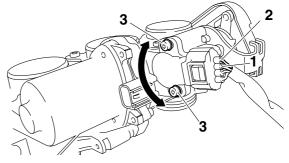
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927

- c. Measure the throttle position sensor voltage.
- d. Adjust the throttle position sensor angle so that the voltage is within the specified range.



Output voltage 0.630–0.730 V

e. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws "3".



\*\*\*\*\*

**INSTALLING THE THROTTLE BODY JOINTS** 1. Install:

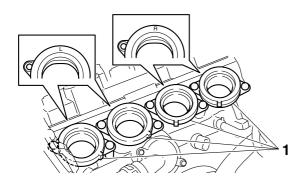
• Throttle body joints "1"

# No.

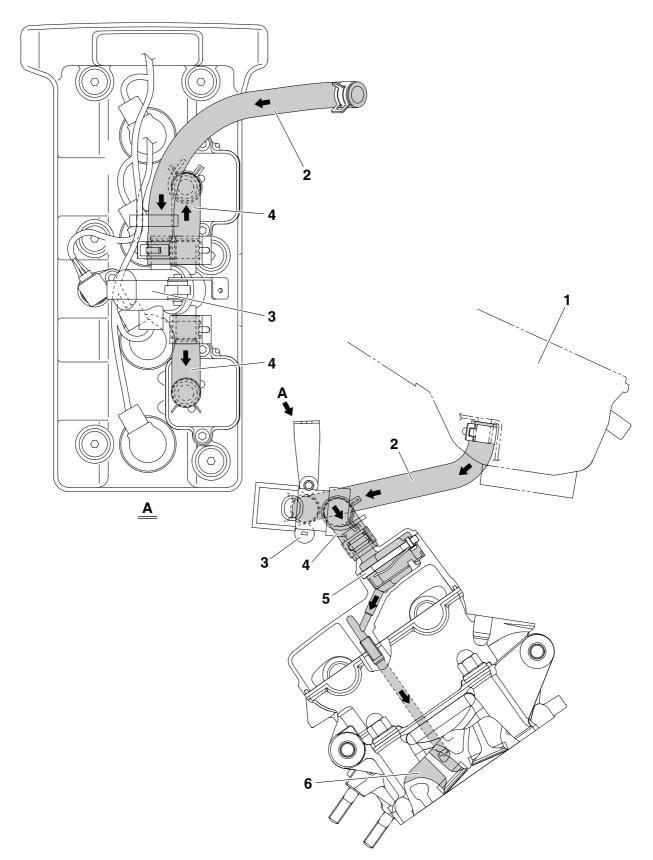
#### Throttle body joint bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

#### NOTE:

Be sure to install the throttle body joints with the "L" mark onto the throttle body openings for cylinders #1 and #2 and the joints with the "R" mark onto the openings for cylinders #3 and #4.

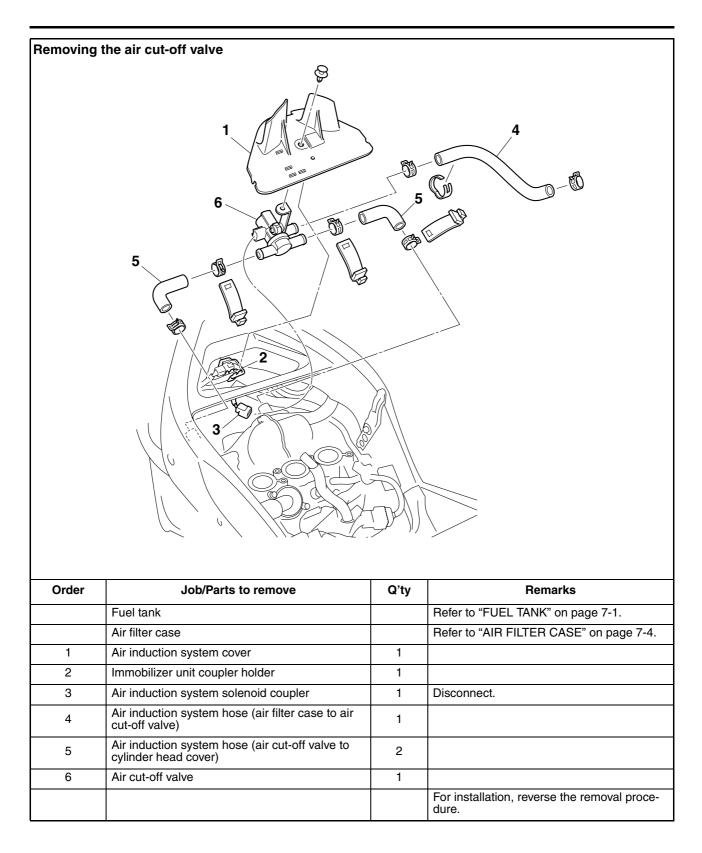


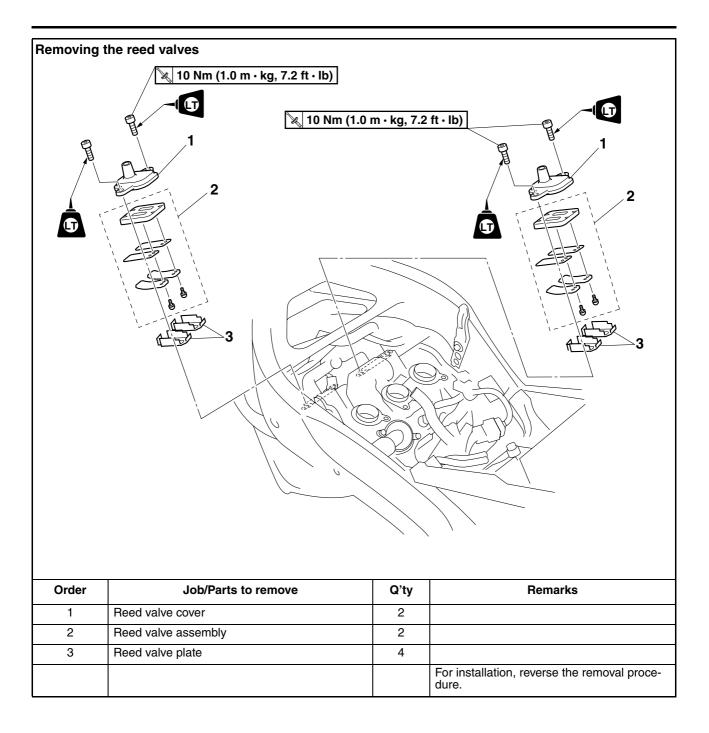
# AIR INDUCTION SYSTEM



- 1. Lower 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 cylinder head cover)
- 5. Reed valve assembly
- 6. Exhaust port

### **AIR INDUCTION SYSTEM**





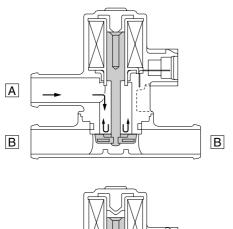
## CHECKING THE AIR INDUCTION SYSTEM

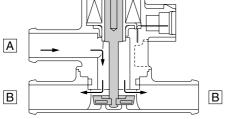
#### Air injection

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 assembly 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  $\rightarrow$  Connect properly. Cracks/damage  $\rightarrow$  Replace.

- 2. Check:
- Reed valve
- Reed valve stopper
- Reed valve seat Cracks/damage → Replace the reed valve assembly.
- 3. Measure:
  - Reed valve bending limit "a" Out of specification → Replace the reed valve assembly.





- 4. Check:
  - Air cut-off valve Cracks/damage  $\rightarrow$  Replace.
- 5. Check:
  - Air induction system solenoid Refer to "CHECKING THE AIR INDUCTION SYSTEM SOLENOID" on page 8-108.

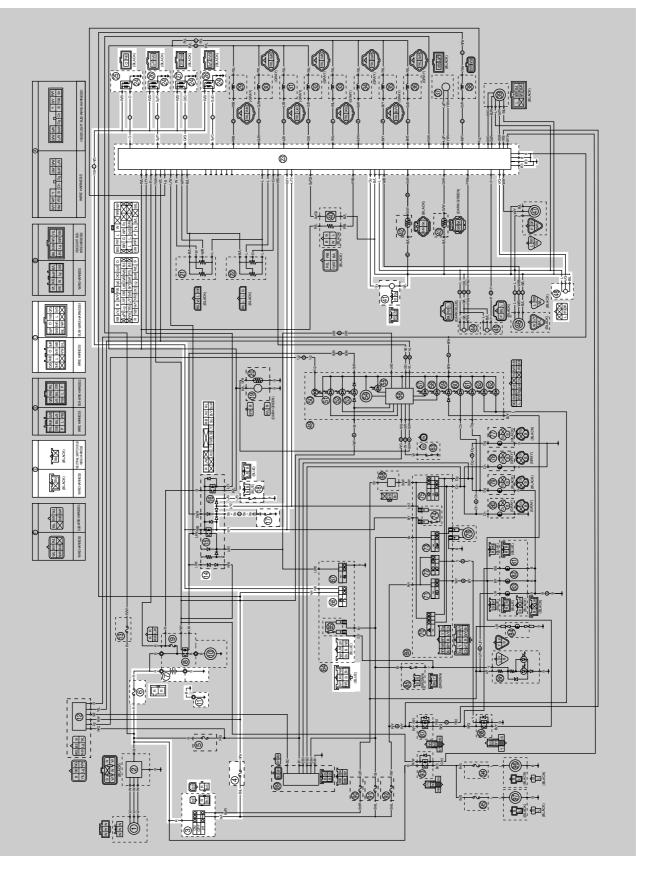
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## IGNITION SYSTEM

#### EAS27110 CIRCUIT DIAGRAM



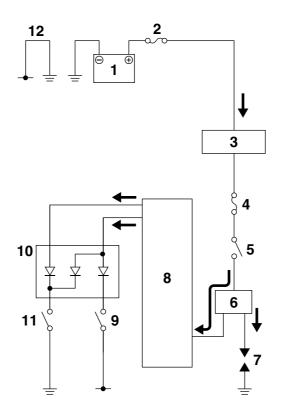
- 3. Main switch
- 4. Ignition fuse
- 6. Main fuse
- 7. Battery
- 11.Engine ground
- 14.Relay unit
- 17.Neutral switch
- 18. Sidestand switch
- 23.ECU (engine control unit)
- 24.Spark plug
- 25.Cylinder-#1 ignition coil
- 26.Cylinder-#2 ignition coil
- 27.Cylinder-#3 ignition coil
- 28.Cylinder-#4 ignition coil
- 41.Crankshaft position sensor
- 48.Lean angle sensor
- 66.Engine stop switch

#### ET2C01023

### ENGINE STOPPING DUE TO SIDESTAND OPERATION

When the engine is running and the transmission is in gear, the engine will stop if the sidestand is moved down. This is because the electric current from the ignition coils does not flow to the ECU when both the neutral switch and sidestand switch are set to "OFF", thereby preventing the spark plugs from producing a spark. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral switch circuit is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral switch circuit is closed) and the sidestand is down (the sidestand switch circuit is open).



- 1. Battery
- 2. Main fuse
- 3. Main switch
- 4. Ignition fuse
- 5. Engine stop switch
- 6. Ignition coil
- 7. Spark plug
- 8. ECU (engine control unit)
- 9. Sidestand switch
- 10. Relay unit (diode)
- 11. Neutral switch
- 12. Engine ground

NOTE:		
<ul> <li>Before troubleshooting, remove the follow</li> <li>Rider seat</li> <li>Fuel tank</li> <li>Air filter case</li> <li>Side cowlings</li> <li>Bottom cowlings</li> </ul>	<i>v</i> ing part(s):	
1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUS- ES" on page 8-95.	$NG \to$	Replace the fuse(s).
OK↓		·
<ol> <li>Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-96.</li> </ol>	$NG \rightarrow$	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
OK↓		
<ol> <li>Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-8.</li> </ol>	$NG \to$	Re-gap or replace the spark plug(s).
OK↓		
4. Check the ignition spark gap. Refer to "CHECKING THE IGNI- TION COILS" on page 8-102.	$\text{OK} \rightarrow$	Ignition system is OK.
NG↓		
5. Check the ignition coils. Refer to "CHECKING THE IGNI- TION COILS" on page 8-102.	$NG \to$	Replace the ignition coil(s).
ОК↓		
<ol> <li>Check the crankshaft position sensor.</li> <li>Refer to "CHECKING THE CRANK-SHAFT POSITION SENSOR" on page 8-103.</li> </ol>	$NG \rightarrow$	Replace the crankshaft position sensor.
ОК↓		
7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the main switch/immobilizer unit.
OK↓		L]

EA327150 TROUBLESHOOTING

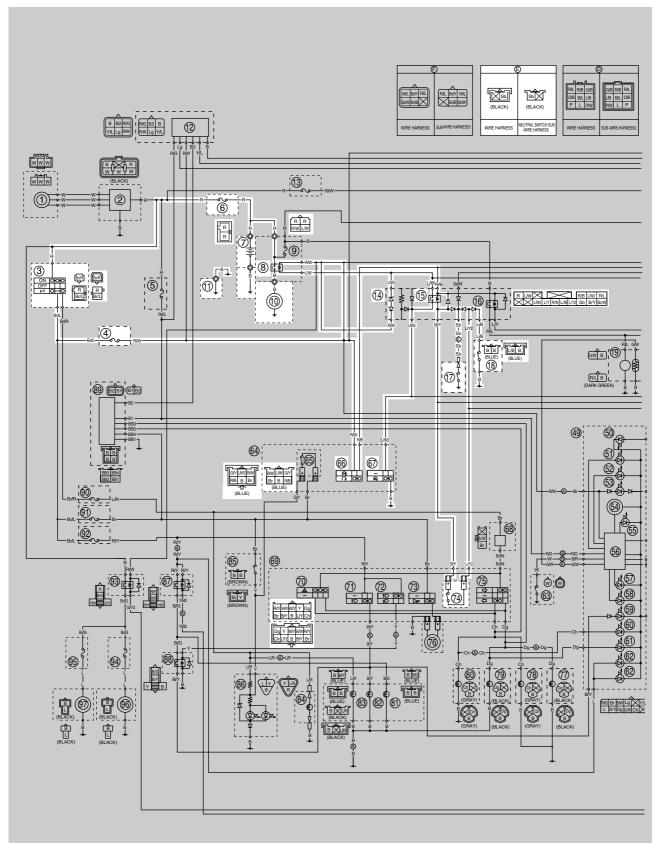
The ignition system fails to operate (no spark or intermittent spark).

## **IGNITION SYSTEM**

8. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$\text{NG} \rightarrow$	Replace the right handlebar switch.
ОК↓		
9. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$\text{NG} \rightarrow$	Replace the neutral switch.
OK↓		
10.Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$\text{NG} \rightarrow$	Replace the sidestand switch.
OK↓		
11.Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-101.	$\text{NG} \rightarrow$	Replace the relay unit.
OK↓		
12.Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-103.	$\text{NG} \rightarrow$	Replace the lean angle sensor.
<u> </u>		
13.Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-1.	$NG \rightarrow$	Properly connect or repair the ignition sys- tem's wiring.
ОК↓		
Replace the ECU.		
·		

# ELECTRIC STARTING SYSTEM

# CIRCUIT DIAGRAM



8-7

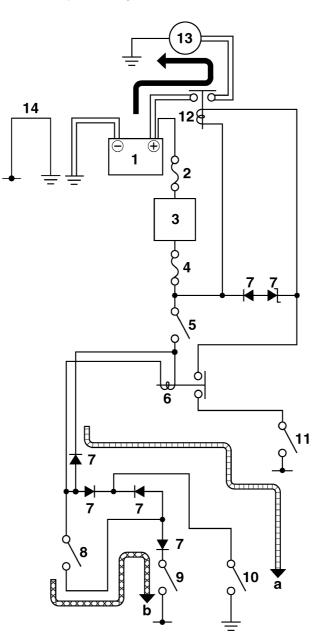
- 3. Main switch
- 4. Ignition fuse
- 6. Main fuse
- 7. Battery
- 8. Starter relay
- 10.Starter motor
- 11.Engine ground
- 14.Relay unit
- 15.Starting circuit cut-off relay
- 17.Neutral switch
- 18. Sidestand switch
- 66.Engine stop switch
- 67.Start switch
- 74.Clutch switch

#### EAS27180 STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the engine stop switch is set to " $\bigcirc$ " and the main switch is set to "ON" (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cut-off relay is closed and the engine can be started by pressing the start switch.



- a. WHEN THE TRANSMISSION IS IN NEUTRAL
- b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR
- 1. Battery
- 2. Main fuse
- 3. Main switch
- 4. Ignition fuse
- 5. Engine stop switch
- 6. Relay unit (starting circuit cut-off relay)
- 7. Relay unit (diode)
- 8. Clutch switch
- 9. Sidestand switch
- 10. Neutral switch
- 11. Start switch
- 12. Starter relay
- 13. Starter motor
- 14. Engine ground

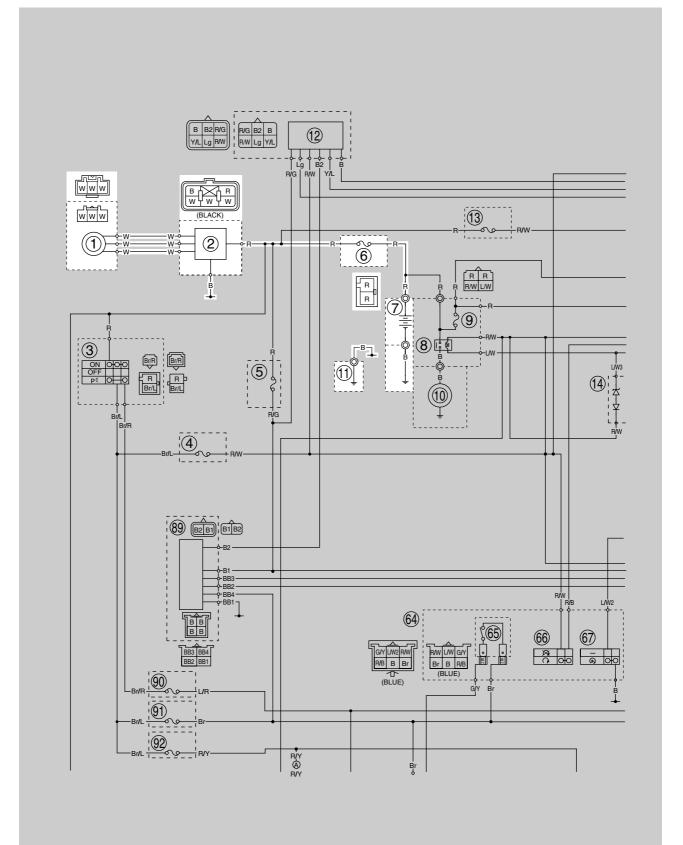
<ul> <li>EAS27190</li> <li>TROUBLESHOOTING</li> <li>The starter motor fails to turn.</li> <li>NOTE:</li></ul>	ving part(s):	
1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUS- ES" on page 8-95.	$NG \to$	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-96.	$NG \to$	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
OK↓		
<ol> <li>Check the relay unit (starting circuit cut-off relay).</li> <li>Refer to "CHECKING THE RE- LAYS" on page 8-99.</li> </ol>	$NG \rightarrow$	Replace the relay unit.
<u> </u>		
4. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-101.	$NG \to$	Replace the relay unit.
<u> </u>		
5. Check the starter relay. Refer to "CHECKING THE RE- LAYS" on page 8-99.	$NG \to$	Replace the starter relay.
OK↓		
6. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the main switch/immobilizer unit.
OK↓		
7. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the right handlebar switch.
OK↓		

## **ELECTRIC STARTING SYSTEM**

8. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the neutral switch.
OK↓		
9. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the sidestand switch.
OK↓		
10.Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the clutch switch.
OK↓		
11.Check the start switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the right handlebar switch.
OK↓		
12.Check the starter motor. Refer to "CHECKING THE START- ER MOTOR" on page 5-35.	$NG \to$	Repair or replace the starter motor.
OK↓		
13.Check the entire starting system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-7.	$NG \to$	Properly connect or repair the starting sys- tem's wiring.
OK↓		
The starting system circuit is OK.		
·		

# CHARGING SYSTEM

#### EAS27210 CIRCUIT DIAGRAM

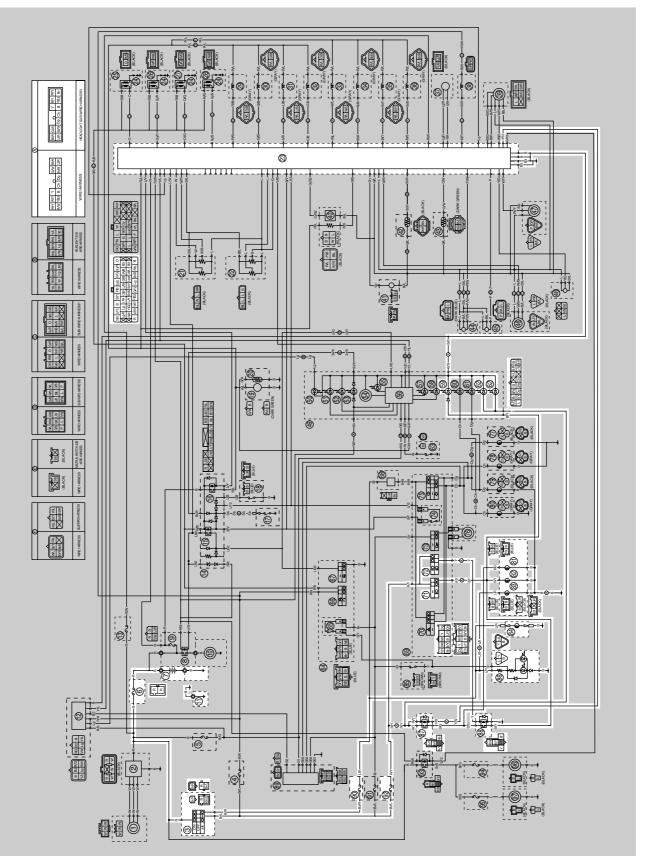


- AC magneto
   Rectifier/regulator
- 6. Main fuse
- 7. Battery
- 11.Engine ground

<ul> <li>FAS27230</li> <li>TROUBLESHOOTING</li> <li>The battery is not being charged.</li> <li>NOTE:</li></ul>	ving part(s):	
1. Check the fuse. (Main) Refer to "CHECKING THE FUS- ES" on page 8-95.	$NG \to$	Replace the fuse.
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-96.	$NG \rightarrow$	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
OK↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-103.	$NG \to$	<ul> <li>Replace the stator coil assembly.</li> </ul>
OK↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTI- FIER/REGULATOR" on page 8-104.	$NG \to$	Replace the rectifier/regulator.
OK↓		
<ol> <li>Check the entire charging system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-13.</li> </ol>	$NG \to$	Properly connect or repair the charging system's wiring.
OK↓		
The charging system circuit is OK.		

# LIGHTING SYSTEM

#### EAS27250 CIRCUIT DIAGRAM



- 3. Main switch
- 6. Main fuse
- 7. Battery
- 11.Engine ground
- 23.ECU (engine control unit)
- 59. High beam indicator light
- 62.Meter light
- 71.Pass switch
- 72.Dimmer switch
- 81.Headlight (low beam)
- 82.Headlight (high beam)
- 83. Auxiliary light
- 84.License plate light
- 86.Tail/brake light
- 87.Headlight relay (on/off)
- 88.Headlight relay (dimmer)
- 90.Taillight fuse
- 92.Headlight fuse

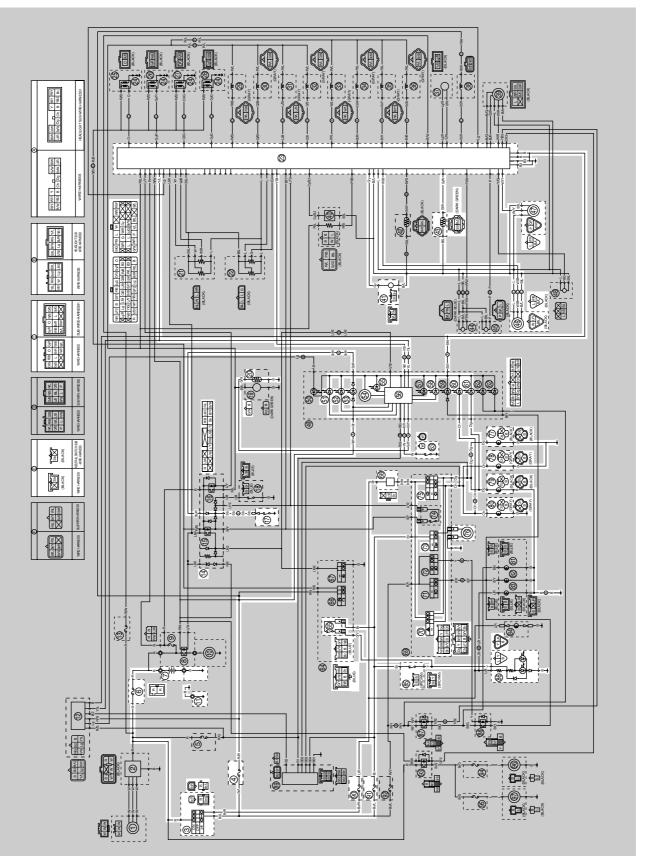
Any of the following fail to light: headlight (h taillight, license plate light, auxiliary light or NOTE:		eadlight (low beam), high beam indicator light,
<ul> <li>Before troubleshooting, remove the follow</li> <li>Rider seat</li> <li>Fuel tank</li> <li>Side cowlings</li> <li>Rear cowling</li> <li>Front cowling</li> </ul>	ving part(s):	
<ol> <li>Check the condition of each bulb and bulb socket. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-94.</li> </ol>	$NG \to$	Replace the bulb(s) and bulb socket(s).
ОК↓		
<ol> <li>Check the fuses. (Main, headlight and taillight) Refer to "CHECKING THE FUS- ES" on page 8-95.</li> </ol>	$NG \rightarrow$	Replace the fuse(s).
ОК↓		
<ol> <li>Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-96.</li> </ol>	$NG \rightarrow$	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
OK↓		
4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$\text{NG} \rightarrow$	Replace the main switch/immobilizer unit.
 OK↓		
5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the left handlebar switch.
OK↓		
<ol> <li>Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 8-91.</li> </ol>	$NG \to$	Replace the left handlebar switch.
OK↓		
<ol> <li>Check the headlight relay (on/off). Refer to "CHECKING THE RE- LAYS" on page 8-99.</li> </ol>	$\text{NG} \rightarrow$	Replace the headlight relay (on/off).
 ΟΚ↓		

### **LIGHTING SYSTEM**

8. Check the headlight relay (dimmer). Refer to "CHECKING THE RE- LAYS" on page 8-99.	$NG \to$	Replace the headlight relay (dimmer).
OK↓		
<ol> <li>Check the entire lighting system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-17.</li> </ol>	$NG \to$	Properly connect or repair the lighting sys- tem's wiring.
OK↓		
This circuit is OK.		

#### EAS27270 SIGNALING SYSTEM

#### EAS27280 CIRCUIT DIAGRAM



- 3. Main switch
- 4. Ignition fuse
- 6. Main fuse
- 7. Battery
- 11.Engine ground
- 14.Relay unit
- 17.Neutral switch
- 20.Fuel sender
- 23.ECU (engine control unit)
- 41.Crankshaft position sensor
- 43.Coolant temperature sensor
- 46.Cylinder identification sensor
- 47.Speed sensor
- 51.Fuel level warning light
- 52.Oil level warning light
- 53.Neutral indicator light
- 54.Tachometer
- 55.Shift timing indicator light
- 56.Multi-function meter
- 58. Coolant temperature warning light
- 60.Left turn signal indicator light
- 61.Right turn signal indicator light
- 63.Oil level switch
- 65.Front brake light switch
- 68.Turn signal/hazard relay
- 70.Hazard switch
- 73.Horn switch
- 75. Turn signal switch
- 76.Horn
- 77.Rear right turn signal light
- 78.Rear left turn signal light
- 79.Front right turn signal light
- 80.Front left turn signal light
- 85.Rear brake light switch
- 86.Tail/brake light
- 90.Taillight fuse
- 91.Signaling system fuse

<ul> <li>EAS27290</li> <li>TROUBLESHOOTING</li> <li>Any of the following fail to light: turn signal</li> <li>The horn fails to sound.</li> <li>NOTE:</li></ul>	-	light or indicator light.
<ol> <li>Check the fuses. (Main, ignition, signaling system and taillight) Refer to "CHECKING THE FUS- ES" on page 8-95.</li> </ol>	$NG \to$	Replace the fuse(s).
$OK\downarrow$		
<ol> <li>Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-96.</li> </ol>	$NG \rightarrow$	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
OK↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the main switch/immobilizer unit.
OK↓		
<ol> <li>Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.</li> </ol>	$NG \to$	Properly connect or repair the signaling system's wiring.
OK↓		
Check the condition of each of the sig- naling system's circuits. Refer to "Checking the signaling system".		
Checking the signaling system		
The horn fails to sound.		
1. Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the left handlebar switch.
OK↓		
2. Check the horn. Refer to "CHECKING THE HORN" on page 8-104.	$NG \to$	Replace the horn.
OK↓		L]

<ol> <li>Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.</li> </ol>	$NG \rightarrow$	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		
The brake light fails to come on.		
<ol> <li>Check the front brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-91.</li> </ol>	$NG \to$	Replace the front brake light switch.
OK↓		
<ol> <li>Check the rear brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-91.</li> </ol>	$NG \to$	Replace the rear brake light switch.
ОК↓		
<ol> <li>Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.</li> </ol>	$NG \to$	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		
The turn signal light, turn signal indicator li	ght or both fa	il to blink.
1. Check the turn signal light bulbs and sockets. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-94.	$NG \to$	Replace the turn signal light bulb(s), sock- et(s) or both.
OK↓		
2. Check the turn signal switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the left handlebar switch.
OK↓		
3. Check the hazard switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the left handlebar switch.
OK↓		
4. Check the turn signal/hazard relay. Refer to "CHECKING THE TURN SIGNAL/HAZARD RELAY" on page 8-100.	$NG \to$	Replace the turn signal/hazard relay.
OK↓		

5. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.	$\text{NG} \rightarrow$	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		
The neutral indicator light fails to come.		
1. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	$NG \to$	Replace the neutral switch.
OK↓		
2. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-101.	$\text{NG} \rightarrow$	Replace the relay unit.
OK↓		
<ol> <li>Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.</li> </ol>	$NG \rightarrow$	Properly connect or repair the signaling system's wiring.
<u>ок</u> ↓		
This circuit is OK.		
The oil level warning light fails to come.		
1. Check the oil level switch. Refer to "CHECKING THE OIL LEVEL SWITCH" on page 8-105.	$NG \to$	Replace the oil level switch.
Οκ↓		
2. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.	$\text{NG} \rightarrow$	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		
The fuel level warning light fails to come.		
1. Check the fuel sender. Refer to "CHECKING THE FUEL SENDER" on page 8-105.	$NG \to$	Replace the fuel pump assembly.
 OK↓		

<ol> <li>Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.</li> </ol>	$NG \rightarrow$	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		
The coolant temperature warning light fails	to come.	
<ol> <li>Check the coolant temperature sen- sor.</li> <li>Refer to "CHECKING THE COOL- ANT TEMPERATURE SENSOR" on page 8-106.</li> </ol>	$NG \to$	Replace the coolant temperature sensor.
OK↓		
<ol> <li>Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.</li> </ol>	$NG \rightarrow$	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		
The speedometer fails to operate.		
1. Check the speed sensor. Refer to "CHECKING THE SPEED SENSOR" on page 8-106.	$NG \to$	Replace the speed sensor.
ОК↓		
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.
ΟΚ↓		
Replace the meter assembly.		
The shift timing indicator light fails to come	<u>.</u>	
<ol> <li>Check that the shift timing indicator light is set to come on and that the brightness level of the light is ad- justed properly. Refer to "FEATURES" on page 1-2.</li> </ol>	$NG \rightarrow$	Replace the meter assembly.
OK↓		

 Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.

OK↓

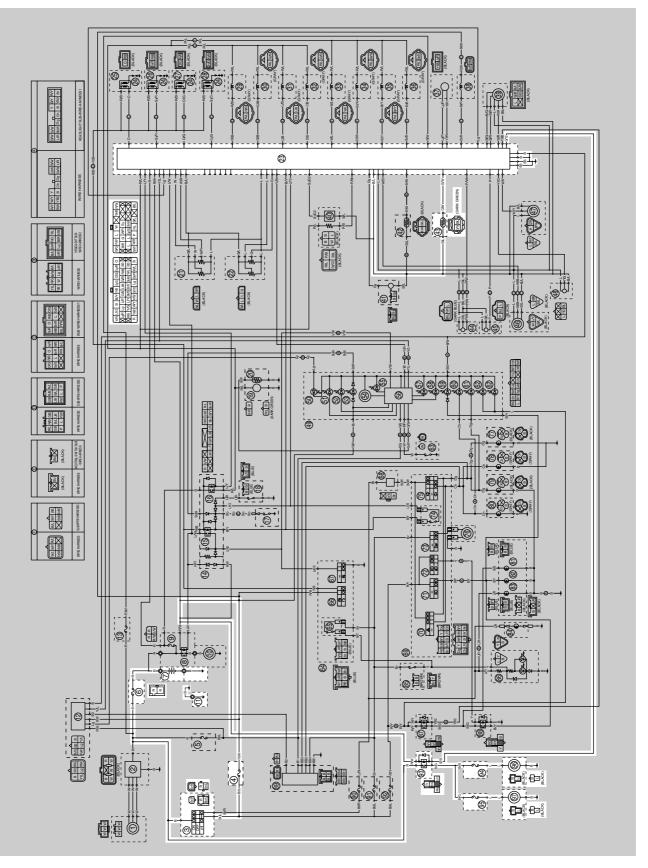
This circuit is OK.

 $\text{NG} \rightarrow$ 

Properly connect or repair the signaling system's wiring.

# COOLING SYSTEM

#### EAS27310 CIRCUIT DIAGRAM

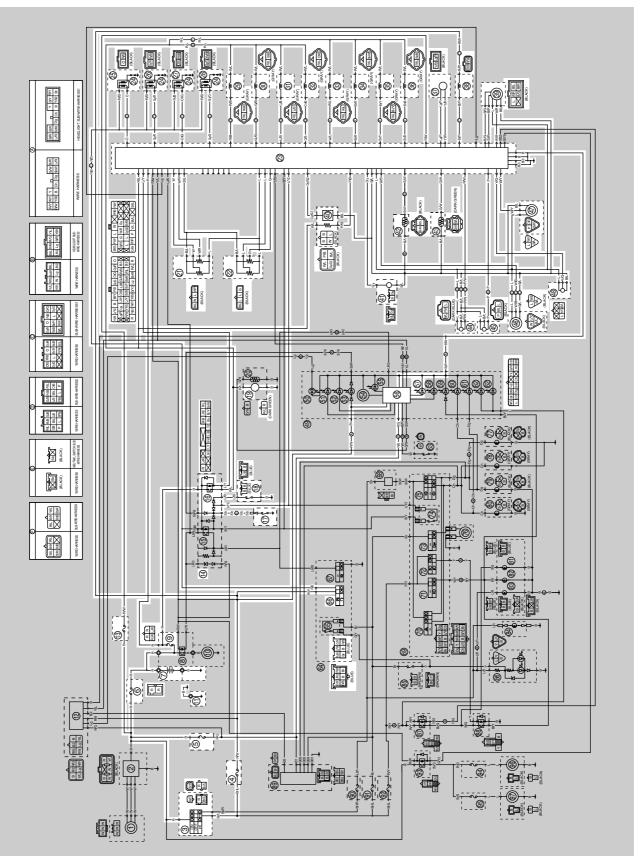


- 3. Main switch
- 4. Ignition fuse
- 6. Main fuse
- 7. Battery
- 11.Engine ground
- 23.ECU (engine control unit)
- 43.Coolant temperature sensor
- 93. Radiator fan motor relay
- 94. Right radiator fan motor fuse
- 95.Left radiator fan motor fuse
- 96.Right radiator fan motor
- 97.Left radiator fan motor

TROUBLESHOOTING         NOTE:         Before troubleshooting, remove the following part(s):         1. Rider seat         2. Fuel tank         3. Side cowlings         I. Check the fuses. (Main, ignition and radiator fan mo- tor)         Refer to "CHECKING THE FUS- ES" on page 8-95.         OK↓         2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-96.         OK↓         3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-91.         OK↓         4. Check the radiator fan motors. Refer to "CHECKING THE RADIA- TOR FAN MOTORS" on page 8-106.         OK↓         5. Check the radiator fan motor relay. LAYS" on page 8-99.         OK↓         6. Check the coolant temperature. Refer to "CHECKING THE RE- LAYS" on page 8-99.         OK↓         7. Check the otolant temperature. Refer to "CHECKING THE RE- LAYS" on page 8-99.         OK↓         7. Check the entire cooling system's wiring.         NG →         Replace the coolant temperature Refer to "CIRCUIT DIAGRAM" on page 8-29.         OK↓         7. Inscircuit is OK.	EAS27320		
<ul> <li>Before troubleshooting, remove the following part(s): <ol> <li>Rider seat</li> <li>Fuel tank</li> <li>Side cowlings</li> </ol> </li> <li>1. Check the fuses. <ul> <li>(Main, ignition and radiator fan motor)</li> <li>Refer to "CHECKING THE FUS-ES" on page 8-95.</li> </ul> </li> <li>2. Check the battery. <ul> <li>Refer to "CHECKING AND</li> <li>CHARGING THE BATTERY" on page 8-96.</li> <li>OK ↓</li> </ul> </li> <li>3. Check the main switch. <ul> <li>Refer to "CHECKING THE</li> <li>SWITCHES" on page 8-91.</li> <li>OK ↓</li> </ul> </li> <li>4. Check the radiator fan motors. <ul> <li>Refer to "CHECKING THE RADIA-TOR FAN MOTORS" on page 8-91.</li> <li>OK ↓</li> </ul> </li> <li>5. Check the radiator fan motors. <ul> <li>Refer to "CHECKING THE RADIA-TOR FAN MOTORS" on page 8-91.</li> <li>OK ↓</li> </ul> </li> <li>6. Check the radiator fan motor relay. <ul> <li>Refer to "CHECKING THE RE-LAYS" on page 8-99.</li> <li>OK ↓</li> </ul> </li> <li>7. Check the coolant temperature. <ul> <li>Refer to "CHECKING THE RE-LAYS" on page 8-99.</li> <li>OK ↓</li> </ul> </li> <li>7. Check the entire cooling system's wiring. <ul> <li>Refer to "CIRCUIT DIAGRAM" on page 8-29.</li> <li>OK ↓</li> </ul> </li> <li>Properly connect or repair the cooling system's wiring.</li> <li>Refer to "CIRCUIT DIAGRAM" on page 8-29.</li> <li>OK ↓</li> </ul>			
$\begin{array}{c c} (Main, ignition and radiator fan motor) \\ Refer to "CHECKING THE FUS-ES" on page 8-95. \\ \hline \\ OK \downarrow \\ \hline \\$	<ul> <li>Before troubleshooting, remove the follow</li> <li>1. Rider seat</li> <li>2. Fuel tank</li> </ul>	ving part(s):	
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-96.       NG →         0K↓       • Clean the battery terminals. • Recharge or replace the battery.         0K↓       NG →         3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-91.       NG →         0K↓       NG →         4. Check the radiator fan motors. Refer to "CHECKING THE RADIA- TOR FAN MOTORS" on page 8-106.       NG →         5. Check the radiator fan motor relay. Refer to "CHECKING THE RE- LAYS" on page 8-99.       NG →         0K↓       NG →         6. Check the coolant temperature. Refer to "CHECKING THE RE- LAYS" on page 8-99.       NG →         0K↓       NG →         7. Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.       NG →         0K↓       NG →	(Main, ignition and radiator fan mo- tor) Refer to "CHECKING THE FUS-	$NG \rightarrow$	Replace the fuse(s).
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-96.       • Clean the battery terminals.         OK↓       • Recharge or replace the battery.         3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-91.       NG →         OK↓       Replace the main switch/immobilizer unit.         • Check the radiator fan motors. Refer to "CHECKING THE RADIA- TOR FAN MOTORS" on page 8-106.       NG →         OK↓       Replace the radiator fan motor relay. Refer to "CHECKING THE RE- LAYS" on page 8-99.       NG →         OK↓       Replace the radiator fan motor relay. Refer to "CHECKING THE RE- LAYS" on page 8-99.       NG →         OK↓       NG →       Replace the coolant temperature. Refer to "CHECKING THE COOL- ANT TEMPERATURE SENSOR" on page 8-106.       NG →         OK↓       NG →       Replace the coolant temperature sensor.	OK↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-91.       NG →       Replace the main switch/immobilizer unit.         0K↓       Image: Check the radiator fan motors. Refer to "CHECKING THE RADIA- TOR FAN MOTORS" on page 8-106.       NG →       Replace the radiator fan motor(s).         5. Check the radiator fan motor relay. Refer to "CHECKING THE RE- LAYS" on page 8-99.       NG →       Replace the radiator fan motor relay.         6. Check the coolant temperature. Refer to "CHECKING THE COOL- ANT TEMPERATURE SENSOR" on page 8-106.       NG →       Replace the coolant temperature sensor.         0K↓       NG →       Replace the coolant temperature sensor.       NG →         0K↓       NG →       Replace the coolant temperature sensor.         0K↓       OK ↓       NG →       Replace the coolant temperature sensor.         0K↓       OK ↓       NG →       Replace the coolant temperature sensor.         0K↓       OK ↓       NG →       Replace the coolant temperature sensor.	Refer to "CHECKING AND CHARGING THE BATTERY" on	$NG \to$	
Refer to "CHECKING THE SWITCHES" on page 8-91.Replace the main switch/immobilizer unit.OK $\downarrow$ Image: Second	OK↓		
4. Check the radiator fan motors. Refer to "CHECKING THE RADIA- TOR FAN MOTORS" on page 8-106.       NG $\rightarrow$ 0K $\downarrow$ Replace the radiator fan motor (s).         5. Check the radiator fan motor relay. Refer to "CHECKING THE RE- LAYS" on page 8-99.       NG $\rightarrow$ 0K $\downarrow$ Replace the radiator fan motor relay.         0K $\downarrow$ NG $\rightarrow$ 6. Check the coolant temperature. Refer to "CHECKING THE COUL- ANT TEMPERATURE SENSOR" on page 8-106.       NG $\rightarrow$ 0K $\downarrow$ NG $\rightarrow$ 7. Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.       NG $\rightarrow$ 0K $\downarrow$ Properly connect or repair the cooling system's wiring.         0K $\downarrow$ NG $\rightarrow$	Refer to "CHECKING THE	$NG \to$	Replace the main switch/immobilizer unit.
Refer to "CHECKING THE RADIA- TOR FAN MOTORS" on page 8-106.Replace the radiator fan motor(s). $OK \downarrow$ S. Check the radiator fan motor relay. Refer to "CHECKING THE RE- LAYS" on page 8-99.NG $\rightarrow$ $OK \downarrow$ Replace the radiator fan motor relay. $OK \downarrow$ NG $\rightarrow$ 6. Check the coolant temperature. Refer to "CHECKING THE COOL- ANT TEMPERATURE SENSOR" on page 8-106.NG $\rightarrow$ $OK \downarrow$ NG $\rightarrow$ 7. Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.NG $\rightarrow$ $OK \downarrow$ Properly connect or repair the cooling system's wiring. $OK \downarrow$ NG $\rightarrow$	ОК↓		
5. Check the radiator fan motor relay. Refer to "CHECKING THE RE- LAYS" on page 8-99.       NG $\rightarrow$ Replace the radiator fan motor relay.         OK $\downarrow$ 0K $\downarrow$ NG $\rightarrow$ Replace the radiator fan motor relay.         OK $\downarrow$ NG $\rightarrow$ Replace the coolant temperature. Refer to "CHECKING THE COOL- ANT TEMPERATURE SENSOR" on page 8-106.       NG $\rightarrow$ OK $\downarrow$ NG $\rightarrow$ Replace the coolant temperature sensor.         OK $\downarrow$ NG $\rightarrow$ Replace the coolant temperature sensor.         OK $\downarrow$ NG $\rightarrow$ Replace the coolant temperature sensor.         OK $\downarrow$ OK $\downarrow$ NG $\rightarrow$ OK $\downarrow$ NG $\rightarrow$ Properly connect or repair the cooling system's wiring.         OK $\downarrow$ OK $\downarrow$ Properly connect or repair the cooling system's wiring.	Refer to "CHECKING THE RADIA- TOR FAN MOTORS" on page	$NG \to$	Replace the radiator fan motor(s).
Refer to "CHECKING THE RE-LAYS" on page 8-99.       Replace the radiator fan motor relay. $OK \downarrow$ NG $\rightarrow$ 6. Check the coolant temperature. Refer to "CHECKING THE COOL-ANT TEMPERATURE SENSOR" on page 8-106.       NG $\rightarrow$ $OK \downarrow$ Replace the coolant temperature sensor. $OK \downarrow$ NG $\rightarrow$ 7. Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.       NG $\rightarrow$ $OK \downarrow$ Properly connect or repair the cooling system's tem's wiring.	ΟΚ↓]		
<ul> <li>6. Check the coolant temperature. Refer to "CHECKING THE COOL- ANT TEMPERATURE SENSOR" on page 8-106.</li> <li>OK↓</li> <li>7. Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.</li> <li>OK↓</li> </ul>	Refer to "CHECKING THE RE-	$NG \to$	Replace the radiator fan motor relay.
Refer to "CHECKING THE COOL- ANT TEMPERATURE SENSOR" on page 8-106.Replace the coolant temperature sensor. $OK \downarrow$ $OK \downarrow$ $NG \rightarrow$ Properly connect or repair the cooling system's tem's wiring. $Page 8-29.$ $OK \downarrow$ $OK \downarrow$ $OK \downarrow$	OK↓		
7. Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29. OK $\downarrow$ NG $\rightarrow$ Properly connect or repair the cooling system's wiring.	Refer to "CHECKING THE COOL- ANT TEMPERATURE SENSOR"	$NG \rightarrow$	Replace the coolant temperature sensor.
wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29. OK↓	OK↓		
	wiring. Refer to "CIRCUIT DIAGRAM" on	$NG \to$	
This circuit is OK.	OK↓		
	This circuit is OK.		

# FUEL INJECTION SYSTEM

# CIRCUIT DIAGRAM



3. Main switch 4. Ignition fuse 5. Backup fuse (odometer, clock and immobilizer system) 6. Main fuse 7. Battery 9. Fuel injection system fuse 11.Engine ground 13.ETV fuse 14.Relay unit 16. Fuel pump relay 17.Neutral switch 18.Sidestand switch 19. Fuel pump 21. Throttle position sensor (for throttle cable pulley) 22. Throttle position sensor (for throttle valves) 23.ECU (engine control unit) 24.Spark plug 25.Cylinder-#1 ignition coil 26.Cylinder-#2 ignition coil 27.Cylinder-#3 ignition coil 28.Cylinder-#4 ignition coil 29. Primary injector #1 30.Primary injector #2 31.Primary injector #3 32.Primary injector #4 33. Secondary injector #1 34. Secondary injector #2 35. Secondary injector #3 36.Secondary injector #4 37.Throttle servo motor 38. Air induction system solenoid 39.EXUP servo motor 40.0<sub>2</sub> sensor 41.Crankshaft position sensor 42. Air temperature sensor 43. Coolant temperature sensor 44.Intake air pressure sensor 45. Atmospheric pressure sensor 46.Cylinder identification sensor 47.Speed sensor 48.Lean angle sensor 56.Multi-function meter 57. Engine trouble warning light 66.Engine stop switch

#### EAS27350 ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, the ECU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the odometer/tripmeter/fuel reserve tripmeter LCD. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

Warning light indica- tion	ECU operation	Fuel injection opera- tion	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substi- tute characteristics in accordance with the description of the mal- function	Can or cannot be oper- ated depending on the fault code

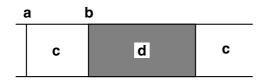
### Engine trouble warning light indication and fuel injection system operation

\* The warning light flashes when any one of the conditions listed below is present and the start switch is pushed:

11:	Cylinder identification sensor	30:	Lean angle sensor (latch up detected)
12:	Crankshaft position sensor	41:	Lean angle sensor (open or short-circuit)
19:	Sidestand switch (open circuit in the wire to the ECU)	50:	ECU internal malfunction (memory check error)

### Checking the engine trouble warning light

The engine trouble warning light comes on for 1.4 seconds after the main switch has been turned to "ON" and it comes on while the start switch is being pushed. If the warning light does not come on under these conditions, the warning light (LED) may be defective.



- a. Main switch "OFF"
- b. Main switch "ON"
- c. Engine trouble warning light off

d. Engine trouble warning light on for 1.4 seconds

#### EAS27380

### SELF-DIAGNOSTIC FUNCTION TABLE

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue to operate or stop operating, depending on the conditions.

Fault code No.	ltem	Symptom	Able/un- able to start	Able/un- able to drive
11	Cylinder identification sensor	No normal signals are received from the cylinder identification sensor when the engine is started or while the vehicle is being driv- en.	Unable	Able
12	Crankshaft position sensor	No normal signals are received from the crankshaft position sensor.	Unable	Unable
13	Intake air pressure sensor (open or short circuit)	Intake air pressure sensor: open or short circuit detected.	Able	Able
14	Intake air pressure sensor hose line (piping system)	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	Able	Able
15	Throttle position sen- sor (for throttle valves) (open or short cir- cuit/loose connection)	Throttle position sensor (for throt- tle valves): open or short circuit detected. Throttle position sensor (for throt- tle valves) coupler connection is loose.	Able/Un- able	Able/Un- able
17	EXUP servo motor circuit (open or short circuit)	EXUP servo motor circuit: open or short circuit detected.	Able	Able

### Self-Diagnostic Function table

### **FUEL INJECTION SYSTEM**

Fault code No.	ltem	Symptom	Able/un- able to start	Able/un- able to drive
18	EXUP servo motor (stuck)	EXUP servo motor is stuck.	Able	Able
19	Sidestand switch (open circuit in the wire to the ECU)	Open circuit is detected in the in- put line from the sidestand switch to the ECU.	Unable	Unable
20	Intake air pressure sensor or atmospher- ic pressure sensor	When the main switch is turned to "ON", the atmospheric pressure sensor voltage and intake air pres- sure sensor voltage differ greatly.	Able	Able
21	Coolant temperature sensor (open or short circuit)	Coolant temperature sensor: open or short circuit detected.	Able	Able
22	Air temperature sen- sor (open or short circuit)	Air temperature sensor: open or short circuit detected.	Able	Able
23	Atmospheric pres- sure sensor (open or short circuit)	Atmospheric pressure sensor: open or short circuit detected.	Able	Able
24	O <sub>2</sub> sensor	No normal signal is received from the $O_2$ sensor.	Able	Able
30	Lean angle sensor	Latch up detected. No normal signal is received from the lean angle sensor.	Unable	Unable
33	Cylinder-#1 ignition coil (open circuit)	Primary lead of the cylinder-#1 ig- nition coil: open circuit detected.	Able (depending on the number of faulty cylin- ders)	Able (depending on the number of faulty cylin- ders)
34	Cylinder-#2 ignition coil (open circuit)	Primary lead of the cylinder-#2 ig- nition coil: open circuit detected.	Able (depending on the number of faulty cylin- ders)	Able (depending on the number of faulty cylin- ders)
35	Cylinder-#3 ignition coil (open circuit)	Primary lead of the cylinder-#3 ig- nition coil: open circuit detected.	Able (depending on the number of faulty cylin- ders)	Able (depending on the number of faulty cylin- ders)
36	Cylinder-#4 ignition coil (open circuit)	Primary lead of the cylinder-#4 ig- nition coil: open circuit detected.	Able (depending on the number of faulty cylin- ders)	Able (depending on the number of faulty cylin- ders)

Fault code No.	Item	Symptom	Able/un- able to start	Able/un- able to drive
39	Primary injector (open circuit)	Primary injector: open circuit detected.	Able (depending on the number of faulty cylin- ders)	Able (depending on the number of faulty cylin- ders)
40	Secondary injector (open circuit)	Secondary injector: open circuit detected.	Able (depending on the number of faulty cylin- ders)	Able (depending on the number of faulty cylin- ders)
41	Lean angle sensor (open or short-circuit)	Lean angle sensor: open or short circuit detected.	Unable	Unable
40	Speed sensor	No normal signals are received from the speed sensor.	Able	Able
42	Neutral switch	Neutral switch: open or short circuit detected.		
43	Fuel system voltage (monitoring voltage)	Power supply to the injectors and the fuel pump is not normal.	Able	Able
44	Error in writing the amount of CO adjust- ment on EEPROM	An error is detected while reading or writing on EEPROM (CO ad- justment value).	Able	Able
46	Vehicle system power supply (monitoring voltage)	Power supply is not normal.	Able	Able
50	ECU internal malfunc- tion	ECU memory is faulty. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	Able/Un- able	Able/Un- able
59	Throttle position sen- sor (for throttle cable pulley) (open or short cir- cuit/loose connection)	Throttle position sensor (for throt- tle cable pulley): open or short circuit detected. Throttle position sensor (for throt- tle cable pulley) coupler connec- tion is loose.	Able/Un- able	Able/Un- able
60	Throttle servo motor	Throttle servo motor: open or short circuit detected. Motor is defective or ECU internal malfunction.	Able/Un- able	Able/Un- able

#### Communication error with the meter

Faul code N	Itom	Symptom	Able/un- able to start	Able/un- able to drive	
Er-1	ECU internal malfunc- tion (output signal error)	No signals are received from the ECU.	Unable	Unable	

Fault code No.	Item	Symptom	Able/un- able to start	Able/un- able to drive
Er-2	ECU internal malfunc- tion (output signal error)	No signals are received from the ECU within the specified duration.	Unable	Unable
Er-3	ECU internal malfunc- tion (output signal error)	Data from the ECU cannot be re- ceived correctly.	Unable	Unable
Er-4	ECU internal malfunc- tion (input signal error)	Non-registered data has been re- ceived from the meter.	Unable	Unable

#### EAS27400 TROUBLESHOOTING METHOD

## The engine operation is not normal and the engine trouble warning light comes on.

- 1. Check:
  - Fault code number

#### \*\*\*\*\*

- a. Check the fault code number displayed on the meter.
- b. Identify the faulty system with the fault code. Refer to "Self-Diagnostic Function table".
- c. Identify the probable cause of the malfunction. Refer to "Fault code table".

#### \*\*\*\*\*

2. Check and repair the probable cause of malfunction.

Fault code No.	No fault code No.
Check and repair. Refer to "TROUBLE- SHOOTING DE- TAILS" on page 8-48. Monitor the opera- tion of the sensors and actuators in the diagnostic mode. Re- fer to "Sensor opera- tion table" and "Actuator operation table".	Check and repair.

3. Perform Fuel injection system reinstatement action.

Refer to "Reinstatement method" of table in "TROUBLESHOOTING DETAILS".

4. Turn the main switch to "OFF" and back to "ON", then check that no fault code number is displayed.

#### NOTE:

If fault codes are displayed, repeat steps (1) to (4) until no fault code number is displayed.

 Erase the malfunction history in the diagnostic mode. Refer to "Sensor operation table (Diagnostic code No. 62)".

#### NOTE:

Turning the main switch to "OFF" will not erase the malfunction history.

# The engine operation is not normal but the engine trouble warning light does not come on.

1. Check the operation of following sensors and actuators in the Diagnostic mode. Refer to "Sensor operation table" and "Actuator operation table".

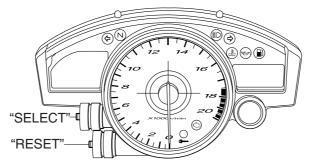
01: Throttle position sensor (for throttle valves) signal 1 (throttle angle)
13: Throttle position sensor (for throttle valves) signal 2 (throttle angle)
14: Throttle position sensor (for throttle cable pulley) signal 1 (throttle angle)
15: Throttle position sensor (for throttle cable pulley) signal 2 (throttle angle)
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 inner parts of the engine.

#### EAS27420 DIAGNOSTIC MODE

Setting the diagnostic mode

- 1. Turn the main switch to "OFF".
- 2. Disconnect the wire harness coupler from the fuel pump.
- 3. Press and hold the "SELECT" and "RESET" buttons, turn the main switch to "ON", and continue to press the buttons for 8 seconds or more.

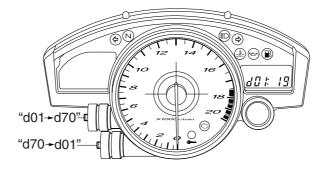


#### NOTE:

- All displays on the meter disappear except the odometer/trip meter/fuel reserve trip meter/stopwatch display.
- "dIAG" appears on the odometer/trip meter/fuel reserve trip meter/stopwatch LCD.
- 4. Press the "SELECT" button to select the diagnostic mode "dIAG".
- 5. After selecting "dIAG", simultaneously press the "SELECT" and "RESET" buttons for 2 seconds or more to activate the diagnostic mode. The diagnostic code number "d01" appears on the clock LCD.
- 6. Select the diagnostic code number corresponding to the fault code number by pressing the "SE-LECT" and "RESET" buttons.

#### NOTE:

- To decrease the selected diagnostic code number, press the "RESET" button. Press the "RESET" button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the "SELECT" button. Press the "SELECT" button for 1 second or longer to automatically increase the diagnostic code numbers.



- 7. Verify the operation of the sensor or actuator.
- Sensor operation
- The data representing the operating conditions of the sensor appears on the odometer/trip meter/fuel reserve trip meter/stopwatch LCD.
- Actuator operation
   Set the engine stop switch to "O" to operate the actuator.

#### NOTE:

If the engine stop switch is set to " $\cap$ ", set it to " $\boxtimes$ ", and then set it to " $\cap$ " again.

8. Turn the main switch to "OFF" to cancel the diagnostic mode.

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
11	No normal signals are re- ceived from the cylinder identification sensor when the engine is started or while the vehicle is being driven.	<ul> <li>Open or short circuit in sub-wire-harness 1.</li> <li>Open or short circuit in wire harness.</li> <li>Defective cylinder identification sensor.</li> <li>Malfunction in ECU.</li> <li>Improperly installed sensor.</li> </ul>	
12	No normal signals are re- ceived from the crankshaft position sensor.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective crankshaft position sensor.</li> <li>Malfunction in pickup rotor.</li> <li>Malfunction in ECU.</li> <li>Improperly installed sensor.</li> </ul>	
13	Intake air pressure sensor: open or short circuit detect- ed.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective intake air pressure sensor.</li> <li>Malfunction in ECU.</li> </ul>	03
14	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	<ul> <li>Intake air pressure sensor hose is de- tached, clogged, kinked, or pinched.</li> <li>Malfunction in ECU.</li> </ul>	03
15	Throttle position sensor (for throttle valves): open or short circuit detected. Throttle position sensor (for throttle valves) coupler con- nection is loose.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective throttle position sensor (for throt- tle valves).</li> <li>Malfunction in ECU.</li> <li>Improperly installed throttle position sensor (for throttle valves).</li> </ul>	01 13
17	EXUP servo motor circuit: open or short circuit detect- ed or loose connection.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective EXUP servo motor (potentiometer circuit).</li> </ul>	53
18	EXUP servo motor is stuck.	<ul> <li>Open or short circuit in wire harness.</li> <li>Stuck EXUP servo motor (mechanism).</li> <li>Stuck EXUP servo motor (motor).</li> </ul>	53
19	Open circuit is detected in the input lead from the sid- estand switch to the ECU.	<ul> <li>Open circuit in wire harness (ECU coupler).</li> <li>Malfunction in ECU.</li> <li>Relay unit (diode)</li> </ul>	20
20	When the main switch is turned to "ON", the atmo- spheric pressure sensor voltage and intake air pres- sure sensor voltage differ greatly.	<ul> <li>Atmospheric pressure sensor hose is clogged.</li> <li>Intake air pressure sensor hose is clogged, kinked, or pinched.</li> <li>Malfunction of the atmospheric pressure sensor in the intermediate electrical potential.</li> <li>Malfunction of the intake air pressure sensor in the intermediate electrical potential.</li> <li>Malfunction of the intake air pressure sensor in the intermediate electrical potential.</li> <li>Malfunction in ECU.</li> </ul>	03 02
21	Coolant temperature sen- sor: open or short circuit detected.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective coolant temperature sensor.</li> <li>Malfunction in ECU.</li> <li>Improperly installed coolant temperature sensor.</li> </ul>	06

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
22	Air temperature sensor: open or short circuit detect- ed.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective air temperature sensor.</li> <li>Malfunction in ECU.</li> <li>Improperly installed air temperature sensor.</li> </ul>	05
23	Atmospheric pressure sen- sor: open or short circuit detected.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective atmospheric pressure sensor.</li> <li>Improperly installed atmospheric pressure sensor.</li> <li>Malfunction in ECU.</li> </ul>	02
24	No normal signal is re- ceived from the O <sub>2</sub> sensor.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective O<sub>2</sub> sensor.</li> <li>Malfunction in ECU.</li> <li>Improperly installed O<sub>2</sub> sensor.</li> </ul>	_
30	Latch up detected. No normal signal is re- ceived from the lean angle sensor.	<ul> <li>The vehicle has overturned.</li> <li>Defective lean angle sensor.</li> <li>Malfunction in ECU.</li> <li>Improperly installed lean angle sensor.</li> </ul>	08
33	Open circuit detected in the primary lead of the cylin- der-#1 ignition coil.	<ul> <li>Open circuit in wire harness.</li> <li>Malfunction in ignition coil.</li> <li>Malfunction in ECU.</li> </ul>	30
34	Open circuit detected in the primary lead of the cylin- der-#2 ignition coil.	<ul> <li>Open circuit in wire harness.</li> <li>Malfunction in ignition coil.</li> <li>Malfunction in ECU.</li> </ul>	31
35	Open circuit detected in the primary lead of the cylin- der-#3 ignition coil.	<ul> <li>Open circuit in wire harness.</li> <li>Malfunction in ignition coil.</li> <li>Malfunction in ECU.</li> </ul>	32
36	Open circuit detected in the primary lead of the cylin- der-#4 ignition coil.	<ul> <li>Open circuit in wire harness.</li> <li>Malfunction in ignition coil.</li> <li>Malfunction in ECU.</li> </ul>	33
39	Open circuit detected in a primary injector.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective primary injector.</li> <li>Malfunction in ECU.</li> <li>Improperly installed primary injector.</li> </ul>	36 37 38 39
40	Open circuit detected in a secondary injector.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective secondary injector.</li> <li>Malfunction in ECU.</li> <li>Improperly installed secondary injector.</li> </ul>	40 41 42 43
41	Lean angle sensor: open or short circuit detect- ed.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective lean angle sensor.</li> <li>Malfunction in ECU.</li> </ul>	08
42	No normal signals are re- ceived from the speed sen- sor.	<ul> <li>Open circuit in wire harness.</li> <li>Malfunction in speed sensor.</li> <li>Malfunction in ECU.</li> </ul>	07
42	Neutral switch: open or short circuit detect- ed.	<ul> <li>Open circuit in wire harness.</li> <li>Malfunction in neutral switch.</li> <li>Malfunction in ECU.</li> </ul>	21

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
43	Power supply to the injec- tors and the fuel pump is not normal.	Open or short circuit in wire harness.     Malfunction in ECU.	
44	An error is detected while reading or writing on EE- PROM (CO adjustment val- ue).	<ul> <li>Malfunction in ECU. (The CO adjustment value is not properly written on or read from the internal memo- ry).</li> </ul>	60
46	Power supply is not normal.	<ul> <li>Malfunction in the charging system. Refer to "CHARGING SYSTEM" on page 8-13.</li> </ul>	_
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	• Malfunction in ECU. (The program and data are not properly written on or read from the internal memo- ry.)	_
59	Throttle position sensor (for throttle cable pulley): open or short circuit detect- ed. Throttle position sensor (for throttle cable pulley) cou- pler connection is loose.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective throttle position sensor.</li> <li>Improperly installed throttle position sensor.</li> <li>Malfunction in ECU.</li> </ul>	14 15
60	Throttle servo motor: open or short circuit detect- ed. Defective throttle servo mo- tor. Malfunction in ECU (servo motor driving system).	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective throttle servo motor (potentiometer circuit).</li> <li>Stuck throttle servo motor (mechanism).</li> <li>Stuck throttle servo motor (motor).</li> <li>Malfunction in ECU.</li> </ul>	01
Er-1	No signals are received from the ECU.	<ul> <li>Open or short circuit in wire harness.</li> <li>Malfunction in meter.</li> <li>Malfunction in ECU.</li> <li>Defective wire connection of the ECU coupler.</li> </ul>	_
Er-2	No signals are received from the ECU within the specified duration.	<ul> <li>Improper connection in wire harness.</li> <li>Malfunction in meter.</li> <li>Malfunction in ECU.</li> </ul>	_
Er-3	Data from the ECU cannot be received correctly.	<ul> <li>Improper connection in wire harness.</li> <li>Malfunction in meter.</li> <li>Malfunction in ECU.</li> </ul>	_
Er-4	Non-registered data has been received from the meter.	<ul> <li>Improper connection in wire harness.</li> <li>Malfunction in meter.</li> <li>Malfunction in ECU.</li> </ul>	_

Sensor operation table				
Diag- nostic code No.	Item	Meter display	Checking method	
01	Throttle position sensor (for throttle valves) signal 1			
	Fully closed position	12–21	Check with throttle valves fully closed.	
	Fully opened position	97–106	Check with throttle valves fully opened.	
02	Atmospheric pressure	Displays the atmospheric pressure.	Compare the actually mea- sured atmospheric pres- sure with the meter display value.	
03	Intake air pressure	Displays intake air pressure.	Compare the actually mea- sured atmospheric pres- sure with the meter display value without cranking the engine.	
05	Intake air temperature	Displays the intake air tem- perature.	Compare the actually mea- sured air temperature with the meter display value.	
06	Coolant temperature	Displays the coolant temper- ature.	Compare the actually mea- sured coolant temperature with the meter display val- ue.	
07	Vehicle speed pulse	0–999	Check that the number in- creases when the rear wheel is rotated. The num- ber is cumulative and does not reset each time the wheel is stopped.	
08	Lean angle sensor • Upright • Overturned	0.4–1.4 3.7–4.4	Remove the lean angle sensor and incline it more than 65 degrees.	
09	Fuel system voltage (bat- tery voltage)	Approximately 12.0	Set the engine stop switch to " $\bigcirc$ ", and then compare with the actually measured battery voltage. (If the bat- tery voltage is lower, re- charge the battery.)	
13	Throttle position sensor (for throttle valves) signal 2			
	Fully closed position	9–23	Check with throttle valve fully closed.	
	<ul> <li>Fully opened position</li> </ul>	94–108	Check with throttle valve fully opened.	

Diag			
Diag- nostic code No.	Item	Meter display	Checking method
14	Throttle position sensor (for throttle cable pulley) signal 1		
	Fully closed position	12–22	Check with throttle grip fully closed.
	<ul> <li>Fully opened position</li> </ul>	97–107	Check with throttle grip fully opened.
15	Throttle position sensor (for throttle cable pulley) signal 2		
	Fully closed position	10–24	Check with throttle grip fully closed.
	<ul> <li>Fully opened position</li> </ul>	95–109	Check with throttle grip fully opened.
20	Sidestand switch		Set ON/OFF the sidestand
	<ul> <li>Stand retracted</li> </ul>	ON	switch (with the transmis- sion in gear).
	<ul> <li>Stand extended</li> </ul>	OFF	sion in geai).
21	Neutral switch		Shift the transmission.
	Neutral	ON	
	• In gear	OFF	
60	EEPROM fault cylinder No.		_
	No history	00	
	• History exists	<ul> <li>01-04 (fault cylinder No.)</li> <li>(If more than one cylinder is defective, the display changes every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats.)</li> </ul>	
61	Malfunction history code		
	No history	00	
	• History exists	<ul> <li>Fault codes 11-60</li> <li>(If more than one code number is detected, the dis- play changes every two seconds to show all the de- tected code numbers.</li> <li>When all code numbers are shown, the display re- peats.)</li> </ul>	

Diag- nostic code No.	Item	Meter display	Checking method
62	Malfunction history code erasure		
	No history	00	—
	History exists	<ul> <li>Displays the total number of malfunctions, including the current malfunction, that have occurred since the history was last erased.</li> <li>(For example, if there have been three malfunctions, "03" is displayed.)</li> </ul>	To erase the history, set the engine stop switch from " $\bigotimes$ " to " $\bigcirc$ ".
63	Malfunction code reinstate (for fault code No. 24 and 40 only)		
	No malfunction code	00	—
	Malfunction code exists	<ul> <li>Fault codes 24, 40</li> <li>(If more than one code number is detected, the dis- play changes every two seconds to show all the de- tected code numbers.</li> <li>When all code numbers are shown, the display re- peats.)</li> </ul>	To reinstate, set the engine stop switch from "⊗" to "∩".
70	Control number	00	—

#### Actuator operation table

Diag- nostic code No.	Item	Actuation	Checking method
30	Cylinder-#1 ignition coil	Actuates the cylinder-#1 igni- tion coil five times at one- second intervals. Illuminates the engine trou- ble warning light.	Check the spark five times. • Connect an ignition checker.
31	Cylinder-#2 ignition coil	Actuates the cylinder-#2 igni- tion coil five times at one- second intervals. Illuminates the engine trou- ble warning light.	Check the spark five times. • Connect an ignition checker.
32	Cylinder-#3 ignition coil	Actuates the cylinder-#3 igni- tion coil five times at one- second intervals. Illuminates the engine trou- ble warning light.	Check the spark five times. • Connect an ignition checker.

Diag- nostic code No.	Item	Actuation	Checking method
33	Cylinder-#4 ignition coil	Actuates the cylinder-#4 igni- tion coil five times at one- second intervals. Illuminates the engine trou- ble warning light.	Check the spark five times. • Connect an ignition checker.
36	Primary injector #1	Actuates the primary injector #1 five times at one-second intervals. Illuminates the engine trou- ble warning light.	Check the operating sound of the primary injector #1 five times.
37	Primary injector #2	Actuates the primary injector #2 five times at one-second intervals. Illuminates the engine trou- ble warning light.	Check the operating sound of the primary injector #2 five times.
38	Primary injector #3	Actuates the primary injector #3 five times at one-second intervals. Illuminates the engine trou- ble warning light.	Check the operating sound of the primary injector #3 five times.
39	Primary injector #4	Actuates the primary injector #4 five times at one-second intervals. Illuminates the engine trou- ble warning light.	Check the operating sound of the primary injector #4 five times.
40	Secondary injector #1	Actuates the secondary in- jector #1 five times at one- second intervals. Illuminates the engine trou- ble warning light.	Check the operating sound of the secondary injector #1 five times.
41	Secondary injector #2	Actuates the secondary in- jector #2 five times at one- second intervals. Illuminates the engine trou- ble warning light.	Check the operating sound of the secondary injector #2 five times.
42	Secondary injector #3	Actuates the secondary in- jector #3 five times at one- second intervals. Illuminates the engine trou- ble warning light.	Check the operating sound of the secondary injector #3 five times.
43	Secondary injector #4	Actuates the secondary in- jector #4 five times at one- second intervals. Illuminates the engine trou- ble warning light.	Check the operating sound of the secondary injector #4 five times.

Diag- nostic code No.	ltem	Actuation	Checking method
48	Air induction system sole- noid	Actuates the air induction system solenoid five times at one-second intervals. Illuminates the engine trou- ble warning light.	Check the operating sound of the air induction system solenoid five times.
50	Fuel injection system relay	Actuates the fuel injection system relay five times at one-second intervals. Illuminates the engine trou- ble warning light. (The engine trouble warning light is OFF when the relay is ON, and the engine trouble warning light is ON when the relay is OFF).	Check the operating sound of the fuel injection system relay five times.
51	Radiator fan motor relay	Actuates the radiator fan mo- tor relay five times at one- second intervals. (ON 2 sec- onds, OFF 3 seconds) Illuminates the engine trou- ble warning light.	Check the operating sound of the radiator fan motor re- lay five times.
52	Headlight relay	Actuates the headlight relay five times at one-second in- tervals. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trou- ble warning light.	Check the operating sound of the headlight relay five times.
53	EXUP servo motor	Actuates the servo motor (turns to open side and to closed side). Illuminates the engine trou- ble warning light.	Check the operating sound.

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#### TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Check and service the items or components that are the probable cause of the malfunction following the order given. After the check and service of the malfunctioning part has been completed, reset the meter display according to the reinstatement method.

Fault code No.:

Code number displayed on the meter when the engine failed to work normally. Refer to "Self-Diagnostic Function table".

Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "DIAGNOSTIC MODE" on page 8-40.

Fault	code No.	11	Symptom	No normal signals are received from the cylinder identifi- cation sensor when the engine is started or while the ve- hicle is being driven.				
Diagn	ostic code	No.	—	—				
Order	Item/components and probable cause			bable	Check or maintenance job	Reinstatement method		
1	Installed condition of cylinder identifi- cation sensor.				Check for looseness or pinching.	Cranking the engine.		
2	pler	identif	ication sens ess ECU co		<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>			
3	Open or short circuit in wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between the cylinder identification sensor coupler and ECU coupler. (blue-blue) (white/black-white/black) (black/blue-black/blue)</li> </ul>			
4	Defective of sor.	cylinde	er identificat	ion sen-	Replace if defective.     Refer to "CHECKING THE     CYLINDER IDENTIFICATION     SENSOR" on page 8-109.			

Fault o	code No.	12	Symptom		No normal signals are received from the crankshaft posi- tion sensor.			
Diagn	ostic code	No.	—	—				
Order	Item/comp cause	onen	ts and prot	able	Check or maintenance job	Reinstatement method		
1	Installed co tion sensor		on of cranks	haft posi-	Check for looseness or pinching.	Cranking the engine.		
2		aft pos	ition sensor ess ECU co		<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>			
3	Open or sh	nort ci	rcuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between the crankshaft position sensor coupler and ECU coupler. (gray–gray) (black/blue–black/blue)</li> </ul>			
4	Defective of	ranks	haft positior	n sensor.	Replace if defective. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-103.			

Fault	code No.	13	Symptom	Intake air	ntake air pressure sensor: open or short circuit detected.			
Diagn	ostic code	No.	03	Intake air	r pressure sensor			
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method		
1	Connections • Intake air pressure sensor coupler • Main wire harness ECU coupler				<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Reinstated au- tomatically if a normal signal is received.		
2	Open or short circuit in wire harness and/or sub-wire-harness 2.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between intake air pressure sensor coupler and ECU coupler. (black/blue-black/blue) (pink/white-pink/white) (blue-blue)</li> </ul>			
3	Defective i	ntake	air pressure	e sensor.	<ul> <li>Execute the diagnostic mode. (Code No. 03)</li> <li>Replace if defective. Refer to "CHECKING THE IN- TAKE AIR PRESSURE SEN- SOR" on page 8-110.</li> </ul>			

Fault				Intake air pressure sensor: hose system malfunction (clogged or detached hose).		
Diagn	ostic code	No.	03	Intake air	r pressure sensor	
Order Item/components and probable cause			ts and prob	bable	Check or maintenance job	Reinstatement method
1	Intake air pressure sensor hose			ose	<ul> <li>Check the intake air pressure sensor hose condition.</li> <li>Repair or replace the sensor hose.</li> </ul>	Cranking the engine.
2	Defective intake air pressure sensor.			e sensor.	<ul> <li>Execute the diagnostic mode. (Code No. 03)</li> <li>Replace if defective. Refer to "CHECKING THE IN- TAKE AIR PRESSURE SEN- SOR" on page 8-110.</li> </ul>	

Fault	code No.	15	Symptom		oosition sensor (for throttle valve cuit detected.	s): open or	
Diagn					oosition sensor (for throttle valve oosition sensor (for throttle valve		
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method	
1	Installed co sensor (for		on of throttle tle valves).	position	<ul> <li>Check for looseness or pinching.</li> <li>Check that the sensor is installed in the specified position.</li> </ul>	Turning the main switch to "ON".	
2	valves) c	oositio ouplei	n sensor (fo , ess ECU co		<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>		
3	Open or short circuit in wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between throttle position sensor (for throttle valves) coupler and ECU coupler. (black/blue–black/blue) (blue–blue) (blue–blue) (green–green)</li> </ul>		
4	Defective t throttle val		e position se	nsor (for	<ul> <li>Execute the diagnostic mode. (Code Nos. 01, 13)</li> <li>Replace if defective. Refer to "CHECKING THE THROTTLE POSITION SEN- SOR (FOR THROTTLE VALVES)" on page 8-107.</li> </ul>		

Fault	code No.	17	Symptom	EXUP set	EXUP servo motor circuit: open or short circuit detected.				
Diagn	ostic code	No.	53	EXUP se	rvo motor				
Order	Item/comp cause	onen	its and prot	bable	Check or maintenance job	Reinstatement method			
1	Connections • EXUP servo motor coupler • Main wire harness ECU coupler				<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Reinstated au- tomatically if a normal signal is received.			
2	Open or short circuit in wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between EXUP servo motor coupler and ECU coupler. (blue-blue) (white/red-white/red) (black/blue-black/blue)</li> </ul>				
3	Defective I ometer cire		servo moto	r (potenti-	<ul> <li>Execute the diagnostic mode. (Code No. 53)</li> <li>Replace if defective.</li> </ul>				

Fault	code No.	18	Symptom	EXUP ser	rvo motor is stuck.		
Diagn	ostic code	No.	53	EXUP sei	rvo motor		
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method	
1		rvo m	otor coupler ess ECU co		<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> <li>Turning the main switch to "ON".</li> <li>It takes 3 sec onds at the maximum be- fore the origi-</li> </ul>		
2	Open or sh	nort ci	rcuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between EXUP servo motor coupler and ECU coupler. (black/green–black/green) (black/red–black/red)</li> </ul>	nal state returns.	
3	Defective E	EXUP	servo moto	r.	<ul> <li>Execute the diagnostic mode. (Code No. 53)</li> <li>Replace if defective.</li> </ul>		
4	Defective E bles.	EXUP	valve, pulle	y, and ca-	Replace if defective.		

Fault	code No.	19	Symptom	Open circuit is detected in the input lead from the side- stand switch to the ECU.			
Diagn	ostic code	No.	20	Sidestan	d switch		
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method	
1	Connections • Main wire harness ECU coupler				<ul> <li>Execute the diagnostic mode. (Code No. 20)</li> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	If the transmis- sion is in gear, retracting the sidestand. If the transmis- sion is in neu- tral, reconnecting the wiring.	
2	Open or short circuit in wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between ECU coupler and relay unit coupler. (blue/yellow-blue/yellow)</li> <li>Between relay unit coupler and sidestand switch coupler. (blue/black-blue/black)</li> <li>Between sidestand switch coupler and engine ground. (black-black)</li> </ul>		
3	Defective s	sidesta	and switch.		Replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-91.		

Fault	Fault code No.20SymptonDiagnostic code No.03 02		Symptom	When the main switch is turned to "ON", the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly. Intake air pressure sensor Atmospheric pressure sensor				
Diagn								
Order	Item/components and probable cause			bable	Check or maintenance job	Reinstatement method		
1	Defective intake air pressure sensor or atmospheric pressure sensor.				<ul> <li>Execute the diagnostic mode. (Code Nos. 03, 02)</li> <li>Replace if defective. Refer to "CHECKING THE IN- TAKE AIR PRESSURE SEN- SOR" on page 8-110 or "CHECKING THE ATMO- SPHERIC PRESSURE SEN- SOR" on page 8-109.</li> </ul>	Turning the main switch to "ON".		

Fault	code No.	21	Symptom	Coolant t ed.	temperature sensor: open or short circuit detect-		
Diagn	ostic code	No.	06	Coolant t	emperature sensor		
Order	Item/comp cause	onen	ts and prot	able	Check or maintenance job	Reinstatement method	
1		empe	rature senso ess ECU co		<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Reinstated au- tomatically if a normal signal is received.	
2	Open or short circuit in wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between coolant temperature sensor coupler and ECU coupler. (green/white–green/white) (black/blue–black/blue)</li> </ul>		
3	Defective of	coolar	it temperatu	re sensor.	<ul> <li>Execute the diagnostic mode. (Code No. 06)</li> <li>Replace if defective. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-106.</li> </ul>		

Fault	code No.	22	Symptom	Air tempe	Air temperature sensor: open or short circuit detected.			
Diagn	ostic code	No.	05	Air tempe	Air temperature sensor			
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method		
1	Connections • Air temperature sensor coupler • Main wire harness ECU coupler				<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Reinstated au- tomatically if a normal signal is received.		
2	Open or sh	nort ci	rcuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between air temperature sensor coupler and ECU coupler. (brown/white–brown/white) (black/blue–black/blue)</li> </ul>			
3	3 Defective air temperature sensor.				<ul> <li>Execute the diagnostic mode. (Code No. 05)</li> <li>Replace if defective. Refer to "CHECKING THE AIR TEMPERATURE SENSOR" on page 8-110.</li> </ul>			

Fault			Atmosph tected.	Atmospheric pressure sensor: open or short circuit de- tected.				
Diagr	nostic code	No.	02	Atmosph	eric pressure sensor			
Orde	r Item/comp cause	onen	ts and prot	bable	Check or maintenance job	Reinstatement method		
1	pler	eric p	ressure sen: ess ECU co		<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Reinstated au- tomatically if a normal signal is received.		
2			rcuit in wire harness 2.	harness	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between atmospheric pressure sensor coupler and ECU coupler. (black/blue–black/blue) (pink–pink) (blue–blue)</li> </ul>			
3	Defective a sor.	atmos	pheric press	sure sen-	<ul> <li>Execute the diagnostic mode. (Code No. 02)</li> <li>Replace if defective. Refer to "CHECKING THE AT- MOSPHERIC PRESSURE SENSOR" on page 8-109.</li> </ul>			

Fault	code No.	24	Symptom	No norm	o normal signal is received from the O <sub>2</sub> sensor.				
Diagn	ostic code	No.	<b>—</b>	—					
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method			
1	Installed st	tate of	O <sub>2</sub> sensor.		Check for looseness or pinching.	Execute the di-			
2	Connection • O <sub>2</sub> senso • Main wire	or cou	pler ess ECU co	upler	<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	agnostic mode (Code No. 63). (Set the engine stop switch to "∩".)			
3	Open or sł	nort ci	rcuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between O<sub>2</sub> sensor coupler and ECU coupler. (gray/green–gray/green) (black/blue–black/blue) (pink/black–pink/black) (red/blue–red/blue)</li> </ul>				
4	Check fuel	press	sure.		• Refer to "THROTTLE BODIES" on page 7-7.				
5	Defective (	⊃ <sub>2</sub> ser	nsor.		Replace if defective.				

Fault	Fault code No. 30 Symptom		Latch up detected. No normal signal is received from the lean angle sensor.						
Diagn	ostic code	No.	08	Lean ang	ean angle sensor				
Order Item/components and probable cause				bable	Check or maintenance job	Reinstatement method			
1	The vehicle has overturned.				Raise the vehicle upright.	Turning the			
2	Installed s sor.	tate o	f the lean an	igle sen-	Check the installed direction and condition of the sensor.	main switch to "ON" (however, the engine can-			
3	Defective lean angle sensor.				<ul> <li>Execute the diagnostic mode. (Code No. 08)</li> <li>Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-103.</li> </ul>	not be restarted unless the main switch is first turned to "OFF").			

Fault	Fault code No. 33 Symptom		Symptom	Open circuit detected in the primary lead of the cylinder- #1 ignition coil.			
Diagn	ostic code	No.	30	Cylinder-	#1 ignition coil		
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method	
1	Main wire	#1 igr e harn	nition coil co ess ECU co ess 1 couple	upler	<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Cranking the engine. (Connect the cylinder-#1 ig- nition coil cou- pler.)	
2	Open or short circuit in wire harness and/or sub-wire harness 1.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between cylinder-#1 ignition coil coupler and ECU coupler. (red/black-red/blue) (orange-orange)</li> </ul>		
3	Defective of	cylinde	er-#1 ignitior	n coil.	<ul> <li>Execute the diagnostic mode. (Code No. 30)</li> <li>Test the primary and secondary coils for continuity.</li> <li>Replace if defective. Refer to "CHECKING THE IG- NITION COILS" on page 8-102.</li> </ul>		

Fault	Fault code No. 34		Symptom	Open circ #2 ignitic	cuit detected in the primary lead of the cylinder- on coil.			
Diagn	ostic code	No.	31	Cylinder-	#2 ignition coil			
Order	Item/comp cause	oner	its and prob	able	Check or maintenance job	Reinstatement method		
1	Connections • Cylinder-#2 ignition coil coupler • Main wire harness ECU coupler • Sub-wire harness 1 coupler				<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Cranking the engine. (Connect the cylinder-#2 ig- nition coil cou- pler.)		
2			ircuit in wire harness 1.	harness	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between cylinder-#2 ignition coil coupler and ECU coupler. (red/black-red/blue) (gray/red-gray/red)</li> </ul>			
3	Defective cylinder-#2 ignition coil.				<ul> <li>Execute the diagnostic mode. (Code No. 31)</li> <li>Test the primary and secondary coils for continuity.</li> <li>Replace if defective. Refer to "CHECKING THE IG- NITION COILS" on page 8-102.</li> </ul>			

Fault				Open circuit detected in the primary lead of the cylinder- #3 ignition coil.			
Diagn	ostic code	No.	32	Cylinder-	#3 ignition coil		
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method	
1	Main wire	#3 igr e harn	nition coil co ess ECU co ess 1 couple	upler	<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Cranking the engine. (Connect the cylinder-#3 ig- nition coil cou- pler.)	
2	Open or sh and/or sub		rcuit in wire harness 1.	harness	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between cylinder-#3 ignition coil coupler and ECU coupler. (red/black-red/blue) (orange/green-orange/green)</li> </ul>		
3	Defective of	cylinde	er-#3 ignitior	n coil.	<ul> <li>Execute the diagnostic mode. (Code No. 32)</li> <li>Test the primary and secondary coils for continuity.</li> <li>Replace if defective. Refer to "CHECKING THE IG- NITION COILS" on page 8-102.</li> </ul>		

Fault				Open circuit detected in the primary lead of the cylinder- #4 ignition coil.				
Diagr	nostic code	No.	33	Cylinder-	#4 ignition coil			
Orde	r Item/comp cause	onen	ts and prot	bable	Check or maintenance job	Reinstatement method		
1	Main wire	#4 igr e harn	nition coil co ess ECU co ess 1 couple	oupler	<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Cranking the engine. (Connect the cylinder-#4 ig- nition coil cou- pler.)		
2			rcuit in wire harness 1.	harness	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between cylinder-#4 ignition coil coupler and ECU coupler/main wire harness. (red/black-red/blue) (gray/green-gray/green)</li> </ul>			
3	Defective of	cylinde	er-#4 ignitior	n coil.	<ul> <li>Execute the diagnostic mode. (Code No. 33)</li> <li>Test the primary and secondary coils for continuity.</li> <li>Replace if defective. Refer to "CHECKING THE IG- NITION COILS" on page 8-102.</li> </ul>			

Fault	code No.	Symptom	Open circ	cuit detected in a primary injecto	r.		
Diagn	Diagnostic code No. 36 37 38 39			Primary injector #1 Primary injector #2 Primary injector #3 Primary injector #4			
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method	
1		njecto e harn	r coupler ess ECU co ess 2 couple		<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Cranking the engine. (Connect the fuel injector couplers.)	
2	Open or sh and/or sub		rcuit in wire harness 2.	harness	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between primary injector coupler and ECU coupler. (red/blue–red/blue) #1: (red/black–red/black) #2: (green/black–green/black) #3: (blue/black–blue/black) #4: (orange/black–or-ange/black)</li> </ul>		
3	Defective p	orimar	y injector.		<ul> <li>Execute the diagnostic mode. (Code Nos. 36, 37, 38, 39)</li> <li>Replace if defective. Refer to "CHECKING THE PRI- MARY INJECTORS" on page 7-10.</li> </ul>		

Fault	code No.	40	Symptom	Open cire	cuit detected in a secondary injec	ctor.	
Diagn	Diagnostic code No. 40 41 42 43			Secondary injector #1 Secondary injector #2 Secondary injector #3 Secondary injector #4			
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method	
1	<ul> <li>Main wire</li> </ul>	ry inje e harn	ctor coupler ess ECU co ess 2 couple	upler	<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Execute the diagnostic mode (Code No. 63). (Set the engine stop switch to " $\bigcirc$ ".)	
2			rcuit in wire harness 2.	harness	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between secondary injector coupler and ECU coupler. (red/blue-red/blue) #1: (white/blue-white/blue) #2: (sky blue/white-sky blue/white) #3: (brown/yellow-brown/yel-low) #4: (brown/black-brown/black)</li> </ul>		
3	Defective	secon	dary injector	:	<ul> <li>Execute the diagnostic mode. (Code Nos. 40, 41, 42, 43)</li> <li>Replace if defective. Refer to "CHECKING THE SECONDARY INJECTORS" on page 7-6.</li> </ul>		

Fault	code No.	41	Symptom	Lean angle sensor: open or short circuit detected.				
Diagn	ostic code	No.	08	Lean ang	le sensor			
Order	Order Item/components and probable cause				Check or maintenance job	Reinstatement method		
1	Connections • Lean angle sensor coupler • Main wire harness ECU coupler				<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Reinstated au- tomatically if a normal signal is received.		
2	Open or sł	nort ci	rcuit in lead.		<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between lean angle sensor coupler and ECU coupler. (blue–blue) (yellow/green–yellow/green) (black/blue–black/blue)</li> </ul>			
3	Defective I	ean a	ngle sensor.		<ul> <li>Execute the diagnostic mode. (Code No. 08)</li> <li>Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-103.</li> </ul>			

Fault	code No.	42			A. No normal signals are received from the speed sense B. Open circuit is detected in the neutral switch.			
Diagn	ostic code	No.	Α	07	Speed se	Speed sensor		
			В	21	Neutral s	witch		
Order	Item/comp cause	onen	ts and	d prot	able	Check or maintenance job	Reinstatement method	
A-1	Installed s	tate of	fspee	d sens	sor.	Check for looseness or pinching.	Starting the en-	
A-2	Connectio • Speed se • Main wire	ensor			upler	<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	gine, and acti- vating the speed sensor by operating the vehicle.	
A-3	Open or sl	nort ci	rcuit ir	n lead		<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between speed sensor coupler and ECU coupler. (blue-blue) (white/yellow-white/yellow) (black/blue-black/blue)</li> </ul>		
A-4	Defective	speed	senso	or.		<ul> <li>Execute the diagnostic mode. (Code No. 07)</li> <li>Replace if defective. Refer to "CHECKING THE SPEED SENSOR" on page 8-106.</li> </ul>		

Fault	code No.	42				A. No normal signals are received from the speed sensor. B. Open circuit is detected in the neutral switch.			
Diagn	ostic code	No.	Α	07	Speed se	Speed sensor			
	B 21					witch			
Order	Item/comp cause	onen	ts and	d prot	able	Check or maintenance job	Reinstatement method		
B-1	Installed st	tate of	f neutr	al swi	tch.	Check for looseness or pinching.	Starting the en-		
B-2	Connection • Neutral s • Main wire	witch			upler	<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	gine, and acti- vating the speed sensor by operating the vehicle.		
B-3	Open circu	iit in n	eutral	switch	n lead.	<ul> <li>Repair or replace if there is an open circuit.</li> <li>Between neutral switch coupler and relay unit coupler. (sky blue–sky blue)</li> <li>Between relay unit coupler and ECU coupler. (blue/yellow–blue/yellow)</li> </ul>			
B-4	Defective neutral switch.					<ul> <li>Execute the diagnostic mode. (Code No. 21)</li> <li>Replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-91.</li> </ul>			
B-5	Faulty shift ea).	t drum	n (neut	tral de	tection ar-	Replace if defective. Refer to "TRANSMISSION" on page 5-71.			

Fault			Power su mal.	Power supply to the injectors and fuel pump is not nor- mal.			
Diagı	nostic code	No.	09	Fuel syst	em voltage (battery voltage)		
Orde	r Item/comp cause	onen	ts and prot	bable	Check or maintenance job	Reinstatement method	
1		it coup	bler (fuel pui ess ECU co		<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON" when the engine stop switch is set to "⊖".	
2	Open or sł	nort ci	rcuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between relay unit coupler and ECU coupler. (blue/yellow-blue/yellow) (red/blue-red/blue)</li> <li>Between relay unit coupler and starter relay coupler. (red-red)</li> <li>Between relay unit coupler and right handlebar switch coupler. (red/black-red/black)</li> </ul>		
3	Malfunctio pump relay		pen circuit ir	n fuel	<ul> <li>Execute the diagnostic mode. (Code No. 09)</li> <li>Replace if defective.</li> <li>If there is no malfunction with the fuel pump relay, replace the ECU.</li> </ul>		

			An error is detected while reading or writing on EEPROM (CO adjustment value).			
Diagn	ostic code	No.	60	EEPROM	fault cylinder No.	
Order	Item/comp cause	onen	its and prob	bable	Check or maintenance job	Reinstatement method
1					<ul> <li>Set the faulty cylinder's exhaust gas volume.</li> <li>1. Execute the diagnostic mode (Code No. 60) to check the faulty cylinder number. (If multiple cylinders are defective, the numbers of the faulty cylinders are displayed alternately at 2-second intervals.)</li> <li>2. Execute the CO adjustment mode and set the exhaust gas volume of the faulty cylinder to "0". Refer to "ADJUSTING THE EXHAUST GAS VOLUME" on page 3-7.</li> <li>Replace ECU if it does not recover from the malfunction.</li> </ul>	Turning the main switch to "ON". (Readjust the exhaust gas volume after it is reinstated.)

Fault	Fault code No. 46 Symptom P		Power su	Power supply is not normal.			
Diagnostic code No. — —				—			
Order	Item/comp cause	oner	its and prob	able	Check or maintenance job	Reinstatement method	
1	Malfunction in rectifier/regulator			ator	Replace if defective. Refer to "CHARGING SYS- TEM" on page 8-13.	Starting the en- gine and oper- ating it at idle.	
2	Open or s	hort c	ircuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit in the charging system's wiring. Refer to "CHARGING SYS- TEM" on page 8-13.</li> </ul>		

		Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)				
Diagn	Diagnostic code No. —			—		
Order	Order Item/components and proba		bable	Check or maintenance job	Reinstatement method	
1	Malfunction in ECU.				Replace the ECU. <b>NOTE:</b> Be sure to turn the main switch to "OFF" before replacing the ECU.	Turning the main switch to "ON".

Fault	S S			short circ Throttle p	Throttle position sensor (for throttle cable pulley): open or short circuit detected. Throttle position sensor (for throttle cable pulley): coupler connection is loose.			
Diagn	iostic code	No.	14 15		oosition sensor (for throttle cable position sensor (for throttle cable			
Order	ltem/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method		
1	Installed state of throttle position sen- sor (for throttle cable pulley).				<ul> <li>Check for looseness or pinching.</li> <li>Check that the sensor is installed in the specified position.</li> </ul>	Turning the main switch to "ON".		
2	<ul> <li>Connections</li> <li>Throttle position sensor (for throttle cable pulley) coupler</li> <li>Main wire harness ECU coupler</li> </ul>				<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>			
3	Open or short circuit in wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between throttle position sensor (for throttle cable pulley) coupler and ECU coupler. (black/blue–black/blue) (white–white) (white–white) (white/red–white/red) (blue–blue)</li> </ul>			
4	Defective t throttle cal		e position se lley).	nsor (for	<ul> <li>Execute the diagnostic mode. (Code Nos. 14, 15)</li> <li>Replace if defective. Refer to "CHECKING THE THROTTLE POSITION SEN- SOR (FOR THROTTLE CA- BLE PULLEY)" on page 8-107.</li> </ul>			

Fault	Fault code No. 60 Symptom		Throttle servo motor: open or short circuit detected. Defective throttle servo motor. Malfunction in ECU (servo motor driving system).			
Diagn	ostic code	No.	01 13		oosition sensor (for throttle valve oosition sensor (for throttle valve	
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method
1	Installed s sor (for thr		f throttle pos alves).	ition sen-	<ul> <li>Check for looseness or pinching.</li> <li>Check that the sensor is installed in the specified position.</li> </ul>	Turning the main switch to "ON".
2	Connections • Throttle servo motor coupler • Main wire harness ECU coupler				<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	
3	Open or sl	nort ci	rcuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between throttle servo motor coupler and ECU coupler. (yellow/red–yellow/red) (light green/red–light green/red)</li> </ul>	
4	Defective t	throttle	e servo moto	or.	<ul> <li>Execute the diagnostic mode. (Code Nos. 01, 13)</li> <li>Replace the throttle body assembly if defective.</li> </ul>	
5	Malfunctio	n in E	CU.		Replace the ECU.	1

Fault o	code No.	Er-1	Symptom	No signa	Is are received from the ECU.	
Diagn	ostic code	No.	—	—		
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method
1	Connections • Main wire harness ECU coupler • Main wire harness meter assembly coupler				<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON".
2	Open or sh	nort ci	rcuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between meter assembly coupler and ECU coupler. (yellow/blue–yellow/blue)</li> </ul>	
3	Malfunctio	n in m	eter assemt	oly.	Replace the meter assembly.	
4	Malfunctio	n in E	CU.		Replace the ECU.	

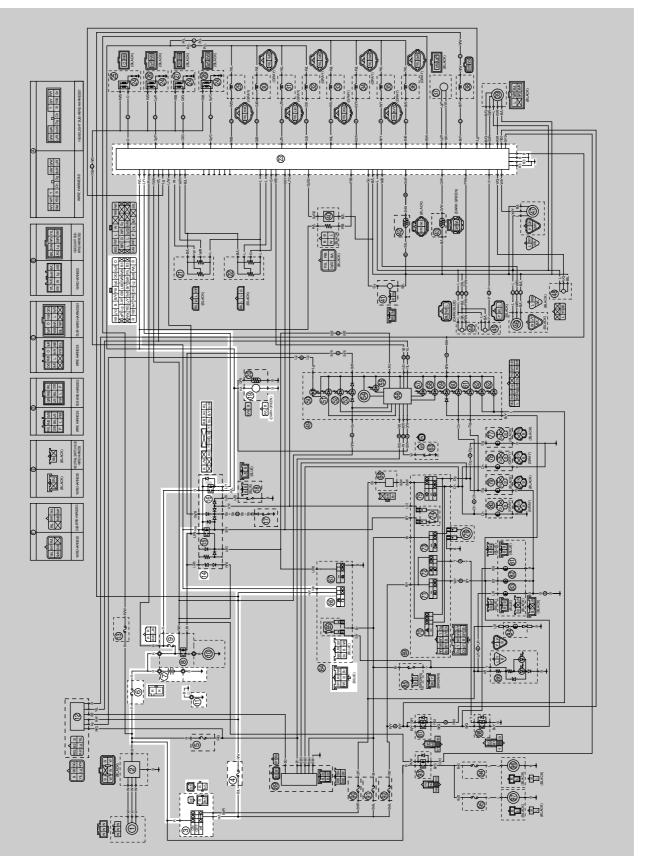
		No signa duration.	No signals are received from the ECU within the specified duration.			
Diagn	ostic code	No.	—	—		
Order Item/components and probable cause					Check or maintenance job	Reinstatement method
1	Connections <ul> <li>Main wire harness ECU coupler</li> <li>Main wire harness meter assembly coupler</li> </ul>				<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON".
2	Open or sl	nort ci	rcuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between meter assembly coupler and ECU coupler. (yellow/blue–yellow/blue)</li> </ul>	
3	Malfunctio	n in m	eter asseml	oly.	Replace the meter assembly.	1
4	Malfunctio	n in E	CU.		Replace the ECU.	1

Fault	code No.	Er-3	Symptom	Data fron	n the ECU cannot be received cor	rrectly.
Diagn	ostic code	No.	—	—		
Order	Item/comp cause	onen	ts and prob	bable	Check or maintenance job	Reinstatement method
1		e harn	ess ECU co ess meter a		<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON".
2	Open or sh	nort ci	rcuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between meter assembly coupler and ECU coupler. (yellow/blue–yellow/blue)</li> </ul>	
3	Malfunction	n in m	eter assemt	oly.	Replace the meter assembly.	
4	Malfunctio	n in E	CU.		Replace the ECU.	

Fault code No. Er-4 Symptom		Non-regi	Non-registered data has been received from the meter.					
Diagnostic code No. — —				—	-			
Order	Item/comp cause	onen	ts and prol	bable	Check or maintenance job	Reinstatement method		
1	Connections • Main wire harness ECU coupler • Main wire harness meter assembly coupler				<ul> <li>Check the couplers for any pins that may be pulled out.</li> <li>Check the locking condition of the couplers.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON".		
2	Open or short circuit in wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between meter assembly coupler and ECU coupler. (yellow/blue–yellow/blue)</li> </ul>			
3	Malfunctio	n in m	eter assem	bly.	Replace the meter assembly.			
4	Malfunctio	n in E	CU.		Replace the ECU.	1		

## FUEL PUMP SYSTEM

## CIRCUIT DIAGRAM

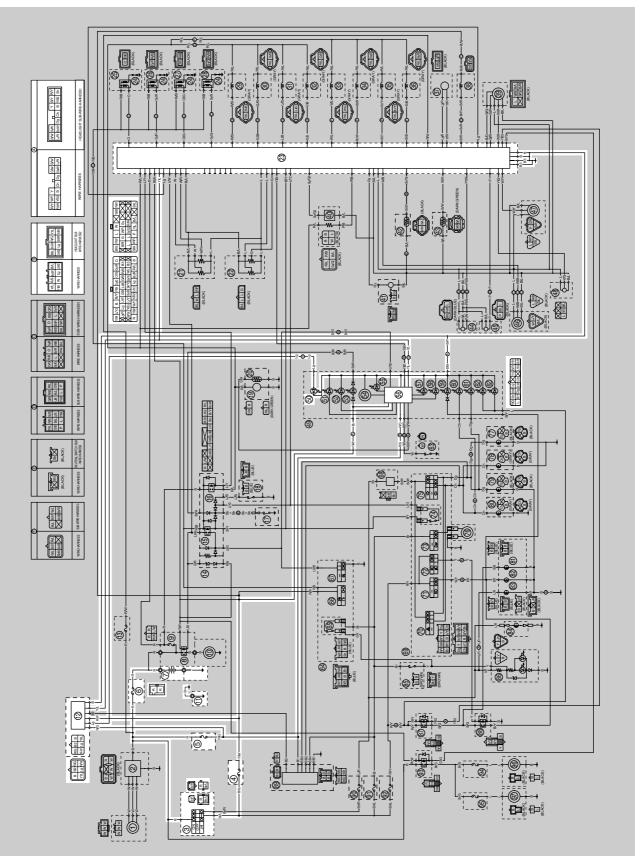


- 3. Main switch
- 4. Ignition fuse
- 6. Main fuse
- 7. Battery
- 9. Fuel injection system fuse
- 11.Engine ground
- 14.Relay unit
- 16.Fuel pump relay
- 19.Fuel pump
- 23.ECU (engine control unit)
- 66.Engine stop switch

EAS27570 <b>TROUBLESHOOTING</b> If the fuel pump fails to operate. <b>NOTE:</b> • Before troubleshooting, remove the follow	wing part(s):	
<ol> <li>Rider seat</li> <li>Fuel tank</li> <li>Side cowlings</li> </ol>	ining part(o).	
<ol> <li>Check the fuses. (Main, ignition and fuel injection system) Refer to "CHECKING THE FUS- ES" on page 8-95.</li> </ol>	NG $\rightarrow$ Replace the fuse(s).	
OK↓	,	
<ol> <li>Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-96.</li> </ol>	NG  ightarrow	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
ОК↓		
<ol> <li>Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-91.</li> </ol>	$NG \to$	Replace the main switch/immobilizer unit.
OK↓		
4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-91.	NG  ightarrow	Replace the right handlebar switch.
OK↓		
<ol> <li>Check the relay unit (fuel pump re- lay).</li> <li>Refer to "CHECKING THE RE- LAYS" on page 8-99.</li> </ol>	$NG \rightarrow$	Replace the relay unit.
OK↓		
<ol> <li>Check the fuel pump. Refer to "CHECKING THE FUEL PUMP" on page 8-108.</li> </ol>	$NG \to$	Replace the fuel pump.
OK↓	т	
<ol> <li>Check the entire fuel pump sys- tem's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-73.</li> </ol>	$NG \rightarrow$	Properly connect or repair the fuel pump system's wiring.
OK↓		
Replace the ECU.		

#### EAS27640 IMMOBILIZER SYSTEM

#### EAS27650 CIRCUIT DIAGRAM



- 3. Main switch
- 4. Ignition fuse
- 5. Backup fuse (odometer, clock and immobilizer system)
- 6. Main fuse
- 7. Battery
- 11.Engine ground
- 12.Immobilizer unit
- 23.ECU (engine control unit)
- 50. Immobilizer system indicator light
- 56.Multi-function meter

### GENERAL INFORMATION

This vehicle is equipped with an immobilizer system to help prevent theft by re-registering codes in the standard keys. This system consists of the following:

- a code re-registering key (with a red bow)
- two standard keys (with a black bow) that can be re-registered with new codes
- a transponder (installed in the red key bow)
- an immobilizer unit
- the ECU
- an immobilizer system indicator light

The key with the red bow is used to register codes in each standard key. Do not use the key with the red bow for driving. It should only be used for re-registering new codes in the standard keys. The immobilizer system cannot be operated with a new key until the key is registered with a code. If you lose the code re-registering key, the ECU and main switch (equipped with the immobilizer unit) need to be replaced.

Therefore, always use a standard key for driving. (See caution below.)

#### NOTE:

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

#### EC2C01001

#### **CAUTION:**

- DO NOT LOSE THE CODE RE-REGISTERING KEY! If the code re-registering key is lost, registering new codes in the standard keys is impossible. The standard keys can still be used to start the vehicle. However, if code re-registering is required (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.

#### EAS27690

#### PART REPLACEMENT AND KEY CODE REGISTRATION REQUIREMENTS

In the course of use, you may encounter the following cases where replacement of parts and registration of code re-registering/standard keys are required.

#### NOTE:

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

	Parts to be replaced					
	Main switch/immo- bilizer unit		Standard	ECU	Accesso- ry lock*	Key registration re- quirement
	Main switch	Immobiliz- er unit	key	200	and key	
Standard key is lost						New standard key
All keys have been lost (including code re-registering key)				$\checkmark$	$\checkmark$	Code re-registering key and standard keys
ECU is defective				$\checkmark$		Code re-registering key and standard keys
Immobilizer unit is defective						Code re-registering key and standard keys
Main switch is defec- tive				$\checkmark$	$\checkmark$	Code re-registering key and standard keys
Accessory lock* is defective					$\checkmark$	Not required

\* Accessory locks mean the seat lock, fuel tank cap or the helmet holder.

#### Code re-registering key registration:

When the immobilizer unit or ECU is replaced, the code re-registering key must be registered to the unit.

To register a code re-registering key:

1. Turn the main switch to "ON" with the code re-registering key.

#### NOTE:

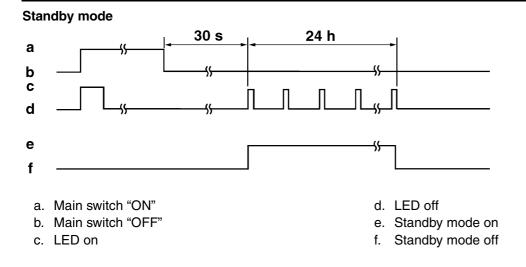
Check that the immobilizer system indicator light comes on for one second, then goes off. When the immobilizer system indicator light goes off, the code re-registering key has been registered.

2. Check that the engine can be started.

3. Register the standard key, following the instructions in the section below.

#### Standby mode:

To enable the immobilizer system, turn the ignition key to "OFF". 30 seconds later, the indicator light will start flashing continuously in the standby flashing mode pattern for up to 24 hours. After that time, the indicator light will stop flashing, but the immobilizer system is still enabled.



#### Standard key registration:

Standard key registration is required when a standard key is lost and needs to be replaced, or when the code re-registering key is re-registered after the immobilizer unit or ECU are replaced.

#### NOTE:

Do not start the engine with a standard key that has not been registered. If the main switch is turned "ON" with a standard key that has not been registered, the immobilizer system indicator light flashes to indicate fault code "52". (Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-83.)

- 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.

#### NOTE:

The existing standard key code is erased from the memory when the key registration mode is activated. When the key registration mode is activated, the immobilizer system indicator light flashes rapidly.

4. While the indicator light is flashing, turn the main switch to "OFF", remove the key, and within 5 seconds, insert the second standard key to be registered into the main switch.

#### NOTE:

If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the registration mode is deactivated. If this occurs, the second standard key cannot be registered, and steps 2 to 4 need to be repeated to register both standard keys.

#### 5. Turn the main switch to "ON".

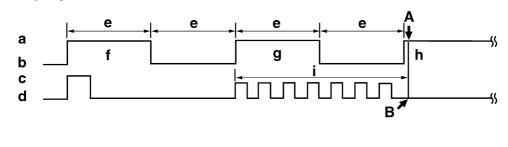
#### NOTE:\_

When the indicator light goes off, the registration is complete.

6. Check that the engine can be started with the two registered standard keys.

### **IMMOBILIZER SYSTEM**

#### Standard key registration



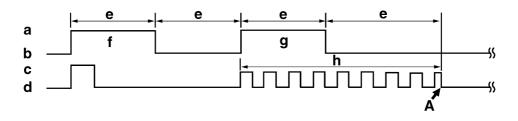
- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key

- 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.

#### EAS27700 TROUBLESHOOTING

When the main switch is turned to "ON", the immobilizer system indicator light does not come on nor flashes.

<ol> <li>Check the fuses. (Main, ignition, and backup) Refer to "CHECKING THE FUS- ES" on page 8-95.</li> </ol>	NG  ightarrow	Replace the fuse(s).
OK↓		
<ol> <li>Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-96.</li> </ol>	NG  ightarrow	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
OK↓		
<ol> <li>Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-91.</li> </ol>	$NG \rightarrow$	Replace the main switch/immobilizer unit.
OK↓		
<ol> <li>Check the entire immobilizer system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-77.</li> </ol>	NG  ightarrow	Properly connect or repair the immobilizer system wiring.
OK↓		
Check the condition each of the im- mobilizer system circuits. Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-83.		

EAS27720

#### SELF-DIAGNOSIS FAULT CODE INDICATION

When a system malfunction occurs, the fault code number is signaled by the immobilizer system indicator light.

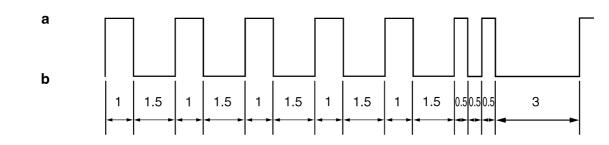
Fault code	Part	Symptom	Cause	Action
51	IMMOBILIZER UNIT	Code cannot be transmitted be- tween the key and the immobilizer unit.	<ol> <li>Radio wave interference caused by objects around the keys and antennas.</li> <li>Immobilizer unit malfunction.</li> <li>Key malfunction.</li> </ol>	<ol> <li>Keep magnets, metal objects, and other immo- bilizer system keys away from the keys and an- tennas.</li> <li>Replace the main switch/im- mobilizer unit.</li> <li>Replace the key.</li> </ol>

### **IMMOBILIZER SYSTEM**

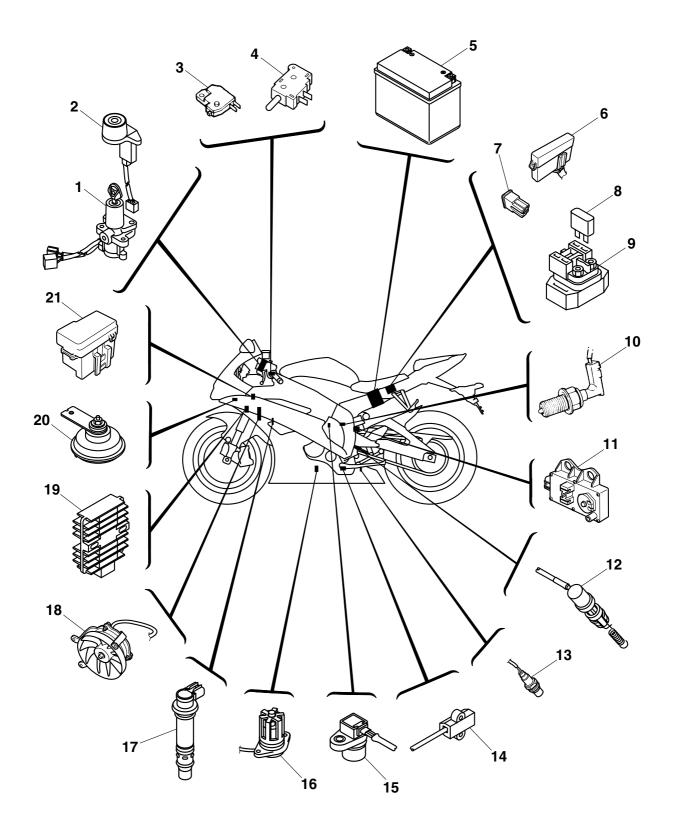
Fault code	Part	Symptom	Cause	Action
52	IMMOBILIZER UNIT	Codes between the key and immobilizer unit do not match.	<ol> <li>Signal received from other transponder (failed to recognize code after ten con- secutive attempts).</li> <li>Signal received from unregistered stan- dard key.</li> </ol>	<ol> <li>Place the immobilizer unit at least 50 mm away from the transponder of other vehicles.</li> <li>Register the standard key.</li> </ol>
53	IMMOBILIZER UNIT	Codes cannot be transmitted be- tween the ECU and the immobilizer unit.	<ul> <li>Noise interference or disconnected lead/ca- ble.</li> <li>1. Interference due to radio wave noise.</li> <li>2. Disconnected com- munication harness.</li> <li>3. Immobilizer unit mal- function.</li> <li>4. ECU malfunction.</li> </ul>	<ol> <li>Check the wire harness and connector.</li> <li>Replace the main switch/im- mobilizer unit.</li> <li>Replace the ECU.</li> </ol>
54	IMMOBILIZER UNIT	Codes transmitted between the ECU and the immobilizer unit do not match.	<ul> <li>Noise interference or disconnected lead/ca- ble.</li> <li>1. Interference due to radio wave noise.</li> <li>2. Disconnected com- munication harness.</li> <li>3. Immobilizer unit mal- function.</li> <li>4. ECU failure. (The ECU or immobi- lizer unit was re- placed with a used unit from another ve- hicle.)</li> </ul>	<ol> <li>Register the code re-register- ing key.</li> <li>Check the wire harness and connector.</li> <li>Replace the main switch/im- mobilizer unit.</li> <li>Replace the ECU.</li> </ol>
55	IMMOBILIZER UNIT	Key code registra- tion malfunction.	Same standard key was attempted to be regis- tered two consecutive times.	Register another standard key.
56	ECU	Unidentified code is received.	Noise interference or disconnected lead/ca- ble.	<ol> <li>Check the wire harness and connector.</li> <li>Replace the main switch/im- mobilizer unit.</li> <li>Replace the ECU.</li> </ol>

#### Immobilizer system indicator light fault code indication

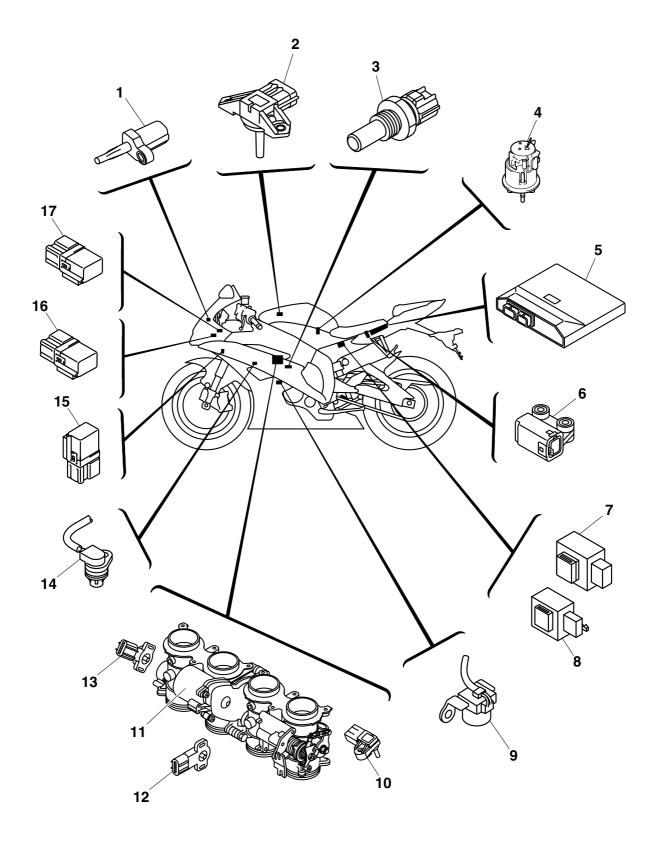
Units of 10: Cycles of on for 1 second and off for 1.5 seconds. Units of 1: Cycles of on for 0.5 second and off for 0.5 second. Example: fault code 52



a. Light on b. Light off

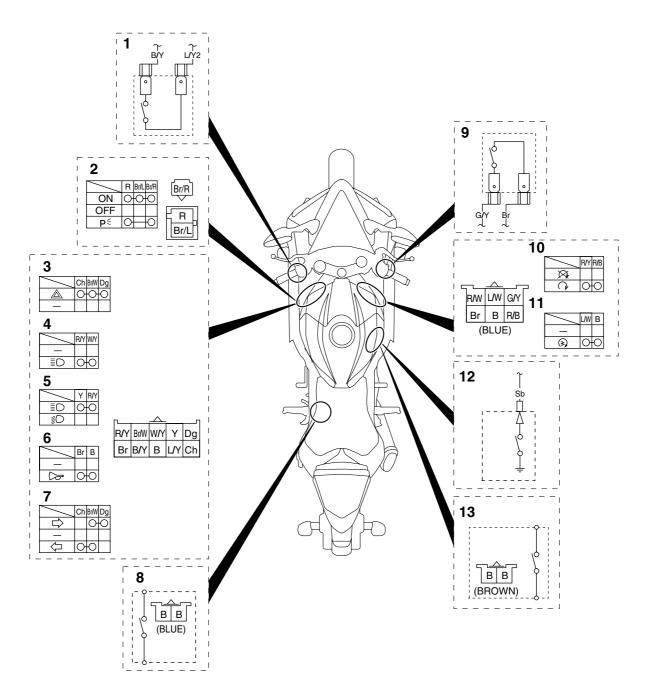


- 1. Main switch
- 2. Immobilizer unit
- 3. Front brake light switch
- 4. Clutch switch
- 5. Battery
- 6. Fuse box (backup, ETV)
- 7. Main fuse
- 8. Fuel injection system fuse
- 9. Starter relay
- 10. Neutral switch
- 11. EXUP servo motor
- 12. Rear brake light switch
- 13.O<sub>2</sub> sensor
- 14. Sidestand switch
- 15. Speed sensor
- 16. Oil level switch
- 17. Ignition coil
- 18. Radiator fan motor
- 19. Rectifier/regulator
- 20. Horn
- 21. Fuse box (radiator fan motor, signaling system, ignition, taillight, headlight)



- 1. Air temperature sensor
- 2. Atmospheric pressure sensor
- 3. Coolant temperature sensor
- 4. Fuel pump
- 5. ECU (engine control unit)
- 6. Lean angle sensor
- 7. Relay unit
- 8. Turn signal/hazard relay
- 9. Crankshaft position sensor
- 10. Intake air pressure sensor
- 11. Throttle servo motor
- 12. Throttle position sensor (for throttle cable pulley)
- 13. Throttle position sensor (for throttle valves)
- 14. Cylinder identification sensor
- 15. Radiator fan motor relay
- 16. Headlight relay (dimmer)
- 17. Headlight relay (on/off)

#### EAS27980 CHECKING THE SWITCHES



- 1. Clutch switch
- 2. Main switch
- 3. Hazard switch
- 4. Pass switch
- 5. Dimmer switch
- 6. Horn switch
- 7. Turn signal switch
- 8. Sidestand switch
- 9. Front brake light switch
- 10. Engine stop switch
- 11. Start switch
- 12. Neutral switch
- 13. 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.

#### CAUTION:

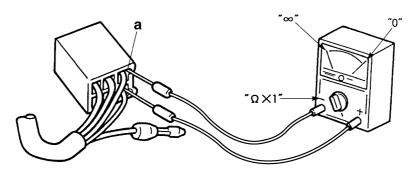
Never insert the tester probes into the coupler terminal slots "a". Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



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

NOTE:

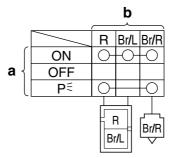
- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.
- When checking for continuity, switch back and forth between the switch positions a few times.



The switches and their terminal connections are illustrated as in the following example of the main switch.

The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row.

The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indication by " $\bigcirc$ — $\bigcirc$ ". There is continuity between red, brown/blue, and brown/red when the switch is set to "ON" and between red and brown/red when the switch is set to "P $\in$ ".



### CHECKING THE BULBS AND BULB SOCKETS

#### NOTE: \_

Do not check any of the lights that use LEDs.

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

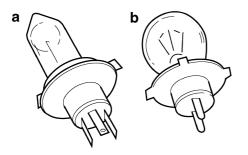
Damage/wear  $\rightarrow$  Repair or replace the bulb, bulb socket or both.

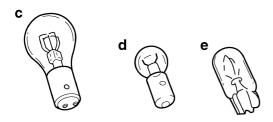
Improperly connected  $\rightarrow$  Properly connect. No continuity  $\rightarrow$  Repair or replace the bulb, bulb socket or both.

#### Types of bulbs

The bulbs used on this vehicle are shown in the following illustration.

- Bulbs "a" and "b" are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulbs "c" are used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs "d" and "e" are 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

#### WARNING

Since headlight bulbs get extremely hot, keep flammable products and your hands away from them until they have cooled down.

## CAUTION:

- 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 a 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

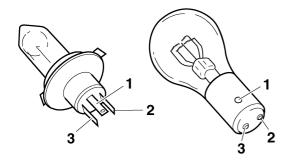
#### NOTE:

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

#### NOTE:\_

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

#### \*\*\*\*

- a. Install a good bulb into the bulb socket.
- b. Connect the pocket tester probes to the respective leads of the bulb socket.
- c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

\*\*\*\*\*

#### EAS28000 CHECKING THE FUSES

The following procedure applies to all of the fuses.

CAUTION:

To avoid a short circuit, always turn the main switch to "OFF" when checking or replacing a fuse.

- 1. Remove:
- Rider seat
- Left upper side cowling Refer to "GENERAL CHASSIS" on page 4-1.
- 2. Check:
  - Fuse

#### \*\*\*\*

a. Connect the pocket tester to the fuse and check the continuity.

#### NOTE: \_

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 " $\infty$ ", 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
Ignition	15 A	1
Headlight	15 A	1
Fuel injection system	15 A	1
Left radiator fan motor	15 A	1
Right radiator fan motor	15 A	1
Signaling system	10 A	1
Taillight	7.5 A	1
Backup (odometer, clock and immobilizer system)	7.5 A	1
ETV	7.5 A	1
Spare	15 A	1
Spare	15 A	1
Spare	10 A	1
Spare	7.5 A	1

#### EWA13310

#### 

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electri-

#### cal system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

#### \*\*\*\*\*

- 4. Install:
  - Left upper side cowling
- Rider seat Refer to "GENERAL CHASSIS" on page 4-1.

### 

#### 

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.

#### CAUTION:

EC2C01024

- This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
- Charging time, charging amperage and charging voltage for an MF battery are different from those of conventional batteries. The MF battery should be charged according to the instructions for the charging method. If the battery is overcharged, the

#### electrolyte level will drop considerably. Therefore, take special care when charging the battery.

#### NOTE:

Since MF batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

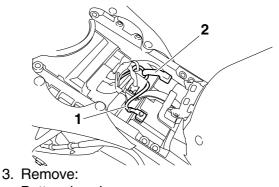
- 1. Remove:
- Rider seat
- Fuel tank bracket

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

- 2. Disconnect:
  - Battery leads (from the battery terminals)

## CAUTION:

First, disconnect the negative battery lead "1", and then positive battery lead "2".



- Battery band
- Battery
- 4. Check:
- Battery charge
- Connect a pocket tester to the battery terminals.
- Positive tester probe → positive battery terminal
   Negative tester probe →
- negative battery terminal

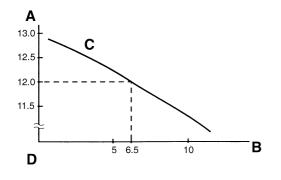
#### NOTE: \_

- The charge state of an MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

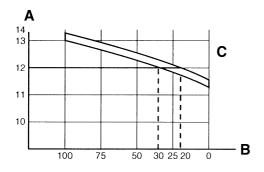
b. Check the charge of the battery, as shown in the charts and the following example.

#### 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 illustration)

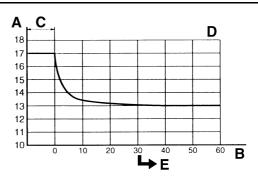
## WARNING

Do not quick charge a battery.

### CAUTION:

• Never remove the MF battery sealing caps.

- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative battery lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



- 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.

#### NOTE: \_

Voltage should be measured 30 minutes after the engine is stopped.

b. Connect a charger and ammeter to the battery and start charging.

#### NOTE:

Set the charging voltage at 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

c. Make sure that the current is higher than the standard charging current written on the battery.

#### NOTE:

If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

- 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.

#### NOTE:\_

Voltage should be measured 30 minutes after the engine is stopped.

- b. Connect a charger and ammeter to the battery and start charging.
- c. Make sure that the current is higher than the standard charging current written on the battery.

#### NOTE: \_

If the current is lower than the standard charging current written on the battery, this type of battery charger cannot charge the MF battery. A variable voltage charger is recommended.

d. Charge the battery until the battery's charging voltage is 15 V.

#### NOTE: \_

Set the charging time at 20 hours (maximum).

e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

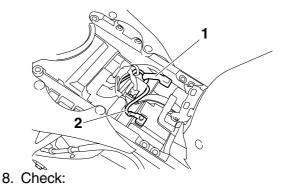
12.8 V or more --- Charging is complete. 12.7 V or less --- Recharging is required. Under 12.0 V --- Replace the battery.

#### \*\*\*\*\*

- 6. Install:
  - Battery
  - Battery band
- 7. Connect:
  - Battery leads
     (to the battery termi
- (to the battery terminals) ECA13630

#### CAUTION:

First, connect the positive battery lead "1", and then the negative battery lead "2".



- Battery terminals
   Dirt → Clean with a wire brush.
   Loose connection → Connect properly.
- 9. Lubricate:
  - Battery terminals

#### Recommended lubricant Dielectric grease

10.Install:

- Fuel tank bracket
- Rider seat

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

### CHECKING THE RELAYS

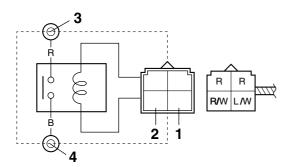
Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.



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

- 1. Disconnect the relay from the wire harness.
- 2. Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the relay terminal as shown. Check the relay operation. Out of specification  $\rightarrow$  Replace.

#### Starter relay



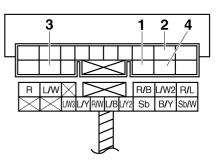
- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe

#### Result

0

Continuity (between "3" and "4")

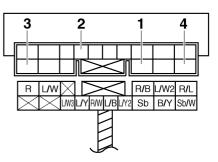
#### Relay unit (starting circuit cut-off relay)



- 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)

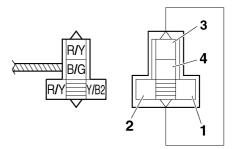


- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe



Result Continuity (between "3" and "4")

#### Headlight relay (on/off)



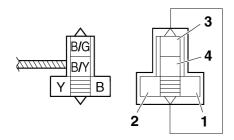
- 1. Positive battery terminal
- 2. Negative battery terminal

- 3. Positive tester probe
- 4. Negative tester probe



Result Continuity (between "3" and "4")

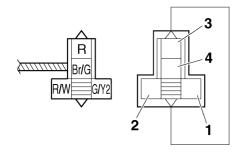
#### Headlight relay (dimmer)



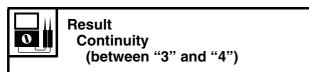
- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe

### 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



### CHECKING THE TURN SIGNAL/HAZARD RELAY

- 1. Check:
  - Turn signal/hazard relay input voltage Out of specification → The wiring circuit from the main switch to the turn signal/hazard relay coupler is faulty and must be repaired.



#### Turn signal/hazard relay input voltage DC 12 V

#### \*\*\*\*\*

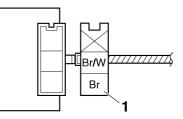
a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.



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

- Positive tester probe ightarrow
- brown "1"
- Negative tester probe  $\rightarrow$

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  $\rightarrow$  Replace.



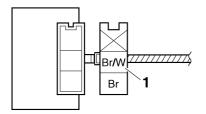
Turn signal/hazard relay output voltage DC 12 V

- \*\*\*\*\*
- 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  $\rightarrow$
- brown/white "1"
- Negative tester probe  $\rightarrow$  ground



- b. Turn the main switch to "ON".
- c. Measure the turn signal/hazard relay output voltage.

\*\*\*\*\*

### CHECKING THE RELAY UNIT (DIODE)

- 1. Check:
  - Relay unit (diode)
     Out of specification → Replace.

**AND** 

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

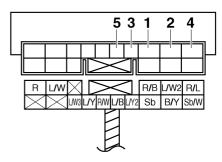
#### NOTE:\_

The pocket tester or the analog pocket tester readings are shown in the following table.



#### Continuity

Positive tester probe  $\rightarrow$  sky blue "1" Negative tester probe  $\rightarrow$ black/yellow "2" No continuity Positive tester probe  $\rightarrow$ black/yellow "2" Negative tester probe  $\rightarrow$  sky blue "1" Continuity Positive tester probe  $\rightarrow$  sky blue "1" Negative tester probe  $\rightarrow$ blue/yellow "3" No continuity Positive tester probe  $\rightarrow$ blue/yellow "3" Negative tester probe  $\rightarrow$  sky blue "1" Continuity Positive tester probe  $\rightarrow$  sky blue "1" Negative tester probe  $\rightarrow$  sky blue/white "4" No continuity Positive tester probe  $\rightarrow$  sky blue/white "4" Negative tester probe  $\rightarrow$  sky blue "1" Continuity Positive tester probe  $\rightarrow$ blue/black "5" Negative tester probe  $\rightarrow$ blue/yellow "3" No continuity Positive tester probe  $\rightarrow$ blue/yellow "3" Negative tester probe  $\rightarrow$ blue/black "5"



- Disconnect the relax unit coupler from the
- 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. Pocket tester d. Check the relay unit (diode) for no continuity. 90890-03112 \*\*\*\*\* Analog pocket tester YU-03112-C **CHECKING THE IGNITION COILS** The following procedure applies to all of the igni-• Negative tester probe  $\rightarrow$ tion coils. red/black "1" 1. Check: • Positive tester probe  $\rightarrow$ • Primary coil resistance spark plug terminal "2" Out of specification  $\rightarrow$  Replace. **Primary coil resistance** 0 **1.19–1.61** Ω 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 b. Measure the secondary coil resistance. Analog pocket tester \*\*\*\*\* YU-03112-C 3. Check: Ignition spark gap • Positive tester probe  $\rightarrow$ Out of specification  $\rightarrow$  Replace. red/black "1" • Negative tester probe  $\rightarrow$ Minimum ignition spark gap orange or gray/red or orange/green or 6.0 mm (0.24 in) gray/green "2" a. Connect the ignition checker "1" as shown. Ignition checker 90890-06754 Opama pet-4000 spark checker YM-34487 c. Measure the primary coil resistance. \*\*\*\*\* 2. Check: Secondary coil resistance Out of specification  $\rightarrow$  Replace. 2 Secondary coil resistance 0 8.5–11.5 kΩ 2. Ignition coil b. Turn the main switch to "ON" and engine stop \*\*\*\*\*\*\*\*\*\*\*
  - a. Connect the pocket tester ( $\Omega \times 1k$ ) to the ignition coil as shown.

switch to " $\cap$ ".

c. Measure the ignition spark gap "a".

d. Crank the engine by pushing the start switch "(a)" and gradually increase the spark gap until a misfire occurs.

#### .......

#### CHECKING THE CRANKSHAFT POSITION SENSOR

- 1. Disconnect:
- Crankshaft position sensor coupler (from the wire harness)
- 2. Check:
- Crankshaft position sensor resistance Out of specification  $\rightarrow$  Replace the crankshaft position sensor.



Crankshaft position sensor resistance

248–372 Ω at 20 °C (68 °F)

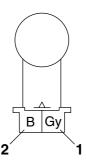
a. Connect the pocket tester ( $\Omega \times 100$ ) to the crankshaft position sensor coupler as shown.



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

- Positive tester probe  $\rightarrow$
- gray "1" • Negative tester probe  $\rightarrow$ black "2"





b. Measure the crankshaft position sensor resistance.

.....

#### EAS28130 CHECKING THE LEAN ANGLE SENSOR

- 1. Remove:
- Lean angle sensor (from the bracket)
- 2. Check:
- Lean angle sensor output voltage Out of specification  $\rightarrow$  Replace.

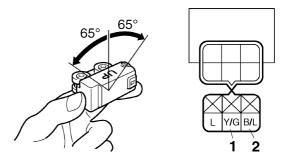


Lean angle sensor output voltage Less than 65°: 0.4–1.4 V More than 65°: 3.7–4.4 V

- \*
- a. Connect the lean angle sensor coupler to the lean angle sensor.
- b. Connect the pocket tester (DC 20 V) to the lean angle sensor coupler as shown.

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

- Positive tester probe  $\rightarrow$
- yellow/green "1"
- Negative tester probe  $\rightarrow$ black/blue "2"



- c. Turn the main switch to "ON".
- d. Turn the lean angle sensor to 65°.
- e. Measure the lean angle sensor output voltage.

\*\*\*\*\*

#### EAS28150 CHECKING THE STATOR COIL

- 1. Disconnect:
- Stator coil coupler (from the wire harness)
- 2. Check:
- Stator coil resistance Out of specification  $\rightarrow$  Replace the stator coil.



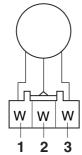
Stator coil resistance 0.12–0.18 Ω at 20 °C (68 °F)

a. Connect the pocket tester ( $\Omega \times 1$ ) to the stator coil coupler as shown.



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

- Positive tester probe → white "1"
- Negative tester probe → white "2"
- Positive tester probe → white "1"
- Negative tester probe → white "3"
- Positive tester probe → white "2"
- Negative tester probe → white "3"



b. Measure the stator coil resistance.

#### \*\*\*\*

## CHECKING THE RECTIFIER/REGULATOR

- 1. Check:
  - Charging voltage Out of specification → Replace the rectifier/regulator.



Charging voltage 14 V at 5000 r/min

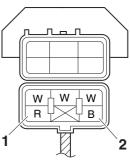
#### \*\*\*\*

- a. Set the engine tachometer to the cylinder-#1 ignition coil.
- b. Connect the pocket tester (DC 20 V) to the rectifier/regulator coupler as shown.



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

- Positive tester probe  $\rightarrow$
- red "1"
- Negative tester probe → black "2"



- c. Start the engine and let it run at approximately 5000 r/min.
- d. Measure the charging voltage.

#### \*\*\*\*\*

- CHECKING THE HORN
- 1. Check:
- Horn resistance
  - Out of specification  $\rightarrow$  Replace.



Coil resistance 1.15–1.25 Ω at 20 °C (68 °F)

#### .....

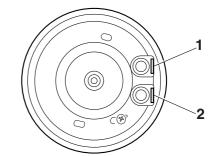
- a. Disconnect the horn leads from the horn terminals.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the horn terminals.



#### Pocket tester 90890-03112 Analog pocket tester

YU-03112-C

- Positive tester probe  $\rightarrow$
- horn terminal "1"
- Negative tester probe → horn terminal "2"



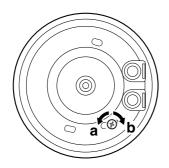
c. Measure the horn resistance.

#### \*\*\*\*\*

- 2. Check:
  - Horn sound
    - Faulty sound  $\rightarrow$  Adjust or replace.

#### \*\*\*\*\*\*

- a. Connect a battery (12 V) to the horn.
- b. Turn the adjusting screw in direction "a" or "b" until the horn sound is obtained.



#### 

#### EAS28190 CHECKING THE OIL LEVEL SWITCH

- 1. Drain:
- Engine oil
- 2. Remove:
  - Oil level switch (from the oil pan)
- 3. Check:
  - Oil level switch resistance Out of specification  $\rightarrow$  Replace the oil level switch.

#### **Oil level switch resistance** 0 Maximum level position **484–536** Ω **Minimum level position 114–126** Ω

#### \*\*\*\*\*\*

a. Connect the pocket tester ( $\Omega \times 100$ ) to the oil level switch terminal as shown.



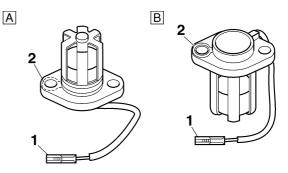
Pocket tester 90890-03112 Analog pocket tester YU-03112-C

Minimum level position "A"

- Positive tester probe  $\rightarrow$
- connector (white) "1"
- Negative tester probe  $\rightarrow$ body earth "2"

#### Maximum level position "B" • Positive tester probe $\rightarrow$

- connector (white) "1"
- Negative tester probe  $\rightarrow$ body earth "2"



b. Measure the oil level switch resistance.

#### \*\*\*\*\*

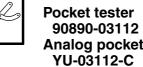
#### EAS28230 CHECKING THE FUEL SENDER

- 1. Disconnect:
- Fuel pump coupler
- Fuel sender coupler (from the wire harness)
- 2. Remove:
- Fuel tank
- 3. Remove:
- Fuel pump
  - (from the fuel tank)
- 4. Check:
- Fuel sender resistance



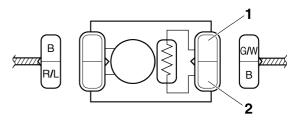
**Fuel sender resistance** 900–1050 Ω at 25 °C (77 °F)

a. Connect the pocket tester ( $\Omega \times 1$ ) to the fuel sender terminal as shown.



Analog pocket tester

- Positive tester probe  $\rightarrow$
- green/white "1"
- Negative tester probe  $\rightarrow$
- black "2"



b. Measure the fuel sender resistance. \*\*\*\*\*

#### EAS28240 CHECKING THE SPEED SENSOR

- 1. Check:
- Speed sensor output voltage Out of specification → Replace.



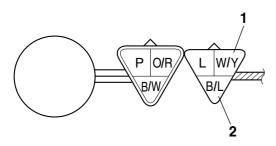
#### Output voltage reading cycle 0.6 V to 4.8 V to 0.6 V to 4.8 V

- \*\*\*\*\*
- a. Connect the pocket tester (DC 20 V) to the speed sensor coupler (wire harness side) as shown.



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

- Positive tester probe → white/yellow "1"
- Negative tester probe → black/blue "2"

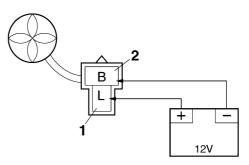


- b. Turn the main switch to "ON".
- c. Elevate the rear wheel and slowly rotate it.
- d. Measure the voltage of white/yellow and black/blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.

\*\*\*\*\*

### CHECKING THE RADIATOR FAN MOTORS

- 1. Check:
- Radiator fan motor Faulty/rough movement  $\rightarrow$  Replace.
- \*\*\*\*\*\*\*
- a. Disconnect the radiator fan motor coupler from the wire harness.
- b. Connect the battery (DC 12 V) as shown.
- Positive tester probe  $\rightarrow$
- blue "1"
- Negative tester probe → black "2"



c. Measure the radiator fan motor movement.

#### \*\*\*\*\*

# CHECKING THE COOLANT TEMPERATURE SENSOR

- 1. Remove:
- Coolant temperature sensor Refer to "THERMOSTAT" on page 6-7.

### 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.

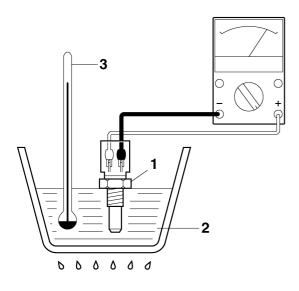


Resistance at 80 °C 290–354 Ω

- a. Connect the pocket tester ( $\Omega \times 100$ ) to the
  - coolant temperature sensor as shown.



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



b. Immerse the coolant temperature sensor "1" in a container filled with coolant "2".

#### NOTE:

Make sure the coolant temperature sensor terminals do not get wet.

- c. Place a thermometer "3" in the coolant.
- d. Slowly heat the coolant, then let it cool down to the specified temperature.
- e. Measure the coolant temperature sensor resistance.

#### \*\*\*\*\*

#### EAS28300

#### CHECKING THE THROTTLE POSITION SENSOR (FOR THROTTLE VALVES)

- 1. Remove:
  - Throttle position sensor (for throttle valves) (from the throttle body)
- 2. Check:
  - Throttle position sensor (for throttle valves)
     maximum resistance

Out of specification  $\rightarrow$  Replace the throttle position sensor (for throttle valves).



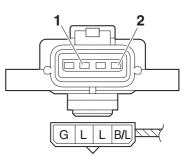
## Resistance 2.0–3.0 $k\Omega$

a. Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor (for throttle valves) terminal as shown.

A REAL PROPERTY OF A REAL PROPER

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

- Positive tester probe  $\rightarrow$
- blue "1"
- Negative tester probe → black/blue "2"



b. Measure the throttle position sensor (for throttle valves) maximum resistance.

### 

#### 3. Install:

Throttle position sensor (for throttle valves)
 NOTE: \_\_\_\_\_\_\_

When installing the throttle position sensor (for throttle valves), adjust its angle properly. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR (FOR THROTTLE VALVES)" on page 7-10.

### CHECKING THE THROTTLE POSITION SENSOR (FOR THROTTLE CABLE PULLEY)

- 1. Remove:
  - Throttle position sensor (for throttle cable pulley)

(from the throttle body)

- 2. Check:
- Throttle position sensor (for throttle cable pulley) maximum resistance
   Out of specification → Replace the throttle

position sensor (for throttle cable pulley).



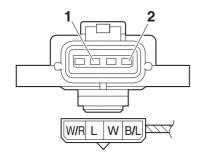
# Resistance 2.0–3.0 k $\Omega$

- a. Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor (for throttle cable pulley) terminal 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 throttle position sensor (for throttle cable pulley) maximum resistance.

### .....

#### 3. Install:

• Throttle position sensor (for throttle cable pulley)

#### NOTE:

When installing the throttle position sensor (for throttle cable pulley), adjust its angle properly. Refer to "ADJUSTING THE THROTTLE POSI-TION SENSOR (FOR THROTTLE CABLE PULLEY)" on page 7-11.

#### EAS28350

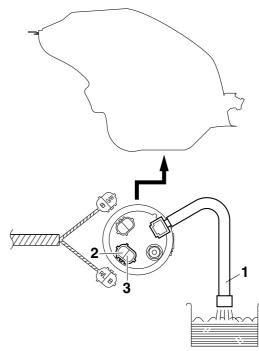
### CHECKING THE FUEL PUMP

#### 

Gasoline is extremely flammable and under certain circumstances there can be a danger of an explosion or fire. Be extremely careful and note the following points:

- Stop the engine before refueling.
- Do not smoke, and keep away from open flames, sparks, or any other source of fire.
- If you do accidentally spill gasoline, wipe it up immediately with dry rags.
- If gasoline touches the engine when it is hot, a fire may occur. Therefore, make sure the engine is completely cool before performing the following test.
- 1. Disconnect:
  - Fuel pump coupler

- Fuel sender coupler (from the wire harness)
- 2. Remove:
- Fuel tank
- 3. Check:
  - Fuel pump operation Faulty/rough movement  $\rightarrow$  Replace.
- \*\*\*\*\*
- a. Fill the fuel tank.
- b. Put the end of the fuel hose "1" into an open container.
- c. Connect the battery (DC 12 V) to the fuel pump terminal as shown.
- Positive battery lead  $\rightarrow$
- red/blue "2"
- Negative battery lead  $\rightarrow$
- black "3"



d. Check the fuel pump operation.

\_\_\_\_\_

# CHECKING THE AIR INDUCTION SYSTEM SOLENOID

- 1. Check:
  - Air induction system solenoid resistance Out of specification → Replace.



Solenoid resistance 18–22 Ω at 20 °C (68 °F)

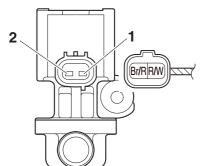
#### \*\*\*\*\*\*\*\*

a. Disconnect 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 → brown/red "1"
- Negative tester probe → red/white "2"



c. Measure the air induction system solenoid resistance.

\*\*\*\*\*

#### EAS28380 CHECKING THE ATMOSPHERIC PRESSURE

- SENSOR
- 1. Check:
- Atmospheric pressure sensor output voltage Out of specification  $\rightarrow$  Replace.

0

Atmospheric pressure sensor output voltage 3.15–4.15 V

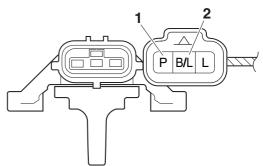
\*\*\*\*\*

 Connect the pocket tester (DC 20 V) to the atmospheric pressure sensor coupler as shown.



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

- Positive tester probe  $\rightarrow$
- pink "1"
- Negative tester probe → black/blue "2"



- b. Turn the main switch to "ON".
- c. Measure the atmospheric pressure sensor output voltage.

\_\_\_\_\_

### CHECKING THE CYLINDER IDENTIFICATION SENSOR

- 1. Remove:
- Timing plate cover
- 2. Check:
  - Cylinder identification sensor output voltage Out of specification → Replace.

0	

Cylinder identification sensor output voltage (ON) Less than 0.8 V Cylinder identification sensor output voltage (OFF) More than 4.8 V

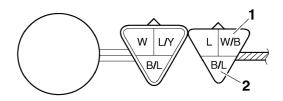
#### ••••••

a. Connect the pocket tester (DC 20 V) to the cylinder identification sensor coupler (wire harness side) as shown.



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

- Positive tester probe  $\rightarrow$
- white/black "1"
- Negative tester probe → black/blue "2"



- b. Turn the main switch to "ON".
- c. Rotate the crankshaft.
- d. Measure the voltage of white/black and black/blue. Turn the crankshaft twice and check that the output voltage rises to approximately 4.8 V once.

\*\*\*\*\*

# CHECKING THE INTAKE AIR PRESSURE SENSOR

- 1. Check:
- Intake air pressure sensor output voltage Out of specification → Replace.



### Intake air pressure sensor output voltage 3.15–4.15 V

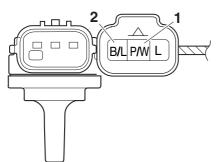
### \*\*\*\*

a. Connect the pocket tester (DC 20 V) to the intake air pressure sensor coupler as shown.



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

- Positive tester probe  $\rightarrow$
- pink/white "1"
- Negative tester probe → black/blue "2"



- b. Turn the main switch to "ON".
- c. Measure the intake air pressure sensor output voltage.

\*\*\*\*\*

# CHECKING THE AIR TEMPERATURE SENSOR

- 1. Remove:
- Air temperature sensor

# 

• Handle the air temperature sensor with special care.

- Never subject the air temperature sensor to strong shocks. If the air temperature sensor is dropped, replace it.
- 2. Check:
  - Air temperature sensor resistance Out of specification → Replace.

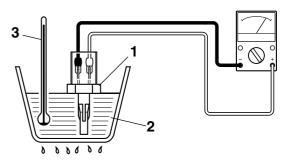


Air temperature sensor resistance 290–390  $\Omega$  at 80 °C (176 °F)

\*\*\*\*

a. Connect the pocket tester ( $\Omega \times 100$ ) to the air temperature sensor terminal as shown.





b. Immerse the air temperature sensor "1" in a container filled with water "2".

### NOTE: \_

Make sure that the 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 air temperature sensor resistance.

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# TROUBLESHOOTING

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# TROUBLESHOOTING

#### EAS28460

# GENERAL INFORMATION

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

#### EAS28470 STARTING FAILURES

### Engine

- 1. Cylinder(s) and cylinder head
- Loose spark plug
- Loose cylinder head
- Damaged cylinder head gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Improperly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve
- 2. Piston(s) and piston ring(s)
  - Improperly installed piston ring
  - Damaged, worn or fatigued piston ring
  - Seized piston ring
  - Seized or damaged piston
- 3. Air filter
  - Improperly installed air filter
  - Clogged air filter element
- 4. Crankcase and crankshaft
  - Improperly assembled crankcase
  - Seized crankshaft

### **Fuel system**

- 1. Fuel tank
  - Empty fuel tank
  - Clogged fuel tank drain hose
  - Deteriorated or contaminated fuel
- 2. Fuel pump
  - Faulty fuel pump
  - Faulty fuel pump relay
- 3. Throttle body(-ies)
  - Deteriorated or contaminated fuel
  - Sucked-in air

### **Electrical system**

- 1. Battery
- Discharged battery
- Faulty battery
- 2. Fuse(s)
  - Blown, damaged or incorrect fuse
  - Improperly installed fuse
- 3. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
  - Fouled spark plug
  - Worn or damaged electrode
  - Worn or damaged insulator
- 4. Ignition coil(s)
  - Cracked or broken ignition coil body
  - Broken or shorted primary or secondary coils
- 5. Ignition system
- Faulty ECU
- Faulty crankshaft position sensor
- Faulty cylinder identification sensor
- 6. Switches and wiring
- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty start switch
- Faulty sidestand switch
- Faulty clutch switch
- Improperly grounded circuit
- Loose connections
- 7. Starting system
- Faulty starter motor
- Faulty starter relay
- · Faulty starting circuit cut-off relay
- Faulty starter clutch

#### EAS28490 INCORRECT ENGINE IDLING SPEED

### Engine

- 1. Cylinder(s) and cylinder head
  - 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 cable free play
  - Flooded throttle body
  - Faulty air induction system

### **Electrical system**

- 1. Battery
- Discharged battery
- Faulty battery
- 2. Spark plug(s)
- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- 3. Ignition coil(s)
  - Broken or shorted primary or secondary coils
  - Cracked or broken ignition coil
- 4. Ignition system
  - Faulty ECU
  - Faulty crankshaft position sensor
  - Faulty cylinder identification sensor

# POOR MEDIUM-AND-HIGH-SPEED

### PERFORMANCE

Refer to "STARTING FAILURES" on page 9-1.

## Engine

- 1. Air filter
  - Clogged air filter element

## Fuel system

- 1. Fuel pump
  - Faulty fuel pump

### EAS28530

# FAULTY GEAR SHIFTING

### Shifting is difficult

Refer to "Clutch drags".

### EAS28540

# SHIFT PEDAL DOES NOT MOVE

### Shift shaft

- · Improperly adjusted shift rod
- Bent shift shaft

### Shift drum and shift forks

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

### Transmission

- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

#### EAS28550 JUMPS OUT OF GEAR

### Shift shaft

- Incorrect shift pedal position
- Improperly returned stopper lever

### Shift forks

Worn shift fork

### Shift drum

- Incorrect axial play
- Worn shift drum groove

### Transmission

• Worn gear dog

# 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

# OVERHEATING

### Engine

- 1. Clogged coolant passages
- Cylinder head and piston(s)
- Heavy carbon buildup

# TROUBLESHOOTING

- 2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity
  - Inferior oil quality

### **Cooling system**

- 1. Coolant
- Low coolant level
- 2. Radiator
  - Damaged or leaking radiator
  - Faulty radiator cap
  - Bent or damaged radiator fin
- 3. Water pump
  - Damaged or faulty water pump
  - Thermostat
  - Thermostat stays closed
  - Oil cooler
  - Clogged or damaged oil cooler
  - Hose(s) and pipe(s)
  - Damaged hose
  - Improperly connected hose
  - Damaged pipe
  - Improperly connected pipe

# Fuel system

- 1. Throttle body(-ies)
  - Damaged or loose throttle body joint
- 2. Air filter
  - Clogged air filter element

# Chassis

- 1. Brake(s)
- Dragging brake

## **Electrical system**

- 1. Spark plug(s)
- Incorrect spark plug gap
- Incorrect spark plug heat range
- 2. Ignition system
- Faulty ECU
- 3. Cooling system
  - Faulty radiator fan motor relay
  - Faulty coolant temperature sensor
  - Faulty ECU

# OVERCOOLING

## **Cooling system**

- 1. Thermostat
- Thermostat stays open

### EAS28620

## POOR BRAKING PERFORMANCE

Worn brake pad

- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit
- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

# 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
- 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

# UNSTABLE HANDLING

### Handlebars

- Bent or improperly installed right handlebar
- Bent or improperly installed left handlebar
- 1. Steering head components
  - Improperly installed upper bracket
  - Improperly installed lower bracket (improperly tightened ring nut)
  - Bent steering stem
  - Damaged ball bearing or bearing race
- 2. Front fork leg(s)
  - 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
- 3. Swingarm
  - Worn bearing or bushing
- Bent or damaged swingarm

# Rear shock absorber assembly

- Faulty rear shock absorber spring
- Leaking oil or gas

### Tire(s)

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

### Wheel(s)

- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

### Frame

- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

## EAS28710

# FAULTY LIGHTING OR SIGNALING SYSTEM

### Headlight does not come on

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main switch)
- Burnt-out headlight bulb

### Headlight bulb burnt out

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Headlight bulb life expired

### Tail/brake light does not come on

- Wrong tail/brake light LED
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light LED

### Tail/brake light bulb burnt out

- Wrong tail/brake light LED
- Faulty battery
- · Incorrectly adjusted rear brake light switch
- Tail/brake light LED life expired

### Turn signal does not come on

- Faulty turn signal switch
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

### Turn signal flashes slowly

- Faulty turn signal/hazard relay
- · Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

### Turn signal remains lit

- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

### Turn signal flashes quickly

- Incorrect turn signal bulb
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

### Horn does not sound

- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

#### EAS28740 WIRING DIAGRAM

### YZF-R6(V) 2006

- 1. AC magneto
- 2. Rectifier/regulator
- 3. Main switch
- 4. Ignition fuse
- 5. Backup fuse (odometer, clock and immobilizer system)
- 6. Main fuse
- 7. Battery
- 8. Starter relay
- 9. Fuel injection system fuse
- 10. Starter motor
- 11. Engine ground
- 12. Immobilizer unit
- 13. ETV fuse
- 14. Relay unit
- 15. Starting circuit cut-off relay
- 16. Fuel pump relay
- 17. Neutral switch
- 18. Sidestand switch
- 19. Fuel pump
- 20. Fuel sender
- 21. Throttle position sensor (for throttle cable pulley)
- 22. Throttle position sensor (for throttle valves)
- 23. ECU (engine control unit)
- 24. Spark plug
- 25. Cylinder-#1 ignition coil
- 26. Cylinder-#2 ignition coil
- 27. Cylinder-#3 ignition coil
- 28. Cylinder-#4 ignition coil
- 29. Primary injector #1
- 30. Primary injector #2
- 31. Primary injector #3
- 32. Primary injector #4
- 33. Secondary injector #1
- 34. Secondary injector #2
- 35. Secondary injector #3 36. Secondary injector #4
- 37. Throttle servo motor 38. Air induction system solenoid
- 39. EXUP servo motor
- 40. O<sub>2</sub> sensor
- 41. Crankshaft position sensor
- 42. Air temperature sensor
- 43. Coolant temperature sensor
- 44. Intake air pressure sensor
- 45. Atmospheric pressure sensor
- 46. Cylinder identification sensor
- 47. Speed sensor
- 48. Lean angle sensor
- 49. Meter assembly
- 50. Immobilizer system indicator light
- 51. Fuel level warning light
- 52. Oil level warning light
- 53. Neutral indicator light

54. Tachometer
55. Shift timing indicator light
56. Multi-function meter
57. Engine trouble warning light
58. Coolant temperature warning
light
59. High beam indicator light
60. Left turn signal indicator light
61. Right turn signal indicator light
62. Meter light
63. Oil level switch
64. Right handlebar switch
65. Front brake light switch
66. Engine stop switch
67. Start switch
68. Turn signal/hazard relay
69. Left handlebar switch
70. Hazard switch
71. Pass switch
72. Dimmer switch
73. Horn switch
74. Clutch switch
75. Turn signal switch
76. Horn
77. Rear right turn signal light
78. Rear left turn signal light
79. Front right turn signal light
80. Front left turn signal light
81. Headlight (low beam)
82. Headlight (high beam)
83. Auxiliary light
84. License plate light
85. Rear brake light switch
86. Tail/brake light
87. Headlight relay (on/off)
88. Headlight relay (dimmer)
89. Anti-theft alarm (OPTION)
90. Taillight fuse
91. Signaling system fuse
92. Headlight fuse
93. Radiator fan motor relay
94. Right radiator fan motor fuse
95. Left radiator fan motor fuse
96. Right radiator fan motor
97. Left radiator fan motor

#### EAS28750 COLOR CODE

B Br Dg Gy L Q P R Sb W	Black Brown Chocolate Dark green Green Gray Blue Light green Orange Pink Red Sky blue White

B/R B/W B/Y Br/B Br/G Br/L Br/W Br/Y G/B G/R G/W G/Y G/R G/Y G/R G/Y G/R C/Y G/R C/Y C/S C/R C/Y C/S C/R C/Y C/S C/R C/Y C/S C/R C/Y C/S C/R C/Y C/S C/R C/Y C/S C/R C/Y C/S C/S C/Y C/S C/S C/S C/S C/S C/S C/S C/S C/S C/S	Black/Yellow Brown/Black Brown/Red Brown/Red Brown/Red Brown/White Brown/Yellow Green/Black Green/Yellow Gray/Red Blue/Black Blue/Black Blue/White Blue/Yellow Light green/Red Orange/Black Orange/Green Pink/Black Pink/White Red/Black Red/Green Red/Blue Red/White Red/Yellow Sky blue/White White/Black White/Black White/Black White/Black
Y/R	Yellow/Red



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