

FJR13AV(C) FJR13AEV(C)

SERVICE MANUAL

LIT-11616-19-83

3P6-28197-10

EAS20050

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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.

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

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

NOTE:

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

IMPORTANT MANUAL INFORMATION

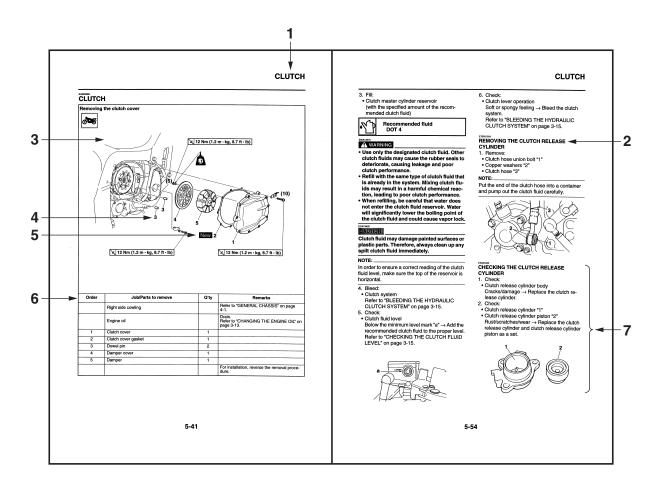
Particularly important information is distinguished in this manual by the following.

	The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!
	Failure to follow WARNING instructions <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 dam- age 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.

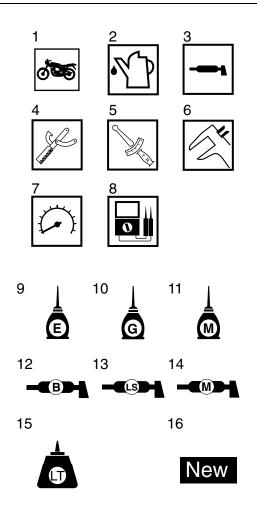


SYMBOLS

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[®])
- 16. Replace the part

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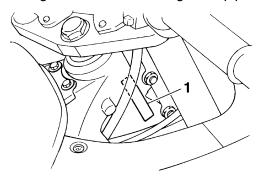
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	1.0
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IDENTIFICATION

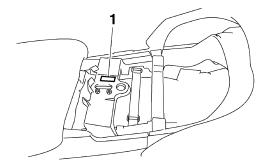
VEHICLE IDENTIFICATION NUMBER

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



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



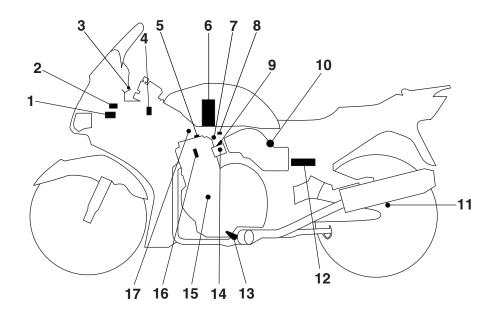
OUTLINE OF THE FI SYSTEM

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



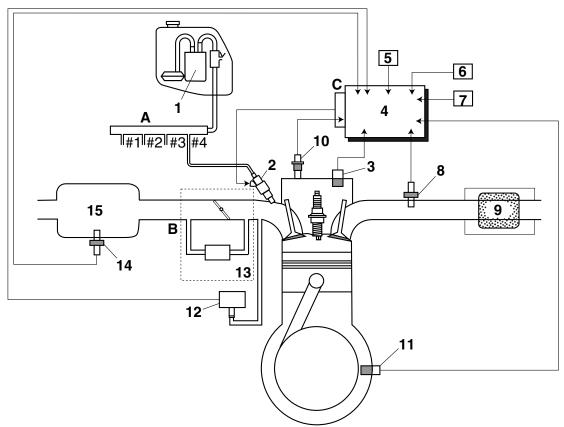
- 1. Relay unit (fuel pump relay)
- 2. Lean angle sensor
- 3. Engine trouble warning light
- 4. Ignition coil
- 5. Cylinder identification sensor
- 6. Fuel pump
- 7. Air induction system solenoid
- 8. Intake air pressure sensor
- 9. Injector
- 10. Intake air temperature sensor

- 11. Rear wheel sensor
- 12. ECU (engine control unit)
- 13.O₂ sensor
- 14. Throttle position sensor
- 15. Crankshaft position sensor
- 16. Spark plug
- 17. Coolant temperature sensor

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The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at only 324 kPa (3.24 kg/cm², 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, coolant temperature sensor, cylinder identification sensor, lean angle sensor, crankshaft position sensor, intake air pressure sensor, intake air temperature sensor, rear wheel 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.



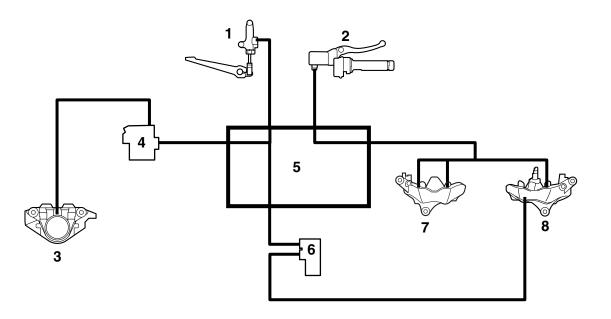
- 1. Fuel pump
- 2. Injector
- 3. Cylinder identification sensor
- 4. ECU (engine control unit)
- 5. Throttle position sensor
- 6. Rear wheel sensor
- 7. Lean angle sensor
- 8. O₂ sensor
- 9. Catalytic converter
- 10. Coolant temperature sensor
- 11. Crankshaft position sensor
- 12. Intake air pressure sensor
- 13. Throttle body

- 14. Intake air temperature sensor
- 15. Air filter case
- A. Fuel system
- B. Air system
- C. Control system

OUTLINE OF THE UNIFIED BRAKE SYSTEM

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

Unified brake system block diagram

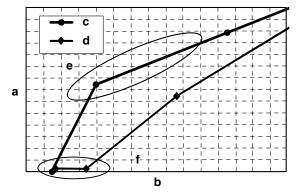


- 1. Rear brake master cylinder
- 2. Front brake master cylinder
- 3. Rear brake caliper
- 4. Proportioning valve
- 5. Hydraulic unit

- 6. Metering valve
- 7. Left front brake caliper
- 8. Right front brake caliper

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

Brake pedal input force and braking force at each wheel



- a. Brake force
- b. Brake pedal force
- c. Rear brake force
- d. Front brake force (unified brake system)

Metering valve

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

Proportioning valve

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

CAUTION:

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

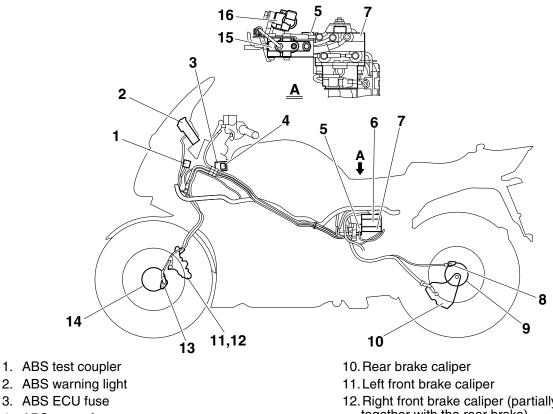
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OUTLINE OF THE ABS

- The Yamaha ABS (anti-lock brake system) features an electronic control system, which acts on the front and rear brakes independently. However, one set of pistons in the right front brake caliper is operated together with the rear brake and this set of pistons is operated only if the force used to depress the brake pedal exceeds a preset level.
- 2. The ABS features a compact and lightweight design to help maintain the basic maneuverability of the vehicle.
- 3. The hydraulic unit, which is the main component of the ABS, is centrally located on the vehicle to increase mass centralization.

- e. Proportioning valve operation
 - f. Metering valve operation

ABS layout



- 4. ABS motor fuse
- 5. ABS motor relay
- 6. ABS ECU (electronic control unit)
- 7. Hydraulic unit (HU)
- 8. Rear wheel sensor
- 9. Rear wheel sensor rotor

- 12. Right front brake caliper (partially operated together with the rear brake)
- 13. Front wheel sensor
- 14. Front wheel sensor rotor
- 15. Proportioning valve
- 16. Metering valve

ABS

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

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

Useful terms

- Wheel speed:
- The rotation speed of the front and rear wheels.
- Chassis speed:
 - The speed of the chassis.

When the brakes are applied, wheel speed and chassis speed are reduced. However, the chassis travels forward by its inertia even though the wheel speed is reduced.

Brake force:

The force applied by braking to reduce the wheel speed.

• Wheel lock:

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

• Side force:

The force on the tires which supports the vehicle when cornering.

• Slip ratio:

When the brakes are applied, slipping occurs between the tires and the road surface. This causes a difference between the wheel speed and the chassis speed.

Slip ratio is the value that shows the rate of wheel slippage and is defined by the following formula.

Slip ratio =	Chassis speed – Wheel speed	× 100 (%)
	Chassis speed	_

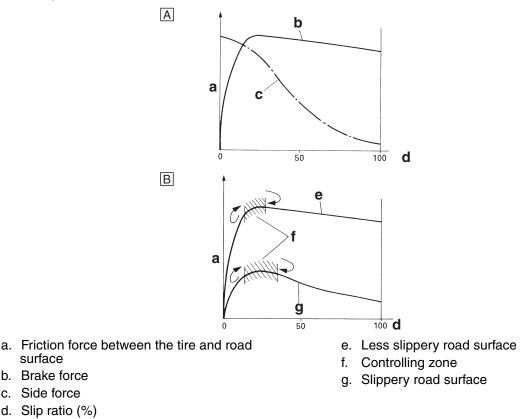
0%: There is no slipping between the wheel and the road surface. The chassis speed is equal to the wheel speed.

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

Brake force and vehicle stability

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

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

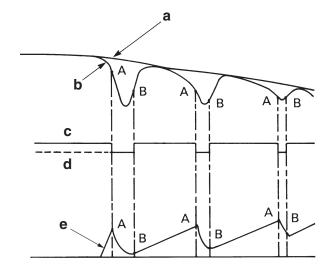


Wheel slip and hydraulic control

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

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

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



- a. Chassis speed
- b. Wheel speed
- c. Pressurized

d. Depressurized

e. Brake force

ABS operation and vehicle control

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

NOTE: _

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When the ABS is activated, a pulsating action may be felt at the brake lever or brake pedal, but this does not indicate a malfunction.

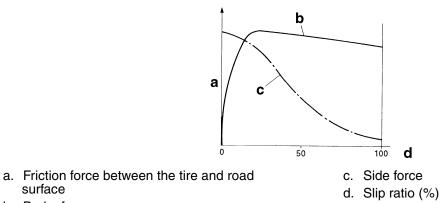
The higher the side force on a tire, the less traction there is available for braking. This is true whether the vehicle is equipped with ABS or not. Therefore, sudden braking while cornering is not recommended. Excessive side force, which ABS cannot prevent, could cause the tire to slip sideways.

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

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

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



b. Brake force

Electronic ABS features

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

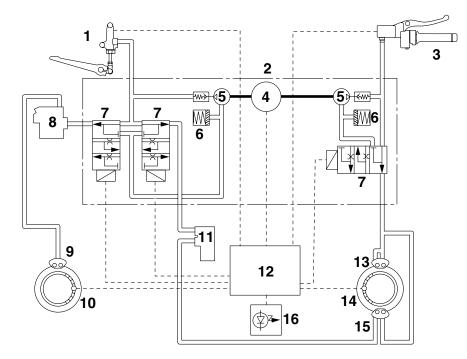
The ABS control is processed with good response under various vehicle travel conditions.

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

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

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

ABS block diagram



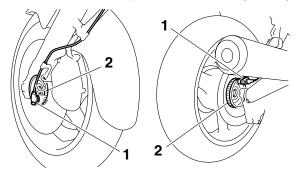
- 1. Rear brake master cylinder
- 2. Hydraulic unit
- 3. Front brake master cylinder
- 4. ABS motor
- 5. Hydraulic pump
- 6. Buffer chamber
- 7. Hydraulic control valve
- 8. Proportioning valve
- 9. Rear brake caliper

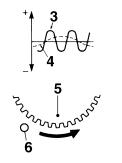
- 10. Rear wheel sensor
- 11. Metering valve
- 12. ABS ECU
- 13. Left front brake caliper
- 14. Front wheel sensor
- 15. Right front brake caliper
- 16. ABS warning light

ABS COMPONENT FUNCTIONS

Wheel sensors and wheel sensor rotors

Wheel sensors "1" detect the wheel speed and transmit the rotation signal to the ABS ECU. Each wheel sensor is composed of a permanent magnet and a coil. The wheel sensors are installed in the sensor housing for each wheel. Sensor rotors "2" are pressed in the inner side of the front and rear wheel hubs and rotate with the wheels. The wheel sensor rotors have 42 serrations inside and are installed close to the wheel sensors. As the distance changes between the top and bottom of the serrations with the rotation of the wheels, inductive electromotive force is generated in the wheel sensors. Wheel speed is detected based on the frequency of this alternating voltage.





6. Wheel sensor

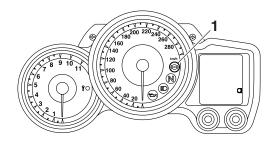
- 3. At high speed
- 4. At low speed
- 5. Wheel sensor rotor

ABS warning light

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

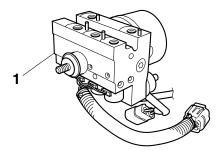
CAUTION:

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



Hydraulic unit

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

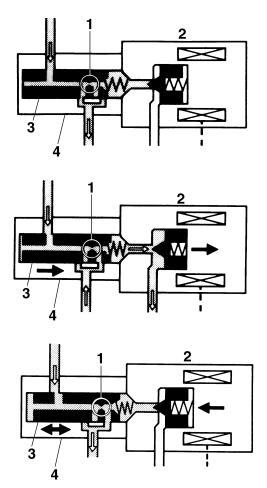


Hydraulic control valve

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

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

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



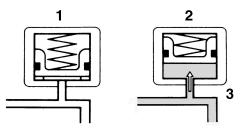
- 1. Orifice
- valvo

4. Flow control valve

- 2. Solenoid valve
- 3. Spool

Buffer chamber

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

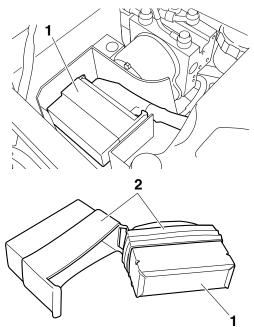


1. Buffer chamber (pressurized)

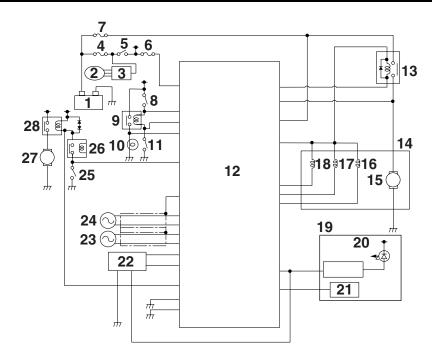
- Raised piston
- 2. Buffer chamber (depressurized)

ABS ECU (electronic control unit)

The ABS ECU "1" controls the ABS and is installed under the storage compartment. To protect the ABS ECU from water damage, it is protected by a cover "2".



As shown in the block following diagram, the ABS ECU receives wheel sensor signals from the front and rear wheels and also receives signals from other monitor circuits.



- 1. Battery
- 2. AC magneto
- 3. Rectifier/regulator
- 4. Main fuse
- 5. Main switch
- 6. ABS fuse
- 7. ABS motor fuse
- 8. Front brake light switch
- 9. Brake light relay
- 10. Tail/brake light
- 11. Rear brake light switch
- 12. ABS ECU
- 13. ABS motor relay
- 14. Hydraulic unit
- 15. ABS motor

- 16. Unified brake system solenoid
- 17. Rear brake solenoid
- 18. Front brake solenoid
- 19. Meter assembly
- 20. ABS warning light
- 21. Speedometer
- 22. ABS test coupler
- 23. Rear wheel sensor
- 24. Front wheel sensor
- 25. Start switch
- 26. Starting circuit cut-off relay
- 27. Starter motor
- 28. Starter relay

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

ABS control operation

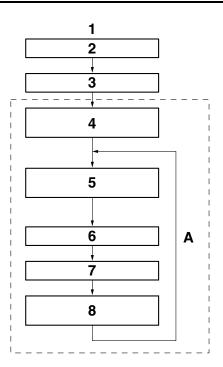
The ABS control operation performed in the ABS ECU is divided into the following two parts.

- Hydraulic control
- Self-diagnosis

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

NOTE: _

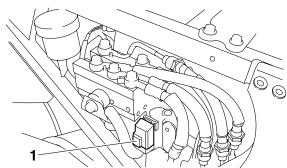
Some types of malfunctions are not recorded in the memory of the ABS ECU (e.g., a drop in battery voltage).



- 1. Software operation flow
- 2. Main switch "ON"
- 3. Initialize
- 4. Self-diagnosis (when static)
- 5. Self-diagnosis (when riding)
- 6. Receive signals
- 7. Control operation
- 8. Depressurize/pressurize
- A. 8/1000th of a second

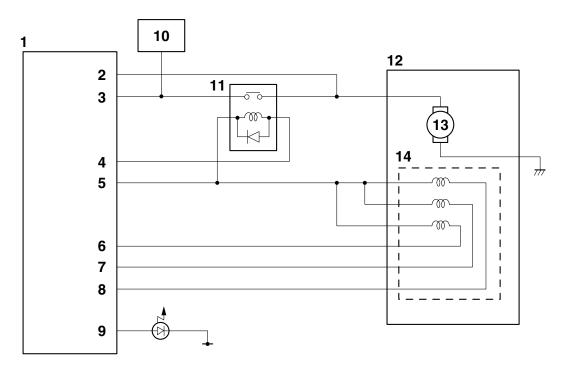
ABS motor relay

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



Composition and operation

The ABS motor relay is activated by signals transmitted from the ABS ECU and the ABS motor operates when the ABS starts to reduce the hydraulic pressure of the brake fluid.



- 1. ABS ECU
- 2. Pump motor monitor
- 3. Power supply
- 4. Pump motor relay coil
- 5. Power supply
- 6. Front brake solenoid
- 7. Rear brake solenoid
- 8. Unified brake system solenoid

- 9. ABS warning light
- 10. Battery
- 11. ABS motor relay
- 12. Hydraulic unit
- 13. ABS motor
- 14. Solenoid valves

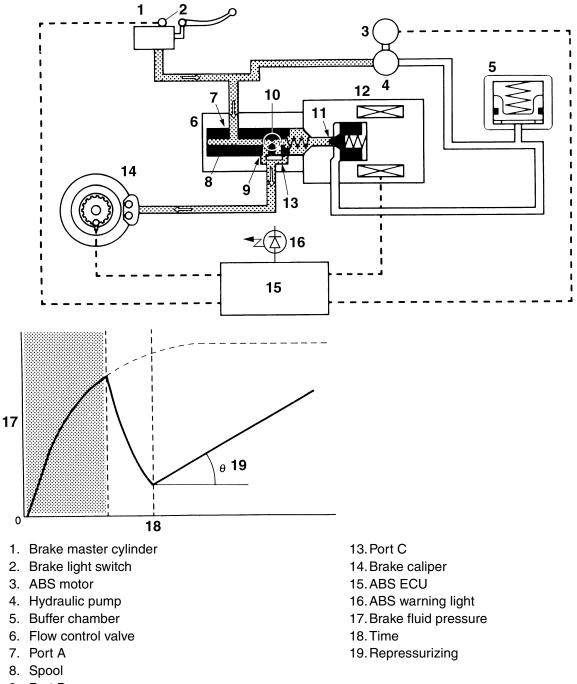
ABS OPERATION

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

Normal braking (ABS not activated)

When the ABS is not activated, port D "11" of the solenoid valve is closed because a control signal has not been transmitted from the ABS ECU and port A "7" and port B "9" of the flow control valve are open. Therefore, when the brake lever is squeezed, the hydraulic pressure in the brake master cylinder increases and the brake fluid is sent to the brake caliper via port A and port B.

At this time, the inlet and outlet check valves of the hydraulic pump are closed, preventing the brake fluid from flowing through the pump. As a result, the brake master cylinder directly pressurizes the brake caliper during normal braking. When the brake lever is released, the brake fluid in the brake caliper returns to the brake master cylinder via port A and port B.

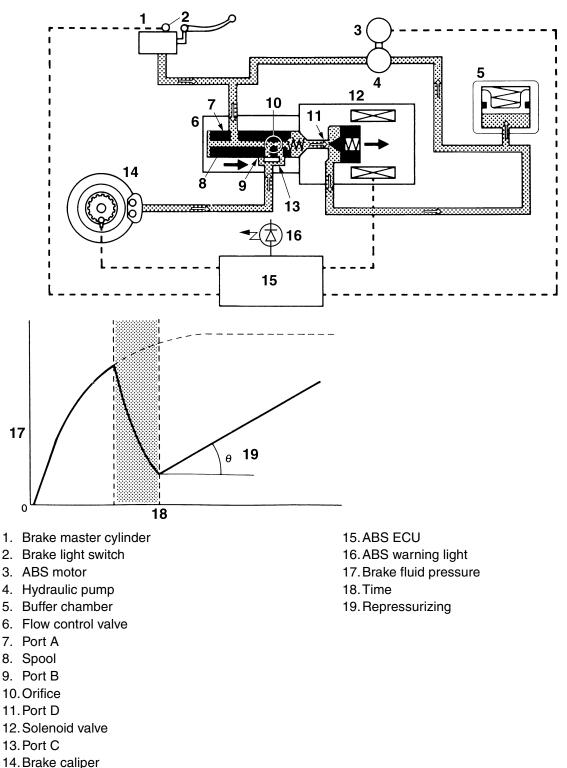


- 9. Port B
- 10. Orifice
- 11. Port D
- 12. Solenoid valve

Emergency braking (ABS activated)

1. Depressurized state

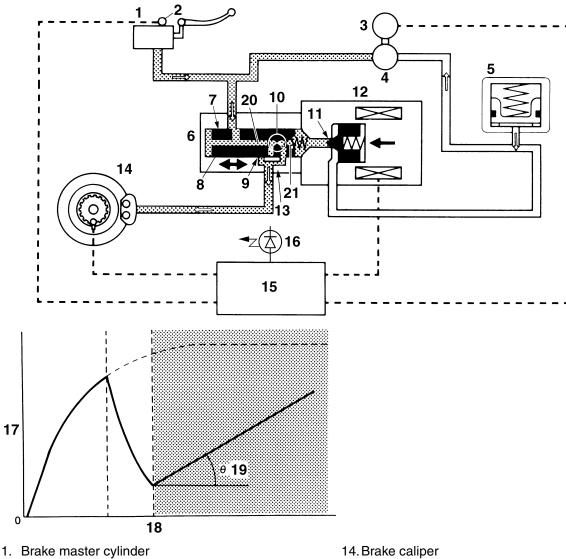
When the front wheel is about to lock, port D "11" of the solenoid valve is opened by the "depressurization" signal transmitted from the ABS ECU. When this occurs, the spool of the flow control valve compresses the return spring and closes port B "9". Brake fluid that has entered through port A "7" is restricted by the orifice "10" and the brake fluid is sent to the brake caliper via port C "13" and to the buffer chamber via port D "11". As a result, the hydraulic pressure in the brake caliper is reduced. The brake fluid stored in the buffer chamber is pumped back to the brake master cylinder by the hydraulic pump linked to the ABS motor.



1-18

2. Pressurized state

Port D "11" is closed by the "pressurization" signal transmitted from the ABS ECU. Before this occurs, the spool of the flow control valve has compressed the return spring and closed port B "9". Brake fluid that has entered through port A "7" is further restricted by the orifice "10" and the brake fluid is sent to the brake caliper via port A "7" and port C "13". At this time, the brake is pressurized at a constant rate regardless of the brake fluid pressure level since the restriction of port A "7" changes so that a constant pressure difference is maintained between chamber A "20" and chamber B "21" of the flow control valve.



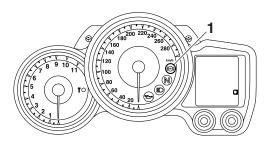
- 2. Brake light switch
- 3. ABS motor
- 4. Hydraulic pump
- 5. Buffer chamber
- 6. Flow control valve
- 7. Port A
- 8. Spool
- 9. Port B
- 10. Orifice
- 11. Port D
- 12. Solenoid valve
- 13. Port C

- 15. ABS ECU
- 16. ABS warning light
- 17. Brake fluid pressure
- 18. Time
- 19. Repressurizing
- 20. Chamber A
- 21. Chamber B

ABS SELF-DIAGNOSIS FUNCTION

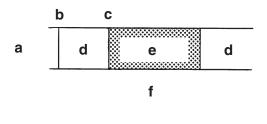
ABS warning light

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



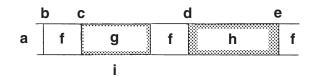
Instances when the ABS warning light comes on

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



- a. ABS warning light
- b. Main switch "OFF"
- c. Main switch "ON"
- d. Goes off

- e. Comes on for 2 seconds
- f. ABS self-diagnosis
- The ABS warning light comes on while the start switch is being pushed. When the engine is being started, the ABS warning light comes on while the start switch is being pushed. (Refer to "ELECTRIC STARTING SYSTEM" on page 8-13.)

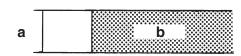


- a. ABS warning light
- b. Main switch "OFF"
- c. Main switch "ON"
- d. Start switch "ON"
- e. Start switch "OFF"

- f. Goes off
- g. Comes on for 2 seconds
- h. Comes on while the start switch is being pushed
- i. ABS self-diagnosis

3. The ABS warning light comes on while riding.

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

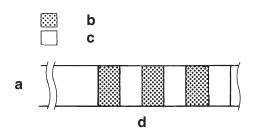


- a. ABS warning light
- b. Comes on
- 4. The ABS warning light flashes while riding.

If the ABS warning light flashes while riding, there is no problem with the function of the ABS. However, the ABS ECU input has unstable factors. (For details, refer to "ABS TROUBLESHOOTING OUTLINE" on page 8-133.)

NOTE:

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



a. ABS warning light

d. Unstable ABS ECU input

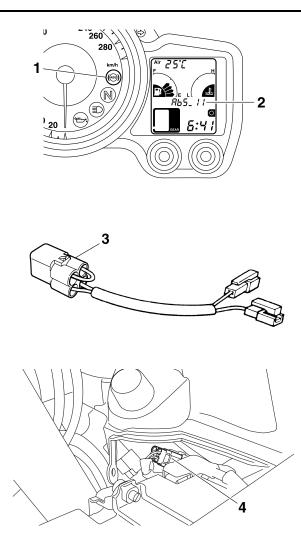
- b. Comes on
- c. Goes off
- 5. The ABS warning light "1" flashes and a malfunction code "2" is indicated on the multi-function display when the test coupler adapter "3" is connected to the ABS test coupler "4" for troubleshooting the ABS.

The ABS test coupler can be accessed by removing front cowling right inner panel 1. When the test coupler adapter is connected to the ABS test coupler, the ABS warning light starts flashing and the multi-function display indicates all the malfunction codes recorded in the ABS ECU.



NOTE:

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



ET3P61054

ABS WARNING LIGHT AND OPERATION

ABS warning light

- When the main switch is turned to "ON", the ABS warning light comes on for 2 seconds, then goes off.
- The ABS warning light comes on while the start switch is being pushed.
- If the ABS warning light comes on while riding, stop the vehicle, and then turn the main switch to "OFF", then back to "ON". The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.
- If the rear wheel is raced with the vehicle on the centerstand, the ABS warning light may flash or come on. If this occurs, turn the main switch to "OFF", then back to "ON". The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.
- The ABS operation is normal if the ABS warning light flashes.
- Even if the ABS warning light remains on and does not go off, or if it comes on after riding, conventional braking performance of the vehicle is maintained.

ABS function

- When hydraulic control is performed by the ABS, the brake system alerts the rider that the wheels have a tendency to lock by generating a reaction-force pulsating action in the brake lever or brake pedal. When the ABS is activated, the grip between the road surface and tires is close to the limit. The ABS cannot prevent wheel lock* on slippery surfaces, such as ice, when it is caused by engine braking, even if the ABS is activated.
- The ABS is not designed to shorten the braking distance or improve the cornering performance.

- Depending on the road conditions, the braking distance may be longer compared to that of vehicles not equipped with ABS. Therefore, ride at a safe speed and keep a safe distance between yourself and other vehicles.
- The braking of the vehicle, even in the worst case, is principally executed when the vehicle is advancing straight ahead. During a turn, sudden braking is liable to cause a loss of traction of the tires. Even vehicles equipped with ABS cannot be prevented from falling over if braked suddenly.
- The ABS does not work when the main switch is turned to "OFF". The conventional braking function can be used.

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

ET3P66049

OUTLINE OF THE YCC-S (Yamaha Chip Controlled-Shift) SYSTEM (FJR13AE)

Concept

YCC-S offers more enjoyable and easy riding by eliminating the need for the user to operate the clutch, which also reduces fatigue during long touring.

YCC-S is not an automatic transmission, although it allows the user to shift gears by foot or hand according to preference.

When shifting, a signal is sent to the MCU (motor control unit), which ensures optimum clutch operation, shifting, and engine control. Therefore, the user never needs to operate the clutch, which in turn, reduces fatigue and allows the user to concentrate while riding.

When stopping at traffic lights or in traffic jams, YCC-S operates the clutch instead of the user.

Basic function

To shift gears after starting the engine, the user must use the shift pedal. However, depending on the user's preference, the transmission can be shifted by hand after setting the hand shift select button to "ON".

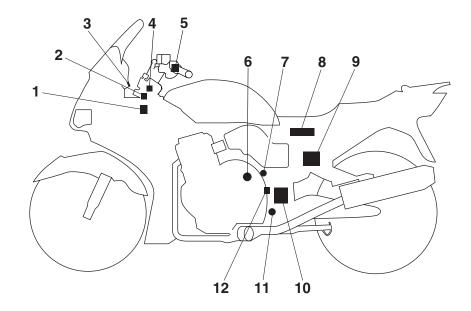
When the engine is started, the MCU disengages the clutch. A signal is sent to the MCU when the transmission is shifted from neutral to 1st gear by hand or foot. When the throttle is opened, the MCU then engages the clutch according to engine r/min. Clutch engagement is controlled optimally by the MCU. Clutch engagement is not constant in order to provide smooth shifting according to engine requirements and conditions.

The YCC-S system will not shift up if the engine r/min is lower than a specified value. Even if the user shifts up, if the specified value is not met (engine r/min is too low), the YCC-S system will not shift up until the above-mentioned specified value is met.

Likewise, the YCC-S system will not shift down if the specified value is not met (engine r/min is too high).

In this case, the throttle must be closed so that the MCU can disengage the clutch until the specified value is met to prevent the engine from stopping. During this period, a coasting condition will be felt. The user must shift down properly in order for the YCC-S system to provide a smooth stopping condition.

The YCC-S system is constantly performing a self-diagnosis when the engine is running. If any trouble is detected, the MCU automatically stops the YCC-S system and shifting is impossible.

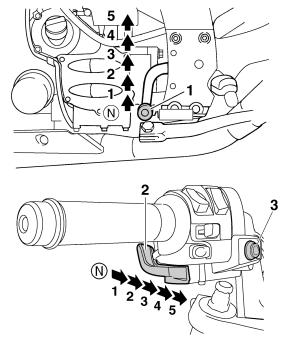


- 1. YCC-S test coupler
- 2. YCC-S control relay
- 3. YCC-S indicator and warning light
- 4. YCC-S motor control fuse
- 5. Hand shift switch
- 6. Gear position sensor
- 7. Neutral switch

- 8. MCU (motor control unit)
- 9. Shift actuator
- 10. Clutch actuator
- 11. Foot shift switch
- 12. YCC-S speed sensor

Shift pattern

This vehicle is equipped with a constant-mesh 5-speed transmission. The gears can be shifted using either the shift pedal "1" or the hand shift switch "2". The hand shift switch has to be enabled by pressing the hand shift select button "3" prior to being used. The gear positions are shown in the illustration.



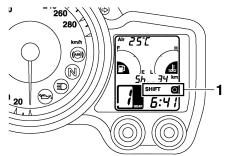
Attention

- Do not turn the main switch to "OFF" while the vehicle is moving, otherwise the electrical systems will be switched off, including the YCC-S system, which may result in loss of control or an accident. Make sure that the vehicle is stopped before turning the main switch to "OFF".
- The clutch will be engaged for a few seconds after the engine is stopped using the main switch if the transmission is not in neutral. This means that the vehicle cannot be moved by pushing or pulling it. To move the vehicle, turn the main switch to "ON", and then apply the front or rear brake to disengage the clutch. A click will be heard when the clutch is disengaged.
- Always stop the engine and turn the main switch to "LOCK" when parking the vehicle.

YCC-S indicator and warning light

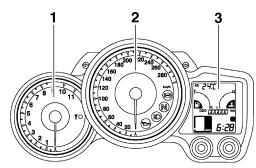
- The YCC-S system is constantly performing a self-diagnosis.
- The YCC-S system also performs a self-diagnosis when the main switch is turned to "ON". The YCC-S indicator and warning light "1" come on during this self-diagnosis. After the self-diagnosis is completed, if there were no problems found, the YCC-S indicator and warning light will go off.
- If the YCC-S indicator and warning light come on while riding, stop the vehicle, park it in a safe place, and then contact a Yamaha dealer.

Because the YCC-S system stops automatically when the YCC-S indicator and warning light come on, it is impossible to shift since clutch operation is stopped. To move the vehicle, turn the main switch to "OFF" and place the vehicle on the centerstand. While rotating the rear wheel, push the shift rod forward and shift the transmission into neutral.



ET3P61043 INSTRUMENT FUNCTIONS

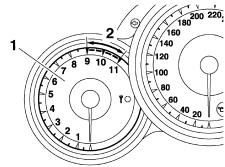
Speedometer



- 1. Tachometer
- 2. Speedometer
- 3. Multi-function display

The speedometer shows the riding speed. When the key is turned to "ON", the speedometer needle will sweep once across the speed range and then return to zero in order to test the electrical circuit.

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.

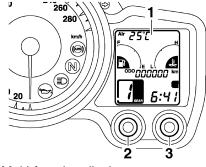
When the key is turned to "ON", the tachometer needle will sweep once across the r/min range and then return to zero r/min in order to test the electrical circuit.

CAUTION:

Do not operate the engine in the tachometer red zone.

Red zone: 9000 r/min and above

Multi-function display



- 1. Multi-function display
- 2. "SELECT" button
- 3. "RESET" button

WARNING

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

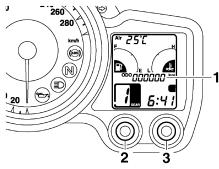
The multi-function display is equipped with the following:

- 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 on the fuel reserve)
- a clock
- a fuel meter
- a coolant temperature meter
- a transmission gear display
- an ambient temperature display
- a fuel consumption display (instantaneous and average consumption functions)
- a self-diagnosis device

NOTE:

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

Odometer and tripmeter modes



- 1. Odometer/tripmeter/fuel reserve tripmeter
- 2. "SELECT" button
- 3. "RESET" button

Pushing the "SELECT" button switches the display between the odometer mode "ODO" and the tripmeter modes "TRIP 1" and "TRIP 2" in the following order:

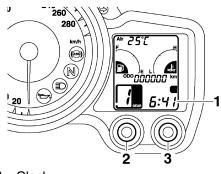
 $ODO \rightarrow TRIP 1 \rightarrow TRIP 2 \rightarrow ODO$ NOTE:

When selecting "TRIP 1" or "TRIP 2", the display flashes for five seconds.

When approximately 5.5 L (1.45 US gal) (1.21 Imp.gal) of fuel remains in the fuel tank, the display will automatically change to the fuel reserve tripmeter mode "F-TRIP" and start counting the distance traveled from that point. In that case, pushing the "SELECT" button switches the display between the various tripmeter and odometer modes in the following order:

F-TRIP \rightarrow TRIP 1 \rightarrow TRIP 2 \rightarrow ODO \rightarrow F-TRIP To reset a tripmeter, select it by pushing the "SE-LECT" button, and then push the "SELECT" button for at least one second while the display is flashing. If you do not reset the fuel reserve tripmeter manually, it will reset itself automatically and the display will return to the prior mode after refueling and traveling 5 km (3 mi).

Clock

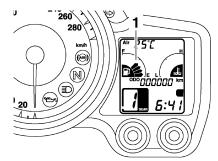


- 1. Clock
- 2. "SELECT" button
- 3. "RESET" button

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.

Fuel meter



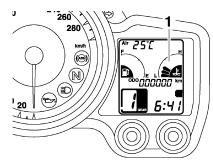
1. Fuel meter

The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the fuel meter disappear towards "E" (Empty) as the fuel level decreases. When the last segment starts flashing, refuel as soon as possible. When the key is turned to "ON", all of the display segments of the fuel meter will appear one after the other and then disappear in order to test the electrical circuit.

NOTE:

This fuel meter is equipped with a self-diagnosis system. If the electrical circuit is defective, all the display segments will start flashing. If this occurs, check the electrical circuit. Refer to "SIGNALING SYSTEM" on page 8-39.

Coolant temperature meter



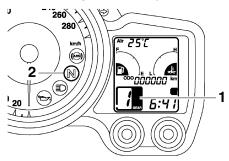
1. Coolant temperature meter

With the key in the "ON" position, the coolant temperature meter indicates the temperature of the coolant. When the key is turned to "ON", all of the display segments of the coolant temperature meter will appear one after the other and then disappear in order to test the electrical circuit. The coolant temperature varies with changes in the weather and engine load. If the top segment flashes, stop the vehicle and let the engine cool.

CAUTION:

Do not operate the engine if it is overheated.

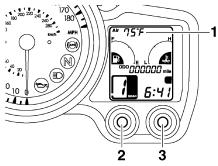
Transmission gear display



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

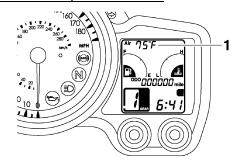
This display shows the selected gear. The neutral position, however, is not displayed, it is indicated by the neutral indicator light.

To avoid damaging the YCC-S clutch, the display flashes when it is necessary to downshift. If this occurs, downshift until the display stops flashing. (FJR13AE) Ambient temperature, instantaneous fuel consumption and average fuel consumption modes



- 1. Ambient temperature/instantaneous fuel consumption/average fuel consumption
- 2. "SELECT" button
- 3. "RESET" button

Push the "RESET" button to switch the display between the ambient temperature mode "Air", the instantaneous fuel consumption mode "MPG" and the average fuel consumption mode "AV__._ MPG" in the following order: Air \rightarrow MPG \rightarrow AV__.. MPG \rightarrow Air Ambient temperature mode



1. Ambient temperature

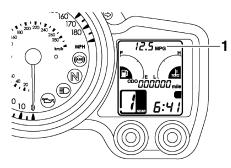
This display shows the ambient temperature from 16 °F to 122 °F in 1 °F increments. The temperature displayed may vary from the ambient temperature.

NOTE:

- If the ambient temperature falls below 16 °F, a lower temperature than 16 °F will not be displayed.
- If the ambient temperature climbs above 122 °F, a higher temperature than 122 °F will not be displayed.
- The accuracy of the temperature reading may be affected when riding slowly [approximately under 20 km/h (12.5 mi/h)] or when stopped at traffic signals, railroad crossings, etc.

FEATURES

Instantaneous fuel consumption mode



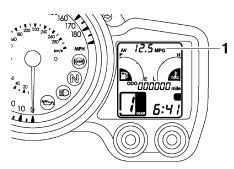
1. Instantaneous fuel consumption

The display shows the distance that can be traveled on 1.0 US.gal of fuel under the current riding conditions.

NOTE: _

If traveling at speeds under 10 km/h (6.0 mi/h), "__._" will be displayed.

Average fuel consumption mode



1. Average fuel consumption

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

When the average fuel consumption mode is selected, the display flashes for five seconds, and then "AV __._ MPG" (average distance that can be traveled using 1.0 US.gal of fuel) is displayed. NOTE:

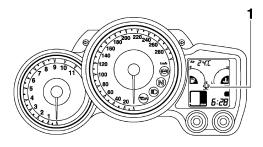
- To reset the average fuel consumption display, push the "RESET" button to select the mode again, and then push the "RESET" button for 1 second while the display is flashing.
- After resetting an average fuel consumption display, "__._" will be shown for that display until the vehicle has traveled 1 km (0.6 mi).

CAUTION:

EC3P66002

If there is a malfunction, "--.-" will be displayed. Replace the meter assembly.

Self-diagnosis device



1. Fault code display

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

If any of those circuits are defective, the multifunction display will indicate a two-digit fault code (e.g., 11, 12, 13).

If the multi-function display indicates such an fault code, note the code number, and check the vehicle.

Refer to "FUEL INJECTION SYSTEM" on page 8-57.

CAUTION:

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

IMPORTANT INFORMATION

EAS20190

PREPARATION FOR REMOVAL AND DISASSEMBLY

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



2. Use only the proper tools and cleaning equipment.

Refer to "SPECIAL TOOLS" on page 1-33.

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.

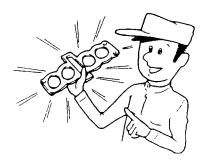


- 4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
- 5. Keep all parts away from any source of fire.

EAS20200

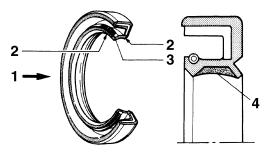
REPLACEMENT PARTS

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.



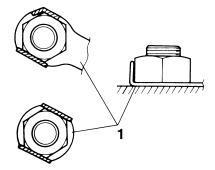
1. Oil

EAS20210

- 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.



IMPORTANT INFORMATION

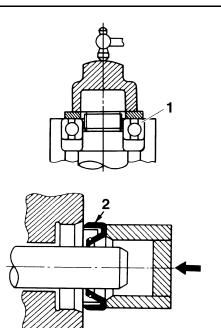
EAS20230 BEARINGS AND OIL SEALS

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

ECA13300

CAUTION:

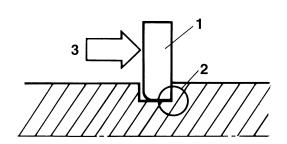
Do not spin the bearing with compressed air because this will damage the bearing surfaces.



EAS20240

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

the thrust "3" that the circlip receives.



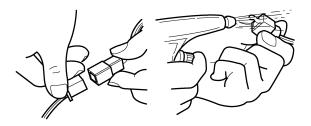
CHECKING THE CONNECTIONS

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.

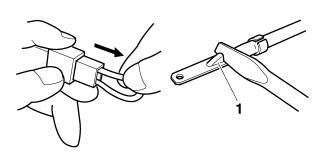


- 3. Check:
 - All connections

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.

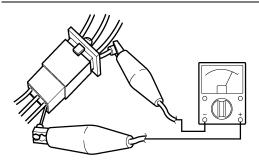
- 5. Check:
- Continuity (with the pocket tester)

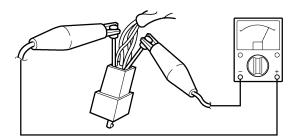


Pocket tester 90890-03112 Analog pocket tester YU-03112-C

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
Test coupler adapter 90890-03149		1-21, 4-61, 4-62, 8-175
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-32, 4-20, 5-42, 8-132, 8-133, 8-156, 8-157, 8-215, 8-216, 8-217, 8-221, 8-223, 8-224, 8-225, 8-226, 8-227, 8-228, 8-229, 8-230, 8-231, 8-232, 8-233, 8-234, 8-235, 8-236
Valve lapper 90890-04101 Valve lapping tool YM-A8998	014	3-7
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456	90890-03094 YU-44456	3-9
Timing light 90890-03141 Inductive clamp timing light YU-03141		3-12

Tool name/Tool No.	Illustration	Reference pages
Compression gauge 90890-03081 Engine compression tester YU-33223		3-13
Oil filter wrench 90890-01426 YU-38411	64.2	3-15
Oil pressure gauge set 90890-03120		3-16
Oil pressure adapter B 90890-03124	M20×P1.5	3-16
Vacuum/pressure pump gauge set 90890-06756 Mityvac brake bleeding tool YS-42423	Contraction of the second seco	3-19
Magnet base B 90890-06844 Magnetic base stand YU-A8438		3-20
Dial gauge & stand set 90890-01252		3-20
Steering nut wrench 90890-01403 Spanner wrench YU-33975	R20 R20	3-34, 4-85
Damper rod holder 90890-01447 YM-01447	26.5	4-77, 4-78

Tool name/Tool No.	Illustration	Reference
	mustration	pages
Slide metal installer 90890-01508 YM-01508		4-79
Fork seal driver 90890-01502 YM-A0948		4-79, 4-80
Final gear backlash band 90890-01511 YM-01230		4-101
Coupling gear/middle shaft tool 90890-01229 Gear holder YM-01229	25×22×1.6 41.7×35×1.5	4-103, 4-106
Bearing retainer wrench 90890-04050 Pinion bearing retainer & remover YM-04050	5.5 Ø34 Ø56 Ø66	4-103, 4-106
Fork seal driver weight 90890-01184 Replacement hammer YM-A9409-7	¢34.5	4-108, 4-109
Fork seal driver attachment 90890-01186 Replacement 27 mm YM-A9409-1	+ ø27 + → ø35 →	4-108, 4-109
Oil seal installing tool 90890-01512 YM-01512		4-109
Pivot shaft wrench 90890-01471 Frame spanner socket YM-01471	ø14.5	5-8, 5-9

Tool name/Tool No.	Illustration	Reference
		pages
Pivot shaft wrench adapter 90890-01476		5-8, 5-9
Disital size it tastar		
Digital circuit tester 90890-03174		5-11, 5-70, 7-9
Model 88 Multimeter with tachometer YU-A1927		
	and and a	
Rotor holding tool		5-14, 5-17
90890-01235 Universal magneto & rotor holder		
YU-01235		
Yamaha bond No. 1215 90890-85505		5-19, 5-35, 5-38, 5-101,
(Three Bond No.1215 [®])	and the second se	6-13
Valve spring compressor		5-25, 5-30
90890-04019		5-25, 5-50
YM-04019	g31, M6×P1.0	
	The Part	
Valve spring compressor attachment	90890-04114	5-25, 5-30
90890-04114 Valve spring compressor adapter 19.5 mm	arta)	
YM-04114	019	
	YM-04114	
	019.5	
	019.5	
Valve guide remover (ø5)		5-26
90890-04097 Valve guide remover (5.0 mm)		
YM-04097	05	
	X	
Valve guide installer (ø5) 90890-04098		5-26
Valve guide installer (5.0 mm) YM-04098	6	

Tool name/Tool No.	Illustration	Reference pages
Valve guide reamer (ø5) 90890-04099 Valve guide reamer (5.0 mm) YM-04099	05	5-26
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-34, 5-35, 5-38
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-34
Universal clutch holder 90890-04086 YM-91042	90890-04086 <u>M8×P1.25</u> 30 ¹¹⁹ 156 YM-91042	5-56, 5-59
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		5-57
Bearing retainer wrench 90890-04137 Middle drive shaft bearing retainer wrench YM-04137		5-87, 5-89
Damper spring compressor 90890-04090		5-87, 5-88
Bearing retainer wrench 90890-04140 Middle drive shaft bearing retainer wrench YM-04140		5-88

Tool name/Tool No.	Illustration	Reference pages
Gear lash measurement tool 90890-01467 YM-01467	35	5-91
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304 <u>M6×P1.0</u> YU-01304	5-105
Piston ring compressor 90890-05158 YM-08037		5-110
Slide hammer bolt 90890-01083 Slide hammer bolt 6 mm YU-01083-1	M6×P1.0	5-123
Weight 90890-01084 YU-01083-3	90890-01084 ø8.5 YU-01083-3	5-123
Radiator cap tester 90890-01325 Radiator pressure tester YU-24460-01	90890-01325 038	6-3
	YU-24460-01	

Tool name/Tool No.	Illustration	Reference pages
Radiator cap tester adapter 90890-01352 Radiator pressure tester adapter YU-33984	90890-01352 041 028	6-3
	YU-33984	
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A	ø35 ø27.5	6-13
Middle driven shaft bearing driver 90890-04058 Bearing driver 40 mm YM-04058	040 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6-13
Pressure gauge 90890-03153 YU-03153	Contraction of the second seco	7-8
Fuel pressure adapter 90890-03176 YM-03176		7-8
Ignition checker 90890-06754 Opama pet-4000 spark checker YM-34487		8-227

SPECIFICATIONS

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GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS

Model

Model

FJR13A 3P64 (USA)		
FJR13A 3P65 (California)		
FJR13AE 2D24 (USA)		
FJR13AE 2D25 (California)		

2230 mm (87.8 in) 750 mm (29.5 in) 1450 mm (57.1 in) 800 mm (31.5 in)

Dimensions

Overall length
Overall width
Overall height
Seat height
Wheelbase
Ground clearance
Minimum turning radius

1545 mm (60.8 in) 130 mm (5.12 in) 3100 mm (122.0 in)

Weight

With oil and fuel

Maximum load

FJR13A 291.0 kg (642 lb) (USA) FJR13A 292.0 kg (644 lb) (California) FJR13AE 295.0 kg (650 lb) (USA) FJR13AE 296.0 kg (653 lb) (California) FJR13A 212 kg (467 lb) (USA) FJR13A 211 kg (465 lb) (California) FJR13AE 208 kg (459 lb) (USA) FJR13AE 207 kg (456 lb) (California)

ENGINE SPECIFICATIONS

Engine	
Engine type	Liquid cooled 4-stroke, DOHC
Displacement	1298.0 cm ³ (79.20 cu.in)
Cylinder arrangement	Forward-inclined parallel 4-cylinder
Bore × stroke	79.0 × 66.2 mm (3.11 × 2.61 in)
Compression ratio	10.80 :1
Standard compression pressure (at sea level)	1600 kPa/400 r/min (228 psi/400 r/min) (16.0 kgf/cm²/400 r/min)
Minimum-maximum	1390–1790 kPa (197.7–254.6 psi) (13.9–17.9 kgf/cm ²)
Starting system	Electric starter
Fuel	
Recommended fuel	Unleaded gasoline only
Fuel tank capacity	25.0 L (6.61 US gal) (5.50 Imp.gal)
Fuel reserve amount	5.5 L (1.45 US gal) (1.21 Imp.gal)
Engine oil	
Lubrication system	Wet sump
Туре	YAMALUBE 4 (20W40) or SAE20W40
Recommended engine oil grade	API service SE, SF, SG type or higher
Engine oil quantity	
Total amount	4.90 L (5.18 US qt) (4.31 Imp.qt)
Without oil filter cartridge replacement	3.80 L (4.02 US qt) (3.34 Imp.qt)
With oil filter cartridge replacement	4.00 L (4.23 US qt) (3.52 Imp.qt)
Oil pressure (hot)	30.0 kPa/1000 r/min (4.4 psi/1000 r/min) (0.30 kgf/cm²/1000 r/min)
Final gear oil	
Туре	Shaft drive gear oil (Part No.: 9079E-SH001-00)
Quantity	0.20 L (0.21 US qt) (0.18 Imp.qt)
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	0.03–0.08 mm (0.0012–0.0032 in)
Limit	0.15 mm (0.0059 in)
Bypass valve opening pressure	78.4–117.6 kPa (11.4–17.1 psi) (0.78–1.18
	kgf/cm²)
Relief valve operating pressure	480.0–560.0 kPa (69.6–81.2 psi) (4.80–5.60 kgf/cm²)
Cooling system	
Radiator capacity (including all routes)	2.60 L (2.75 US qt) (2.29 Imp.qt)
Radiator capacity	0.65 L (0.69 US qt) (0.57 Imp.qt)
•	

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

Valve relief pressure Thermostat Model/manufacturer Valve opening temperature Valve full open temperature Valve lift (full open) Radiator core Width Height Depth Water pump Water pump Water pump type Reduction ratio Impeller shaft tilt limit 0.25 L (0.26 US qt) (0.22 Imp.qt) 93.3–122.7 kPa (13.5–17.8 psi) (0.93–1.23 kgf/cm²) 4.9 kPa (0.7 psi) (0.05 kgf/cm²)

4FM/NIPPON THERMOSTAT 69.0–73.0 °C (156.20–163.40 °F) 85.0 °C (185.00 °F) 8.0 mm (0.31 in)

360.0 mm (14.17 in) 273.8 mm (10.78 in) 22.0 mm (0.87 in)

NGK/CR8E

DENSO/U24ESR-N

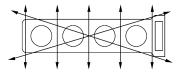
Single suction centrifugal pump $75/48 \times 25/28$ (1.395) 0.15 mm (0.006 in)

Spark plug (s)

Manufacturer/model Manufacturer/model Spark plug gap

Cylinder head

Volume Warpage limit



Camshaft

Drive system Camshaft cap inside diameter Camshaft journal diameter Camshaft-journal-to-camshaft-cap clearance Camshaft lobe dimensions Intake A Limit Intake B Limit Exhaust A Limit Exhaust B 22.74–23.34 cm³ (1.39–1.42 cu.in) 0.10 mm (0.0039 in)

0.7–0.8 mm (0.028–0.031 in)

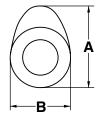
Chain drive (right) 24.500–24.521 mm (0.9646–0.9654 in) 24.459–24.472 mm (0.9630–0.9635 in) 0.028–0.062 mm (0.0011–0.0024 in)

33.050–33.150 mm (1.3012–1.3051 in) 32.050 mm (1.2618 in) 24.997–25.097 mm (0.9841–0.9881 in) 23.997 mm (0.9448 in) 33.050–33.150 mm (1.3012–1.3051 in) 32.950 mm (1.2972 in) 24.997–25.097 mm (0.9841–0.9881 in)

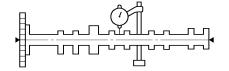
ENGINE SPECIFICATIONS

Limit

24.897 mm (0.9802 in)



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



Valve margin thickness D (intake) Valve margin thickness D (exhaust)

Valve stem diameter (intake) Valve stem diameter (exhaust) Valve guide inside diameter (intake) Limit Valve guide inside diameter (exhaust) Limit 0.030 mm (0.0012 in)

92RH2015/136 Automatic

0.15–0.22 mm (0.0059–0.0087 in) 0.18–0.25 mm (0.0071–0.0098 in)

29.90-30.10 mm (1.1772-1.1850 in) 25.90-26.10 mm (1.0197-1.0276 in)

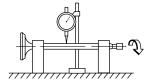
0.90-1.10 mm (0.0354-0.0433 in) 0.90-1.10 mm (0.0354-0.0433 in)

0.80–1.20 mm (0.0315–0.0472 in) 0.50–0.90 mm (0.0197–0.0354 in)

4.975–4.990 mm (0.1959–0.1965 in) 4.965–4.980 mm (0.1955–0.1961 in) 5.000–5.012 mm (0.1969–0.1973 in) 5.050 mm (0.1988 in) 5.000–5.012 mm (0.1969–0.1973 in) 5.050 mm (0.1988 in) Valve-stem-to-valve-guide clearance (intake) Limit

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

Valve stem runout



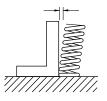
Cylinder head valve seat width (intake) Cylinder head valve seat width (exhaust)

Valve spring

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

Installed compression spring force (exhaust)

Spring tilt (intake) Spring tilt (exhaust)



Winding direction (intake) Winding direction (exhaust)

Cylinder

Bore Taper limit Out of round limit

Piston

Piston-to-cylinder clearance Limit Diameter D 0.010–0.037 mm (0.0004–0.0015 in) 0.080 mm (0.0032 in) 0.020–0.047 mm (0.0008–0.0019 in) 0.105 mm (0.0041 in) 0.010 mm (0.0004 in)

0.90–1.10 mm (0.0354–0.0433 in) 0.90–1.10 mm (0.0354–0.0433 in)

39.73 mm (1.56 in) 37.74 mm (1.49 in) 39.73 mm (1.56 in) 37.74 mm (1.49 in) 33.00 mm (1.30 in) 33.00 mm (1.30 in) 21.85 N/mm (124.76 lb/in) (2.23 kgf/mm) 28.34 N/mm (161.82 lb/in) (2.89 kgf/mm) 21.85 N/mm (124.76 lb/in) (2.23 kgf/mm) 28.34 N/mm (161.82 lb/in) (2.89 kgf/mm) 136.00–158.00 N (30.57–35.52 lb) (13.87– 16.11 kgf) 136.00–158.00 N (30.57–35.52 lb) (13.87– 16.11 kgf) 2.5°/1.7 mm (2.5°/0.067 in) 2.5°/1.7 mm (2.5°/0.067 in)

79.000–79.010 mm (3.1102–3.1106 in) 0.050 mm (0.0020 in) 0.050 mm (0.0020 in)

Clockwise

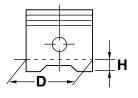
Clockwise

0.020-0.045 mm (0.0008-0.0018 in) 0.12 mm (0.0047 in) 78.965-78.980 mm (3.1089-3.1094 in)

ENGINE SPECIFICATIONS

Height H

5.0 mm (0.20 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 × T)



End gap (installed) Limit Ring side clearance Limit 2nd ring Ring type Dimensions (B × T)



End gap (installed) Limit Ring side clearance Limit Oil ring

Dimensions $(B \times T)$



End gap (installed) Ring side clearance 0.50 mm (0.0197 in) Intake side 19.004–19.015 mm (0.7482–0.7486 in) 19.045 mm (0.7498 in) 18.991–19.000 mm (0.7477–0.7480 in) 18.971 mm (0.7469 in) 0.004–0.024 mm (0.00016–0.00094 in)

Barrel $1.00 \times 2.80 \text{ mm} (0.04 \times 0.11 \text{ in})$

0.35–0.45 mm (0.0138–0.0177 in) 0.70 mm (0.0276 in) 0.030–0.070 mm (0.0012–0.0028 in) 0.120 mm (0.0047 in)

Taper 1.00 \times 2.90 mm (0.04 \times 0.11 in)

0.75–0.85 mm (0.0295–0.0335 in) 1.20 mm (0.0472 in) 0.020–0.060 mm (0.0008–0.0024 in) 0.120 mm (0.0047 in)

 2.00×2.50 mm (0.08 \times 0.10 in)

0.20-0.60 mm (0.0079-0.0236 in) 0.060-0.150 mm (0.0024-0.0059 in)

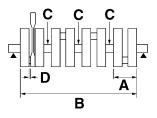
Connecting rod

Oil clearance (using plastigauge[®]) Bearing color code Small end inside diameter

Crankshaft

Balancer

Width A Width B Runout limit C Big end side clearance D



Journal oil clearance (using plastigauge[®]) Bearing color code 0.031–0.048 mm (0.0012–0.0019 in) 1.Blue 2.Black 3.Brown 4.Green 5.Yellow 6.Pink 19.005–19.018 mm (0.7482–0.7487 in)

61.60–63.20 mm (2.425–2.488 in) 325.10–326.30 mm (12.80–12.85 in) 0.030 mm (0.0012 in) 0.160–0.262 mm (0.0063–0.0103 in)

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

Balancer drive method	Gear
utch	
Clutch type	Wet, multiple-disc
Clutch release method	Hydraulic inner push
Clutch lever free play	FJR13A 1.9–20.7 mm (0.07–0.81 in)
Friction plate thickness	2.90–3.10 mm (0.114–0.122 in)
Wear limit	2.80 mm (0.1102 in)
Plate quantity	9 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	8 pcs
Warpage limit	0.10 mm (0.0039 in)
Clutch spring height	6.78 mm (0.27 in)
Minimum height	6.4 mm (0.25 in)
Spring quantity	1 pc
Push rod bending limit	0.370 mm (0.0146 in)
Clutch pressure plate stroke	FJR13AE 2.8 mm (0.11 in) or more
ansmission	
Transmission type	Constant mesh 5-speed
Primary reduction system	Spur gear
Primary reduction ratio	75/48 (1.563)
	Shaft drive
•	
Operation	FJR13A Left foot operation
	FJR13AE Left foot and left hand operation
Gear ratio	
1st	43/17 (2.529)
Warpage limit Clutch spring height Minimum height Spring quantity Push rod bending limit Clutch pressure plate stroke ansmission Transmission type Primary reduction system Primary reduction ratio Secondary reduction system Secondary reduction ratio Operation Gear ratio	0.10 mm (0.0039 in) 6.78 mm (0.27 in) 6.4 mm (0.25 in) 1 pc 0.370 mm (0.0146 in) FJR13AE 2.8 mm (0.11 in) or more Constant mesh 5-speed Spur gear 75/48 (1.563) Shaft drive $35/37 \times 21/27 \times 33/9$ (2.698) FJR13A Left foot operation FJR13AE Left foot and left hand operation

ENGINE SPECIFICATIONS

2nd	39/22 (1.773)
3rd	31/23 (1.348)
4th	28/26 (1.077)
5th	26/28 (0.929)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
Shifting mechanism	
Shift mechanism type	Shift drum and guide bar
Shift fork guide bar bending limit	0.100 mm (0.0039 in)
Air filter	
Air filter element	Dry element
Fuel pump	
Pump type	Electrical
Model/manufacturer	5JW 21/DENSO
Maximum consumption amperage	6.0 A
Output pressure	324.0 kPa (47.0 psi) (3.24 kgf/cm ²)
Fueliniester	
Model/quantity	
Manufacturer	NIPPON INJECTOR
Throttle body	
Type/quantity	42EHS/4
Manufacturer	MIKUNI
ID mark	3P61 00 (USA)
	3P65 10 (California)
Throttle position sensor	
Resistance	4.0–6.0 kΩ
Output voltage (at idle)	0.63–0.73 V
Evel injection concer	
Fuel injection sensor	421 560 () at 20 °C (69 °E)
Crankshaft position sensor resistance	421–569 Ω at 20 °C (68 °F) More then 4.9 V
Cylinder identification sensor output voltage (ON)	More than 4.8 V
Cylinder identification sensor output voltage (OFF)	
Intake air pressure sensor output voltage	3.75–4.25 V
Coolant temperature sensor resistance	290–354 Ω at 80 °C (176 °F)
Idling condition	
Engine idling speed	1000–1100 r/min
Intake vacuum	33.3 kPa (9.8 inHg) (250 mmHg)
Water temperature	100.0–105.0 °C (212.00–221.00 °F)
Oil temperature	80.0–90.0 °C (176.00–194.00 °F)
Throttle cable free play	3.0–5.0 mm (0.12–0.20 in)
Air induction system	
Air induction system Solenoid resistance	10-25 () at 20 °C (68 °E)
	19–25 Ω at 20 °C (68 °F)
Shaft drive	
Middle gear backlash	0.10–0.20 mm (0.0039–0.0079 in)

Ring-gear-to-stopper-bolt clearance Ring-gear-to-thrust-washer clearance Final gear backlash 0.30–0.60 mm (0.0118–0.0236 in) 0.10–0.20 mm (0.0039–0.0079 in) 0.22–0.45 mm (0.0087–0.0177 in)

CHASSIS SPECIFICATIONS

CHASSIS SPECIFICATIONS

Chassis	
Chassis	Diamond
Frame type	26.00°
Caster angle Trail	109.0 mm (4.29 in)
Trail	109.0 11111 (4.29 11)
Front wheel	
Wheel type	Cast wheel
Rim size	17M/C × MT3.50
Rim material	Aluminum
Wheel travel	135.0 mm (5.31 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Rear wheel	
Wheel type	Cast wheel
Rim size	$17M/C \times MT5.50$
Rim material	Aluminum
Wheel travel	125.0 mm (4.92 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Front tire	
Туре	Tubeless
Size	120/70 ZR17M/C (58W)
Manufacturer/model	METZELER/Roadtec Z6G
Manufacturer/model	BRIDGESTONE/BT020F
Wear limit (front)	1.0 mm (0.04 in)
Rear tire	
Туре	Tubeless
Size	180/55 ZR17M/C (73W)
Manufacturer/model	METZELER/Roadtec Z6C
Manufacturer/model	BRIDGESTONE/BT020R
Wear limit (rear)	1.0 mm (0.04 in)
Tire air pressure (measured on cold tires)	
Loading condition	0–90 kg (0–198 lb)
Front	270 kPa (39 psi) (2.70 kgf/cm²)
Rear	290 kPa (42 psi) (2.90 kgf/cm ²)
Loading condition	FJR13A 90–212 kg (198–467 lb) (USA)
-	FJR13A 90–211 kg (198–465 lb) (California)
	FJR13AE 90–208 kg (198–459 lb) (USA)
	FJR13AE 90–207 kg (198–456 lb) (California)
Front	270 kPa (39 psi) (2.70 kgf/cm ²)
Rear	290 kPa (42 psi) (2.90 kgf/cm ²)
High-speed riding	· · · · · · · · · · · · · · · · · · ·
Front	270 kPa (39 psi) (2.70 kgf/cm²)
Rear	290 kPa (42 psi) (2.90 kgf/cm ²)
	· · / · · · · · · · · · · · · · · · · ·

Front brake					
Туре	Dual disc brake				
Operation	Right hand operation				
Front disc brake	right hand operation				
Disc outside diameter × thickness	$220.0 \times 4.5 \text{ mm} (12.60 \times 0.19 \text{ in})$				
	$320.0 \times 4.5 \text{ mm} (12.60 \times 0.18 \text{ in})$				
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)	5.5 mm (0.22 in)				
Limit	0.5 mm (0.02 in)				
Brake pad lining thickness (outer)	5.5 mm (0.22 in)				
Limit	0.5 mm (0.02 in)				
Master cylinder inside diameter	15.00 mm (0.59 in)				
Caliper cylinder inside diameter	$30.23 \text{ mm} \times 4 (1.19 \text{ in} \times 4)$				
Caliper cylinder inside diameter (for unified	d brake)33.96 mm \times 2, 22.65 mm \times 2 (1.34 in \times 2, 0.89 in				
Recommended fluid	× 2) DOT 4				
Rear brake					
Туре	Single disc brake				
Operation	Right foot operation				
Brake pedal position	42.0 mm (1.65 in) (below the top of the rider				
	footrest)				
Rear disc brake	,				
Disc outside diameter $ imes$ thickness	282.0 × 5.0 mm (11.10 × 0.20 in)				
Brake disc thickness limit	4.5 mm (0.18 in)				
Brake disc deflection limit	0.15 mm (0.0059 in)				
Brake pad lining thickness (inner)	6.3 mm (0.25 in)				
Limit	0.8 mm (0.03 in)				
Brake pad lining thickness (outer)	6.3 mm (0.25 in)				
Limit	0.8 mm (0.03 in)				
Master cylinder inside diameter	15.0 mm (0.59 in)				
Caliper cylinder inside diameter	41.30 mm (1.63 in)				
Recommended fluid	DOT 4				
Clutch Recommended fluid	DOT 4				
Master cylinder inside diameter	14.0 mm (0.55 in)				
Release cylinder inside diameter	29.6 mm (1.17 in)				
Steering					
Steering	Angular booring				
Steering bearing type	Angular bearing				
Lock to lock angle (left)	34.0°				
Lock to lock angle (right)	34.0°				
Front suspension					
Туре	Telescopic fork				
Spring/shock absorber type	Coil spring/oil damper				
Front fork travel	135.0 mm (5.31 in)				
Fork spring free length	262.0 mm (10.31 in)				
Limit	257.0 mm (10.12 in)				
Collar length	149.5 mm (5.89 in)				
Installed length	251.0 mm (9.88 in)				

Spring rate K1 Spring stroke K1 Inner tube outer diameter Inner tube bending limit Optional spring available Recommended oil Quantity Level	8.30 N/mm (47.39 lb/in) (0.85 kgf/mm) 0.0–135.0 mm (0.00–5.31 in) 48.0 mm (1.89 in) 0.2 mm (0.01 in) No Ohlins R & T43 (ACC-RT43F-00-00) 696.0 cm ³ (23.53 US oz) (24.55 lmp.oz) 92.0 mm (3.62 in)
Rear suspension	
Туре	Swingarm (link suspension)
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	60.0 mm (2.36 in)
Spring free length	154.6 mm (6.09 in)
Installed length	136.2 mm (5.36 in)
Spring free length	73.9 mm (2.91 in)
Installed length	67.3 mm (2.65 in)
Soft	
Spring rate K1	91.00 N/mm (519.61 lb/in) (9.28 kgf/mm)
Spring rate K2	124.00 N/mm (708.04 lb/in) (12.64 kgf/mm)
Spring stroke K1	0.0–42.0 mm (0.00–1.65 in)
Spring stroke K2	42.0–60.0 mm (1.65–2.36 in)
Hard	
Spring rate K1	124.00 N/mm (708.04 lb/in) (12.64 kgf/mm)
Spring stroke K1	7.0–60.0 mm (0.28–2.36 in)
Optional spring available	No
Enclosed gas/air pressure (STD)	1200 kPa (170.7 psi) (12.0 kgf/cm²)

ELECTRICAL SPECIFICATIONS

2 V ransistorized coil ignition (digital) .0°/1050 r/min UA0010/MITSUBISHI 0383/DENSO .0 mm (0.24 in) .53–2.07 Ω at 20 °C (68 °F) 2–18 k Ω at 20 °C (68 °F) tesin 0.0 k Ω
ransistorized coil ignition (digital) .0°/1050 r/min UA0010/MITSUBISHI O383/DENSO .0 mm (0.24 in) .53–2.07 Ω at 20 °C (68 °F) 2–18 kΩ at 20 °C (68 °F)
.0°/1050 r/min UA0010/MITSUBISHI O383/DENSO .0 mm (0.24 in) .53–2.07 Ω at 20 °C (68 °F) 2–18 kΩ at 20 °C (68 °F)
.0°/1050 r/min UA0010/MITSUBISHI O383/DENSO .0 mm (0.24 in) .53–2.07 Ω at 20 °C (68 °F) 2–18 kΩ at 20 °C (68 °F)
UA0010/MITSUBISHI O383/DENSO .0 mm (0.24 in) .53–2.07 Ω at 20 °C (68 °F) 2–18 kΩ at 20 °C (68 °F)
O383/DENSO .0 mm (0.24 in) .53–2.07 Ω at 20 °C (68 °F) 2–18 kΩ at 20 °C (68 °F) resin
O383/DENSO .0 mm (0.24 in) .53–2.07 Ω at 20 °C (68 °F) 2–18 kΩ at 20 °C (68 °F) resin
.0 mm (0.24 in) .53–2.07 Ω at 20 °C (68 °F) 2–18 kΩ at 20 °C (68 °F)
.0 mm (0.24 in) .53–2.07 Ω at 20 °C (68 °F) 2–18 kΩ at 20 °C (68 °F)
.53–2.07 Ω at 20 °C (68 °F) 2–18 kΩ at 20 °C (68 °F) eesin
2–18 kΩ at 20 °C (68 °F)
2–18 kΩ at 20 °C (68 °F)
0.0 kΩ
NX07/DENSO
4.0 V 590 W 5000 r/min
.13–0.19 Ω at 20 °C (68 °F)
emi conductor-short circuit
H012AA/SHINDENGEN
4.2–14.8 V
0.0 A
0.0 V
iT14B-4
2 V, 12.0 Ah
YM
.20 A
alogen bulb
2 V, 60 W/55.0 W × 2
2 V, 60 W/55.0 W × 2 2 V, 5.0 W/21.0 W × 2
2 V, 5.0 W/21.0 W × 2
2 V, 5.0 W/21.0 W × 2 2 V, 21 W/5.0 W × 2

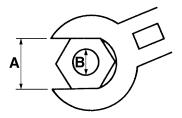
Indicator light	
Neutral indicator light	LED
Turn signal indicator light	LED
Oil level warning light	LED
High beam indicator light	LED
Engine trouble warning light	LED
ABS warning light	LED
Electric starting system	
System type	Constant mesh
Starter motor	
Model/manufacturer	3P6/YAMAHA
Power output	0.80 kW
Armature coil resistance	0.024–0.030 Ω at 20 °C (68 °F)
Brush overall length	10.8 mm (0.43 in)
Limit	3.65 mm (0.14 in)
Brush spring force	5.28–7.92 N (19.01–28.51 oz) (538–808 gf)
Commutator diameter	24.5 mm (0.96 in)
Limit	23.5 mm (0.93 in)
Mica undercut (depth)	1.50 mm (0.06 in)
Starter relay	
Model/manufacturer	MS5F-631/JIDECO
Amperage	180.0 A
Horn	21
Horn type	Plane
Quantity	
Model/manufacturer	HF-12/NIKKO
Maximum amperage Coil resistance	3.0 A
Performance	1.01–1.11 Ω at 20 °C (68 °F)
Fenomance	108–116 dB/2 m (6.6 ft)
Turn signal/hazard relay Relay type	Full transistor
Model/manufacturer	FE246BH/DENSO
	No
Built-in, self-canceling device Turn signal blinking frequency	75.0–95.0 cycles/min
Wattage	21 W × 2.0
Oil level switch	
Model/manufacturer	3P6/DENSO
Fuel gauge	
Model/manufacturer	5JW/DENSO
Sender unit resistance (full)	19.0–21.0 Ω
Sender unit resistance (empty)	139.0–141.0 Ω
Starting circuit cut-off relay	
Model/manufacturer	G8R-30Y-V3/OMRON

Headlight relay	
Model/manufacturer	ACM33211 M05/MATSUSHITA
Coil resistance	96.0 Ω
Radiator fan	
Model/manufacturer	3P6/DENSO
Running rpm	4250 r/min
Fan motor relay	
Model/manufacturer	ACM33211 M05/MATSUSHITA
Coil resistance	96.0 Ω
Thermo unit	
Model/manufacturer	25978/MITSUBISHI
Resistance at 80°C	290.0–390.0 Ω
Gear position sensor	
Output voltage (at neutral position)	FJR13AE 0.71–0.91 V
Resistance	FJR13AE 4.0–6.0 kΩ
Foot shift switch	
Output voltage	FJR13AE 2.4–2.6 V
Resistance	FJR13AE 4.0–6.0 kΩ
Grip warmer	
Resistance	FJR13AE 1.21–1.48 Ω at 20 °C (68 °F)
Fuses	
Main fuse	50.0 A
Headlight fuse	25.0 A
Signaling system fuse	15.0 A
Ignition fuse	10.0 A
Radiator fan fuse	15.0 A × 2
Auxiliary DC jack fuse	3.0 A
Hazard fuse	10.0 A
Fuel injection system fuse	15.0 A
ABS motor fuse	30.0 A
ABS control unit fuse	10.0 A
YCC-S motor control fuse	FJR13AE 30.0 A
Backup fuse	10.0 A
Reserve fuse	30.0 A
Reserve fuse	25.0 A
Reserve fuse	15.0 A
Reserve fuse	10.0 A
Reserve fuse	3.0 A

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
Spark plug	M10	4	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Cylinder head bolt	M10	10	See NOTE.	-E
Cylinder head bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Camshaft cap bolt	M6	20	10 Nm (1.0 m·kg, 7.2 ft·lb)	-C
Cylinder head cover bolt	M6	8	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Engine oil check bolt	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Cylinder head stud bolt (exhaust pipe)	M8	8	15 Nm (1.5 m·kg, 11 ft·lb)	
Reed valve cover bolt	M6	6	14 Nm (1.4 m·kg, 10 ft·lb)	-6
Connecting rod nut	M8	8	See NOTE.	
Generator rotor bolt	M12	1	130 Nm (13.0 m·kg, 94 ft·lb)	
Pickup rotor bolt	M10	1	45 Nm (4.5 m·kg, 32 ft·lb)	
Front balancer lever bolt	M8	1	14 Nm (1.4 m·kg, 10 ft·lb)	-6
Rear balancer lever bolt	M8	1	14 Nm (1.4 m·kg, 10 ft·lb)	-6
Front balancer shaft pinch bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	-
Rear balancer shaft pinch bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Timing chain tensioner bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Timing chain tensioner cap bolt	M6	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Camshaft sprocket bolt	M7	4	24 Nm (2.4 m·kg, 17 ft·lb)	
Water pump assembly bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Water pump housing cover bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Coolant drain bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Water jacket joint bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Thermostat inlet pipe 1 bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Thermostat housing cover/radia- tor filler pipe bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Thermostat housing bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Oil cooler bolt	M6	4	12 Nm (1.2 m·kg, 8.7 ft·lb)	-6
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kg, 31 ft·lb)	
Oil strainer bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Oil pump assembly bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	-6
Oil delivery pipe 2 bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Oil delivery pipe 3 bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
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 pan bolt	M6	20	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil pump drive chain guide bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	-6

Item	Thread size	Q'ty	Tightening torque	Remarks
Oil pump housing cover bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil level switch bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Throttle body joint clamp screw	M4	8	3 Nm (0.3 m·kg, 2.2 ft·lb)	
Air filter case joint clamp screw	M4	4	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Air filter case and rear lower fuel tank bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Intake air pressure sensor bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Exhaust pipe assembly nut	M8	8	20 Nm (2.0 m·kg, 14 ft·lb)	
Muffler and exhaust pipe assem- bly bolt	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Exhaust pipe assembly bolt	M8	2	17 Nm (1.7 m·kg, 12 ft·lb)	
Muffler bolt	M10	2	25 Nm (2.5 m·kg, 18 ft·lb)	
Crankcase bolt	M9	10	See NOTE.	–€
Crankcase bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	-E
Crankcase bolt	M6	17	10 Nm (1.0 m·kg, 7.2 ft·lb)	-E
Crankcase bolt	M8	2	24 Nm (2.4 m·kg, 17 ft·lb)	- E
Crankcase blind plug (FJR13A)	M10	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Neutral switch (FJR13AE)	M10	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Lower crankcase plug bolt (FJR13A)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	-9
YCC-S speed sensor bolt (FJR13AE)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Generator cover bolt	M6	11	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Clutch cover bolt	M6	10	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Middle gear case cover bolt	M6	9	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Pickup rotor cover bolt	M6	8	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Rear balancer cover bolt	M6	4	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil baffle plate 1 bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	ġ
Oil baffle plate 2 bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Timing mark accessing plug	M8	1	15 Nm (1.5 m·kg, 11 ft·lb)	
Oil guide plate bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	Ē
Damper cover bolt (middle gear case cover)	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Oil baffle plate 3 bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Upper crankcase plug bolt	M6	1	12 Nm (1.2 m·kg, 8.7 ft·lb)	-6
Crankcase damper bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	-6
Damper cover bolt (clutch cover)	M6	5	12 Nm (1.2 m·kg, 8.7 ft·lb)	ā,
Stator assembly lead holder bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	-6
Main gallery bolt	M20	1	12 Nm (1.2 m·kg, 8.7 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Starter clutch bolt	M8	3	32 Nm (3.2 m·kg, 23 ft·lb)	-6
Clutch boss nut	M20	1	90 Nm (9.0 m⋅kg, 65 ft⋅lb)	Use a lock washer.
Clutch spring bolt	M6	6	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Clutch release cylinder bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Clutch hose union bolt	M10	1	30 Nm (3.0 m·kg, 22 ft·lb)	
Bleed screw (clutch release cylin- der)	M8	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Main axle assembly screw	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	- ⊚ Stake
Middle drive pinion gear nut	M22	1	110 Nm (11.0 m·kg, 80 ft·lb)	Use a lock washer.
Middle drive shaft bearing hous- ing bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Bearing retainer (middle drive shaft)	M88	1	110 Nm (11.0 m·kg, 80 ft·lb)	Stake
Middle driven pinion gear nut	M28	1	110 Nm (11.0 m·kg, 80 ft·lb)	- ⊕ Stake
Bearing retainer (middle driven shaft)	M68	1	110 Nm (11.0 m·kg, 80 ft·lb)	Stake
Middle driven shaft end cover bolt	M8	3	25 Nm (2.5 m·kg, 18 ft·lb)	-
Shift drum retainer bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Shift shaft spring stopper bolt	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	-6
Stator coil assembly bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Gear position switch bolt (FJR13A)	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	¢
Crankshaft position sensor bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	-6
O ₂ sensor	M18	1	45 Nm (4.5 m·kg, 32 ft·lb)	
Intake air temperature sensor	M12	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Cylinder identification sensor bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Coolant temperature sensor	M12	1	18 Nm (1.8 m·kg, 13 ft·lb)	-
Starter motor bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Throttle position sensor screw	M5	2	3.5 Nm (0.35 m⋅kg, 2.53 ft⋅lb)	
Radiator bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Radiator cover bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	-5
Radiator bracket bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Coolant reservoir bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Coolant reservoir bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Clutch fluid reservoir bolt (FJR13AE)	M6	1	7 Nm (0.7 m⋅kg, 5.1 ft⋅lb)	
Clutch actuator bracket bolt (FJR13AE)	M8	2	19 Nm (1.9 m·kg, 13 ft·lb)	
Clutch actuator bracket bolt (FJR13AE)	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Gear position sensor cover (FJR13AE)	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Gear position sensor screw (FJR13AE)	M5	2	4 Nm (0.4 m⋅kg, 2.9 ft⋅lb)	Ð
Gear position sensor bracket (FJR13AE)	M5	2	9 Nm (0.9 m⋅kg, 6.5 ft⋅lb)	-6
Shift actuator front bolt (FJR13AE)	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Shift actuator rear bolt (FJR13AE)	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Shift rod bolt (FJR13AE)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	-0
Shift rod bolt (FJR13AE)	M8	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	-6
Shift rod front locknut (FJR13AE)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Shift rod rear locknut (FJR13AE)	M8	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Foot shift switch screw (FJR13AE)	M5	2	4 Nm (0.4 m⋅kg, 2.9 ft⋅lb)	-6
Front shift arm bolt (FJR13AE)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	

NOTE:

Cylinder head bolt

Tighten the cylinder head bolts to 25 Nm (2.5 m·kg 18 ft·lb) in the proper tightening sequence, loosen and retighten the bolts to 25 Nm (2.5 m·kg 18 ft·lb) in the proper tightening sequence, and then tighten them further to reach the specified angle $175-185^{\circ}$ in the proper tightening sequence.

NOTE: _

Connecting rod nut

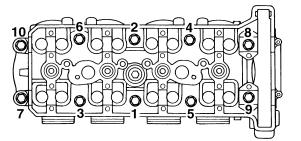
Tighten the connecting rod nuts to 20 Nm (2.0 m·kg 14 ft·lb), and then tighten them further to reach the specified angle 115–125°.

NOTE: ____

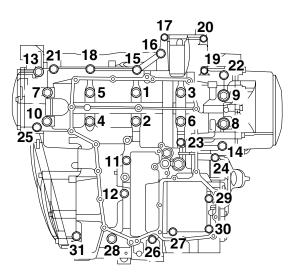
Crankcase bolt

Tighten the crankcase bolts to 20 Nm (2.0 m·kg 14 ft·lb) in the proper tightening sequence, loosen and retighten the bolts to 20 Nm (2.0 m·kg 14 ft·lb) in the proper tightening sequence, and then tighten them further to reach the specified angle $115-125^{\circ}$ in the proper tightening sequence.

Cylinder head tightening sequence:



Crankcase tightening sequence:



CHASSIS TIGHTENING TORQUES

ltem	Thread size	Q'ty	Tightening torque	Remarks
Engine mounting bolts (right front lower side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting bolts (right front upper side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting bolts (left front lower side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting bolts (left front upper side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting nut (rear upper side)	M10	1	45 Nm (4.5 m·kg, 32 ft·lb)	-E
Spacer bolt	M16	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Engine mounting bolt (rear lower side)	M10	1	45 Nm (4.5 m·kg, 32 ft·lb)	-E
Engine mounting bolt (left rear side)	M8	2	16 Nm (1.6 m·kg, 11 ft·lb)	
Engine bracket bolt (left rear side)	M10	1	32 Nm (3.2 m·kg, 23 ft·lb)	
Engine bracket bolt (top)	M8	4	16 Nm (1.6 m·kg, 11 ft·lb)	
Engine mounting bolt (top)	M10	2	37 Nm (3.7 m·kg, 27 ft·lb)	
Pinch bolt (front side)	M8	1	24 Nm (2.4 m·kg, 17 ft·lb)	
Pinch bolt (rear side)	M8	2	24 Nm (2.4 m·kg, 17 ft·lb)	
Pivot shaft	M28	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Pivot shaft nut	M18	1	125 Nm (12.5 m·kg, 90 ft·lb)	
Pivot shaft locknut	M28	1	115 Nm (11.5 m·kg, 85 ft·lb)	
Pivot shaft locknut retainer bolt (FJR13A)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Pivot shaft locknut retainer bolt (FJR13AE)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	-@
Relay arm and frame nut	M10	1	40 Nm (4.0 m·kg, 29 ft·lb)	
Connecting arm and relay arm nut	M10	1	48 Nm (4.8 m·kg, 35 ft·lb)	
Connecting arm and swingarm nut	M10	1	48 Nm (4.8 m·kg, 35 ft·lb)	
Rear shock absorber assembly upper nut	M12	1	64 Nm (6.4 m·kg, 46 ft·lb)	
Rear shock absorber assembly lower nut	M10	1	40 Nm (4.0 m·kg, 29 ft·lb)	
Rear shock absorber spring pre- load adjusting lever nut	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Upper bracket pinch bolt	M8	2	26 Nm (2.6 m·kg, 19 ft·lb)	1
Lower bracket pinch bolt	M8	4	23 Nm (2.3 m·kg, 17 ft·lb)	
Steering stem nut	M28	1	115 Nm (11.5 m·kg, 85 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
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	18 Nm (1.8 m·kg, 13 ft·lb)	See NOTE.
Handlebar bolt	M8	2	23 Nm (2.3 m·kg, 17 ft·lb)	
Handlebar nut	M12	2	65 Nm (6.5 m·kg, 47 ft·lb)	
Clutch master cylinder holder bolt (FJR13A)	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Front brake master cylinder hold- er bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Front fork cap bolt locknut	M10	1	25 Nm (2.5 m·kg, 18 ft·lb)	
Front fork damper rod assembly bolt	M10	1	35 Nm (3.5 m⋅kg, 25 ft⋅lb)	-@
Front fork cap bolt	M45	1	25 Nm (2.5 m·kg, 18 ft·lb)	
Front fender bolt	M6	4	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Brake hose joint bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Lower bracket cover bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front cowling stay and frame nut	M10	2	32 Nm (3.2 m·kg, 23 ft·lb)	
Front cowling assembly bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Windshield upper inner bracket and windshield lower inner brack- et bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Windshield upper inner bracket and windshield drive unit bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Windshield lower inner bracket and windshield drive unit bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rearview mirror nut	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Windshield drive unit bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Windshield drive unit side rail bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Side cover bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Grab bar bolt	M8	5	21 Nm (2.1 m·kg, 15 ft·lb)	
Grab bar bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel pump bolt	M5	6	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Front fuel tank bracket and frame bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Fuel tank and front fuel tank bracket bolt	M8	2	16 Nm (1.6 m⋅kg, 11 ft⋅lb)	
Fuel tank and rear upper fuel tank bracket bolt	M8	2	16 Nm (1.6 m⋅kg, 11 ft⋅lb)	
Rear upper fuel tank bracket and rear lower fuel tank bracket nut	M8	1	16 Nm (1.6 m⋅kg, 11 ft⋅lb)	

TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Rear lower fuel tank bracket and frame bolt	M6	4	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Fuel tank cap bolt	M5	3	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Canister bolt (for California only)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Canister bracket bolt (for Califor- nia only)	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Storage compartment bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
T-bar bolt	M10	3	37 Nm (3.7 m·kg, 27 ft·lb)	
Rear fender bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear fender nut	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front wheel axle bolt	M14	1	91 Nm (9.1 m·kg, 66 ft·lb)	See
Front wheel axle pinch bolt	M8	4	21 Nm (2.1 m·kg, 15 ft·lb)	NOTE.
Front brake disc bolt	M6	12	18 Nm (1.8 m·kg, 13 ft·lb)	-0
Front wheel sensor bolt	M8	1	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear wheel axle nut	M18	1	125 Nm (12.5 m·kg, 90 ft·lb)	
Rear wheel axle pinch bolt	M8	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Rear brake disc bolt	M6	6	18 Nm (1.8 m·kg, 13 ft·lb)	-6
Rear wheel sensor bolt	M8	1	30 Nm (3.0 m·kg, 22 ft·lb)	
Brake torque rod nut	M8	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear wheel dust cover screw	M5	3	5 Nm (0.5 m·kg, 3.6 ft·lb)	-6
Brake hose union bolt	M10	14	30 Nm (3.0 m·kg, 22 ft·lb)	
Brake pipe flare nut	M10	11	19 Nm (1.9 m·kg, 13 ft·lb)	
Front brake caliper bolt	M10	4	40 Nm (4.0 m·kg, 29 ft·lb)	
Front brake hose holder bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front brake caliper bleed screw	M8	3	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Front brake pad bolt	M10	2	17 Nm (1.7 m·kg, 12 ft·lb)	
Rear brake caliper bolt	M10	2	27 Nm (2.7 m·kg, 19 ft·lb)	
Rear brake hose/rear wheel sen- sor lead holder bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake caliper bleed screw	M7	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Hydraulic unit nut	M8	3	16 Nm (1.6 m·kg, 11 ft·lb)	
Metering valve bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Proportioning valve bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Sidestand nut	M10	1	58 Nm (5.8 m·kg, 42 ft·lb)	
Sidestand switch screw	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	-6
Centerstand nut	M10	4	55 Nm (5.5 m·kg, 40 ft·lb)	
Centerstand bracket nut	M10	2	55 Nm (5.5 m·kg, 40 ft·lb)	
Brake pedal bolt	M6	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Right footrest bracket bolt	M8	2	28 Nm (2.8 m·kg, 20 ft·lb)	

TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Rear brake master cylinder bolt	M8	2	18 Nm (1.8 m·kg, 13 ft·lb)	
Rear brake master cylinder lock- nut	M8	1	16 Nm (1.6 m·kg, 11 ft·lb)	
Left footrest assembly bolt	M8	2	28 Nm (2.8 m·kg, 20 ft·lb)	
Left footrest assembly bolt	M10	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Left footrest assembly/sidestand bolt	M10	2	65 Nm (6.5 m·kg, 47 ft·lb)	-6
Shift arm pinch bolt (FJR13A)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Shift rod locknut (FJR13A)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Drive shaft dust cover bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	-6
Final gear oil drain bolt	M14	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Final gear oil filler bolt	M14	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Final drive assembly nut	M10	4	42 Nm (4.0 m·kg, 29 ft·lb)	
Final drive pinion gear bearing retainer	M65	1	110 Nm (11.0 m·kg, 80 ft·lb)	Left-hand thread
Coupling gear nut	M16	1	110 Nm (11.0 m·kg, 80 ft·lb)	Stake
Ring gear bearing housing bolt	M10	2	40 Nm (4.0 m·kg, 29 ft·lb)	
Ring gear bearing housing nut	M8	6	23 Nm (2.3 m·kg, 17 ft·lb)	
Final gear case stud bolt	M8	6	9 Nm (0.9 m⋅kg, 6.5 ft⋅lb)	
Ring gear bearing housing stop- per bolt	M10	1	9 Nm (0.9 m⋅kg, 6.5 ft⋅lb)	- € Left-hand thread
Battery box bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Battery stay bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Battery holder bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Horn bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Shift pedal bolt (FJR13AE)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	-@
Shift pedal pivot bolt (FJR13AE)	M8	1	16 Nm (1.6 m·kg, 11 ft·lb)	-@

NOTE: ____

Lower ring nut

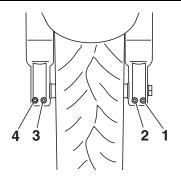
- 1. First, tighten the lower ring nut to approximately 52 Nm (5.2 m·kg, 37 ft·lb) with a torque wrench, then loosen the lower ring nut completely.
- 2. Retighten the lower ring nut to 18 Nm (1.8 m·kg, 13 ft·lb) with a torque wrench.

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).
- 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.



LUBRICATION POINTS AND LUBRICANT TYPES

LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370 ENGINE

Lubrication point	Lubricant
Oil seal lips	-49-
O-rings	-49-
Bearings	• E
Crankshaft pins	(E
Piston surfaces	(E
Piston pins	(E
Connecting rod bolts and nuts	
Crankshaft journals	(E
Camshaft lobes	
Camshaft journals	
Balancer absorbers, weights, gears and shafts	- E
Valve stems (intake and exhaust)	
Valve stem ends (intake and exhaust)	- ©
Water pump impeller shaft	- ©
Oil pump rotors (inner and outer) and oil pump shaft	- ©
Oil pump drive sprocket	
Oil strainer	
Oil nozzle (O-ring)	
Starter clutch idle gear inner surface	(E
Starter clutch assembly	(E
Primary driven gear	(E
Push rods and ball	
Transmission gears (wheel and pinion)	
Main axle and drive axle	
Shift drum	- E
Shift forks and shift fork guide bars	- E
Shift shaft	• E
Shift pedal bolt	
Damper drive cam and damper driven cam	
Middle driven gear	
Middle drive pinion gear	• E
Middle driven pinion gear	- E
Middle drive pinion gear nut	(E

LUBRICATION POINTS AND LUBRICANT TYPES

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

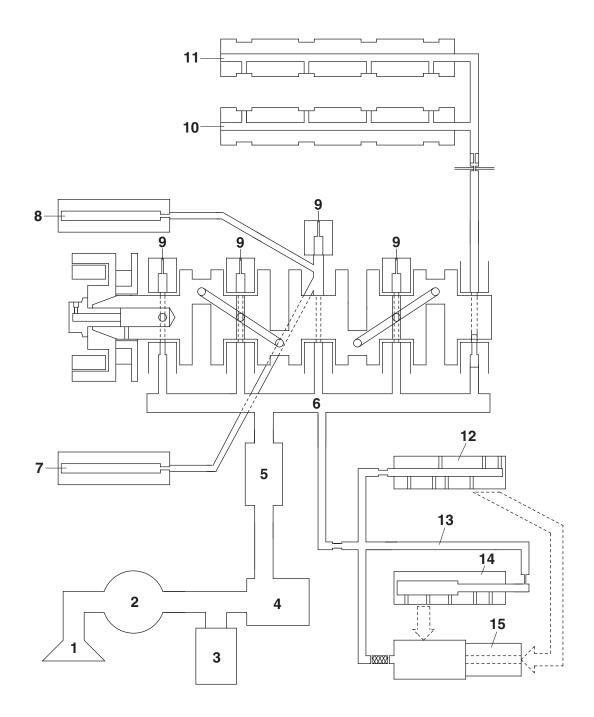
LUBRICATION POINTS AND LUBRICANT TYPES

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Lubrication point	Lubricant
Steering bearings and upper bearing cover lip	
Lower bearing dust seal lip	
Front wheel oil seal lips (right and left)	
Rear wheel oil seal lips	
Rear wheel drive hub oil seal	
Rear wheel drive hub mating surface	
Rear brake pedal pivoting point	
Footrest assembly pivoting point	
Shift pedal pivoting point	
Centerstand pivoting point and metal-to-metal moving parts	
Sidestand pivoting point and metal-to-metal moving parts	
Tube guide (throttle grip) inner surface and throttle cables	
Brake lever pivot bolt and metal-to-metal moving parts	Silicon grease
Clutch lever pivot bolt and metal-to-metal moving parts	Silicon grease
Rear shock absorber assembly oil seal	
Rear shock absorber assembly bearing	
Rear shock absorber assembly spacer	
Pivot shaft and pivot shaft thread	
Pivot shaft bearing	
Pivot shaft oil seal lip	
Relay arm bearing	
Oil seals (rear shock absorber, relay arm and connecting arm)	
Drive shaft spline (final drive pinion gear side)	
Drive shaft spline (universal joint side)	
Ring gear inner surface	
Thrust washer (ring gear)	
Bearing (ring gear)	
Bearing (final drive pinion gear)	

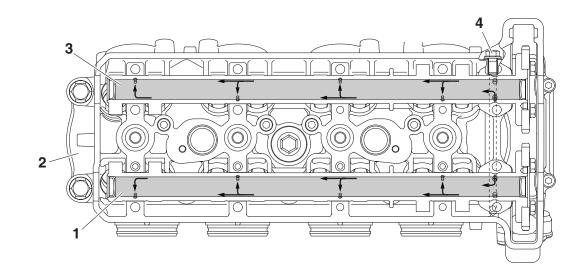
LUBRICATION SYSTEM CHART AND DIAGRAMS

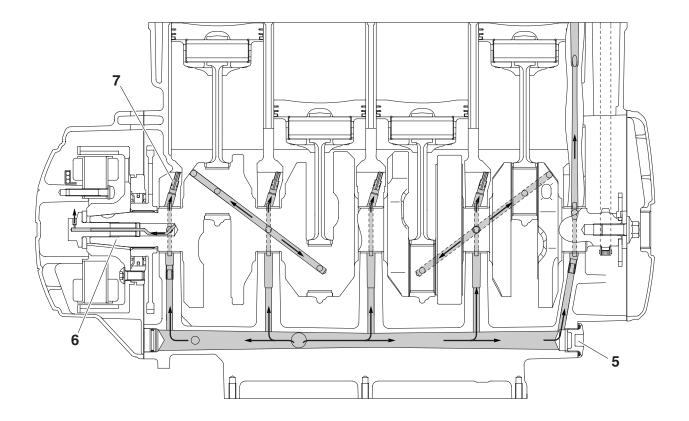
EAS20400 ENGINE OIL LUBRICATION CHART



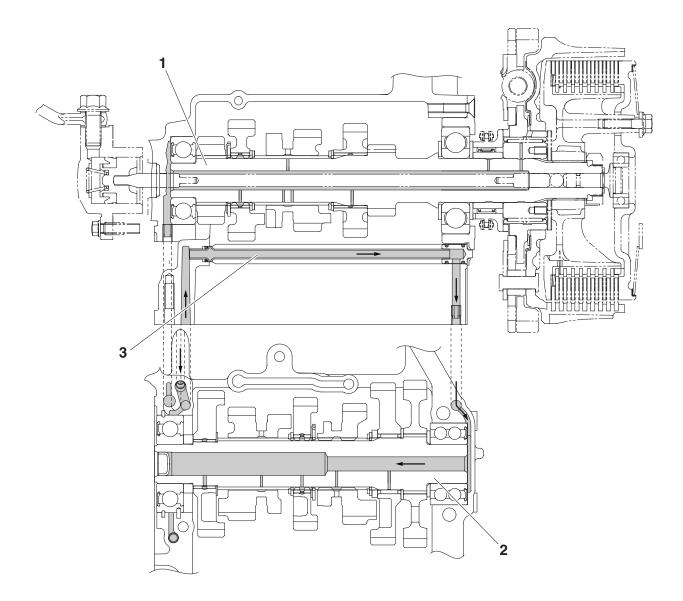
- 1. Oil strainer
- 2. Oil pump
- 3. Relief valve assembly
- 4. Oil filter
- 5. Oil cooler
- 6. Main gallery
- 7. Front balancer shaft
- 8. Rear balancer shaft
- 9. Oil nozzle
- 10. Intake camshaft
- 11. Exhaust camshaft
- 12. Main axle
- 13. Oil pipe
- 14. Drive axle
- 15. Middle drive shaft assembly

LUBRICATION DIAGRAMS

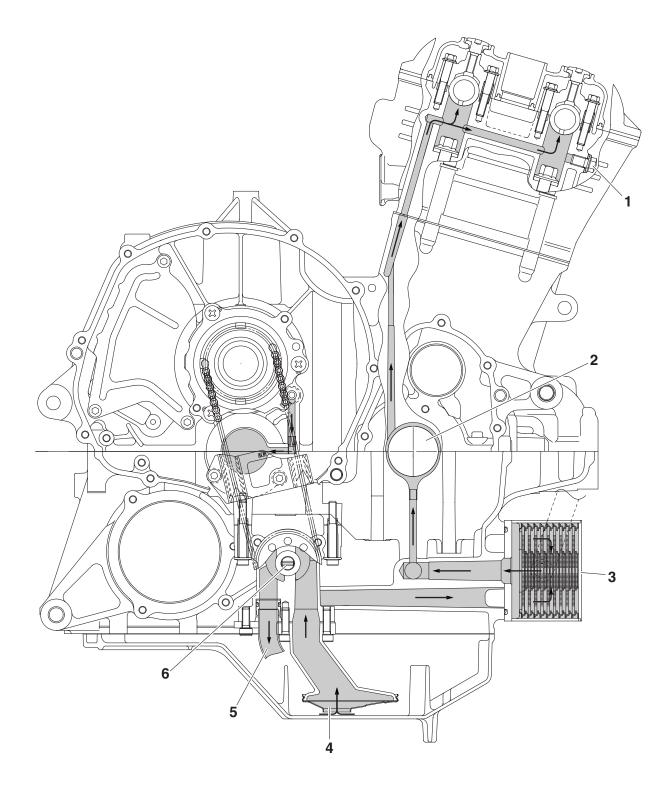




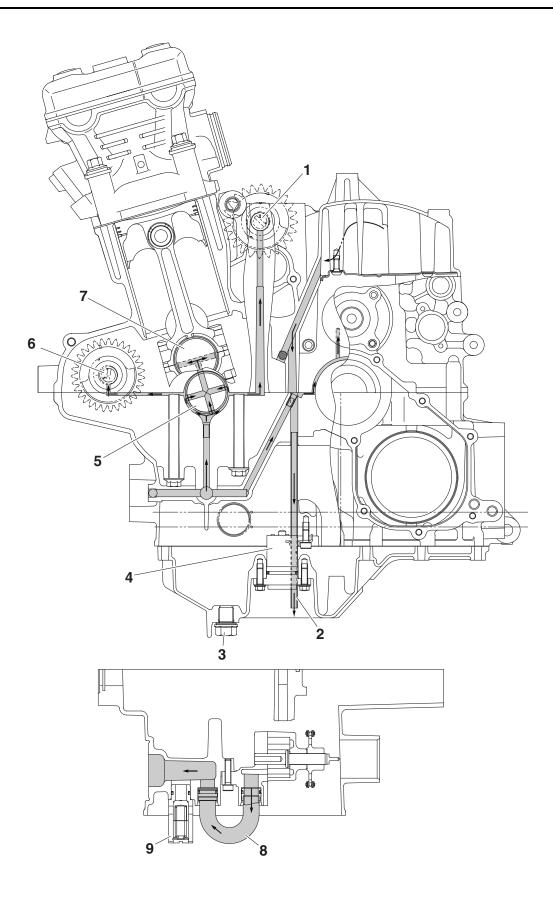
- 1. Intake camshaft
- 2. Cylinder head
- 3. Exhaust camshaft
- 4. Oil check bolt
- 5. Main gallery bolt
- 6. Crankshaft
- 7. Oil nozzle



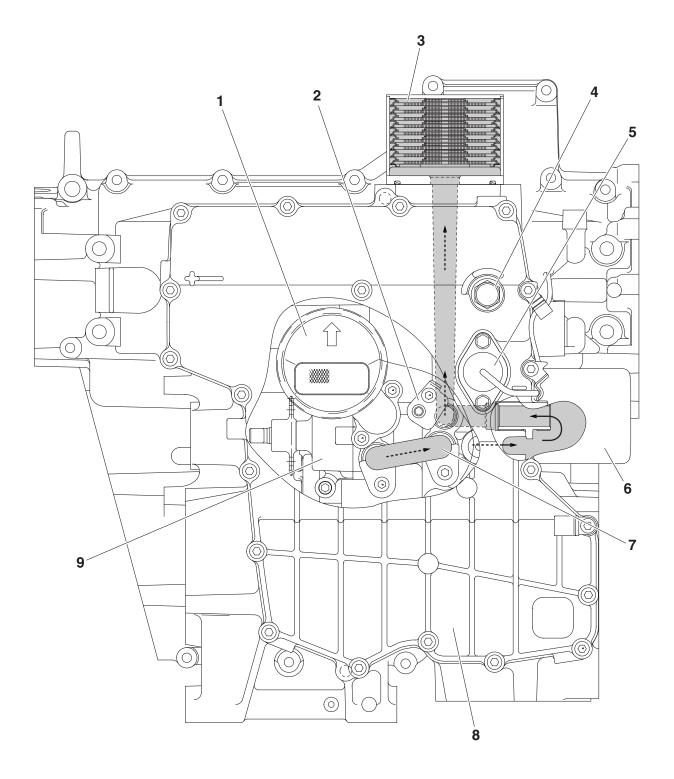
- 1. Main axle
- 2. Drive axle
- 3. Oil delivery pipe 1



- 1. Oil check bolt
- 2. Crankshaft
- 3. Oil cooler
- 4. Oil strainer
 5. Oil delivery pipe 3
- Oil donvol y
 Oil pump



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



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

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COOLING SYSTEM DIAGRAMS C L 12 1 11、 2 10. 3 9 8 \hat{O} Ţ ಹ 4 6 **←** D 📚 đ 7 С В 🔿 9 6 D ď 13 Ē 5 19 18 17 6 ∰ -Î 0 ₩ 5 Ð 16 14

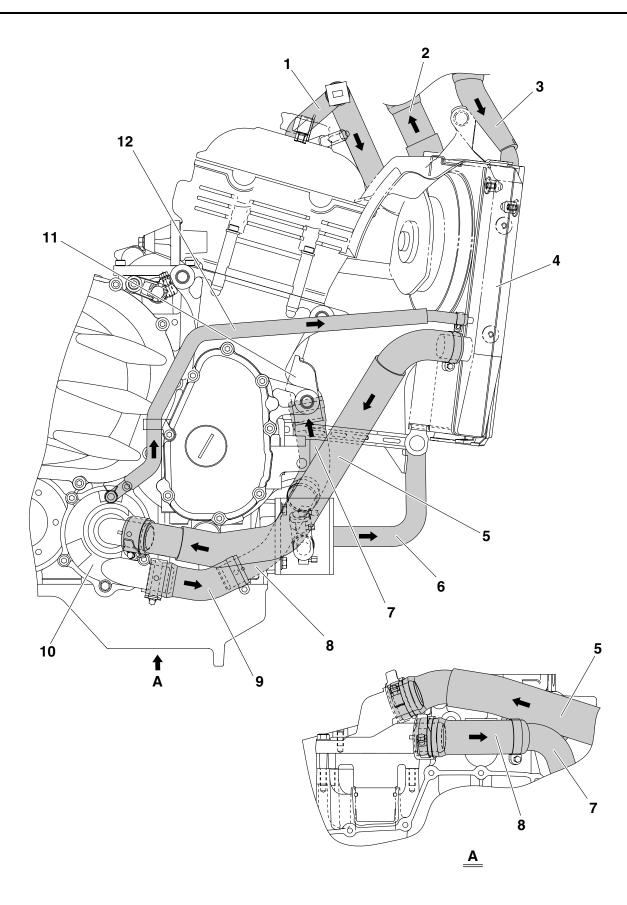
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COOLING SYSTEM DIAGRAMS

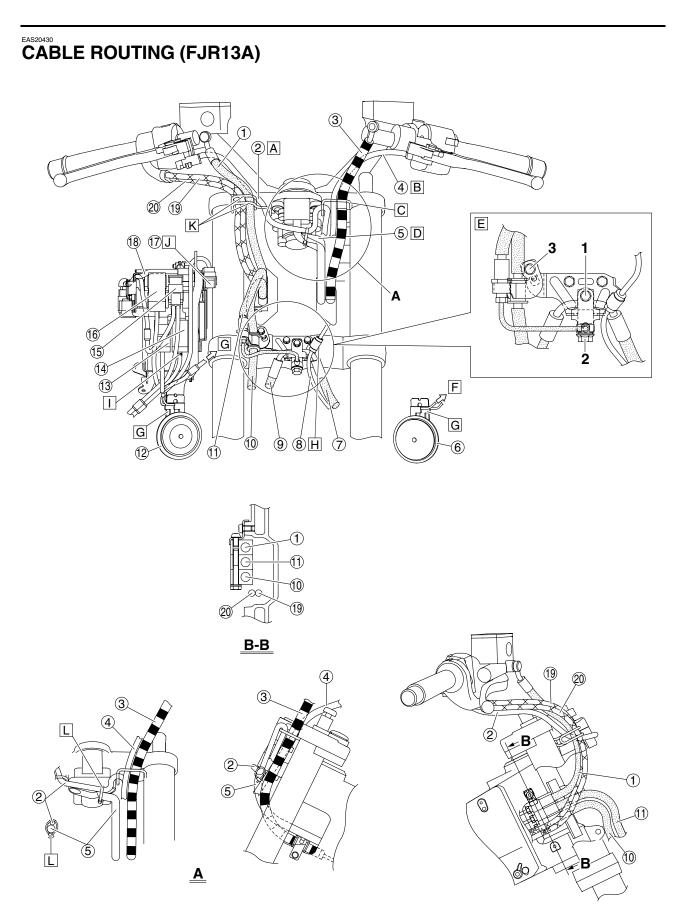
- 1. Thermostat inlet pipe 1
- 2. Thermostat inlet hose 1
- 3. Plunger control unit hose 1
- 4. Plunger control unit hose 2
- 5. Oil cooler outlet hose
- 6. Radiator
- 7. Coolant reservoir breather hose
- 8. Thermostat inlet pipe 2
- 9. Coolant reservoir hose
- 10. Radiator inlet hose
- 11. Thermostat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

COOLING SYSTEM DIAGRAMS

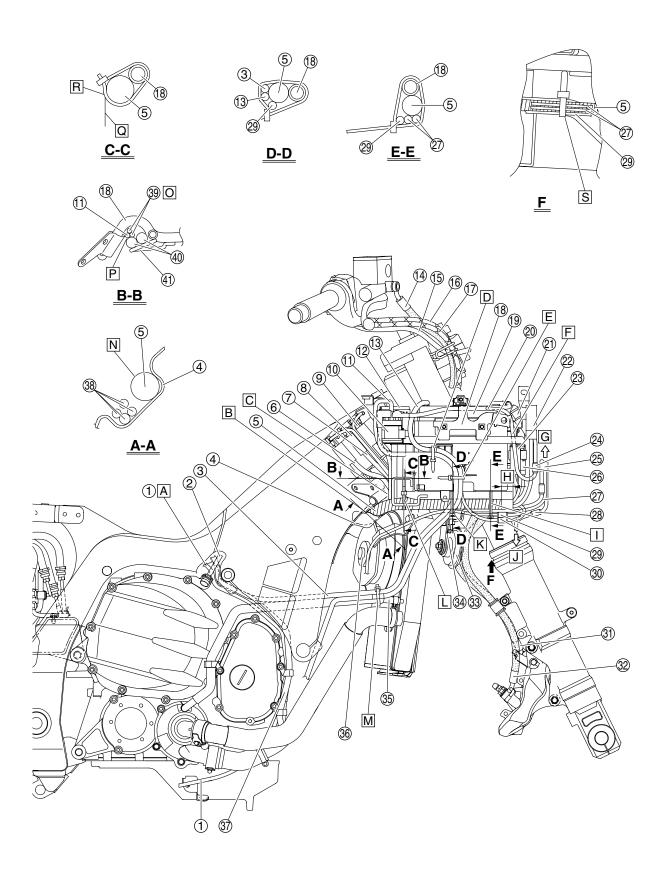


COOLING SYSTEM DIAGRAMS

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

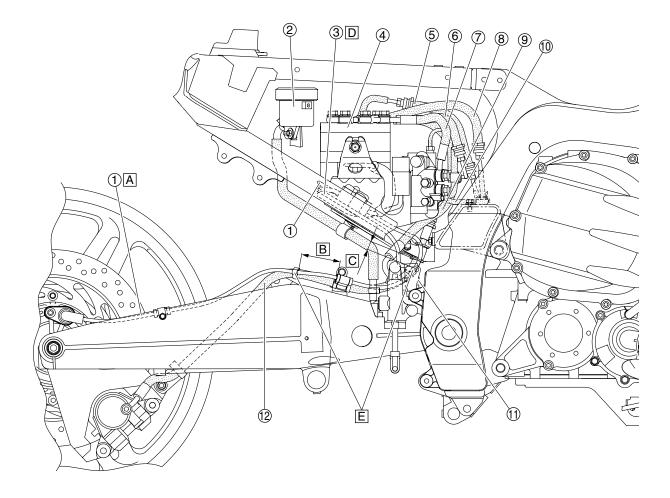


- 1. Brake hose (front brake master cylinder to hydraulic unit)
- 2. Right handlebar switch lead
- 3. Clutch hose
- 4. Left handlebar switch lead
- 5. Main switch lead
- 6. Left horn (low)
- 7. Brake hose (hydraulic unit to left front brake caliper)
- 8. Front wheel sensor lead
- 9. Brake hose (hydraulic unit to right front brake caliper)
- 10. Brake hose (metering valve to right front brake caliper)
- 11. Brake hose (hydraulic unit to front brake calipers)
- 12. Right horn (high)
- 13. Headlight relay (on/off)
- 14. Radiator fan motor relay
- 15. Main fuse
- 16. Brake light relay
- 17. ABS test coupler
- 18. Positive battery lead
- 19. Throttle cable (accelerator cable)
- 20. Throttle cable (decelerator cable)
- A. Route the right handlebar switch lead under the handlebar.
- B. Route the left handlebar switch lead under the handlebar.
- C. Pass the clutch hose, right handlebar switch lead, and left handlebar switch lead through the guide.
- D. Route the main switch lead to the inside of the clutch hose.
- E. Temporarily tighten the brake hose joint bolt, union bolt, and brake hose holder bolt in the proper tightening sequence as shown. Then, tighten the bolts to the specified torques, making sure to tighten the brake hose joint bolt "1" last.
- F. To front cowling wire harness
- G. Install the horn L-shaped connectors so that the leads are routed outward.
- H. Fasten the grommet on the front wheel sensor lead with the holder.
- I. Connect the coupler that has blue tape wrapped around its leads to the radiator fan motor relay.
- J. Install the ABS test coupler completely onto the tab on the battery stay.
- K. Pass the brake hose (front brake master cylinder to hydraulic unit), right handlebar switch lead, and throttle cables through the guide as shown in the illustration.
- L. Fasten the main switch lead and right handlebar switch lead with a plastic locking tie at the location shown in the illustration. Position the buckle of the plastic locking tie under the leads, with the end facing inward, and then cut off the excess end of the tie.

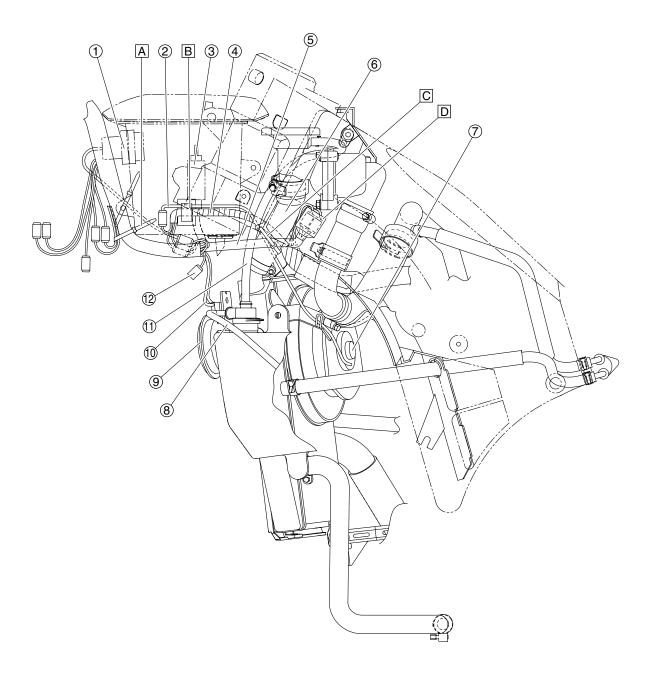


- 1. O₂ sensor lead
- 2. Engine idling speed adjusting cable
- 3. Starter motor lead
- 4. Air deflector
- 5. Wire harness
- 6. Spark plug lead #4
- Spark plug lead #1
- 8. Cylinders-#1/#4 ignition coil
- 9. Cylinders-#2/#3 ignition coil
- 10. Starter relay
- 11. Starter relay lead
- 12. Fuse box 2
- 13. Negative battery lead
- 14. Brake hose (front brake master cylinder to hydraulic unit)
- 15. Right handlebar switch lead
- 16. Throttle cable (accelerator cable)
- 17. Throttle cable (decelerator cable)
- 18. Battery stay
- 19. Battery
- 20. Positive battery lead
- 21. Main fuse
- 22. Brake light relay
- 23. Headlight relay (on/off)
- 24. Positive battery lead coupler
- 25. Front cowling wire harness
- 26. Radiator fan motor relay
- 27. Right horn (high) leads
- 28. Front right turn signal light lead
- 29. Right radiator fan motor lead
- 30. Ground lead coupler
- 31. Brake hose (hydraulic unit to right front brake caliper)
- 32. Brake hose (metering valve to right front brake caliper)
- 33. Right horn (high)
- 34. Right horn (high) connectors
- 35. Water pump breather hose
- 36. Right radiator fan
- 37. Crankshaft position sensor lead
- 38. Spark plug leads
- 39. Ignition coil primary leads
- 40. Fuse box leads
- 41. Guide
- A. Route the O₂ sensor lead to the inside of the engine idling speed adjusting cable.
- B. Make sure that the wire harness and spark plug leads are positioned in the indentation on the right side of the air deflector.
- C. Route the spark plug leads to the inside of the battery stay pipe.
- D. Fasten the negative battery lead at the blue tape and the starter motor lead to the battery box with a plastic locking tie. Face the end of the plastic locking tie downward. Do not cut off the excess end of the plastic locking tie.
- E. Fasten the negative battery lead and starter motor lead to the battery box with a plastic locking tie. Face the end of the plastic locking tie rearward. Do not cut off the excess end of the plastic locking tie.

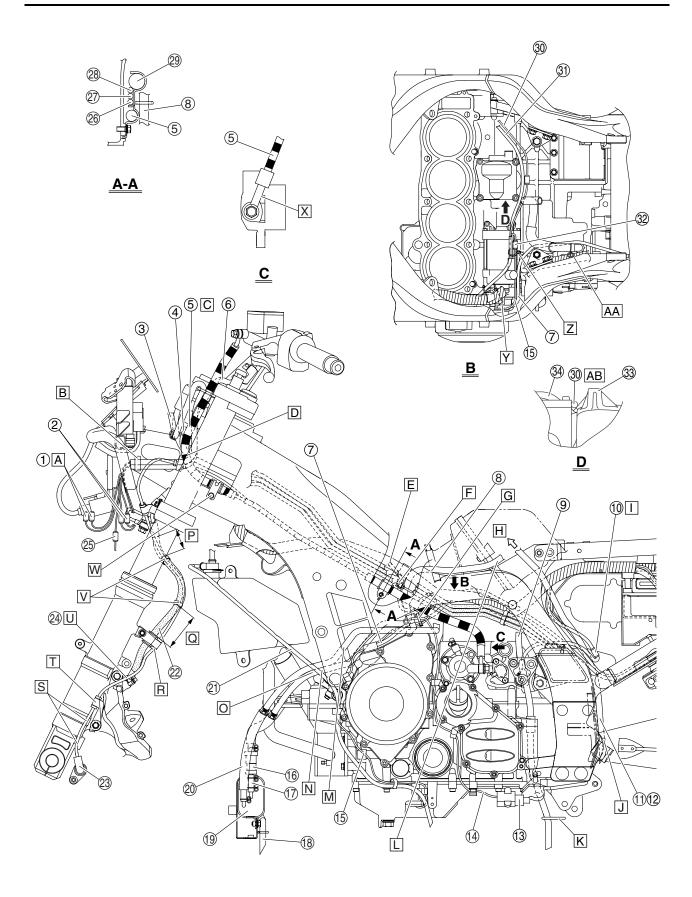
- F. Route the positive battery lead between the battery stay and the battery box.
- G. To front cowling wire harness
- H. Align the rear end of the right radiator fan motor coupler with the tape on the wire harness as shown in the illustration.
- Fasten the wire harness, right horn (high) leads, and right radiator fan motor lead with a plastic locking tie, making sure to install the tie on the fan motor lead's protective sleeve. Face the end of the plastic locking tie outward. Do not cut off the excess end of the plastic locking tie.
- J. To front right turn signal light
- K. Fasten the wire harness, right radiator fan motor lead, negative battery lead, and starter motor lead to the battery stay with a plastic locking tie, making sure to install the tie on the fan motor lead's protective sleeve and to position the tie in front of the air deflector. Face the end of the plastic locking tie outward, and then cut off the excess end of the tie.
- L. Fasten the wire harness to the battery stay with a plastic locking tie. Face the end of the plastic locking tie upward, and then cut off the excess end of the tie.
- M. Fasten the negative battery lead at the blue tape, starter motor lead, and water pump breather hose with a plastic locking tie, making sure to install the tie around the end of the hose's protective sleeve, and then cut off the excess end of the tie. Do not kink the water pump breather hose and do not face the end of the plastic locking tie downward.
- N. Route the wire harness to the outside of the spark plug leads.
- O. Route the ignition coil primary leads to the inside of the fuse box leads.
- P. Route the fuse box leads, starter relay lead, and ignition coil primary leads between the battery stay and the guide.
- Q. Make sure that the wire harness does not protrude to the outside of the battery stay.
- R. Pass the plastic locking tie between the guide and the wire harness.
- S. Position the plastic locking tie to the rear of the bend in the battery stay.



- 1. Rear wheel sensor lead
- 2. Rear brake fluid reservoir
- 3. Rear brake light switch lead
- 4. Hydraulic unit
- 5. Brake hose (front brake master cylinder to hydraulic unit)
- 6. Brake hose (hydraulic unit to proportioning valve)
- 7. Brake hose (hydraulic unit to metering valve)
- 8. Brake hose (hydraulic unit to front brake calipers)
- 9. Brake hose (rear brake master cylinder to hydraulic unit)
- 10. Brake pipe (metering valve to right front brake caliper)
- 11. Rear brake light switch
- 12. Brake hose (proportioning valve to rear brake caliper)
- A. Route the rear wheel sensor lead to the inside of the swingarm, making sure that the lead does not protrude above the swingarm.
- B. 45-55 mm (1.77-2.17 in)
- C. 10-20 mm (0.39-0.79 in)
- D. Route the rear brake light switch lead under the rear wheel sensor lead.
- E. Fasten the rear wheel sensor lead to the brake hose (proportioning valve to rear brake caliper) with the two holders, making sure that the fastener of each holder faces inward.

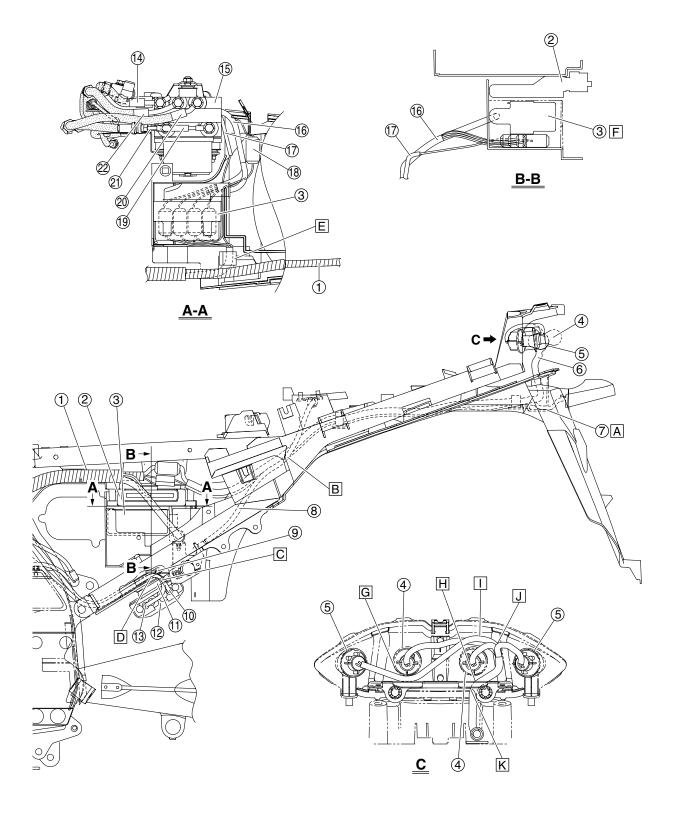


- 1. Auxiliary DC jack
- 2. Left radiator fan motor lead
- 3. Accessory box solenoid
- 4. Wire harness
- 5. Front cowling wire harness
- 6. Radiator inlet hose
- 7. Left radiator fan
- 8. Coolant reservoir breather hose
- 9. Left horn (low)
- 10. Left horn (low) leads
- 11. Thermostat assembly breather hose
- 12. Joint coupler
- A. Fasten the handlebar switch leads to the front cowling wire harness with a plastic locking tie. Face the end of the plastic locking tie rearward, along the side of the accessory box. Do not cut off the excess end of the plastic locking tie.
- B. Fasten the wire harness and left radiator fan motor lead with the holder.
- C. Fasten the front cowling wire harness to the radiator inlet hose with a plastic locking tie, making sure to install the tie on the harness' protective sleeve, and then cut off the excess end of the tie.
- D. After connecting the couplers, cover them completely with the cover, and then push them in between the radiator inlet hose and the thermostat inlet hose 2.

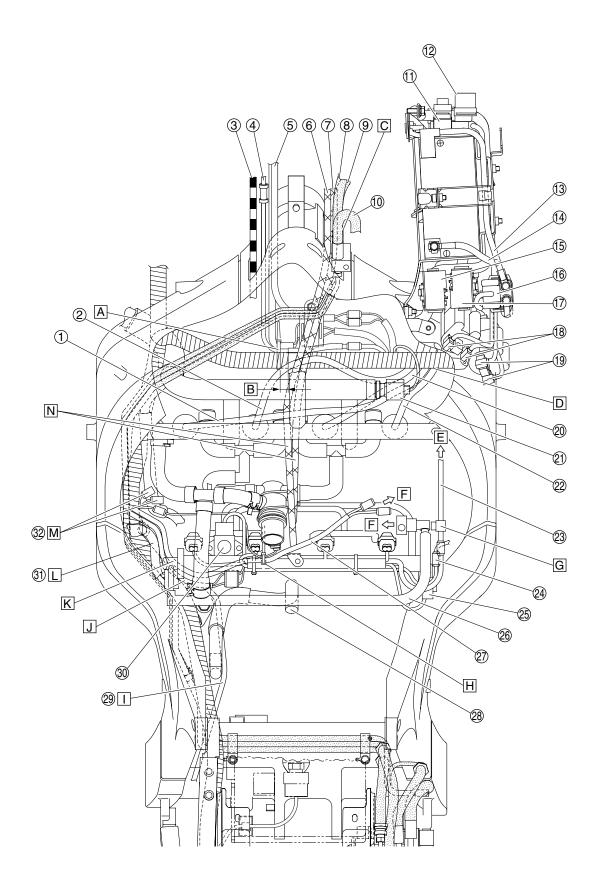


- 1. Grip warmer couplers (for optional grip warmers)
- 2. Handlebar switch couplers
- 3. Right handlebar switch lead
- 4. Main switch lead
- 5. Clutch hose
- 6. Left handlebar switch lead
- 7. Stator coil lead
- 8. Fuel tank breather hose (joint to rollover valve) (for California only)
- 9. Air filter case breather hose
- 10. Gear position switch lead
- 11. Fuel tank breather/overflow hose (except for California)
- 12. Fuel tank overflow hose (for California only)
- 13. Sidestand switch
- 14. Sidestand switch lead
- 15. Oil level switch lead
- 16. Rollover valve (for California only)
- 17. Fuel tank breather hose (rollover valve to canister) (for California only)
- 18. Canister breather hose (for California only)
- 19. Canister (for California only)
- 20. Canister purge hose (3-way joint to canister) (for California only)
- 21. Coolant reservoir breather hose
- 22. Brake hose (hydraulic unit to left front brake caliper)
- Front wheel sensor
- 24. Front wheel sensor lead
- 25. Front left turn signal light lead
- 26. Brake pipe (metering valve to right front brake caliper)
- 27. Brake pipe (hydraulic unit to front brake calipers)
- Brake pipe (front brake master cylinder to hydraulic unit)
- 29. Wire harness
- 30. Crankshaft position sensor lead
- 31. Starter motor lead
- 32. Oil level switch coupler
- 33. Upper crankcase
- 34. Rear balancer cover
- A. Do not connect the grip warmer couplers.
- B. Secure the plastic band by inserting the projection on the band into the hole in the windshield drive unit/meter assembly stay, and then fasten the handlebar switch leads with the band, making sure that the end of the band faces down. Do not cut off the excess end of the plastic band.
- C. Route the clutch hose in front of the front fork as shown in the illustration.
- D. Secure the plastic band by inserting the projection on the band into the hole in the windshield drive unit/meter assembly stay, and then fasten the handlebar switch leads and front wheel sensor lead with the band, making sure that the end of the band faces down. Do not cut off the excess end of the plastic band.
- E. To oil level switch

- F. Fasten the leads (to oil level switch and crankshaft position sensor) that branch off from the wire harness to the guide on the holder with a plastic locking tie, making sure that the end of the tie faces upward. Do not cut off the excess end of the plastic locking tie.
- G. Fasten the sidestand switch lead, stator coil lead, and oil level switch lead with a plastic locking tie, making sure to bundle and fasten the sidestand switch lead so that the coupler is positioned to the front of the tie. Face the end of the plastic locking tie outward. Do not cut off the excess end of the plastic locking tie.
- H. To fuel tank
- Route the gear position switch lead so that the coupler is positioned as shown in the illustration.
- J. Pass the fuel tank breather/overflow hose through the guide on the universal joint dust cover.
- K. Pass the air filter case breather hose through the guide on the muffler bracket.
- L. Pass the fuel tank breather hose (joint to rollover valve) between the frame and the projection on the air filter case as shown in the illustration. (for California only)
- M. Pass the canister purge hose (3-way joint to canister) through the opening in the frame, to the inside of the frame. (for California only)
- N. Pass the fuel tank breather hose (joint to rollover valve) through the cutout in the air deflector. (for California only)
- O. Route the coolant reservoir breather hose to the outside of the fuel tank breather hose (joint to rollover valve) and the canister purge hose (3-way joint to canister). (for California only)
- P. 43-53 mm (1.69-2.09 in)
- Q. 60–70 mm (2.36–2.76 in)
- R. Fasten the grommets on the front wheel sensor lead and the brake hose (hydraulic unit to left front brake caliper) with the holder.
- S. Route the front wheel sensor lead to the outside of the left front brake caliper lower mounting boss and the boss for the left front fork compression damping force adjusting screw.
- T. Fasten the grommet on the front wheel sensor lead with the holder.
- U. Route the front wheel sensor lead between the left front brake caliper and the brake hose (hydraulic unit to left front brake caliper).
- V. Fasten the front wheel sensor lead to the brake hose (hydraulic unit to left front brake caliper) with the two holders, making sure to position the lead to the inside of the hose.
- W. Fasten the clutch hose with the holder.
- When installing the clutch hose onto the clutch release cylinder, make sure that the pipe section on the end of the hose contacts the stopper on the cylinder body.
- Y. To sidestand switch
- Z. Fasten the oil level switch lead and starter motor lead with the clamp.
- AA. Face the ends of the clamp to the left, making sure that the lower end contacts the wire harness.
- AB. Route the starter motor lead between the rear balancer cover bolt and the rib on the crankcase.

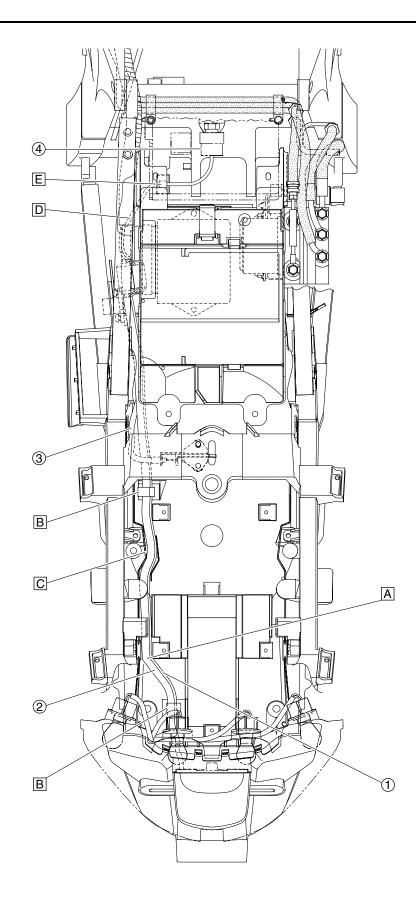


- 1. Wire harness
- 2. ECU (engine control unit)
- 3. ABS ECU (electronic control unit)
- 4. Tail/brake light
- 5. Rear turn signal light
- 6. Tail/brake light assembly lead
- 7. License plate light lead
- 8. Seat lock cable
- 9. Hydraulic unit breather hose
- 10. Stator coil lead
- 11. Rear shock absorber spring preload adjusting cable
- 12. Rectifier/regulator
- 13. Rectifier/regulator lead
- 14. Brake hose (hydraulic unit to metering valve)
- 15. Hydraulic unit
- 16. ABS wire harness
- 17. Rear wheel sensor lead
- 18. Rear brake light switch lead
- 19. Brake hose (front brake master cylinder to hydraulic unit)
- 20. Brake hose (hydraulic unit to front brake calipers)
- 21. Brake hose (rear brake master cylinder to hydraulic unit)
- 22. Brake hose (hydraulic unit to proportioning valve)
- A. Pass the license plate light lead through the hole in the rear fender.
- B. Route the wire harness to the inside of the seat lock cable.
- C. Route the stator coil lead and rectifier/regulator lead to the outside of the rear shock absorber spring preload adjusting cable and under the hydraulic unit breather hose.
- D. Pass the stator coil lead, rectifier/regulator lead, and hydraulic unit breather hose through the guide on the frame, making sure to route the hose to the outside of the leads.
- E. Fasten the leads (to ABS wire harness and rear brake light switch) that branch off from the wire harness with the holder.
- F. When installing the ABS ECU, be sure not to pinch the rear wheel sensor lead and ABS wire harness between the ABS ECU and the rear fender.
- G. Route the rear right turn signal light lead under the right tail/brake light bulb socket.
- H. Route the tail/brake light assembly lead between the left tail/brake light bulb socket and the mounting boss on the tail/brake light assembly.
- Route the rear right turn signal light lead and right tail/brake light lead over the left tail/brake light bulb socket.
- J. Route the leads between the left tail/brake light bulb socket and the rear left turn signal light bulb socket.
- K. Route the tail/brake light assembly lead between the tail/brake light assembly and its bracket.

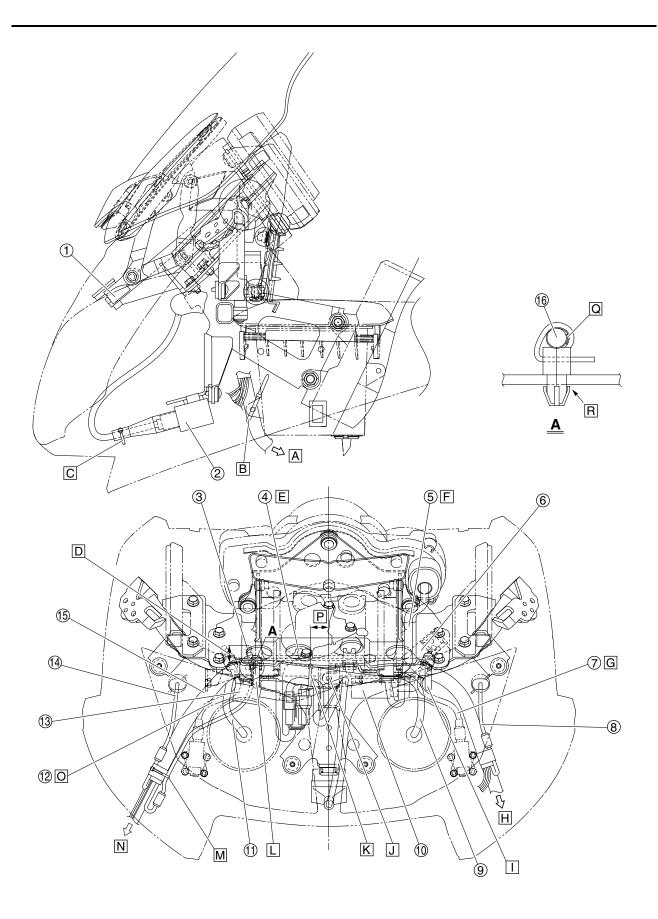


- 1. Spark plug lead #1
- 2. Spark plug lead #2
- 3. Clutch hose
- 4. Front wheel sensor lead
- 5. Main switch lead
- 6. Throttle cable (accelerator cable)
- 7. Throttle cable (decelerator cable)
- 8. Brake hose (hydraulic unit to front brake calipers)
- 9. Brake hose (metering valve to right front brake caliper)
- 10. Brake hose (front brake master cylinder to hydraulic unit)
- 11. Main fuse
- 12. Brake light relay
- 13. Positive battery lead
- 14. Negative battery lead
- 15. Fuse box 1 (identified by blue tape on lead)
- 16. Starter relay
- 17. Fuse box 2
- 18. Cylinders-#2/#3 ignition coil connectors (white)
- 19. Cylinders-#1/#4 ignition coil connectors (black)
- 20. Spark plug lead #3
- 21. Coolant temperature sensor
- 22. Spark plug lead #4
- 23. Cylinder identification sensor lead
- 24. O₂ sensor coupler
- 25. Throttle position sensor
- 26. Fuel hose
- 27. Fuel pump/fuel sender lead
- 28. Crankcase breather hose
- 29. Stator coil lead
- 30. Intake air pressure sensor
- Fuel tank breather hose (joint to rollover valve) (for California only)
- 32. Joint couplers
- A. Fasten the front wheel sensor lead to the wire harness with a plastic locking tie, making sure to align the tie with the white tape on the harness. Face the end of the plastic locking tie forward. Do not cut off the excess end of the plastic locking tie.
- B. Position the plastic locking tie 0–20 mm (0–0.79 in) from the end of the protective sleeve of the front wheel sensor lead.
- C. Route the throttle cables and brake hoses through the right opening in the frame.
- D. Route the wire harness over the spark plug leads.
- E. To cylinder identification sensor
- F. To fuel tank
- G. Fasten the cylinder identification sensor lead with the holder on the throttle body.
- H. Fasten the fuel pump/fuel sender lead and air induction system solenoid lead with a plastic locking tie, making sure that the end of the tie faces forward. Do not cut off the excess end of the plastic locking tie.
- I. Route the stator coil lead to the inside of the engine bracket (top) and under the crankcase breather hose.
- J. Route the wire harness (to sub-wire harness) under the fuel hose connector.
- K. Route the fuel pump/fuel sender lead under the fuel hose connector.

- L. Route the fuel tank breather hose (joint to rollover valve) next to the wire harness and pass it through the guide. (for California only)
- M. Place the joint couplers in the area shown in the illustration, making sure that they do not protrude above the wire harness.
- N. Route the throttle cables over the lead, main switch lead, spark plug lead #2, and wire harness, and under spark plug lead #1.

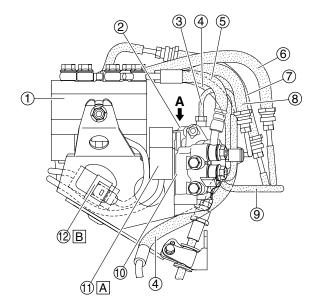


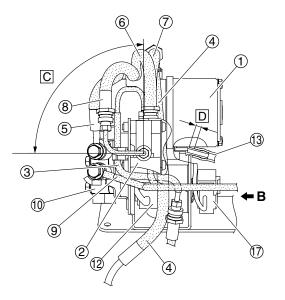
- 1. License plate light lead
- 2. Tail/brake light assembly lead
- 3. Seat lock cable
- 4. Intake air temperature sensor
- A. Route the tail/brake light assembly lead and license plate light lead between the rib and the U-lock holder on the rear fender, making sure that the leads are not routed on top of the holder.
- B. Fasten the tail/brake light assembly lead and license plate light lead with the holder.
- C. Route the tail/brake light assembly lead and license plate light lead between the ribs on the rear fender.
- D. Route the intake air temperature sensor lead under the wire harness.
- E. Fasten the intake air temperature sensor lead to the air filter case with the holder.



- 1. Windshield drive unit
- 2. Relay unit
- 3. Thermistor
- 4. Windshield drive unit lead
- 5. Meter assembly lead
- 6. Headlight relay (dimmer)
- 7. Left headlight beam adjusting cable
- 8. Left auxiliary light lead
- 9. Left headlight lead
- 10. Lean angle sensor
- 11. Right headlight lead
- 12. Right headlight beam adjusting cable
- 13. Turn signal/hazard relay
- 14. Right auxiliary light lead
- 15. Front cowling wire harness
- 16. Thermistor lead
- A. To wire harness
- B. Fasten the front cowling wire harness to the stay on the accessory box with a plastic locking tie as shown in the illustration, making sure to position the tie below where the headlight leads branch off from the harness. Face the end of the plastic locking tie rearward, along the side of the accessory box. Do not cut off the excess end of the plastic locking tie.
- C. Slide the boot over the relay unit coupler, and then fasten the boot with a plastic locking tie. Cut off the excess end of the plastic locking tie.
- D. Less than 20 mm (0.79 in)
- E. Pass the windshield drive unit lead through the hole in the windshield drive unit/meter assembly stay.
- F. Route the meter assembly lead under the windshield drive unit.
- G. Route the left headlight beam adjusting cable under the left headlight lead.
- H. To wire harness
- I. Secure the plastic band by inserting the projection on the band into the hole in the front of the windshield drive unit/meter assembly stay, and then fasten the front cowling wire harness with the band after the headlight lead branches off from the harness.
- J. Secure the front cowling wire harness at the location shown in the illustration by inserting the projection on its holder into the hole in the windshield drive unit/meter assembly stay.
- K. Fasten the leads (to windshield drive unit) that branch off from the front cowling wire harness to the harness with a plastic locking tie, making sure to position the tie 20 mm (0.79 in) from the drive unit couplers.
- L. Secure the plastic band by inserting the projection on the band into the hole in the front of the windshield drive unit/meter assembly stay, and then fasten the front cowling wire harness with the band after the headlight lead branches off from the harness.
- M. Fasten the thermistor lead to the front cowling wire harness with a plastic locking tie, making sure to align the tie with the tape used to fasten the front right turn signal light lead. The thermistor lead should not be taut.
- N. To front right turn signal light, right horn (high), and wire harness

- O. Route the right headlight beam adjusting cable between the right headlight lead and the thermistor lead.
- P. Position the plastic locking tie 25 mm (0.98 in) to the right of the center of the front cowling as shown in the illustration.
- Q. Fasten the thermistor lead with a plastic locking tie, and then cut off the excess end of the tie. Be sure to fold the protective sleeve against the lead to remove any space between the sleeve and the lead when fastening it.
- R. Secure the plastic locking tie by inserting the projection on the tie into the hole in the rear of the windshield drive unit/meter assembly stay.





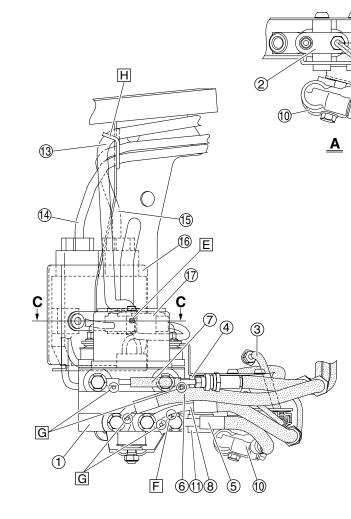
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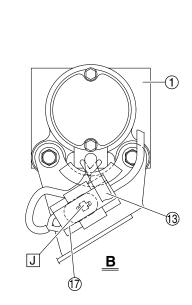
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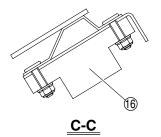
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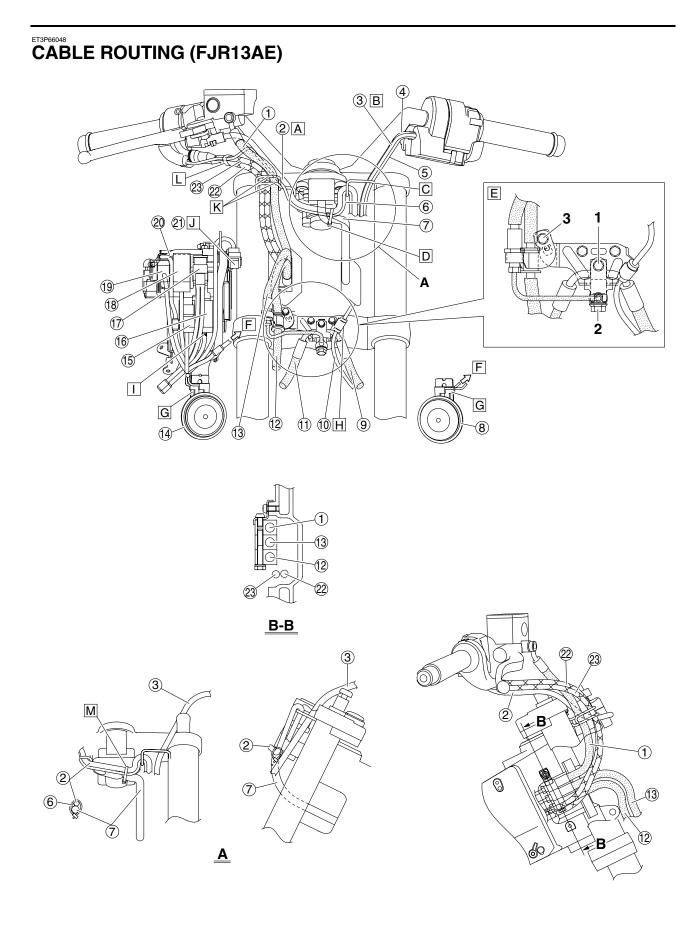
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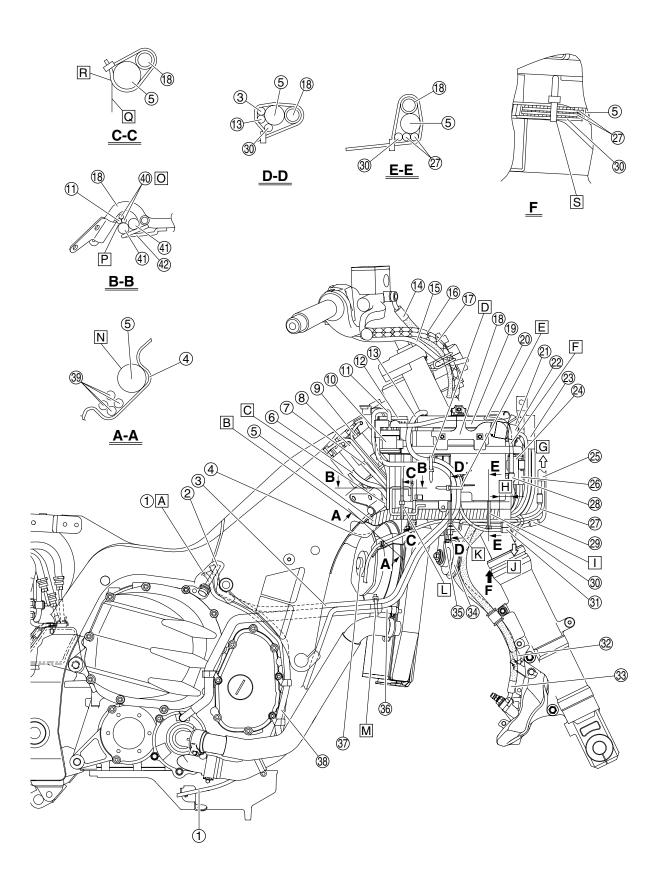


- 1. Hydraulic unit
- 2. Proportioning valve
- 3. Brake hose (proportioning valve to rear brake caliper)
- 4. Brake hose (rear brake master cylinder to hydraulic unit)
- 5. Brake hose (hydraulic unit to metering valve)
- 6. Brake hose (hydraulic unit to front brake calipers)
- 7. Brake hose (front brake master cylinder to hydraulic unit)
- 8. Brake hose (hydraulic unit to proportioning valve)
- 9. Brake hose (metering valve to right front brake caliper)
- 10. Metering valve
- 11. ABS motor relay
- 12. Hydraulic unit solenoid coupler
- 13. Hydraulic unit breather hose
- 14. Stator coil lead
- 15. Rectifier/regulator lead
- 16. Rectifier/regulator
- 17. ABS motor coupler
- A. Install the ABS motor relay completely onto the tab on the hydraulic unit bracket.
- B. Install the hydraulic unit solenoid coupler completely onto the tab on the hydraulic unit bracket.
- C. 87–93°
- D. 5–7 mm (0.20–0.28 in)
- E. Install the hydraulic unit breather hose so that the white paint mark on the hose is facing down.
- F. Make sure that the brake hose (hydraulic unit to proportioning valve) contacts the end of the brake hose (hydraulic unit to metering valve).
- G. Make sure that the brake hoses contact the stoppers on the hydraulic unit.
- H. Pass the hydraulic unit breather hose, stator coil lead, and rectifier/regulator lead though the guide.
- I. 36–42°
- J. Install the ABS motor coupler completely onto the tab on the hydraulic unit bracket.



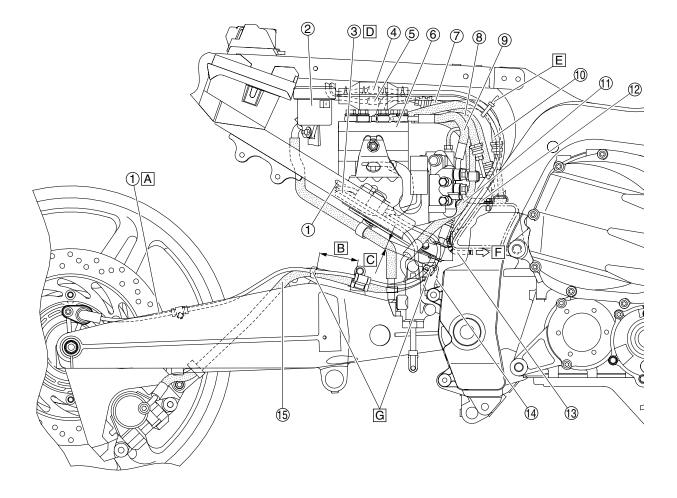
- 1. Brake hose (front brake master cylinder to hydraulic unit)
- 2. Right handlebar switch lead
- 3. Left handlebar switch lead
- 4. Left grip warmer lead
- 5. Hand shift switch lead
- 6. Right grip warmer lead
- Main switch lead
- 8. Left horn (low)
- 9. Brake hose (hydraulic unit to left front brake caliper)
- 10. Front wheel sensor lead
- 11. Brake hose (hydraulic unit to right front brake caliper)
- 12. Brake hose (metering valve to right front brake caliper)
- 13. Brake hose (hydraulic unit to front brake calipers)
- 14. Right horn (high)
- 15. Headlight (on/off)/grip warmer relay
- 16. Radiator fan motor relay
- 17. Main fuse
- 18. Brake light relay
- 19. YCC-S control relay
- 20. Positive battery lead
- 21. ABS test coupler
- 22. Throttle cable (accelerator cable)
- 23. Throttle cable (decelerator cable)
- A. Route the right handlebar switch lead and right grip warmer lead under the handlebar.
- B. Route the left handlebar switch lead, left grip warmer lead, and hand shift switch lead under the handlebar.
- C. Pass the hand shift switch lead, right grip warmer lead, left grip warmer lead, right handlebar switch lead, and left handlebar switch lead through the guide.
- D. Fasten the right handlebar switch lead, right grip warmer lead, and main switch lead with a plastic locking tie.
- E. Temporarily tighten the brake hose joint bolt, union bolt, and brake hose holder bolt in the proper tightening sequence as shown. Then, tighten the bolts to the specified torque, making sure to tighten the brake hose joint bolt "1" last.
- F. To front cowling wire harness
- G. Install the horn L-shaped connectors so that the leads are routed outward.
- H. Fasten the grommet on the front wheel sensor lead with the holder.
- Connect the coupler that has blue tape wrapped around its leads to the radiator fan motor relay.
- J. Install the ABS test coupler completely onto the tab on the battery stay.
- K. Pass the brake hose (front brake master cylinder to hydraulic unit), right handlebar switch lead, right grip warmer lead, and throttle cables through the guide as shown in the illustration.
- L. Fasten the right grip warmer lead to the throttle cables with a plastic locking tie 10 mm (0.39 in) or less from the end of the throttle cable boot. Face the end of the plastic locking tie upward or downward, and then cut off the excess end of the tie.

M. Fasten the right handlebar switch lead, right grip warmer lead, and main switch lead with a plastic locking tie at the location shown in the illustration. Position the buckle of the plastic locking tie under the leads, with the end facing inward, and then cut off the excess end of the tie.

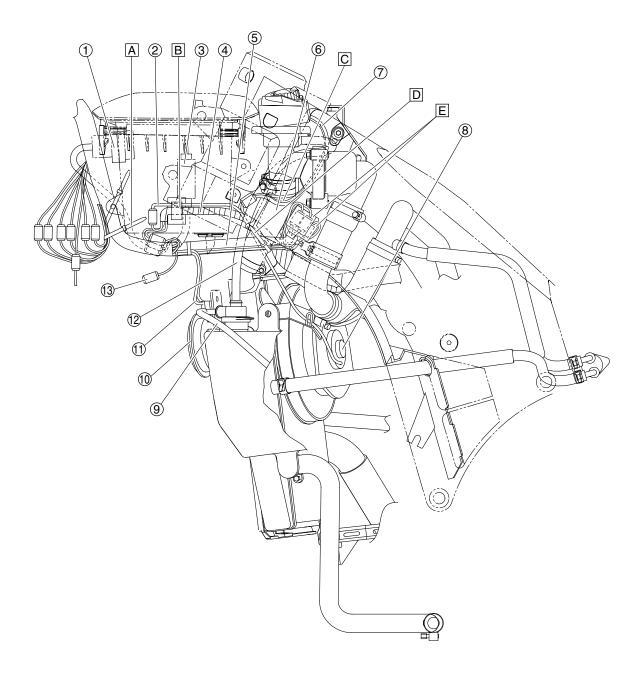


- 1. O₂ sensor lead
- 2. Engine idling speed adjusting cable
- 3. Starter motor lead
- 4. Air deflector
- 5. Wire harness
- 6. Spark plug lead #4
- Spark plug lead #1
- 8. Cylinders-#1/#4 ignition coil
- 9. Cylinders-#2/#3 ignition coil
- 10. Starter relay
- 11. Starter relay lead
- 12. Fuse box 2
- 13. Negative battery lead
- 14. Brake hose (front brake master cylinder to hydraulic unit)
- 15. Right handlebar switch lead
- 16. Throttle cable (accelerator cable)
- 17. Throttle cable (decelerator cable)
- 18. Battery stay
- 19. Battery
- 20. Positive battery lead
- 21. Main fuse
- 22. YCC-S control relay
- 23. Brake light relay
- 24. Headlight (on/off)/grip warmer relay
- 25. Front cowling wire harness
- 26. Radiator fan motor relay
- 27. Right horn (high) leads
- 28. Positive battery lead coupler
- 29. Front right turn signal light lead
- 30. Right radiator fan motor lead
- 31. Ground lead coupler
- 32. Brake hose (hydraulic unit to right front brake caliper)
- Brake hose (metering valve to right front brake caliper)
- 34. Right horn (high)
- 35. Right horn (high) connectors
- 36. Water pump breather hose
- 37. Right radiator fan
- 38. Crankshaft position sensor lead
- 39. Spark plug leads
- 40. Ignition coil primary leads
- 41. Fuse box leads
- 42. Guide
- A. Route the O₂ sensor lead to the inside of the engine idling speed adjusting cable.
- B. Make sure that the wire harness and spark plug leads are positioned in the indentation on the right side of the air deflector.
- C. Route the spark plug leads to the inside of the battery stay pipe.
- D. Fasten the negative battery lead at the blue tape and the starter motor lead to the battery box with a plastic locking tie. Face the end of the plastic locking tie downward. Do not cut off the excess end of the plastic locking tie.
- E. Fasten the negative battery lead and starter motor lead to the battery box with a plastic locking tie. Face the end of the plastic locking tie rearward. Do not cut off the excess end of the plastic locking tie.

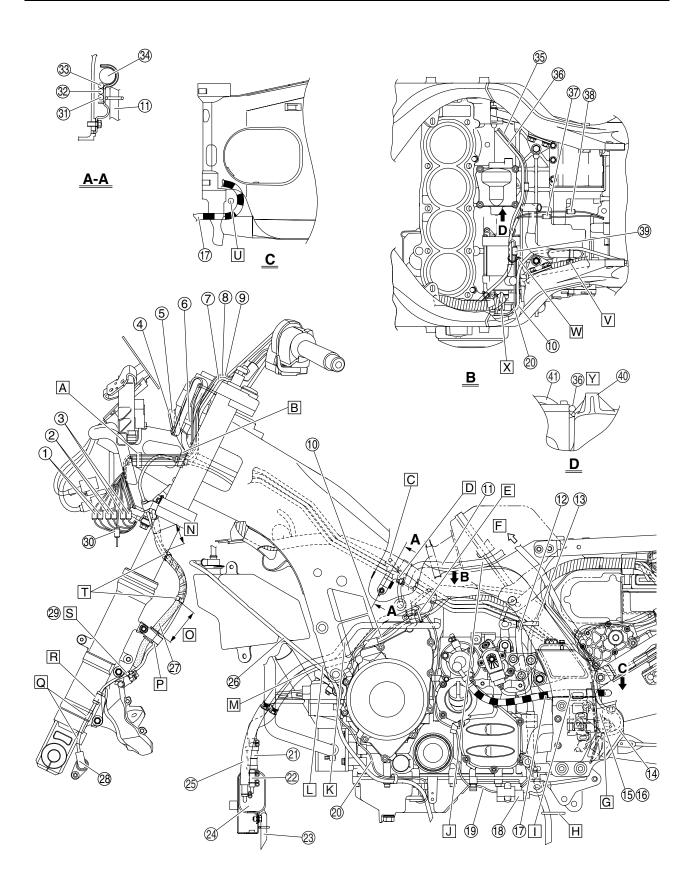
- F. Route the positive battery lead between the battery stay and the battery box.
- G. To front cowling wire harness
- H. Align the rear end of the right radiator fan motor coupler with the tape on the wire harness as shown in the illustration.
- Fasten the wire harness, right horn (high) leads, and right radiator fan motor lead with a plastic locking tie, making sure to install the tie on the fan motor lead's protective sleeve. Face the end of the plastic locking tie outward. Do not cut off the excess end of the plastic locking tie.
- J. To front right turn signal light
- K. Fasten the wire harness, right radiator fan motor lead, negative battery lead, and starter motor lead to the battery stay with a plastic locking tie, making sure to install the tie on the fan motor lead's protective sleeve and to position the tie in front of the air deflector. Face the end of the plastic locking tie outward, and then cut off the excess end of the tie.
- L. Fasten the wire harness to the battery stay with a plastic locking tie. Face the end of the plastic locking tie upward, and then cut off the excess end of the tie.
- M. Fasten the negative battery lead at the blue tape, starter motor lead, and water pump breather hose with a plastic locking tie, making sure to install the tie around the end of the hose's protective sleeve, and then cut off the excess end of the tie. Do not kink the water pump breather hose and do not face the end of the plastic locking tie downward.
- N. Route the wire harness to the outside of the spark plug leads.
- O. Route the ignition coil primary leads to the inside of the fuse box leads.
- P. Route the fuse box leads, starter relay lead, and ignition coil primary leads between the battery stay and the guide.
- Q. Make sure that the wire harness does not protrude to the outside of the battery stay.
- R. Pass the plastic locking tie between the guide and the wire harness.
- S. Position the plastic locking tie to the rear of the bend in the battery stay.



- 1. Rear wheel sensor lead
- 2. Rear brake fluid reservoir
- 3. Rear brake light switch lead
- 4. Clutch actuator motor lead
- 5. Clutch actuator sensor lead
- 6. Hydraulic unit
- 7. Brake hose (front brake master cylinder to hydraulic unit)
- 8. Brake hose (hydraulic unit to proportioning valve)
- 9. Brake hose (hydraulic unit to metering valve)
- 10. Brake hose (hydraulic unit to front brake calipers)
- 11. Brake hose (rear brake master cylinder to hydraulic unit)
- 12. Brake pipe (metering valve to right front brake caliper)
- 13. Clutch hose
- 14. Rear brake light switch
- 15. Brake hose (proportioning valve to rear brake caliper)
- A. Route the rear wheel sensor lead to the inside of the swingarm, making sure that the lead does not protrude above the swingarm.
- B. 45–55 mm (1.77–2.17 in)
- C. 10–20 mm (0.39–0.79 in)
- D. Route the rear brake light switch lead under the rear wheel sensor lead.
- E. Fasten the clutch actuator motor lead and clutch actuator sensor lead to the brake hose (hydraulic unit to front brake calipers) with the plastic locking tie, making sure to face the end of the tie forward. Do not cut off the excess end of the plastic locking tie.
- F. To clutch actuator
- G. Fasten the rear wheel sensor lead to the brake hose (proportioning valve to rear brake caliper) with the two holders, making sure that the fastener of each holder faces inward.

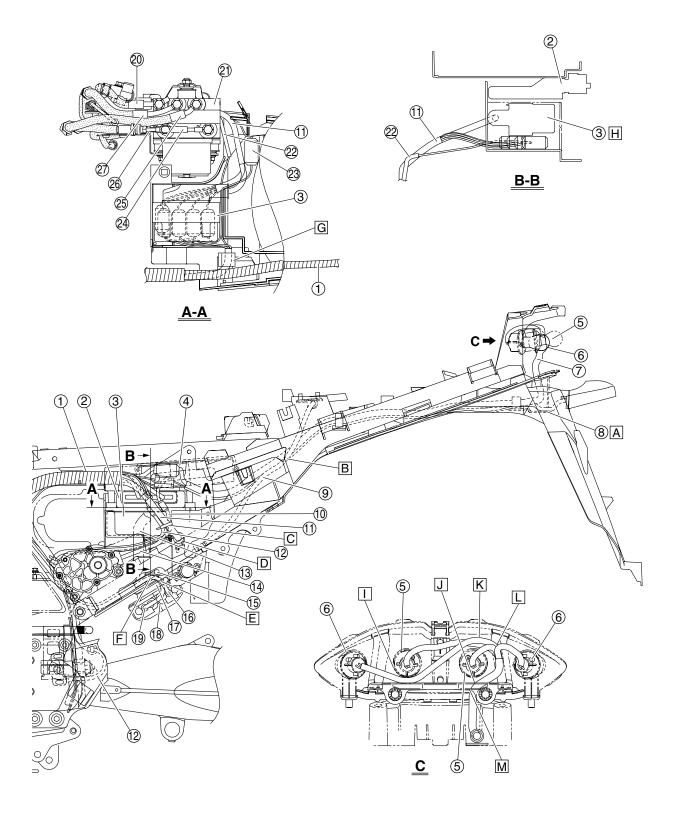


- 1. Auxiliary DC jack
- 2. Left radiator fan motor lead
- 3. Accessory box solenoid
- 4. Wire harness
- 5. Front cowling wire harness
- 6. Radiator inlet hose
- 7. Grip warmer control unit leads
- 8. Left radiator fan
- 9. Coolant reservoir breather hose
- 10. Left horn (low)
- 11. Left horn (low) leads
- 12. Thermostat assembly breather hose
- 13. Joint coupler
- A. Fasten the handlebar switch leads, hand shift switch lead, and grip warmer leads to the front cowling wire harness with a plastic locking tie. Face the end of the plastic locking tie rearward, along the side of the accessory box. Do not cut off the excess end of the plastic locking tie.
- B. Fasten the wire harness and left radiator fan motor lead with the holder.
- C. Route the grip warmer control unit leads to the outside of the thermostat assembly breather hose.
- D. Fasten the front cowling wire harness to the radiator inlet hose with a plastic locking tie, making sure to install the tie on the harness' protective sleeve, and then cut off the excess end of the tie.
- E. After connecting the couplers, cover them completely with the cover, and then push them in between the radiator inlet hose and the thermostat inlet hose 2.



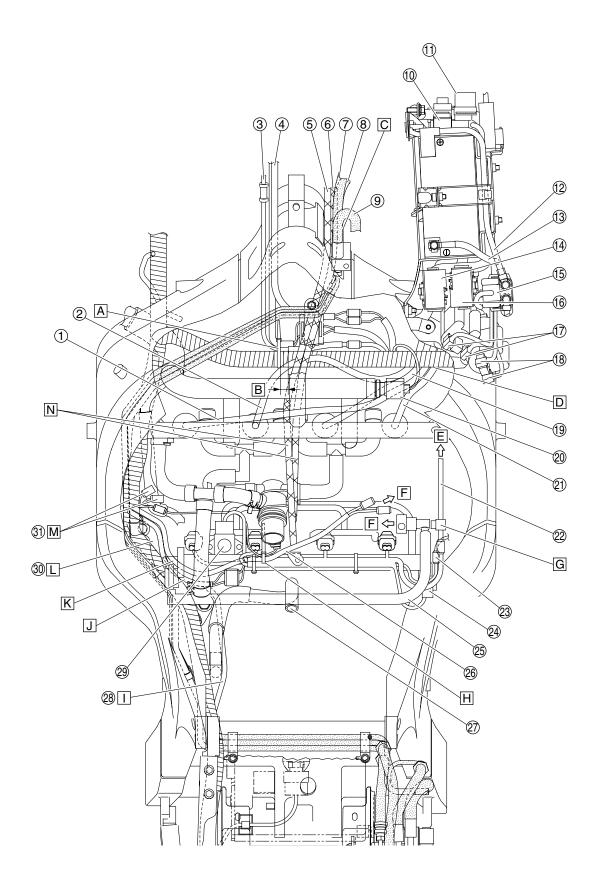
- 1. Grip warmer couplers
- 2. Hand shift switch coupler
- 3. Handlebar switch couplers
- 4. Right grip warmer lead
- 5. Right handlebar switch lead
- 6. Main switch lead
- 7. Hand shift switch lead
- 8. Left grip warmer lead
- 9. Left handlebar switch lead
- 10. Stator coil lead
- 11. Fuel tank breather hose (joint to rollover valve) (for California only)
- 12. Air filter case breather hose
- 13. Gear position sensor lead
- 14. Foot shift switch lead
- 15. Fuel tank breather/overflow hose (except for California)
- 16. Fuel tank overflow hose (for California only)
- 17. Clutch hose
- 18. Sidestand switch
- 19. Sidestand switch lead
- 20. Oil level switch lead
- 21. Rollover valve (for California only)
- 22. Fuel tank breather hose (rollover valve to canister) (for California only)
- 23. Canister breather hose (for California only)
- 24. Canister (for California only)
- 25. Canister purge hose (3-way joint to canister) (for California only)
- 26. Coolant reservoir breather hose
- 27. Brake hose (hydraulic unit to left front brake caliper)
- 28. Front wheel sensor
- 29. Front wheel sensor lead
- 30. Front left turn signal light lead
- 31. Brake pipe (metering valve to right front brake caliper)
- 32. Brake pipe (hydraulic unit to front brake calipers)
- Brake pipe (front brake master cylinder to hydraulic unit)
- 34. Wire harness
- 35. Crankshaft position sensor lead
- 36. Starter motor lead
- 37. Neutral switch coupler
- 38. YCC-S speed sensor
- 39. Oil level switch coupler
- 40. Upper crankcase
- 41. Rear balancer cover
- A. Secure the plastic band by inserting the projection on the band into the hole in the windshield drive unit/meter assembly stay, and then fasten the handlebar switch leads, grip warmer leads and hand shift switch lead with the band, making sure that the end of the band faces down. Do not cut off the excess end of the plastic band.
- B. Secure the plastic band by inserting the projection on the band into the hole in the windshield drive unit/meter assembly stay, and then fasten the handlebar switch leads, grip warmer leads, hand shift switch lead and front wheel sensor lead with the band, making sure that the end of the band faces down. Do not cut off the excess end of the plastic band.

- C. To oil level switch
- D. Fasten the leads (to oil level switch and crankshaft position sensor) that branch off from the wire harness to the guide on the holder with a plastic locking tie, making sure that the end of the tie faces upward. Do not cut off the excess end of the plastic locking tie.
- E. Fasten the sidestand switch lead, stator coil lead, and oil level switch lead with a plastic locking tie, making sure to bundle and fasten the sidestand switch lead so that the coupler is positioned to the front of the tie. Face the end of the plastic locking tie outward. Do not cut off the excess end of the plastic locking tie.
- F. To fuel tank
- G. Pass the fuel tank breather/overflow hose through the guide on the universal joint dust cover.
- H. Pass the air filter case breather hose through the guide on the muffler bracket.
- I. Fasten the clutch hose with the pivot shaft locknut retainer.
- J. Pass the fuel tank breather hose (joint to rollover valve) between the frame and the projection on the air filter case as shown in the illustration. (for California only)
- K. Pass the canister purge hose (3-way joint to canister) through the opening in the frame, to the inside of the frame. (for California only)
- L. Pass the fuel tank breather hose (joint to rollover valve) through the cutout in the air deflector. (for California only)
- M. Route the coolant reservoir breather hose to the outside of the fuel tank breather hose (joint to rollover valve) and the canister purge hose (3-way joint to canister). (for California only)
- N. 43-53 mm (1.69-2.09 in)
- O. 60-70 mm (2.36-2.76 in)
- P. Fasten the grommets on the front wheel sensor lead and the brake hose (hydraulic unit to left front brake caliper) with the holder.
- Q. Route the front wheel sensor lead to the outside of the left front brake caliper lower mounting boss and the boss for the left front fork compression damping force adjusting screw.
- R. Fasten the grommet on the front wheel sensor lead with the holder.
- S. Route the front wheel sensor lead between the left front brake caliper and the brake hose (hydraulic unit to left front brake caliper).
- T. Fasten the front wheel sensor lead to the brake hose (hydraulic unit to left front brake caliper) with the two holders, making sure to position the lead to the inside of the hose.
- U. Route the fuel tank breather/overflow hose to the front of the clutch hose, then through the opening between the frame and the swingarm.
- V. Face the ends of the clamp to the left, making sure that the lower end contacts the wire harness.
- W. Fasten the oil level switch lead and starter motor lead with the clamp.
- X. To sidestand switch
- Y. Route the starter motor lead between the rear balancer cover bolt and the rib on the crankcase.



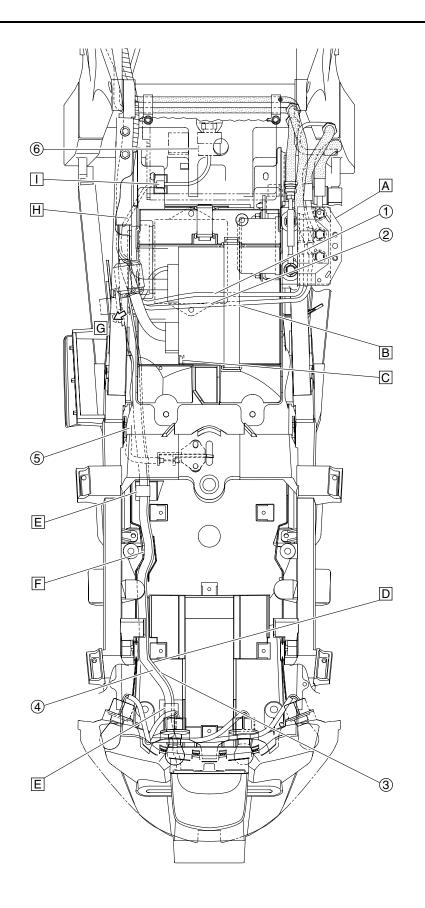
- 1. Wire harness
- 2. ECU (engine control unit)
- 3. ABS ECU (electronic control unit)
- 4. MCU (motor control unit)
- 5. Tail/brake light
- 6. Rear turn signal light
- 7. Tail/brake light assembly lead
- 8. License plate light lead
- 9. Seat lock cable
- 10. Shift actuator motor lead
- ABS wire harness
- 12. Foot shift switch lead
- 13. Clutch fluid reservoir hose
- 14. Shift actuator sensor lead
- 15. Hydraulic unit breather hose
- 16. Stator coil lead
- 17. Rear shock absorber spring preload adjusting cable
- 18. Rectifier/regulator
- 19. Rectifier/regulator lead
- 20. Brake hose (hydraulic unit to metering valve)
- 21. Hydraulic unit
- 22. Rear wheel sensor lead
- 23. Rear brake light switch lead
- Brake hose (front brake master cylinder to hydraulic unit)
- 25. Brake hose (hydraulic unit to front brake calipers)
- Brake hose (rear brake master cylinder to hydraulic unit)
- 27. Brake hose (hydraulic unit to proportioning valve)
- A. Pass the license plate light lead through the hole in the rear fender.
- B. Route the wire harness to the inside of the seat lock cable.
- C. Fasten the shift actuator motor lead, shift actuator sensor lead, and foot shift switch lead to the ABS wire harness with a plastic locking tie, making sure to position the harness to the outside of the other leads. Face the end of the plastic locking tie inward, without cutting off the excess end.
- D. Fasten the ABS wire harness with the holder.
- E. Route the stator coil lead and rectifier/regulator lead to the outside of the rear shock absorber spring preload adjusting cable and under the hydraulic unit breather hose and clutch fluid reservoir hose.
- F. Pass the stator coil lead, rectifier/regulator lead, and hydraulic unit breather hose through the guide on the frame, making sure to route the hose to the outside of the leads.
- G. Fasten the leads (to ABS wire harness and rear brake light switch) that branch off from the wire harness with the holder.
- H. When installing the ABS ECU, be sure not to pinch the rear wheel sensor lead and ABS wire harness between the ABS ECU and the rear fender.
- Route the rear right turn signal light lead under the right tail/brake light bulb socket.
- J. Route the tail/brake light assembly lead between the left tail/brake light bulb socket and the mounting boss on the tail/brake light assembly.
- K. Route the rear right turn signal light lead and right tail/brake light lead over the left tail/brake light bulb socket.

- L. Route the leads between the left tail/brake light bulb socket and the rear left turn signal light bulb socket.
- M. Route the tail/brake light assembly lead between the tail/brake light assembly and its bracket.

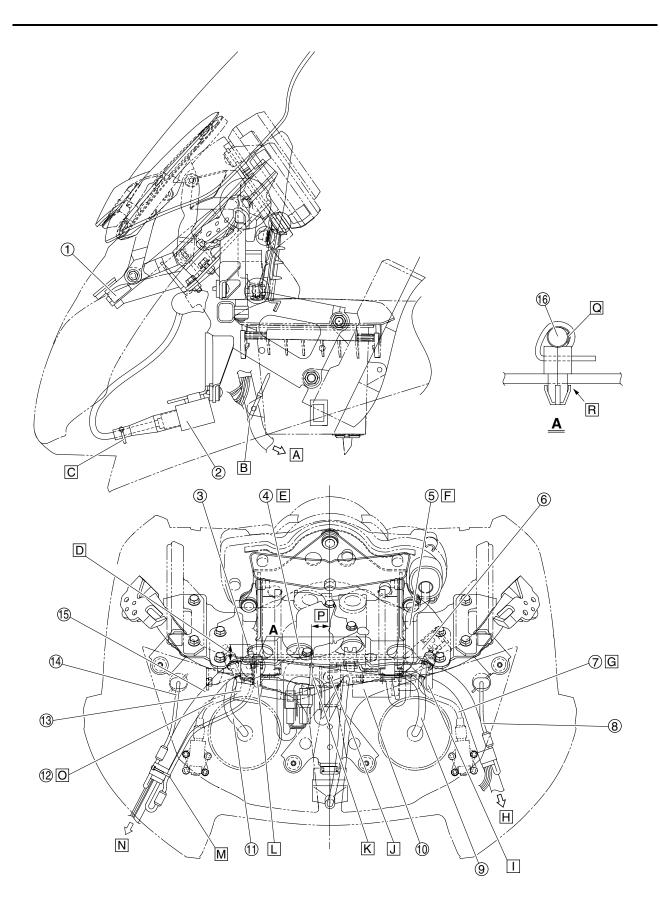


- 1. Spark plug lead #1
- 2. Spark plug lead #2
- 3. Front wheel sensor lead
- 4. Main switch lead
- 5. Throttle cable (accelerator cable)
- 6. Throttle cable (decelerator cable)
- 7. Brake hose (hydraulic unit to front brake calipers)
- 8. Brake hose (metering valve to right front brake caliper)
- 9. Brake hose (front brake master cylinder to hydraulic unit)
- 10. Main fuse
- 11. Brake light relay
- 12. Positive battery lead
- 13. Negative battery lead
- 14. Fuse box 1 (identified by blue tape on lead)
- 15. Starter relay
- 16. Fuse box 2
- 17. Cylinders-#2/#3 ignition coil connectors (white)
- 18. Cylinders-#1/#4 ignition coil connectors (black)
- 19. Spark plug lead #3
- 20. Coolant temperature sensor
- 21. Spark plug lead #4
- 22. Cylinder identification sensor lead
- O₂ sensor coupler
- 24. Throttle position sensor
- 25. Fuel hose
- 26. Fuel pump/fuel sender lead
- 27. Crankcase breather hose
- 28. Stator coil lead
- 29. Intake air pressure sensor
- 30. Fuel tank breather hose (joint to rollover valve) (for California only)
- Joint couplers
- A. Fasten the front wheel sensor lead to the wire harness with a plastic locking tie, making sure to align the tie with the white tape on the harness. Face the end of the plastic locking tie forward. Do not cut off the excess end of the plastic locking tie.
- B. Position the plastic locking tie 0–20 mm (0–0.79 in) from the end of the protective sleeve of the front wheel sensor lead.
- C. Route the throttle cables and brake hoses through the right opening in the frame.
- D. Route the wire harness over the spark plug leads.
- E. To cylinder identification sensor
- F. To fuel tank
- G. Fasten the cylinder identification sensor lead with the holder on the throttle body.
- H. Fasten the fuel pump/fuel sender lead and air induction system solenoid lead to sub-wire harness with a plastic locking tie, making sure that the end of the tie faces forward. Do not cut off the excess end of the plastic locking tie.
- Route the stator coil lead to the inside of the engine bracket (top) and under the crankcase breather hose.
- J. Route the wire harness (to sub-wire harness) under the fuel hose connector.
- K. Route the fuel pump/fuel sender lead under the fuel hose connector.

- L. Route the fuel tank breather hose (joint to rollover valve) next to the wire harness and pass it through the guide. (for California only)
- M. Place the joint couplers in the area shown in the illustration, making sure that they do not protrude above the wire harness.
- N. Route the throttle cables over the main switch lead, spark plug lead #2, and wire harness, and under spark plug lead #1.

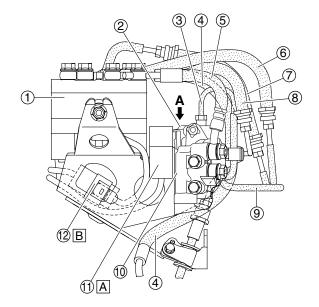


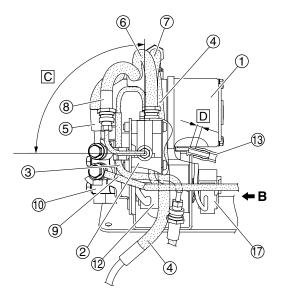
- 1. Clutch actuator motor lead
- 2. Clutch actuator sensor lead
- 3. License plate light lead
- 4. Tail/brake light assembly lead
- 5. Seat lock cable
- 6. Intake air temperature sensor
- A. Connect the clutch actuator motor lead and clutch actuator sensor lead, install the rubber cover around the leads, and then place the cover between the hydraulic unit and the frame. When closing the rubber cover, make sure that the thick section at the base of each projection (four locations) on one side of the cover is pulled through its corresponding hole on the other side. Face the side of the rubber cover with the projections outward.
- B. Fasten the clutch actuator motor lead and clutch actuator sensor lead with the band that is used to secure the MCU (motor control unit).
- C. Make sure that the projection on the storage compartment fits into the indentation in the MCU (motor control unit). The MCU should not be resting on top of the projection.
- D. Route the tail/brake light assembly lead and license plate light lead between the rib and the U-lock holder on the rear fender, making sure that the leads are not routed on top of the holder.
- E. Fasten the tail/brake light assembly lead and license plate light lead with the holder.
- F. Route the tail/brake light assembly lead and license plate light lead between the ribs on the rear fender.
- G. To shift actuator
- H. Route the intake air temperature sensor lead under the wire harness.
- I. Fasten the intake air temperature sensor lead to the air filter case with the holder.



- 1. Windshield drive unit
- 2. Relay unit
- 3. Thermistor
- 4. Windshield drive unit lead
- 5. Meter assembly lead
- 6. Headlight relay (dimmer)
- 7. Left headlight beam adjusting cable
- 8. Left auxiliary light lead
- 9. Left headlight lead
- 10. Lean angle sensor
- 11. Right headlight lead
- 12. Right headlight beam adjusting cable
- 13. Turn signal/hazard relay
- 14. Right auxiliary light lead
- 15. Front cowling wire harness
- 16. Thermistor lead
- A. To wire harness
- B. Fasten the front cowling wire harness to the stay on the accessory box with a plastic locking tie as shown in the illustration, making sure to position the tie below where the headlight leads branch off from the harness. Face the end of the plastic locking tie rearward, along the side of the accessory box. Do not cut off the excess end of the plastic locking tie.
- C. Slide the boot over the relay unit coupler, and then fasten the boot with a plastic locking tie. Cut off the excess end of the plastic locking tie.
- D. Less than 20 mm (0.79 in)
- E. Pass the windshield drive unit lead through the hole in the windshield drive unit/meter assembly stay.
- F. Route the meter assembly lead under the windshield drive unit.
- G. Route the left headlight beam adjusting cable under the left headlight lead.
- H. To wire harness
- I. Secure the plastic band by inserting the projection on the band into the hole in the front of the windshield drive unit/meter assembly stay, and then fasten the front cowling wire harness with the band after the headlight lead branches off from the harness.
- J. Secure the front cowling wire harness at the location shown in the illustration by inserting the projection on its holder into the hole in the windshield drive unit/meter assembly stay.
- K. Fasten the leads (to windshield drive unit) that branch off from the front cowling wire harness to the harness with a plastic locking tie, making sure to position the tie 20 mm (0.79 in) from the drive unit couplers.
- L. Secure the plastic band by inserting the projection on the band into the hole in the front of the windshield drive unit/meter assembly stay, and then fasten the front cowling wire harness with the band after the headlight lead branches off from the harness.
- M. Fasten the thermistor lead to the front cowling wire harness with a plastic locking tie, making sure to align the tie with the tape used to fasten the front right turn signal light lead. The thermistor lead should not be taut.
- N. To front right turn signal light, right horn (high), and wire harness

- O. Route the right headlight beam adjusting cable between the right headlight lead and the thermistor lead.
- P. Position the plastic locking tie 25 mm (0.98 in) to the right of the center of the front cowling as shown in the illustration.
- Q. Fasten the thermistor lead with a plastic locking tie, and then cut off the excess end of the tie. Be sure to fold the protective sleeve against the lead to remove any space between the sleeve and the lead when fastening it.
- R. Secure the plastic locking tie by inserting the projection on the tie into the hole in the rear of the windshield drive unit/meter assembly stay.





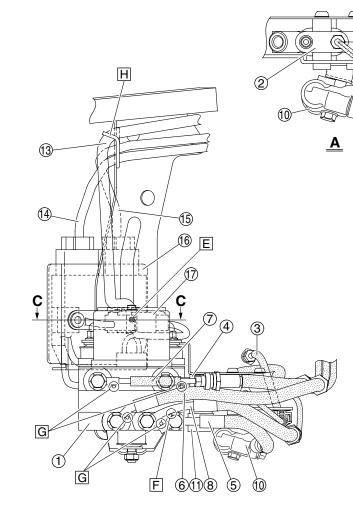
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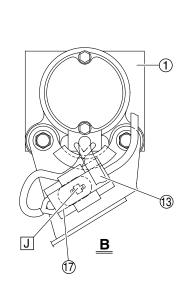
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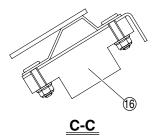
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3

Ι







- 1. Hydraulic unit
- 2. Proportioning valve
- 3. Brake hose (proportioning valve to rear brake caliper)
- 4. Brake hose (rear brake master cylinder to hydraulic unit)
- 5. Brake hose (hydraulic unit to metering valve)
- 6. Brake hose (hydraulic unit to front brake calipers)
- 7. Brake hose (front brake master cylinder to hydraulic unit)
- 8. Brake hose (hydraulic unit to proportioning valve)
- 9. Brake hose (metering valve to right front brake caliper)
- 10. Metering valve
- 11. ABS motor relay
- 12. Hydraulic unit solenoid coupler
- 13. Hydraulic unit breather hose
- 14. Stator coil lead
- 15. Rectifier/regulator lead
- 16. Rectifier/regulator
- 17. ABS motor coupler
- A. Install the ABS motor relay completely onto the tab on the hydraulic unit bracket.
- B. Install the hydraulic unit solenoid coupler completely onto the tab on the hydraulic unit bracket.
- C. 87–93°
- D. 5–7 mm (0.20–0.28 in)
- E. Install the hydraulic unit breather hose so that the white paint mark on the hose is facing down.
- F. Make sure that the brake hose (hydraulic unit to proportioning valve) contacts the end of the brake hose (hydraulic unit to metering valve).
- G. Make sure that the brake hoses contact the stoppers on the hydraulic unit.
- H. Pass the hydraulic unit breather hose, stator coil lead, and rectifier/regulator lead though the guide.
- I. 36–42°
- J. Install the ABS motor coupler completely onto the tab on the hydraulic unit bracket.

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EAS20460

INTRODUCTION

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

EAU17600

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM (FJR13A)

Γ				INITIAL		ODON	IETER REA	DINGS	
N	о.	ITEM	ROUTINE	600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	Fuel line	 Check fuel hoses for cracks or damage. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
2	*	Spark plugs	 Check condition. Adjust gap and clean. Replace every 8000 mi (13000 km) or 12 months. 		\checkmark	Replace.		Replace.	\checkmark
3	*	Valve clearance	 Check and adjust valve clear- ance when engine is cold. 		E	very 26600 i	mi (42000 kn	n)	
4	*	Crankcase breather system	 Check breather hose for cracks or damage. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
5	*	Fuel injection	 Check and adjust engine idle speed and synchronization. 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
6	*	Exhaust system	 Check for leakage. Tighten if necessary. Replace gasket(s) if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	
7	*	Evaporative emis- sion control sys- tem (For California only)	Check control system for damage.Replace if necessary.				\checkmark		
8	*	Air induction sys- tem	 Check the air cut-off valve, reed valve, and hose for dam- age. Replace any damaged parts. 			\checkmark		\checkmark	

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

EAU32183

GENERAL MAINTENANCE AND LUBRICATION CHART (FJR13A)

				INITIAL	ODOMETER READINGS					
No.		ITEM	ROUTINE	600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
1	*	Air filter element	Clean with compressed air.Replace if necessary.		\checkmark	\checkmark		\checkmark	\checkmark	
2	*	Clutch	 Check operation and fluid leakage. Correct if necessary. 		\checkmark	\checkmark				
3	*	Front brake	 Check operation, fluid level, and for fluid leakage. Replace brake pads if neces- sary. 		\checkmark					
4	*	Rear brake	 Check operation, fluid level, and for fluid leakage. Replace brake pads if neces- sary. 	V	\checkmark	\checkmark	V	V	N	

				INITIAL		ODON	IETER REA	DINGS	
N	D .	ITEM		600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
5	*	Brake hoses	Check for cracks or damage.		\checkmark	V			
-			Replace.			Every 4	4 years		
6	*	Wheels	 Check runout and for damage. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
7	*	Tires	 Check tread depth and for damage. Replace if necessary. Check air pressure. Correct if necessary. 		V	V	V	V	V
8	*	Wheel bearings	 Check bearings for smooth operation. Replace if necessary. 		\checkmark	\checkmark		\checkmark	\checkmark
9	*	Swingarm pivot bearings	 Check bearing assemblies for looseness. Moderately repack with lithi- um-soap-based grease. 			V		Repack.	
10	*	Steering bearings	 Check bearing assemblies for looseness. Moderately repack with lithi- um-soap-based grease every 16000 mi (25000 km) or 24 months. 	\checkmark	V	V	\checkmark	Repack.	V
11	*	Chassis fasteners	 Check all chassis fitting and fasteners. Correct if necessary. 		\checkmark	\checkmark		\checkmark	\checkmark
12		Brake and clutch lever pivot shafts	 Apply lithium-soap-based grease (all-purpose grease) lightly. 		\checkmark	\checkmark		\checkmark	\checkmark
13		Brake and shift pedal pivot shafts	 Apply lithium-soap-based grease (all-purpose grease) lightly. 		\checkmark	\checkmark		\checkmark	\checkmark
14	*	Centerstand and sidestand pivots	 Check operation. Apply lithium-soap-based grease (all-purpose grease) lightly. 		\checkmark	\checkmark		\checkmark	\checkmark
15	*	Sidestand switch	Check operation and replace if necessary.	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
16	*	Front fork	 Check operation and for oil leakage. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
17	*	Shock absorber assembly	 Check operation and for oil leakage. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
18	*	Rear suspension link pivots	 Apply lithium-soap-based grease lightly. 					\checkmark	
19		Engine oil	 Change (warm engine before draining). 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
20	*	Engine oil filter cartridge	Replace.	\checkmark		\checkmark		\checkmark	
21	*	Cooling system	 Check hoses for cracks or damage. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
~ 1		Soomy system	Change with ethylene glycol anti-freeze coolant every 24 months.					Change.	
22	*	Final gear oil	 Check oil level and for leak- age. Change at initial 600 mi (1000 km) or 1 month, and thereaf- ter every 16000 mi (25000 km) or 24 months. 	Change.		V		Change.	
23	*	Front and rear brake switches	Check operation.	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
24	*	Control cables	 Apply Yamaha chain and ca- ble lube or engine oil SAE 10W-30 thoroughly. 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark

				INITIAL	ODOMETER READINGS					
No.		ITEM	ROUTINE	` or ´	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
25	*	Throttle grip housing and ca- ble	 Check operation and free play. Adjust the throttle cable free play if necessary. Lubricate the throttle grip housing and cable. 		\checkmark	V	V	V	V	
26	*	Lights, signals and switches	Check operation.Adjust headlight beam.		\checkmark	\checkmark			\checkmark	

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

NOTE:

From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.

EAU17660

NOTE: _

- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- Hydraulic brake and clutch systems
- After disassembling the brake or clutch master cylinders, caliper cylinders or clutch release cylinder, always change the fluid. Regularly check the brake and clutch fluid levels and fill the reservoirs as required.
- Replace the oil seals on the inner parts of the brake or clutch master cylinders, caliper cylinders and clutch release cylinder every two years.
- Replace the brake and clutch hoses every four years or if cracked or damaged.

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM (FJR13AE)

				INITIAL		ODON	IETER REA	DINGS	
N	о.	ITEM	ROUTINE	600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	Fuel line	 Check fuel hoses for cracks or damage. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	
2	*	Spark plugs	 Check condition. Adjust gap and clean. Replace every 8000 mi (13000 km) or 12 months. 			Replace.	\checkmark	Replace.	
3	*	Valve clearance	 Check and adjust valve clear- ance when engine is cold. 		E	very 26600 i	mi (42000 kn	n)	
4	*	Crankcase breather system	 Check breather hose for cracks or damage. Replace if necessary. 		\checkmark			\checkmark	
5	*	Fuel injection	 Check and adjust engine idle speed and synchronization. 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
6	*	Exhaust system	 Check for leakage. Tighten if necessary. Replace gasket(s) if necessary. 		\checkmark	\checkmark	\checkmark		
7	*	Evaporative emis- sion control sys- tem (For California only)	Check control system for damage.Replace if necessary.						

Γ				INITIAL	ODOMETER READINGS					
	No.	ITEM	ROUTINE	600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
8	3 *	Air induction sys- tem	 Check the air cut-off valve, reed valve, and hose for dam- age. Replace any damaged parts. 			\checkmark				

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

GENERAL MAINTENANCE AND LUBRICATION CHART (FJR13AE)

				INITIAL		ODON	IETER REA	DINGS	
N	о.	ITEM	ROUTINE	600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or	12000 mi (19000 km) or	16000 mi (25000 km) or	20000 mi (31000 km) or
				1 monut	0 months	12 months	18 months	24 months	30 months
1	*	Air filter element	Clean with compressed air.Replace if necessary.		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
2	*	YCC-S clutch	 Check operation, fluid level, and for fluid leakage. 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
3	*	Front brake	 Check operation, fluid level, and for fluid leakage. Replace brake pads if neces- sary. 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
4	*	Rear brake	 Check operation, fluid level, and for fluid leakage. Replace brake pads if neces- sary. 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
5	*	Brake hoses	 Check for cracks or damage. 			V		V	
5		Diake noses	Replace.			Every 4	4 years		
6	*	Wheels	 Check runout and for damage. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
7	*	Tires	 Check tread depth and for damage. Replace if necessary. Check air pressure. Correct if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
8	*	Wheel bearings	 Check bearings for smooth operation. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
9	*	Swingarm pivot bearings	 Check bearing assemblies for looseness. Moderately repack with lithi- um-soap-based grease. 			\checkmark		Repack.	
10	*	Steering bearings	 Check bearing assemblies for looseness. Moderately repack with lithi- um-soap-based grease every 16000 mi (25000 km) or 24 months. 	V	\checkmark	V	\checkmark	Repack.	V
11	*	Chassis fasteners	 Check all chassis fitting and fasteners. Correct if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	V
12		Brake lever pivot shafts	 Apply lithium-soap-based grease (all-purpose grease) lightly. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
13		Brake and shift pedal pivot shafts	 Apply lithium-soap-based grease (all-purpose grease) lightly. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
14	*	Centerstand and sidestand pivots	 Check operation. Apply lithium-soap-based grease (all-purpose grease) lightly. 		\checkmark	\checkmark	\checkmark		\checkmark
15	*	Sidestand switch	 Check operation and replace if necessary. 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	

				INITIAL		ODON	IETER REA	DINGS]	
N	о.	ITEM	ROUTINE	600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
16	*	Front fork	 Check operation and for oil leakage. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
17	*	Shock absorber assembly	 Check operation and for oil leakage. Replace if necessary. 		\checkmark	\checkmark				
18	*	Rear suspension link pivots	 Apply lithium-soap-based grease lightly. 					\checkmark		
19		Engine oil	Change (warm engine before draining).	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
20	*	Engine oil filter cartridge	Replace.	\checkmark		\checkmark		\checkmark		
21	*	Cooling system	 Check hoses for cracks or damage. Replace if necessary. 		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
21			 Change with ethylene glycol anti-freeze coolant every 24 months. 					Change.		
22	*	Final gear oil	 Check oil level and for leakage. Change at initial 600 mi (1000 km) or 1 month, and thereafter every 16000 mi (25000 km) or 24 months. 	Change.		V		Change.		
23	*	Front and rear brake switches	Check operation.	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
24	*	Control cables	 Apply Yamaha chain and ca- ble lube or engine oil SAE 10W-30 thoroughly. 	\checkmark	\checkmark	\checkmark			\checkmark	
25	*	Throttle grip housing and ca- ble	 Check operation and free play. Adjust the throttle cable free play if necessary. Lubricate the throttle grip housing and cable. 		V	V	V	V	\checkmark	
26	*	Lights, signals and switches	Check operation.Adjust headlight beam.	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

NOTE: _

From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.

ET3P66053

NOTE: _

• The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

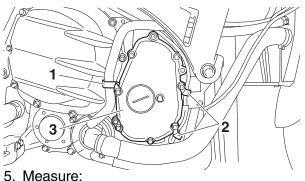
- Hydraulic brake and YCC-S clutch systems
- After disassembling the brake or YCC-S clutch master cylinders, caliper cylinders or YCC-S clutch release cylinder, always change the fluid. Regularly check the brake and YCC-S clutch fluid levels and fill the reservoirs as required.
- Replace the oil seals on the inner parts of the brake or YCC-S clutch master cylinders, caliper cylinders and YCC-S clutch release cylinder every two years.
- Replace the brake and YCC-S clutch hoses every four years or if cracked or damaged.

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
- Right side cowling Refer to "GENERAL CHASSIS" on page 4-1.
- Fuel tank Refer to "FUEL TANK" on page 7-1.
 T-bar
 - Refer to "GENERAL CHASSIS" on page 4-1.
- Air cut-off valve Refer to "AIR INDUCTION SYSTEM" on page 7-11.
- Thermostat inlet pipe 1 Refer to "THERMOSTAT" on page 6-6.
- 2. Disconnect:
- Throttle cables
- 3. Remove:
 - Spark plugs
 - Cylinder head cover
 - Cylinder head cover gasket Refer to "CAMSHAFTS" on page 5-12.
- 4. Remove:
- Hose holder "1"
- Lead holders "2"
- Pickup rotor cover "3"



 Valve clearance Out of specification → Adjust.



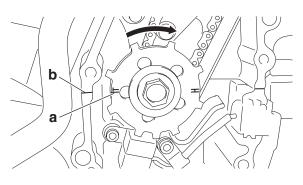
Valve clearance (cold) Intake 0.15–0.22 mm (0.0059–0.0087 in) Exhaust 0.18–0.25 mm (0.0071–0.0098 in)

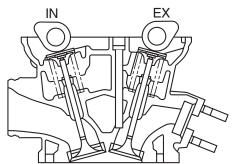
••<u>•</u>••••••••••••

- 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".

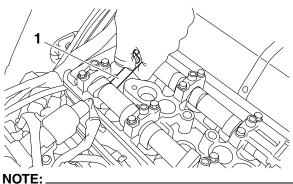
NOTE: _

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





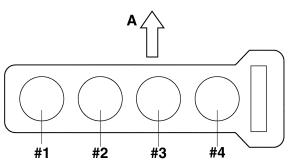
c. Measure the valve clearance with a thickness gauge "1".



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

• Measure the valve clearance in the following sequence.

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



A. Front

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

A		0° ├─	18	80° 	36	60°	54	0°	72	0°
	#1		С							
в	#2			С						
	#3							C	;	
	#4					С				

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

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

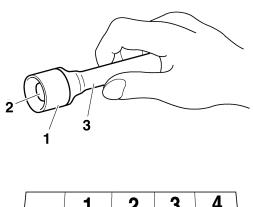
- 6. Remove:
- Camshafts
- NOTE: _
- Refer to "CAMSHAFTS" on page 5-12.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.
- 7. Adjust:
 - Valve clearance

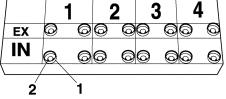
a. Remove the valve lifter "1" and the valve pad "2" with a valve lapper "3".

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 = 0.15–0.22 mm (0.0059–0.0087 in) Measured valve clearance = 0.25 mm

(0.0098 in)

0.25 mm (0.0098 in) - 0.22 mm (0.0087 in) = 0.03 mm (0.001 in)

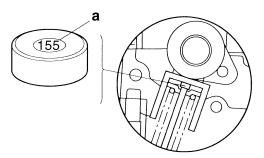
c. Check the thickness of the current valve pad.

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. 120–240
Valve pad thickness	1.20–2.40 mm (0.0472–0.0945 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

Example:

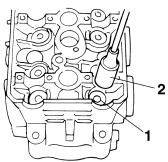
Valve pad number = 158 Rounded value = 160 New valve pad number = 160

- f. Install the new valve pad "1" and the valve lift-
- er "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.



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

NOTE: _

- Refer to "CAMSHAFTS" on page 5-12.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- 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.

- 8. Install:
- All removed parts

NOTE:_

For installation, reverse the removal procedure.

- 9. Adjust:
 - Throttle cable free play Refer to "ADJUSTING THE THROTTLE CA-BLE FREE PLAY" on page 3-10.

SYNCHRONIZING THE THROTTLE BODIES

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

1. Stand the vehicle on a level surface.

NOTE: _

Place the vehicle on the centerstand.

2. Remove:

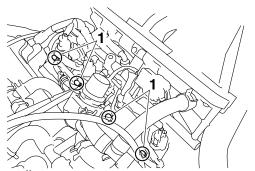
Rider seat

Refer to "GENERAL CHASSIS" on page 4-1. • Fuel tank

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

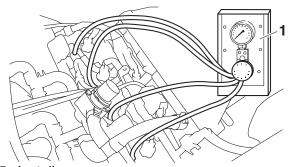
Refer to "GENERAL CHASSIS" on page 4-1.

- 3. Remove:
- Caps "1"



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

Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456

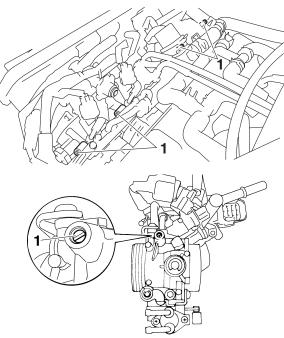


- 5. Install:
- Fuel tank
- 6. Start the engine and let it warm up for several minutes.
- 7. Measure:
 - Engine idling speed Out of specification → Adjust. Refer to "ADJUSTING THE ENGINE IDLING SPEED" on page 3-10.

Engine idling speed 1000–1100 r/min

- 8. Adjust:
 - Throttle body synchronization

- With throttle body #0 as standard, adjust
- a. With throttle body #3 as standard, adjust throttle bodies #1, #2, and #4 using the air screw "1".

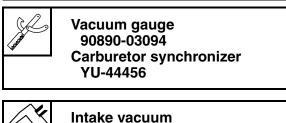


NOTE: _

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

CAUTION:

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



NOTE:

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

33.3 kPa (9.8 inHg) (250 mmHg)

- 9. Measure:
 - Engine idling speed

Out of specification \rightarrow Adjust. Make sure that the vacuum pressure is within specification.

- 10.Stop the engine and remove the measuring equipment.
- 11.Adjust:
- Throttle cable free play Refer to "ADJUSTING THE THROTTLE CA-BLE FREE PLAY" on page 3-10.



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

12.Install:

- Caps
- 13.Install:
- T-bar
- Rider seat

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

EAS20610 ADJUSTING THE ENGINE IDLING SPEED NOTE:

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

- 1. Start the engine and let it warm up for several minutes.
- 2. Remove:
 - Right side cowling
- Rider seat Refer to "GENERAL CHASSIS" on page 4-1. Fuel tank
 - Refer to "FUEL TANK" on page 7-1.
- T-bar

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

Digital tachometer

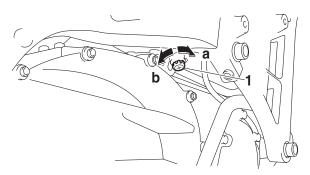
(onto the spark plug lead of cylinder #1)

- 4. Install:
 - Fuel tank
- Refer to "FUEL TANK" on page 7-1. 5. Check:
- Engine idling speed Out of specification \rightarrow Adjust.

Engine idling speed 1000-1100 r/min

- 6. Adjust:
- Engine idling speed
- a. Turn the engine idle speed adjustment screw "1" in direction "a" or "b" until the specified engine idling speed is obtained.

Direction "a" Engine idling speed is increased. **Direction "b"** Engine idling speed is decreased.



- 7. Adjust:
- Throttle cable free play Refer to "ADJUSTING THE THROTTLE CA-BLE FREE PLAY" on page 3-10.



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

- 8. Install:
- T-bar
- Rider seat
- Right side cowling Refer to "GENERAL CHASSIS" on page 4-1.

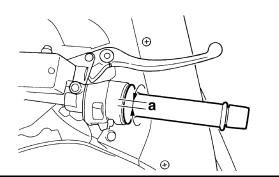
EAS20630

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE:

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

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



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

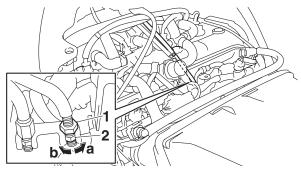
- 2. Remove:
- Rider seat
 - Refer to "GENERAL CHASSIS" on page 4-1.
- Fuel tank Refer to "FUEL TANK" on page 7-1.
- T-bar
 - Refer to "GENERAL CHASSIS" on page 4-1.
- 3. Adjust:
- Throttle cable free play

Throttle body side

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



c. Tighten the locknut.



NOTE:

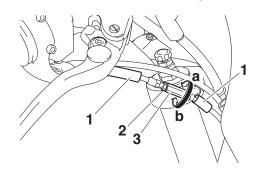
If the specified throttle cable free play cannot be obtained on the throttle body side of the cable, use the adjusting nut on the handlebar side.

Handlebar side

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

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

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



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

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

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

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.

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

Manufacturer/model NGK/CR8E Manufacturer/model DENSO/U24ESR-N

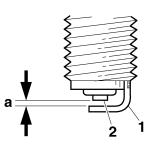
- 5. Check:
- Electrode "1"
- $\label{eq:Damage} \begin{array}{l} \mbox{Damage/wear} \rightarrow \mbox{Replace the spark plug.} \\ \bullet \mbox{ Insulator "2"} \end{array}$

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

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



Spark plug gap 0.7–0.8 mm (0.028–0.031 in)



- 8. Install:
- Spark plug

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.

- 9. Connect:
- Spark plug

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

CHECKING THE IGNITION TIMING

NOTE:

Prior to checking the ignition timing, check the wiring connections of the entire ignition system. Make sure all connections are tight and free of corrosion.

1. Stand the vehicle on a level surface.

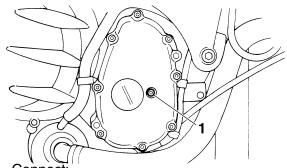
NOTE:

Place the vehicle on the centerstand.

- 2. Remove:
 - Right side cowling
 - Rider seat
 - Refer to "GENERAL CHASSIS" on page 4-1. • Fuel tank
 - Refer to "FUEL TANK" on page 7-1.
 - T-bar

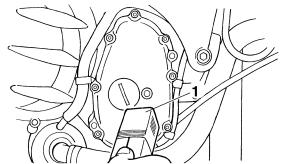
Refer to "GENERAL CHASSIS" on page 4-1.

- 3. Remove:
- Timing mark accessing plug "1" (along with the copper washer)



- 4. Connect:
- Timing light "1" (onto the spark plug lead of cylinder #1)
- Digital tachometer (onto the spark plug lead of cylinder #1)





- 5. Install:
- Fuel tank
- Refer to "FUEL TANK" on page 7-1.
- 6. Check:
- Ignition timing

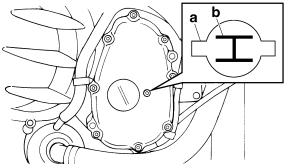
a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.



Engine idling speed 1000–1100 r/min

b. Check that pointer "a" on the pickup rotor cover is within the firing range "b" on the pickup rotor.

Incorrect firing range \rightarrow Check the ignition system.



NOTE:

The ignition timing is not adjustable.

- 7. Tighten:
- Timing mark accessing plug

(along with the copper washer New)

Timing mark accessing plug 15 Nm (1.5 m·kg, 11 ft·lb)

- 8. Install:
 - T-bar
 - Rider seat
 - Right side cowling Refer to "GENERAL CHASSIS" on page 4-1.

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 3-6.
- 2. Start the engine, warm it up for several minutes, and then turn it off.
- 3. Remove:
 - Rider seat Refer to "GENERAL CHASSIS" on page 4-1.
- Fuel tank Refer to "FUEL TANK" on page 7-1.
- T-bar Refer to "GENERAL CHASSIS" on page 4-1.
- 4. Disconnect the all spark plug caps.
- 5. Remove:
- Spark plug

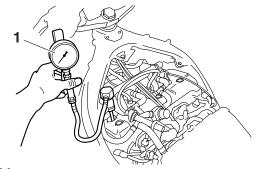
ECA13340

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.

6. Install:

• Compression gauge "1"





7. Measure:

 Compression pressure Out of specification → Refer to steps (c) and (d).

Standard compression pressure (at sea level) 1600 kPa/400 r/min (228 psi/400 r/min) (16.0 kgf/cm²/400 r/min) Minimum–maximum 1390–1790 kPa (197.7–254.6 psi) (13.9–17.9 kgf/cm²)

- a. Set the main switch to "ON".
- b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

NOTE:

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 14 psi).

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

Carbon deposits \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 oil	Piston ring(s) wear or damage \rightarrow Repair.		
Same as without oil	Pistons, valves, cylinder head gasket or piston ring(s) possibly defective \rightarrow Repair.		

8. Install:

Spark plug

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

9. Connect the all spark plug caps.

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

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

CHECKING THE ENGINE OIL LEVEL

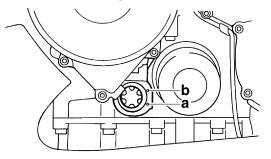
1. Stand the vehicle on a level surface.

NOTE: _

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

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

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



Type YAMALUBE 4 (20W40) or SAE20W40 Recommended engine oil grade API service SE, SF, SG type or higher

CAUTION:

- Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives.
- Do not allow foreign materials to enter the crankcase.

NOTE:

- API Service "SE", "SF" and "SG" type or equivalent (e.g., "SF-SE", "SF-SE-CC", "SF-SE-SD")
- Before checking the engine oil level, wait a few minutes until the oil has settled.

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

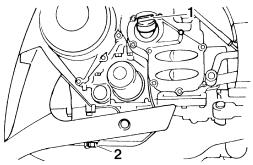
NOTE:

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

EAS20780

CHANGING THE ENGINE OIL

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



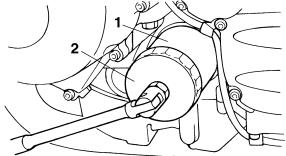
- 4. Drain:
- Engine oil

(completely from the crankcase)

5. If the oil filter cartridge is also to be replaced, perform the following procedure.

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

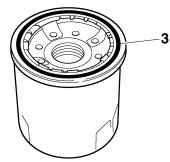




b. Lubricate the O-ring "3" of the new oil filter cartridge with a thin coat of engine oil.

ECA13390

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



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



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

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

(along with the gasket New)

- 7. Fill:
- Crankcase

(with the specified amount of the recommended engine oil)

- Engine oil quantity Total amount 4.90 L (5.18 US qt) (4.31 Imp.qt) Without oil filter cartridge replacement 3.80 L (4.02 US qt) (3.34 Imp.qt) With oil filter cartridge replacement 4.00 L (4.23 US qt) (3.52 Imp.qt)
- 8. Install:
- Engine oil filler cap
- 9. Start the engine, warm it up for several minutes, and then turn it off.
- 10.Check:
- Engine

(for engine oil leaks)

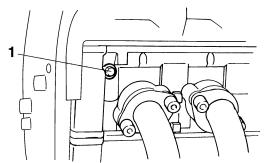
11.Check:

• Engine oil level Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-14.

12.Check:

• Engine oil pressure

- a. Remove the right side cowling. Refer to "GENERAL CHASSIS" on page 4-1.
- b. Slightly loosen the engine oil check bolt "1".



- c. Start the engine and keep it idling until engine oil starts to seep from the oil gallery bolt. If no engine oil comes out after one minute, turn the engine off so that it will not seize.
- d. Check the engine oil passages, the oil filter cartridge and the oil pump for damage or leakage. Refer to "OIL PUMP" on page 5-76.
- e. Start the engine after solving the problem(s) and check the engine oil pressure again.
- f. Tighten the oil gallery bolt to specification.

Engine oil check bolt 20 Nm (2.0 m·kg, 14 ft·lb)

g. Install the right side cowling. Refer to "GEN-ERAL CHASSIS" on page 4-1.

MEASURING THE ENGINE OIL PRESSURE 1. Check:

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

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.

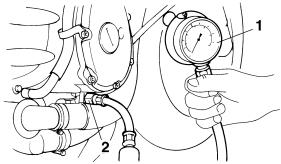
- 3. Remove:
 - Right side cowling Refer to "GENERAL CHASSIS" on page 4-1.
- 4. Remove:
- Main gallery bolt

WARNING

The engine, muffler and engine oil are extremely hot.

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





6. Measure:

 Engine oil pressure (at the following conditions) Out of specification → Adjust.

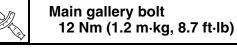


Oil pressure (hot) 30.0 kPa/1000 r/min (4.4 psi/1000 r/min) (0.30 kgf/cm²/1000 r/min) Oil temperature 80.0–90.0 °C (176.00–194.00 °F)

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

7. Install:

Main gallery bolt



8. Install:

• Right side cowling Refer to "GENERAL CHASSIS" on page 4-1.

ADJUSTING THE CLUTCH LEVER (FJR13A only)

1. Adjust:

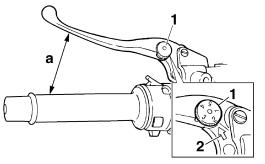
• Clutch lever position (distance "a" from the handlebar grip to the clutch lever)

a. While pushing the clutch lever forward, turn the adjusting dial "1" until the clutch lever is in the desired position.

NOTE:

Be sure to align the setting on the adjusting dial with the arrow mark "2" on the clutch lever holder.

Position #1 Distance "a" is the largest. Position #5 Distance "a" is the smallest.



CHECKING THE CLUTCH FLUID LEVEL (FJR13A)

1. Stand the vehicle on a level surface.

NOTE: _

Place the vehicle on the centerstand.

- 2. Check:
 - Clutch fluid level

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

Recommended fluid DOT 4



WARNING

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

CAUTION:

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

NOTE: ____

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

ET3P66026

CHECKING THE CLUTCH FLUID LEVEL (FJR13AE)

1. Stand the vehicle on a level surface.

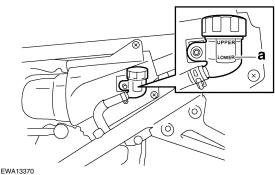
NOTE:

Place the vehicle on the centerstand.

- 2. Remove:
 - Left side cover Refer to "GENERAL CHASSIS" on page 4-1.
- 3. Check:
- Clutch fluid level

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

Recommended fluid DOT 4



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

ECA13420

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

NOTE:

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

4. Install:

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

EAS20900

BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)

WARNING

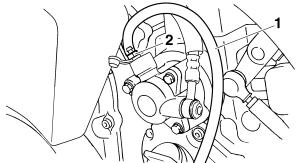
Bleed the hydraulic clutch system whenever: • the system was disassembled,

- a clutch hose was loosened or removed,
- the clutch fluid level is very low,
- clutch operation is faulty.

NOTE:

• Be careful not to spill any clutch fluid or allow the clutch master cylinder reservoir to overflow.

- When bleeding the hydraulic clutch system, make sure there is always enough clutch fluid before applying the clutch lever. Ignoring this precaution could allow air to enter the hydraulic clutch system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the clutch fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.
- 1. Bleed:
- Hydraulic clutch system
- *****
- a. Add the recommended clutch fluid to the proper level.
- Install the clutch master cylinder reservoir diaphragm.
- c. Connect a clear plastic hose "1" tightly to the bleed screw "2".



- d. Place the other end of the hose into a container.
- e. Slowly squeeze the clutch lever several times.
- f. Fully squeeze the clutch lever without releasing it.
- g. Loosen the bleed screw. This will release the tension and cause the clutch lever to contact the handlebar grip.
- h. Tighten the bleed screw and then release the clutch lever.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the clutch fluid in the plastic hose.
- j. Tighten the bleed screw to specification.



Bleed screw 6 Nm (0.6 m·kg, 4.3 ft·lb)

 k. Add the recommended clutch fluid to the proper level.
 Refer to "CHECKING THE CLUTCH FLUID LEVEL (FJR13A)" on page 3-17.

WARNING

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

ET3P66027 BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)

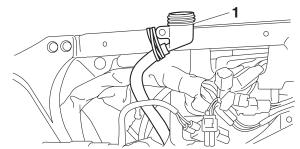
WARNING

Bleed the hydraulic clutch system whenever:

- the system was disassembled,
- a clutch hose was loosened or removed,
- the clutch fluid level is very low,
- clutch operation is faulty.

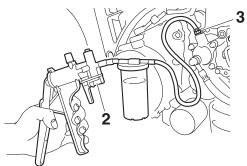
NOTE:

- Before bleeding the hydraulic clutch system, shift the transmission into neutral to engage the clutch.
- Be careful not to spill any clutch fluid or allow the clutch fluid reservoir to overflow.
- When bleeding the hydraulic clutch system, make sure that there is always enough clutch fluid in the reservoir before pumping out the fluid using the vacuum/pressure gauge set. Ignoring this precaution could allow air to enter the hydraulic clutch system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the clutch fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.
- 1. Remove:
- Air filter case
 Befer to "GENI
- Refer to "GENERAL CHASSIS" on page 4-1.
 Rear wheel
 Pefor to "PEAR WHEEL" on page 4-24
- Refer to "REAR WHEEL" on page 4-24. • Swingarm
- Refer to "SWINGARM" on page 4-91.
- 2. Bleed:
- Hydraulic clutch system
- a. Fasten the clutch fluid reservoir "1" to the frame with a suitable strap, etc., as shown in the illustration so that it is not tilted.



- b. Turn the main switch to "ON" and check that the transmission is in neutral.
- c. Add the recommended clutch fluid to the proper level.
- d. Install the clutch fluid reservoir diaphragm.
- e. Connect the vacuum/pressure pump gauge set "2" tightly to the bleed screw "3".

Vacuum/pressure pump gauge set 90890-06756 Mityvac brake bleeding tool YS-42423



- f. Loosen the bleed screw.
- g. Pump out the clutch fluid using the vacuum/pressure pump gauge set.
- h. Tighten the bleed screw.
- i. Disengage the clutch by turning the manual clutch operation bolt "4" in direction "a" until it stops.
- j. Loosen the bleed screw and then retighten it.
- Engage the clutch by turning the manual clutch operation bolt in direction "b" until it stops.

NOTE: _

The following illustration shows the manual clutch operation bolt when viewed from the rear of the vehicle with the swingarm removed.

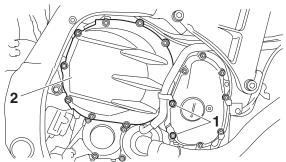


- Repeat steps (i) to (k) until all of the air bubbles have disappeared from the clutch fluid in the plastic hose of the vacuum/pressure pump gauge set.
- m. Tighten the bleed screw to specification.



Bleed screw 6 Nm (0.6 m·kg, 4.3 ft·lb)

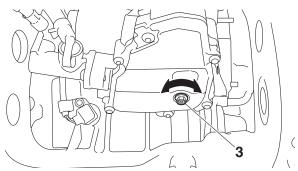
- Manually engage and disengage the clutch 30 times using the manual clutch operation bolt.
- Add the recommended clutch fluid to the proper level.
 Refer to "CHECKING THE CLUTCH FLUID LEVEL (FJR13AE)" on page 3-17.
- *****
- 3. Check:
- Pressure plate stroke
- *****
- a. Remove the pickup rotor cover bolts "1".b. Remove the clutch cover "2".
 - Refer to "CLUTCH" on page 5-44.



c. Manually engage and disengage the clutch using the clutch operation bolt "3" five times, each time for less than 1 second.

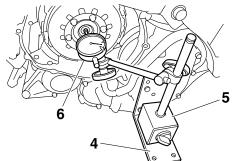
NOTE:

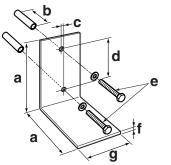
Turn the clutch operation bolt in a continuous motion, without allowing the pressure plate to stop in mid-stroke.



d. Install a suitable bracket "4", the magnet base B "5" and the dial gauge & stand set "6".







- a. 100 mm (3.94 in)
- b. 20 mm (0.79 in)
- c. 1.5 mm (0.06 in)
- d. 64 mm (2.52 in)
- e. $M6 \times 40$ mm bolt
- f. 5 mm (0.20 in)
- g. 60 mm (2.36 in)
- e. Disengage the clutch by turning the manual clutch operation bolt.
- f. Measure the clutch pressure plate stroke.



Clutch pressure plate stroke FJR13AE 2.8 mm (0.11 in) or more g. If the pressure plate stroke is out of specification, repeat steps (j) to (l) in the procedure for step "2. Bleed" until clutch pressure plate stroke is within specification.

- 4. Install:
- Swingarm Refer to "SWINGARM" on page 4-91.
- Rear wheel Refer to "REAR WHEEL" on page 4-24.
- Air filter case Refer to "GENERAL CHASSIS" on page 4-1.

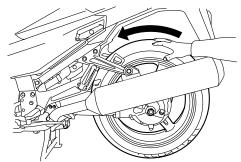
ET3P66067

CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)

- 1. Check:
- Rear wheel drag torque Rear wheel does not rotate/drag torque does not progressively increase in the following order: neutral, 1st gear, and when rear wheel starts to rotate in 1st gear → Check the pressure plate stroke.

Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.

- *****
- a. Place the vehicle on the centerstand.
- b. Turn the main switch to "ON".
- c. Shift the transmission into neutral, and then rotate the rear wheel by hand.



d. Shift the transmission into 1st gear, and then rotate the rear wheel by hand.

- 2. Check:
- Shift operation

Engine stalls \rightarrow Check the pressure plate stroke.

Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.

a. Place the vehicle on the centerstand.

- b. Start the engine.
- c. Shift the transmission from neutral to 1st gear and back to neutral ten times.
- d. Shift the transmission into 1st gear, and then apply the rear brake.

NOTE: _

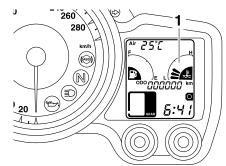
If the engine stalls, restart the engine, let it idle for at least 90 seconds, and then repeat steps (c) and (d).

3. Check:

 Starting-off performance of vehicle Abnormal vehicle vibration/abnormal starting-off performance/sudden acceleration compared to before the hydraulic clutch system was serviced → Select diagnostic code No. Sh_ _66 in the diagnostic mode and operate the hand shift lever switch (shift up) two times.

Refer to "Diagnostic code table (Diagnostic code No. Sh__66)".

- a. Place the vehicle on the centerstand.
- b. Start the engine and warm it up until at least three segments appear on the coolant temperature meter "1" as shown in the illustration.

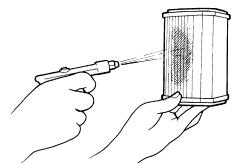


- c. Shift the transmission into 1st gear, and then slowly turn the throttle grip and check that the rear wheel rotates.
- d. Check that the transmission can be shifted into 2nd gear.
- e. Shift the transmission into neutral, and then raise the centerstand.
- f. Shift the transmission into 1st gear, and then slowly turn the throttle grip and check the starting-off performance of the vehicle.

CLEANING THE AIR FILTER ELEMENT (FJR13A)

- 1. Remove:
- Rider seat
- Left side cover
- Air filter case cover
- Air filter element Refer to "GENERAL CHASSIS" on page 4-1.
- 2. Clean:
 - Air filter element

Apply compressed air to the outer surface of the air filter element.



3. Check:

Air filter element
 Damage → Replace.

CAUTION:

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

4. Install:

- Air filter element
- Air filter case cover
- Left side cover
- Rider seat
- Refer to "GENERAL CHASSIS" on page 4-1.

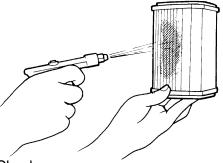
When installing the air filter element into the air filter case cover, make sure their sealing surfaces are aligned to prevent any air leaks.

CLEANING THE AIR FILTER ELEMENT (FJR13AE)

- 1. Remove:
- Rider seat
- Left side cover Refer to "GENERAL CHASSIS" on page 4-1.

- Shift actuator Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-67.
- Air filter case cover
- Air filter element Refer to "GENERAL CHASSIS" on page 4-1.
- 2. Clean:

 Air filter element Apply compressed air to the outer surface of the air filter element.



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

CAUTION:

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

- 4. Install:
- Air filter element
- Air filter case cover Refer to "GENERAL CHASSIS" on page 4-1.
- Shift actuator Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-67.
- Left side cover
- Rider seat

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

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

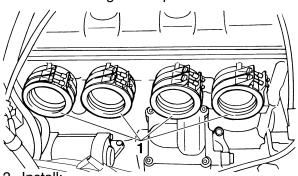
EAS21010

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 "GENERAL CHASSIS" on page 4-1.
- Throttle body Refer to "THROTTLE BODIES" on page 7-5.
- 2. Check:
- Throttle body joints "1" Cracks/damage → Replace.



- 3. Install:
 - Throttle body

Refer to "THROTTLE BODIES" on page 7-5. • Air filter case

Refer to "GENERAL CHASSIS" on page 4-1. • Fuel tank

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

- Rider seat Refer to "GENERAL CHASSIS" on page 4-1.
- EAS21030

CHECKING THE FUEL LINE

- 1. Remove:
- Rider seat

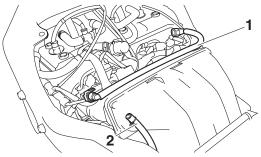
Refer to "GENERAL CHASSIS" on page 4-1. • Fuel tank

- Refer to "FUEL TANK" on page 7-1. • T-bar
- Refer to "GENERAL CHASSIS" on page 4-1.
- 2. Check:
 - Fuel hose "1"
 - Fuel tank breather hose
 - Fuel tank overflow hose
 - Fuel tank breather/overflow hose "2" (except for California)
 - Cracks/damage \rightarrow Replace.

Loose connection \rightarrow Connect properly.

CAUTION:

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



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

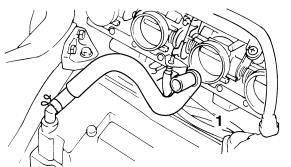
EAS21070

CHECKING THE CRANKCASE BREATHER HOSE

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

CAUTION:

Make sure the crankcase breather hose is routed correctly.



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

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

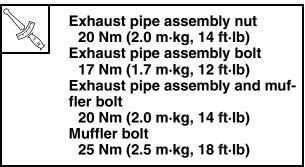
CHECKING THE EXHAUST SYSTEM

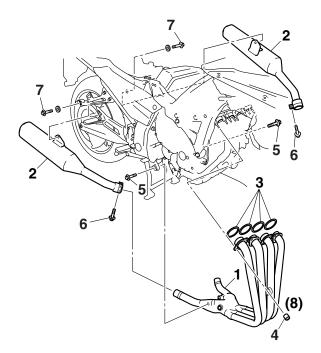
The following procedure applies to all of the exhaust pipes and gaskets.

- 1. Remove:
- Side cowlings

Refer to "GENERAL CHASSIS" on page 4-1. 2. Check:

- Exhaust pipe assembly "1"
- Mufflers "2" Cracks/damage \rightarrow Replace.
- Gasket "3" Exhaust gas leaks \rightarrow Replace.
- 3. Check:
- Tightening torque
- Exhaust pipe assembly nuts "4"
- Exhaust pipe assembly bolts "5"
- Exhaust pipe assembly and muffler bolts "6"
- Muffler bolts "7"





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

EAS21090

CHECKING THE CANISTER (for California only)

- 1. Remove:
- Side cowlings Refer to "GENERAL CHASSIS" on page 4-1.
- 2. Check:
 - Canister
 - Hoses

Cracks/damage \rightarrow Replace.

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

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

CHECKING THE COOLANT LEVEL

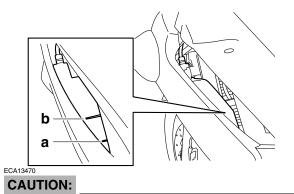
1. Stand the vehicle on a level surface.

NOTE: _

- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.
- 2. Remove:
 - Left side panel
 - Refer to "GENERAL CHASSIS" on page 4-1.
- 3. Check:
- Coolant level

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

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



• Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.

- Use only distilled water. However, if distilled water is not available, soft water may be used.
- 4. Start the engine, warm it up for several minutes, and then turn it off.
- 5. Check:
- Coolant level

NOTE: _

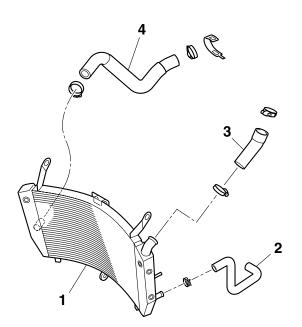
Before checking the coolant level, wait a few minutes until it settles.

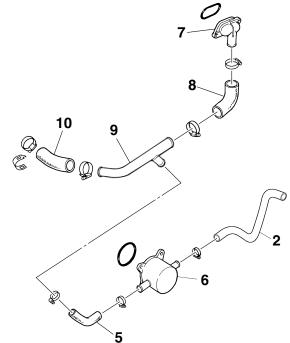
- 6. Install:
- Left side panel Refer to "GENERAL CHASSIS" on page 4-1.

EAS21120

CHECKING THE COOLING SYSTEM

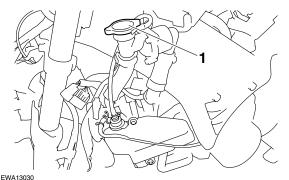
- 1. Remove:
- Exhaust pipe assembly Refer to "ENGINE REMOVAL" on page 5-1.
- 2. Check:
 - Radiator "1"
 - Oil cooler outlet hose "2"
 - Radiator inlet hose "3"
 - Radiator outlet hose "4"
 - Oil cooler inlet hose "5"
 - Oil cooler "6"
 - Water jacket joint "7"
 - Water jacket joint inlet hose "8"
 - Water pump outlet pipe "9"
 - Water pump outlet hose "10" Cracks/damage → Replace. Refer to "RADIATOR" on page 6-1, "OIL COOLER" on page 6-4, "THERMOSTAT" on page 6-6 and "WATER PUMP" on page 6-10.





- 3. Install:
 - Exhaust pipe assembly Refer to "ENGINE REMOVAL" on page 5-1.

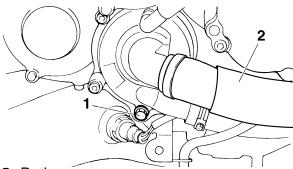
- CHANGING THE COOLANT
- 1. Remove:
- Front cowling Refer to "GENERAL CHASSIS" on page 4-1.
- 2. Remove:
- Radiator cap "1"



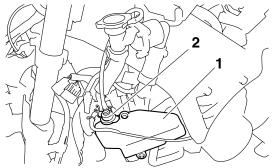
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

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

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



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



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

(along with the copper washer New)



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

- 11.Fill:
- Cooling system

(with the specified amount of the recommended coolant)

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

Handling notes for coolant

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

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

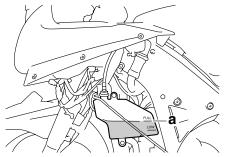
 If coolant is swallowed, induce vomiting and get immediate medical attention.

ECA13480

CAUTION:

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- If coolant comes into contact with painted surfaces, immediately wash them with water.
- Do not mix different types of antifreeze.
- 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 3-24.

NOTE:

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

17.Install:

• Front cowling assembly Refer to "GENERAL CHASSIS" on page 4-1.

CHASSIS

ADJUSTING THE FRONT DISC BRAKE

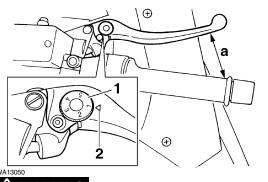
- 1. Adjust:
- Brake lever position (distance "a" from the throttle grip to the brake lever)

a. While pushing the brake lever forward, turn the adjusting dial "1" until the brake lever is in the desired position.

NOTE:

Be sure to align the setting on the adjusting dial with the arrow mark "2" on the brake lever.

Position #1 Distance "a" is the largest. Position #5 Distance "a" is the smallest.



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

ECA13490

CAUTION:

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

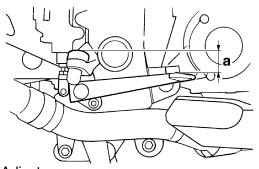
EAS21190

ADJUSTING THE REAR DISC BRAKE

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



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

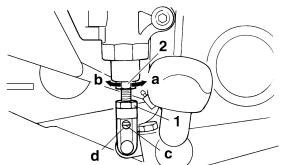


- 2. Adjust:
- Brake pedal position
- ****
- a. Loosen the locknut "1".
- b. Turn the adjusting bolt "2" in direction "a" or "b" until the specified brake pedal position is obtained.

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

WARNING

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



- c. Tighten the locknut "1" to specification.
 - Locknut 16 Nm (1.6 m·kg, 11 ft·lb)

WARNING

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

ECA13510

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

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

EAS21240

CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

NOTE:

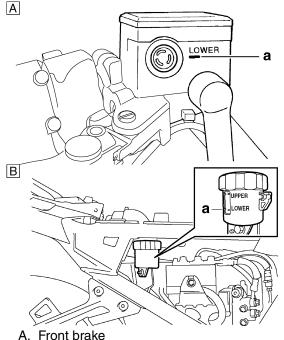
- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.

2. Remove:

- Right side cover Refer to "GENERAL CHASSIS" on page 4-1.
- 3. Check:
 - Brake fluid level Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.

Front brake

Recommended fluid DOT 4 Rear brake Recommended fluid DOT 4



- 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:

ECA13540

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.

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

EAS221250 CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

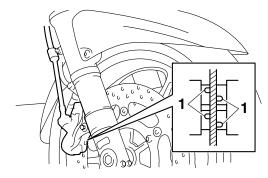
EC3P61037

CAUTION:

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

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

Wear indicator grooves "1" almost disappeared \rightarrow Replace the brake pads as a set. Refer to "FRONT BRAKE" on page 4-29.



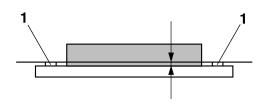
EAS21260

CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

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

Wear indicators "1" almost touch the brake disc \rightarrow Replace the brake pads as a set. Refer to "REAR BRAKE" on page 4-41.



EAS21280

CHECKING THE BRAKE HOSES

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

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

- 2. Check:
- Brake hose holders
 Loose → Tighten the holder bolts.
- 3. Hold the vehicle upright and apply the brake several times.
- 4. Check:
 - Brake hoses

Brake fluid leakage \rightarrow Replace the damaged hose.

Refer to "FRONT BRAKE" on page 4-29, "REAR BRAKE" on page 4-41 and "ABS (AN-TI-LOCK BRAKE SYSTEM)" on page 4-54.

EAS21330

ADJUSTING THE REAR BRAKE LIGHT SWITCH

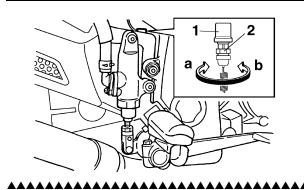
NOTE:

- 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.
- If the switch is not properly adjusted, ABS malfunction code No. 23 may be displayed.

1. Check:

- Rear brake light operation timing Incorrect → Adjust.
- 2. Adjust:
 - Rear brake light operation timing
 - *****
- a. Hold the main body "1" of the rear brake light switch so that it does not rotate and turn the adjusting nut "2" in direction "a" or "b" until the rear brake light comes on at the proper time.

Direction "a" Brake light comes on sooner. Direction "b" Brake light comes on later.



BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)

EWA14000

EC3P61012

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

CAUTION:

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

WARNING

Bleed the ABS whenever:

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

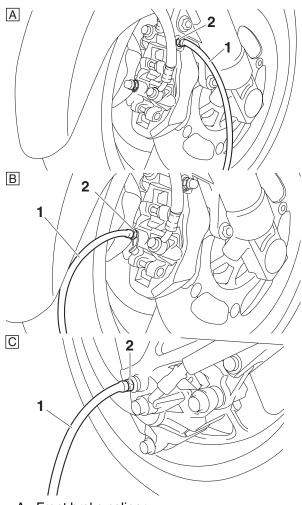
NOTE:

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

1. Remove:

- Right side cover Refer to "GENERAL CHASSIS" on page 4-1.
- 2. Bleed:
- ABS

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



- A. Front brake caliper
- B. Right front brake caliper (unified brake system)
- C. Rear brake caliper
- d. Place the other end of the hose into a container.
- e. Slowly apply the brake several times.
- f. Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.
- g. Loosen the bleed screw.

NOTE:

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

- h. Tighten the bleed screw, and then release the brake lever or brake pedal.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- j. Check the operation of the hydraulic unit. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-60.

EC3P61029

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

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



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

 m. Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the recommended brake fluid.
 Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-29.

EWA14020

After bleeding the ABS, check the brake operation.

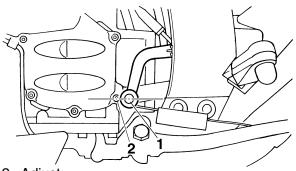
ADJUSTING THE SHIFT PEDAL (FJR13A)

1. Check:

EAS21380

Shift pedal position

Check that the center of the shift pedal end "1" is aligned with the center of the middle gear case cover bolt "2" as shown in the illustration when viewed directly from the side. Incorrect \rightarrow Adjust.

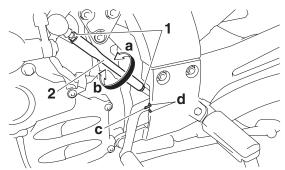


- 2. Adjust:
- Shift pedal position
- ****
- a. Loosen both locknuts "1".
- b. Turn the shift rod "2" in direction "a" or "b" to obtain the correct shift pedal position.

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

NOTE:

Check that the groove "c" in the shift pedal is between the projections "d" on the frame.



c. Tighten both locknuts to specification.

Locknut 7 Nm (0.7 m·kg, 5.1 ft·lb)

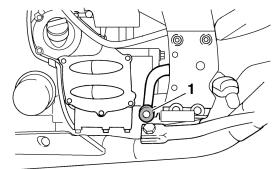
ET3P66029

ADJUSTING THE SHIFT PEDAL (FJR13AE) 1. Check:

- Check.
- Shift pedal position

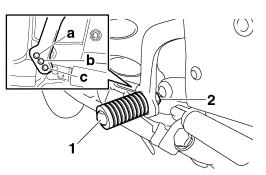
NOTE: _

The shift pedal "1" can be adjusted to three positions to suit the rider's preference as shown.



2. Adjust:

- Shift pedal position
- a. Remove the shift pedal "1" by removing the
- shift pedal bolt "2".



- a. High position
- b. Standard position
- c. Low position
- b. Move the shift pedal to the desired position.
- c. Install the shift pedal bolt, and then tighten it to specification.



Shift pedal bolt 7 Nm (0.7 m·kg, 5.1 ft·lb) LOCTITE[®]

EAS21460

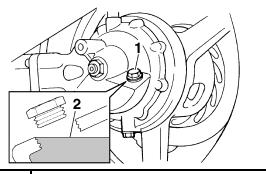
CHECKING THE FINAL GEAR OIL LEVEL

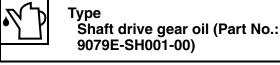
1. Stand the vehicle on a level surface.

- NOTE:
- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.
- 2. Remove:
- Final gear oil filler bolt "1"
- 3. Check:
 - Final gear oil level The final gear oil level should be to the bot-

tom brim "2" of the filler hole. Below the bottom brim \rightarrow Add the recom-

mended final gear oil to the proper level.





4. Install:

• Final gear oil filler bolt

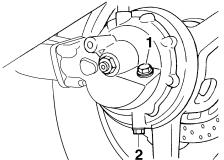
9
N/A
(s)

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

EAS21470

CHANGING THE FINAL GEAR OIL

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



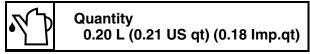
- 3. Check:
- Final gear oil drain bolt gasket Damage → Replace.
- 4. Install:
 - Final gear oil drain bolt

(along with the gasket New)



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

- 5. Fill:
 - Final gear case (with the specified amount of the recommended final gear oil)



Refer to "CHECKING THE FINAL GEAR OIL LEVEL" on page 3-33.

EAS21510

EWA13120

CHECKING AND ADJUSTING THE STEERING HEAD

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. Check:

Steering head

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

 $\label{eq:binding} \mbox{Binding/looseness} \rightarrow \mbox{Adjust the steering head}.$

- 3. Remove:
- Upper bracket
 Befer to "STEE

Refer to "STEERING HEAD" on page 4-83. 4. Adjust:

Steering head

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



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



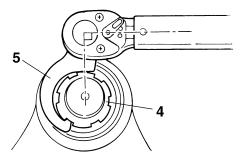
Steering nut wrench 90890-01403 Spanner wrench YU-33975

Lower ring nut (initial tightening torque)

52 Nm (5.2 m·kg, 37 ft·lb)

NOTE: _

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



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

WARNING

Do not overtighten the lower ring nut.



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

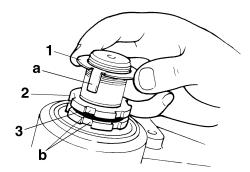
d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.

Refer to "STEERING HEAD" on page 4-83.

- e. Install the rubber washer "3".
- f. Install the upper ring nut "2".
- g. Finger tighten the upper ring nut, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- h. Install the lock washer "1".

NOTE:

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



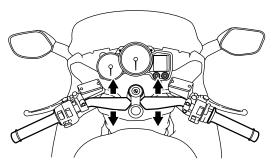
- 5. Install:
 - Upper bracket Refer to "STEERING HEAD" on page 4-83.

ADJUSTING THE HANDLEBAR POSITION

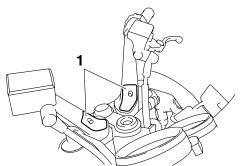
- 1. Check:
- Handlebar position

NOTE:

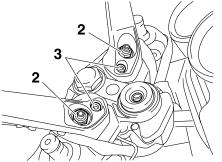
The handlebar position can be adjusted to one of three positions to suit the rider's preference.



- 2. Adjust:
- Handlebar position
- ****
- a. Remove the plates "1".



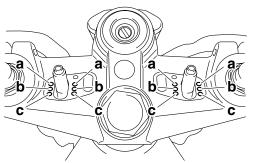
b. Remove the handlebar nuts "2" and bolts "3".



c. Remove the handlebars.

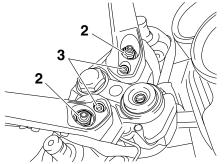
d. Install the handlebars in the desired position.

Fit the projections on each handlebar into the holes in the upper bracket, making sure that the handlebars are installed in the same position.



- a. Front position
- b. Standard position
- c. Rear position

e. Install the handlebar bolts "3" and nuts "2" temporarily.



f. Tighten the handlebar bolts and nuts.

Handlebar bolt 23 Nm (2.3 m·kg, 17 ft·lb) Handlebar nut 65 Nm (6.5 m·kg, 47 ft·lb)

NOTE:

First tighten the bolts, then tighten the nuts.

EAS21530

CHECKING THE FRONT FORK

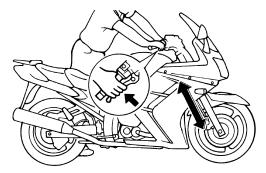
1. Stand the vehicle on a level surface.

WARNING

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

- 2. Check:
- Inner tube
 - Damage/scratches \rightarrow Replace.
- Oil seal
 - 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 4-73.



ADJUSTING THE FRONT FORK LEGS

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

WARNING

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

Spring preload

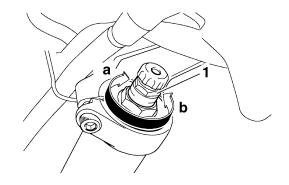
ECA13570

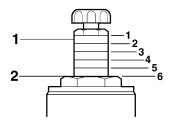
CAUTION:

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

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

Spring preload adjusting positions Minimum 6 Standard 4 Maximum 1





2. Current setting

Rebound damping

CAUTION:

Never go beyond the maximum or minimum adjustment positions.

- 1. Adjust:
- Rebound damping

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

Direction "a"

Rebound damping is increased (suspension is harder).

Direction "b" Rebound damping is decreased (suspension is softer).



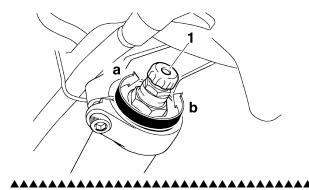
Rebound damping adjusting positions Minimum 17 click(s) out* Standard

12 click(s) out*

Maximum

1 click(s) out*

* With the adjusting knob fully turned in



Compression damping

CAUTION:

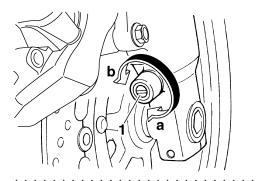
Never go beyond the maximum or minimum adjustment positions.

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

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

(suspension is softer).

Compression damping adjusting positions Minimum 21 click(s) out* Standard 12 click(s) out* Maximum 1 click(s) out* With the adjusting screw fully turned in



ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

WARNING

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

Spring preload

ECA13590

Never go beyond the maximum or minimum adjustment positions.

- 1. Adjust:
- Spring preload

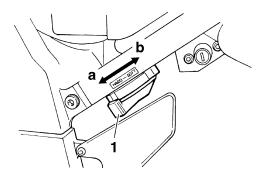
- a. Move the adjusting lever "1" in direction "a" or "b".
- b. Adjust the adjusting lever to "HARD" or "SOFT".

Direction "a"

Spring preload is increased (suspension is harder).

Direction "b"

Spring preload is decreased (suspension is softer).



Rebound damping

CAUTION:

Never go beyond the maximum or minimum adjustment positions.

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

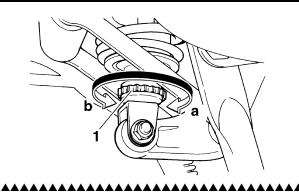
Direction "a"

Rebound damping is increased (suspension is harder). Direction "b"

Direction "b"

Rebound damping is decreased (suspension is softer).

) Jr	Rebound damping adjusting posi- tions
```	Minimum
	20 click(s) out*
	Standard
	12 click(s) out*
	Maximum
	3 click(s) out*
* With	the adjusting knob fully turned in



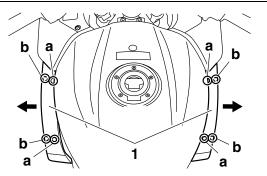
#### ET3P61035

#### **ADJUSTING THE SIDE PANELS**

- 1. Adjust:
- Side panel position

#### NOTE:

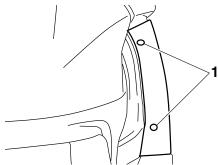
The side panels "1" can be tilted back 30 mm (1.18 in) for added ventilation to suit the riding conditions.



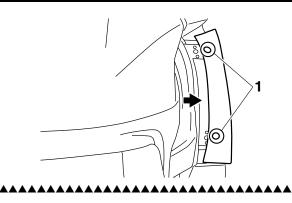
- a. Closed position
- b. Open position

### To open a side panel

a. Remove the quick fastener screws "1".

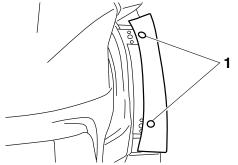


b. Pull the side panel to the open position, and then install the quick fastener screws "1".

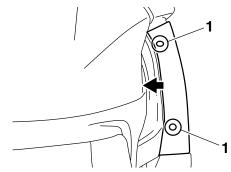


## To close a side panel

a. Remove the quick fastener screws "1".



b. Push the side panel to the closed position, and then install the quick fastener screws "1".



#### NOTE:

Make sure that the side panel is properly installed.

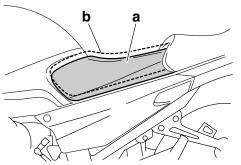
#### *****

### ADJUSTING THE RIDER SEAT HEIGHT

- 1. Check:
- Rider seat height

#### NOTE:

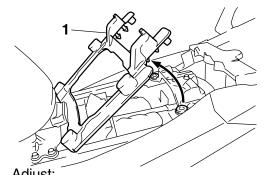
- The rider seat height can be adjusted to one of two positions to suit the rider's preference.
- The rider seat height was adjusted to the lower position at delivery.



- a. Low position
- b. High position
- 2. Remove:
  - Passenger seat
- Rider seat
- Refer to "GENERAL CHASSIS" on page 4-1. 3. Remove:
- Rider seat height position adjuster "1"

#### NOTE:

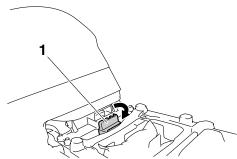
Remove the rider seat height position adjuster by pulling it upward.



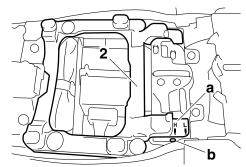
- 4. Adjust:
- Rider seat height

## To change to the high position

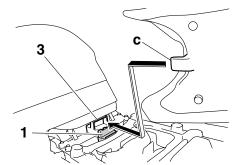
a. Move the rider seat holder cover "1" to the lower position as shown.



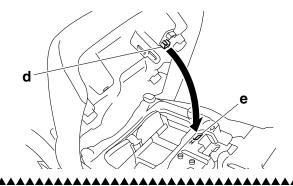
b. Install the rider seat height position adjuster "2" so that the "H" mark "a" is aligned with the match mark "b".



c. Insert the projection "c" on the front of the rider seat into seat holder (for high position) "3" as shown.

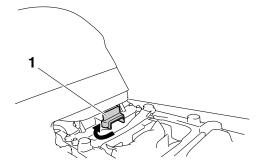


d. Align the high position projection "d" on the bottom of the rider seat with the "H" position slot "e", and then push the rear of the seat down to lock it in place as shown.

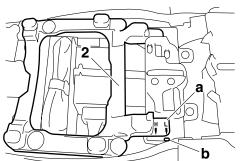


## To change to the low position

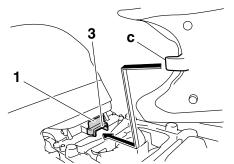
a. Move the rider seat holder cover "1" to the upper position as shown.



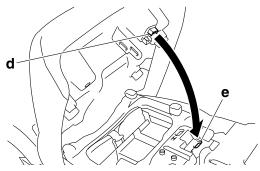
b. Install the rider seat height position adjuster "2" so that the "L" mark "a" is aligned with the match mark "b".



c. Insert the projection "c" on the front of the rider seat into seat holder (for low position) "3" as shown.



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



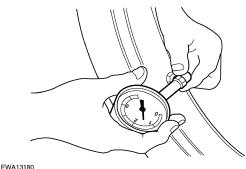
- *****
- 5. Install:
- Passenger seat Refer to "GENERAL CHASSIS" on page 4-1.

#### EAS21650

#### **CHECKING THE TIRES**

The following procedure applies to both of the tires.

- 1. Check:
- Tire pressure Out of specification  $\rightarrow$  Regulate.



#### 

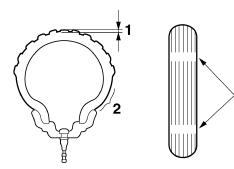
- The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.
- The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
- Operation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

<b>^</b> 4			
K			
$\sim$	cold tires)		
\\	Loading condition		
	0–90 kg (0–198 lb)		
	Front		
	270 kPa (39 psi) (2.70 kgf/cm²)		
	Rear		
	290 kPa (42 psi) (2.90 kgf/cm²)		
	Loading condition		
	FJR13A 90–212 kg (198–467 lb)		
	(USA)		
	FJR13A 90–211 kg (198–465 lb)		
	(California)		
	FJR13AE 90–208 kg (198–459		
	lb) (USA)		
	FJR13AE 90–207 kg (198–456		
	lb) (California)		
	Front		
	270 kPa (39 psi) (2.70 kgf/cm²)		
	Rear		
	290 kPa (42 psi) (2.90 kgf/cm²)		
	High-speed riding		
	Front		
	270 kPa (39 psi) (2.70 kgf/cm²)		
	Rear		
	290 kPa (42 psi) (2.90 kgf/cm²)		
	Maximum load		
	FJR13A 212 kg (467 lb) (USA)		
	FJR13A 211 kg (465 lb) (Califor-		
	nia)		
	FJR13AE 208 kg (459 lb) (USA)		
	FJR13AE 207 kg (456 lb) (Cali-		
	fornia)		
* Total	weight of rider, passenger, cargo		
and accessories			
EW/412100			

### WARNING

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

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



1. Tire tread depth

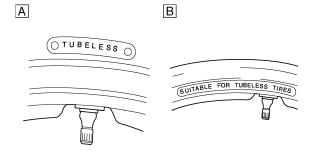
- 2. Side wall
- 3. Wear indicator



Wear limit (front) 1.0 mm (0.04 in) Wear limit (rear) 1.0 mm (0.04 in)

WARNING

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



- A. Tire
- B. Wheel

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

### WARNING

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

3

#### Front tire

Size 120/70 ZR17M/C (58W) Manufacturer/model METZELER/Roadtec Z6G Manufacturer/model BRIDGESTONE/BT020F

Rear tire Size 180/55 ZR17M/C (73W) Manufacturer/model METZEL EB/Boadtec 26

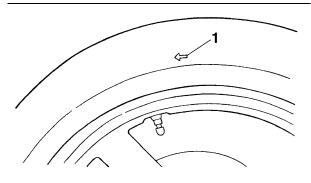
METZELER/Roadtec Z6C Manufacturer/model BRIDGESTONE/BT020R

## 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.



#### EAS21670

#### CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

### 

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.

### 

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
  - $\text{Damage} \rightarrow \text{Replace}.$
- 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.

Recommended lubricant Lithium-soap-based grease

#### EAS21710

#### 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

EAS21730

### LUBRICATING THE CENTERSTAND

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

#### **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 8-203.

#### EAS21770

#### CHECKING THE FUSES

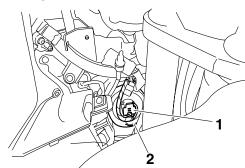
Refer to "ELECTRICAL COMPONENTS" on page 8-203.

#### EAS21790

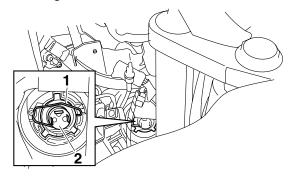
#### **REPLACING THE HEADLIGHT BULBS**

The following procedure applies to both of the headlight bulbs.

- 1. Remove:
- Front cowling left inner panel 1
- Front cowling left inner panel 2
- Front cowling right inner panel 1
- Front cowling right inner panel 2 Refer to "GENERAL CHASSIS" on page 4-1.
- 2. Disconnect:
- Headlight coupler "1"
- 3. Remove:
- Headlight bulb cover "2"



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



### WARNING

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

6. Install:

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

#### 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.

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

10.Install:

- Front cowling right inner panel 2
- Front cowling right inner panel 1
- Front cowling left inner panel 2
- Front cowling left inner panel 1 Refer to "GENERAL CHASSIS" on page 4-1.

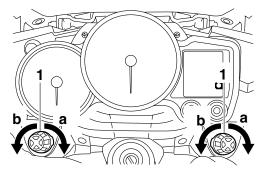
EAS21810

#### ADJUSTING THE HEADLIGHT BEAMS

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

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

### **ELECTRICAL SYSTEM**



#### . . . . . . . . . . . . . . . . . . .

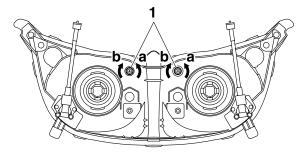
- 2. Adjust:
- Headlight beam (horizontally)
- a. Turn the adjusting screws "1" in direction "a" or "b".

Left headlight

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

**Right headlight** 

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



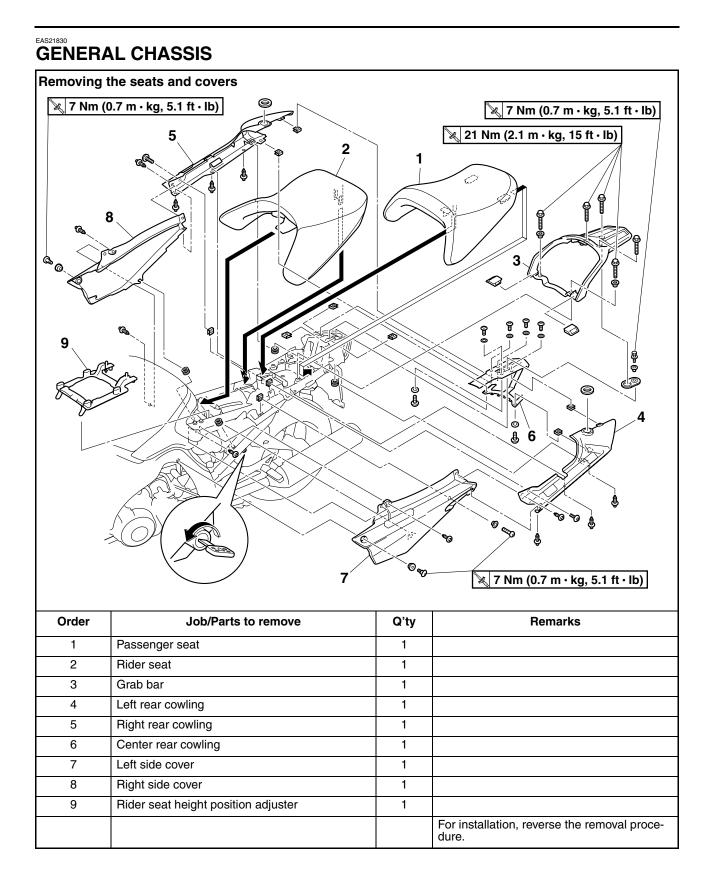
.....

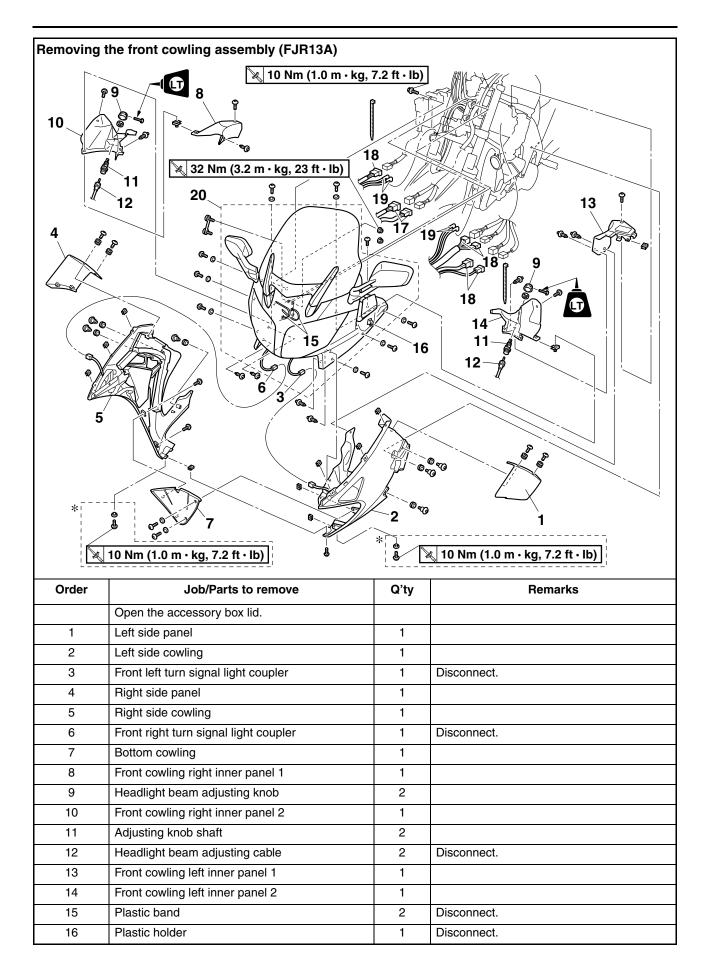
### **CHASSIS**

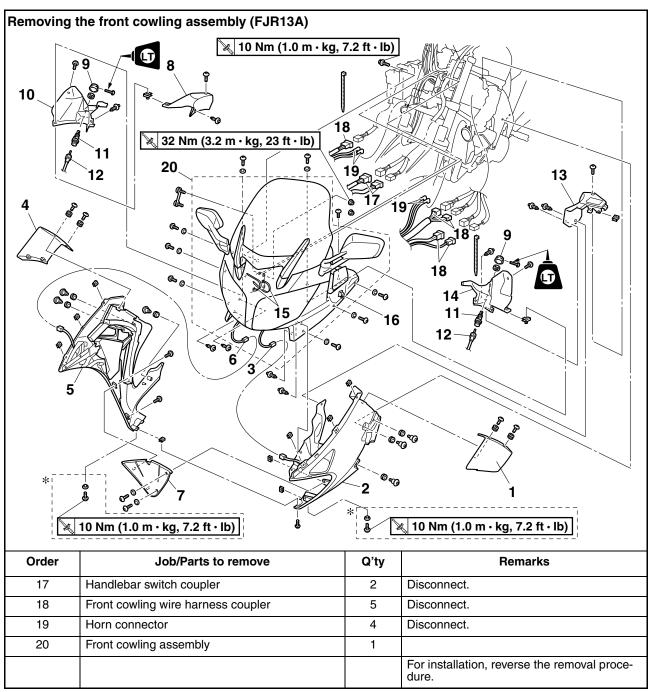
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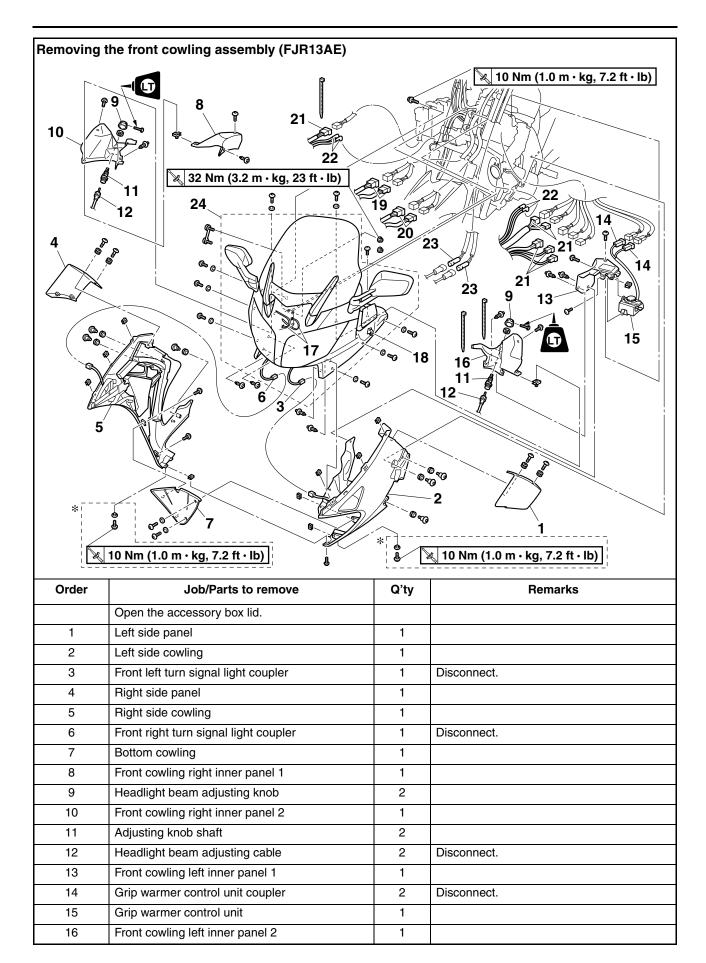
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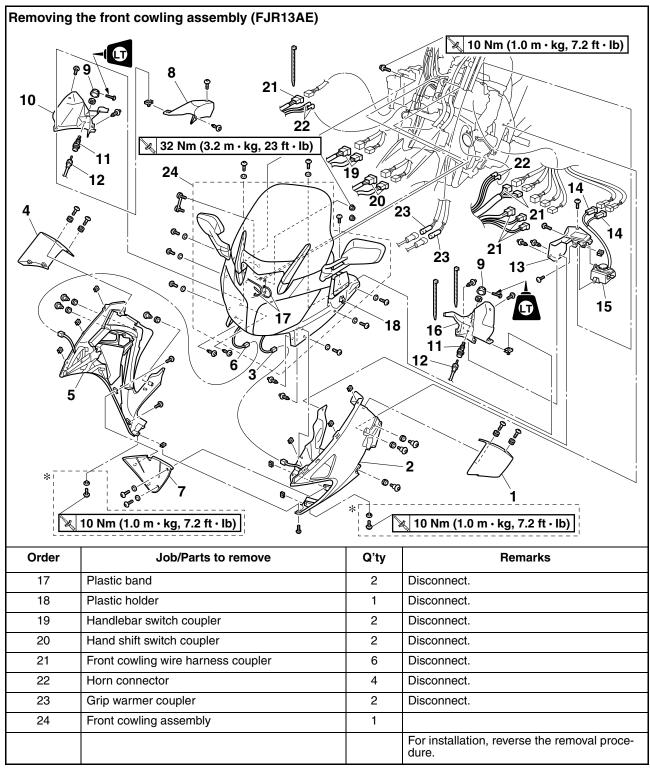




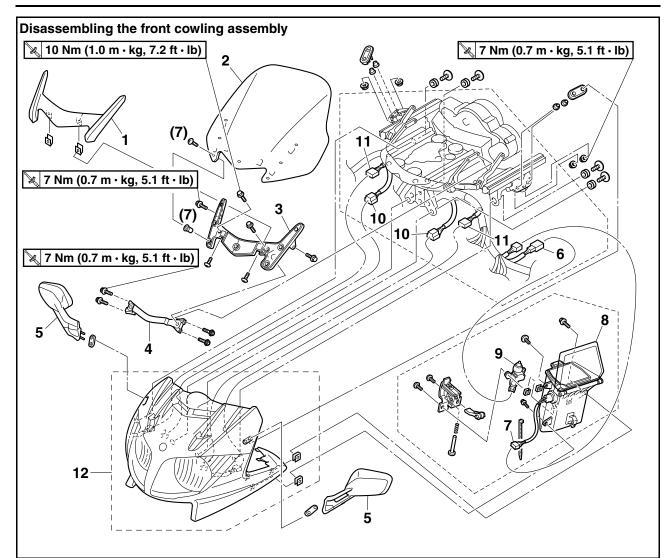


* For California only

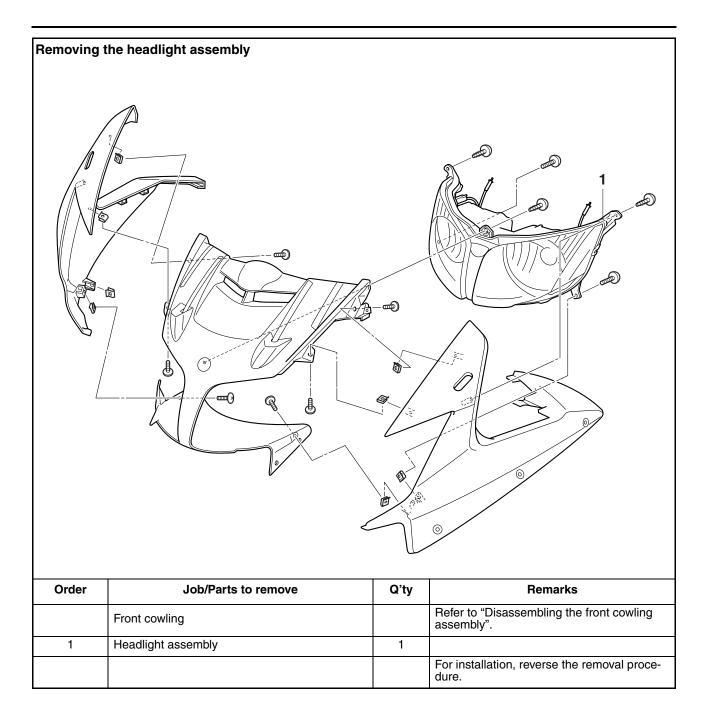


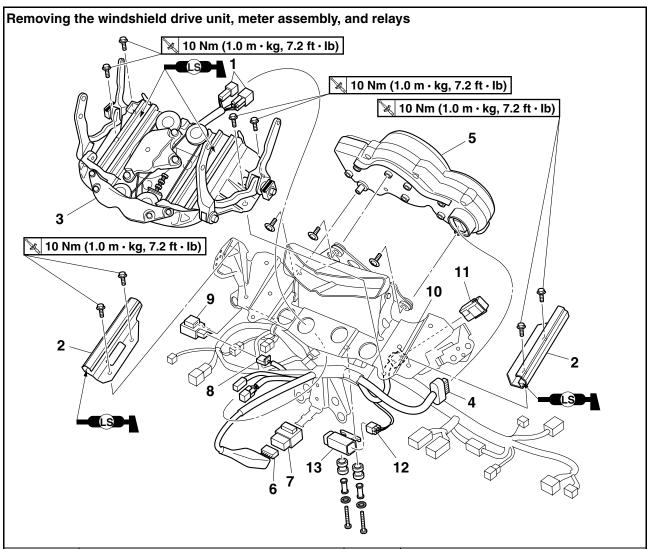


* For California only



Order	Job/Parts to remove	Q'ty	Remarks
	Front cowling assembly		Refer to "Removing the front cowling assembly".
1	Windshield outer bracket	1	
2	Windshield	1	
3	Windshield upper inner bracket	1	
4	Windshield lower inner bracket	1	
5	Rearview mirror	2	
6	Accessory box solenoid coupler	1	Disconnect.
7	Auxiliary DC jack coupler	1	Disconnect.
8	Accessory box	1	
9	Accessory box solenoid	1	
10	Headlight coupler	2	Disconnect.
11	Auxiliary light coupler	2	Disconnect.
12	Front cowling	1	
			For assembly, reverse the disassembly pro- cedure.





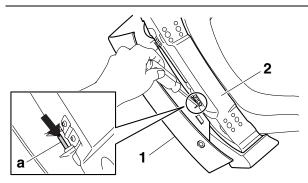
Order	Job/Parts to remove	Q'ty	Remarks
	Front cowling stay		Refer to "Disassembling the front cowling assembly".
1	Windshield drive unit coupler	2	Disconnect.
2	Windshield drive unit side rail	2	
3	Windshield drive unit	1	
4	Meter assembly coupler	1	Disconnect.
5	Meter assembly	1	
6	Relay unit coupler	1	Disconnect.
7	Relay unit	1	
8	Turn signal/hazard relay coupler	1	Disconnect.
9	Turn signal/hazard relay	1	
10	Headlight relay (dimmer) coupler	1	Disconnect.
11	Headlight relay (dimmer)	1	
12	Lean angle sensor coupler	1	Disconnect.
13	Lean angle sensor	1	
			For installation, reverse the removal proce- dure.

## REMOVING THE SIDE PANELS

- 1. Remove:
- Side panel "1"

#### NOTE:

To release a pin on the side panel "1" from its corresponding hinge on the side cowling "2", push the end "a" of the hinge with a flathead screwdriver.



#### ET3P61038

#### INSTALLING THE FRONT COWLING LEFT INNER PANEL 2

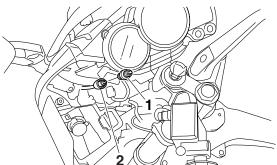
- 1. Install:
- Front cowling left inner panel 2

#### 

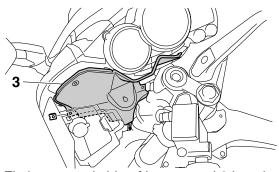
#### CAUTION:

When installing the panels onto the vehicle, be careful not to damage the panels or the vehicle itself.

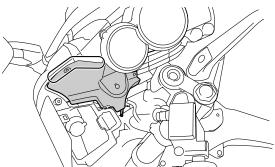
- a. Turn the main switch to "ON", and then open the accessory box lid.
- b. Turn the handlebar completely to the left.
- c. Install the adjusting knob shaft "1" onto the left headlight beam adjusting cable "2".



d. Place front cowling left inner panel 2 "3" between the front cowling assembly and the steering stem.



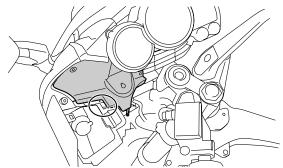
e. Fit the top and side of inner panel 2 into the front cowling assembly to the left of the meter assembly.



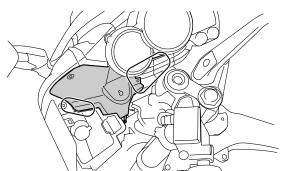
f. Fit inner panel 2 under the right side of the accessory box.

#### NOTE:

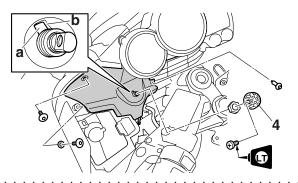
Pull the front cowling assembly outward when fitting the panel under the accessory box.



- g. Fit the lower left corner of inner panel 2 into the front cowling assembly in front of the accessory box, making sure to align the bolt hole in the panel with the bolt hole in the cowling.
- h. Push inner panel 2 inward, under the meter assembly.



- i. Insert the adjusting knob shaft into the hole in inner panel 2, making sure to align the projection "a" on the shaft's sleeve with the slot "b" in the panel, and then install the nut.
- j. Install the headlight beam adjusting knob "4".
- k. Install the hexagon socket bolts and the quick fastener.



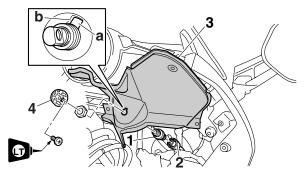
### ET3P61039

## INSTALLING THE FRONT COWLING RIGHT INNER PANEL 2

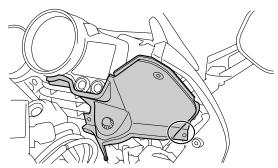
- 1. Install:
- Front cowling right inner panel 2

#### ***

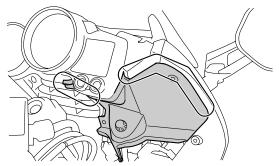
- a. Turn the handlebar completely to the right.
- b. Install the adjusting knob shaft "1" onto the right headlight beam adjusting cable "2".
- c. Insert the adjusting knob shaft into the hole in front cowling right inner panel 2 "3", making sure to align the projection "a" on the shaft's sleeve with the slot "b" in the panel, and then install the nut.
- d. Install the headlight beam adjusting knob "4".



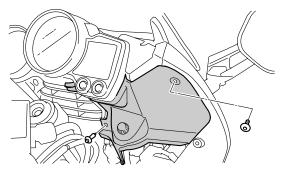
e. Fit the lower right corner of inner panel 2 into the front cowling assembly, making sure to align the bolt hole in the panel with the bolt hole in the cowling.



f. Fit the top and side of inner panel 2 into the front cowling assembly to the right of the meter assembly, and then push the panel inward, under the meter assembly.



g. Install the hexagon socket bolt and the quick fastener.



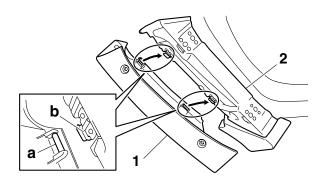
#### *****

#### ET3P61040

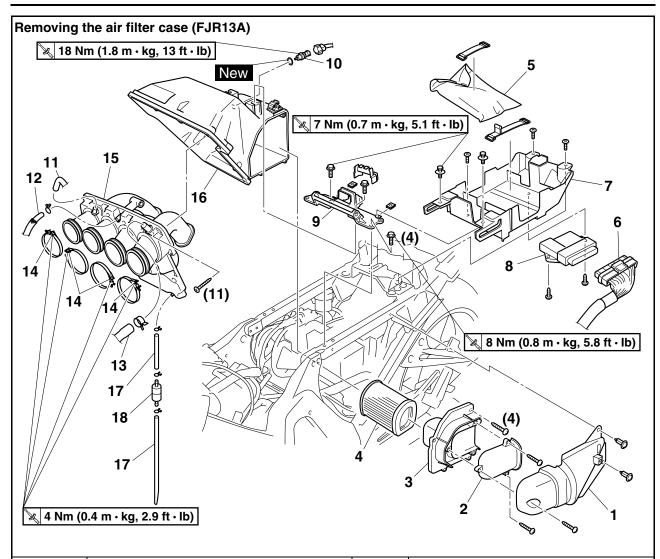
- INSTALLING THE SIDE PANELS
- 1. Install:
- Side panels "1"

#### NOTE: _

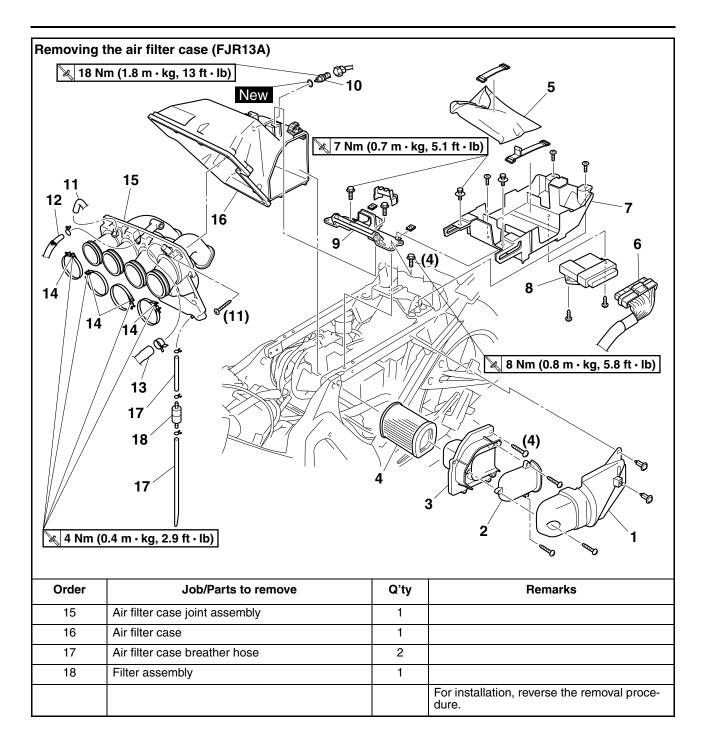
Be sure to fit each pin "a" on the side panels "1" into the groove "b" in its corresponding hinge on the side cowlings "2".

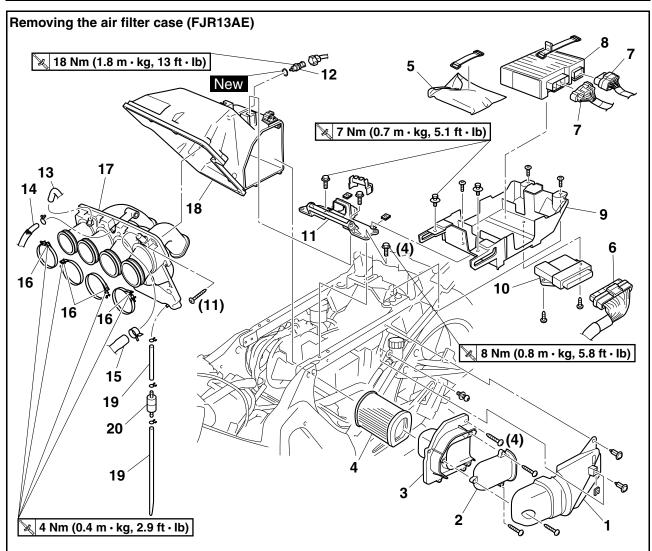


Removing	the T-bar		
Ø	37 Nm (3.7 m · kg, 27 ft · lb)		
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	T-bar	1	
2	Heat protector	1	
			For installation, reverse the removal proce- dure.

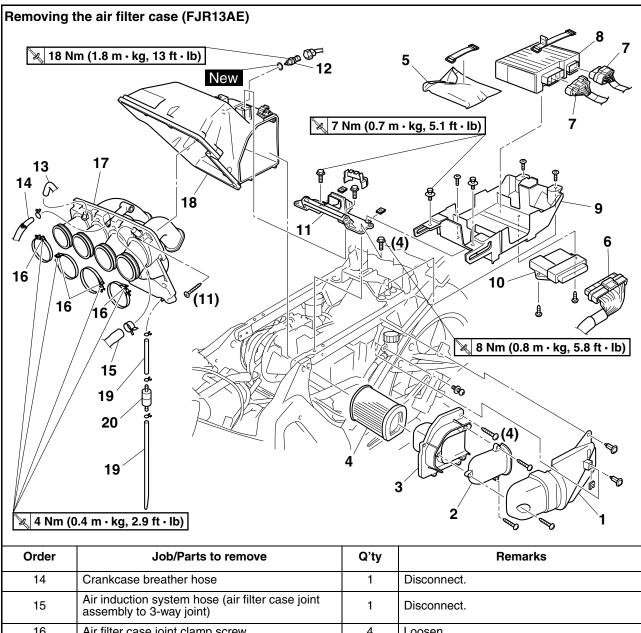


Order	Job/Parts to remove	Q'ty	Remarks
	Left side cover/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Air shroud	1	
2	Air duct	1	
3	Air filter case cover	1	
4	Air filter element	1	
5	Tool kit	1	
6	ECU coupler	1	Disconnect.
7	Storage compartment	1	
8	ECU (engine control unit)	1	
9	Rear lower fuel tank bracket	1	
10	Intake air temperature sensor	1	
11	Bypass air unit inlet hose	1	Disconnect.
12	Crankcase breather hose	1	Disconnect.
13	Air induction system hose (air filter case joint assembly to 3-way joint)	1	Disconnect.
14	Air filter case joint clamp screw	4	Loosen.





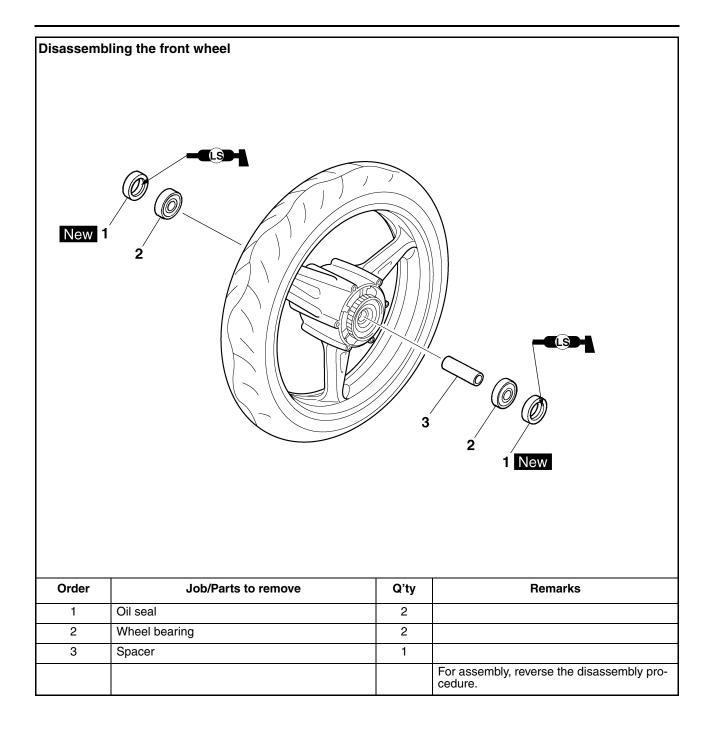
Order	Job/Parts to remove	Q'ty	Remarks
	Left side cover/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Shift actuator		Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-67.
1	Air shroud	1	
2	Air duct	1	
3	Air filter case cover	1	
4	Air filter element	1	
5	Tool kit	1	
6	ECU coupler	1	Disconnect.
7	MCU coupler	2	Disconnect.
8	MCU	1	
9	Storage compartment	1	
10	ECU (engine control unit)	1	
11	Rear lower fuel tank bracket	1	
12	Intake air temperature sensor	1	
13	Bypass air unit inlet hose	1	Disconnect.



14	Crankcase breather hose	1	Disconnect.
15	Air induction system hose (air filter case joint assembly to 3-way joint)	1	Disconnect.
16	Air filter case joint clamp screw	4	Loosen.
17	Air filter case joint assembly	1	
18	Air filter case	1	
19	Air filter case breather hose	2	
20	Filter assembly	1	
			For installation, reverse the removal proce- dure.

#### EAS21880 **FRONT WHEEL** Removing the front wheel, brake discs, wheel sensor, and sensor housing 💐 7 Nm (0.7 m · kg, 5.1 ft · lb) 🔀 7 Nm (0.7 m · kg, 5.1 ft · lb) 🔌 6 Nm (0.6 m • kg, 4.3 ft • lb) 🔀 6 Nm (0.6 m ⋅ kg, 4.3 ft ⋅ lb) 2 ®_® **0**7) PQ 3 °&/@ Cano. 2 🔌 21 Nm (2.1 m · kg, 15 ft · lb) 🔀 18 Nm (1.8 m · kg, 13 ft · lb) **ACT** 5 LT 6 5 🗫 🖗 @ (6 10 (LT) 11 (6) 🔀 40 Nm (4.0 m ⋅ kg, 29 ft ⋅ lb) 🔌 91Nm (9.1 m · kg, 66 ft · lb) (C) 11 9 8 3 🔀 30 Nm (3.0 m · kg, 22 ft · lb) Order Job/Parts to remove Q'ty Remarks Refer to "GENERAL CHASSIS" on page Rider seat/T-bar 4-1. Refer to "FUEL TANK" on page 7-1. Fuel tank 1 1 Front fender 2 Front wheel sensor coupler 1 Disconnect. 3 Front wheel sensor 1 4 2 Front brake caliper 5 Front wheel axle pinch bolt 4 Loosen. 6 Front wheel axle bolt 1 7 1 Front wheel axle 8 1 Front wheel 9 1 Front wheel sensor housing 10 Collar 1 11 Front brake disc 2 For installation, reverse the removal procedure.

### **FRONT WHEEL**



### REMOVING THE FRONT WHEEL

1. Stand the vehicle on a level surface.

### A WARNING

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

- 2. Remove:
- Front wheel sensor
- Front brake calipers
- EC3P61020

#### CAUTION:

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

#### 3. Elevate:

Front wheel

#### NOTE: _

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

### DISASSEMBLING THE FRONT WHEEL

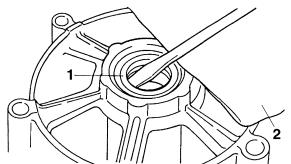
- 1. Remove:
- Oil seals
- Wheel bearings

#### *****

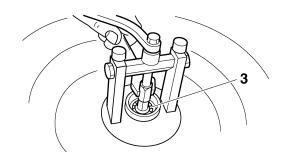
a. Clean the outside of the front wheel hub.b. Remove the oil seals "1" with a flathead screwdriver.

#### 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.



#### *****

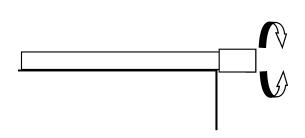
EAS21920

#### CHECKING THE FRONT WHEEL

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

### 

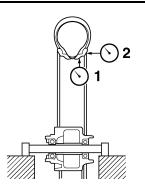
Do not attempt to straighten a bent wheel axle.



- 2. Check:
- Tire
- Front wheel Damage/wear → Replace. Refer to "CHECKING THE TIRES" on page 3-40 and "CHECKING THE WHEELS" on page 3-42.
- 3. Measure:
  - Radial wheel runout "1"
- Lateral wheel runout "2" Over the specified limits  $\rightarrow$  Replace.



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



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

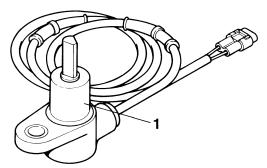


#### EAS22010

MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR EC3P61031

CAUTION:

- Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.
- The front wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.
- 1. Check:
  - Front wheel sensor "1" Cracks/bends/distortion  $\rightarrow$  Replace. Iron powder/dust  $\rightarrow$  Clean.



- 2. Measure:
  - Front wheel sensor resistance Out of specification → Replace.



Regulated resistance 1.2–1.6 kΩ at 20 °C (68 °F)

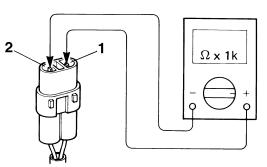
- a. Connect the pocket tester ( $\Omega \times 1k$ ) to the front wheel sensor coupler terminals as shown.



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

- Positive tester probe  $\rightarrow$
- white "1"
- Negative tester probe → gray "2"





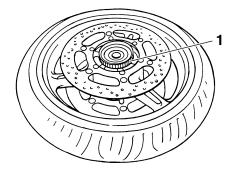
b. Measure the front wheel sensor resistance.

#### *****

- 3. Check:
- Front wheel sensor rotor "1" Cracks/damage → Replace the front wheel assembly.

#### NOTE: _

The wheel sensor rotor of the vehicle is inserted under pressure by a special process and cannot be replaced as a single unit. To replace the sensor rotor, replace the wheel assembly.



### ASSEMBLING THE FRONT WHEEL

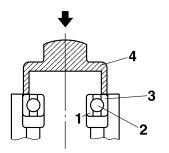
- 1. Install:
- Wheel bearings New
- Oil seals New
- ******
- a. Install the new wheel bearings and oil seals in the reverse order of disassembly.

### 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: _

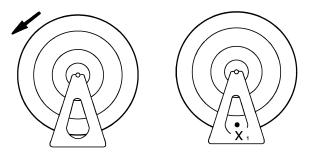
- After replacing the tire, wheel, or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake discs installed.
- 1. Remove:
- Balancing weight(s)
- 2. Find:
- Front wheel's heavy spot

#### NOTE: _

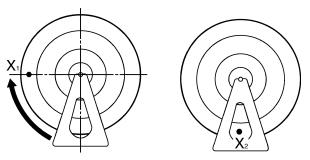
Place the front wheel on a suitable balancing stand.

#### *****

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



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



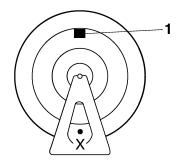
- f. Repeat steps (d) through (f) several times until all the marks come to rest at the same spot.
- g. The spot where all the marks come to rest is the front wheel's heavy spot "X".

#### *****

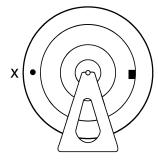
- 3. Adjust:
- Front wheel static balance
- ****
- a. Install a balancing weight "1" onto the rim exactly opposite the heavy spot "X".

#### NOTE:

Start with the lightest weight.



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



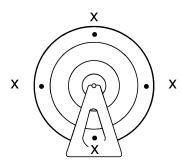
- c. If the heavy spot does not stay in that position, install a heavier weight.
- d. Repeat steps (b) and (c) until the front wheel is balanced.

#### *****

- 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.

#### *****

### INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)

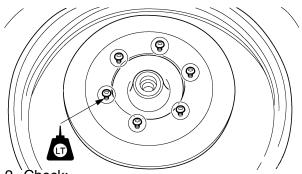
- 1. Install:
- Front brake discs



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

#### NOTE: _

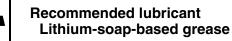
Tighten the brake disc bolts in stages and in a crisscross pattern.



2. Check:

 Front brake discs Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-34.

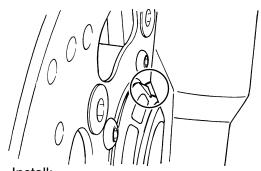
- 3. Lubricate:
- Oil seal lips



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

#### NOTE:

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



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



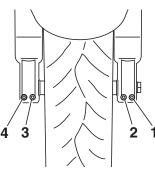
Front wheel axle bolt 91 Nm (9.1 m·kg, 66 ft·lb) Front wheel axle pinch bolt 21 Nm (2.1 m·kg, 15 ft·lb)

### EC3P61022

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

#### *****

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



#### *****

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



Front brake caliper bolt 40 Nm (4.0 m·kg, 29 ft·lb) Front wheel sensor bolt 30 Nm (3.0 m·kg, 22 ft·lb)

#### NOTE:

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

#### EC3P66003

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

• To route the front wheel sensor lead, refer to "CABLE ROUTING (FJR13A)" on page 2-47 and "CABLE ROUTING (FJR13AE)" on page 2-67.

## WARNING

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

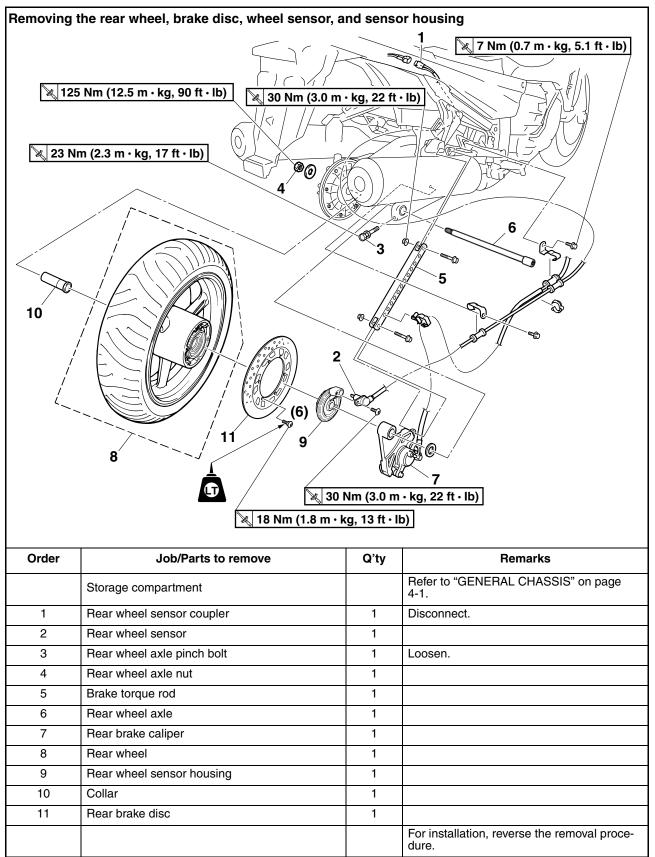
7. Check:

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

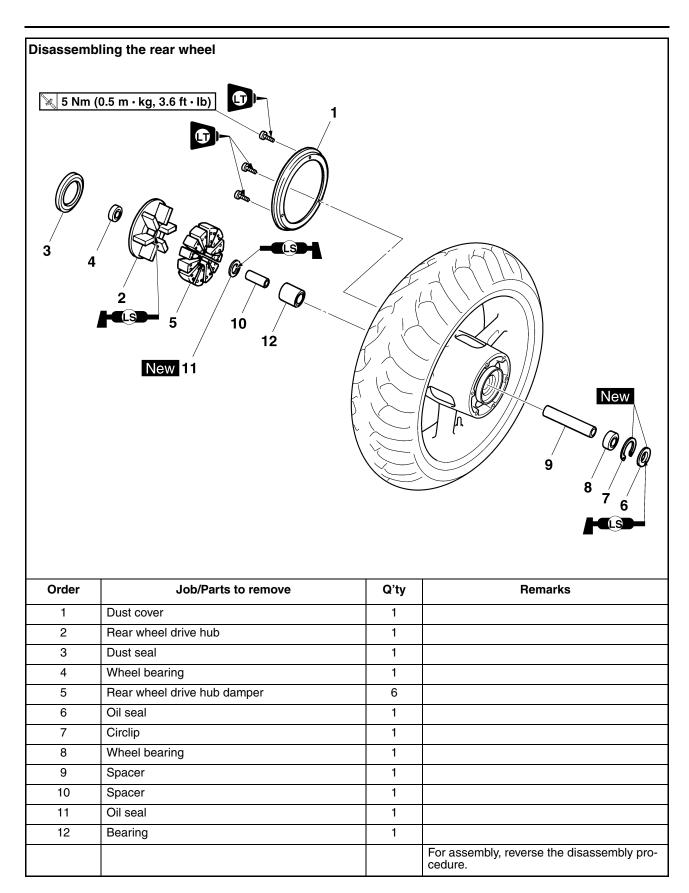
#### NOTE:

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

## REAR WHEEL



### **REAR WHEEL**



### REMOVING THE REAR WHEEL

1. Stand the vehicle on a level surface.

#### A WARNING

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

#### NOTE: _

Place the vehicle on the centerstand so that the rear wheel is elevated.

#### 2. Remove:

- Rear wheel sensor
- Rear wheel axle nut
- Brake torque rod
- Rear wheel axle
- Rear brake caliper
- Rear wheel
- Rear wheel sensor housing

### CAUTION:

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

#### NOTE: _

Move the rear wheel to the right to separate it from the final drive assembly.

#### EAS22080

#### DISASSEMBLING THE REAR WHEEL

- 1. Remove:
- Oil seals
- Wheel bearings

Refer to "DISASSEMBLING THE FRONT WHEEL" on page 4-19.

#### EAS22090

#### CHECKING THE REAR WHEEL

- 1. Check:
- Rear wheel axle
- Rear wheel
- Wheel bearings
- Oil seals Refer to "CHECKING THE FRONT WHEEL" on page 4-19.
- 2. Check:
  - Tire
  - Rear wheel Damage/wear  $\rightarrow$  Replace.

Refer to "CHECKING THE TIRES" on page 3-40 and "CHECKING THE WHEELS" on page 3-42.

- 3. Measure:
  - Radial wheel runout
- Lateral wheel runout Refer to "CHECKING THE FRONT WHEEL" on page 4-19.



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

#### EAS22200

#### MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR EC3P61032

CAUTION:

- Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.
- The rear wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.
- 1. Check:
- Rear wheel sensor Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.
- 2. Measure:
- Rear wheel sensor resistance Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.
- 3. Check:
- Rear wheel sensor rotor Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.

### EAS22140

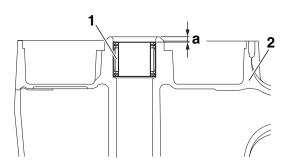
### ASSEMBLING THE REAR WHEEL

- 1. Install:
  - Bearing "1"



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

### **REAR WHEEL**



- 2. Rear wheel
- 2. Install:
- Wheel bearings New
- Oil seals New Refer to "ASSEMBLING THE FRONT WHEEL" on page 4-21.

#### EAS22150

# ADJUSTING THE REAR WHEEL STATIC BALANCE

#### NOTE: _

- After replacing the tire, wheel, or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.
- 1. Adjust:
- Rear wheel static balance Refer to "ADJUSTING THE FRONT WHEEL STATIC BALANCE" on page 4-21.

#### EAS22170

## INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

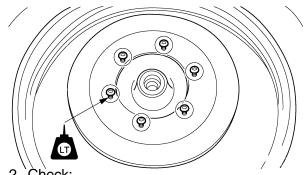
- 1. Install:
- Rear brake disc



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

#### 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 4-47.
- 3. Lubricate:
- Oil seal lips

#### Recommended lubricant Lithium-soap-based grease

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

#### NOTE:

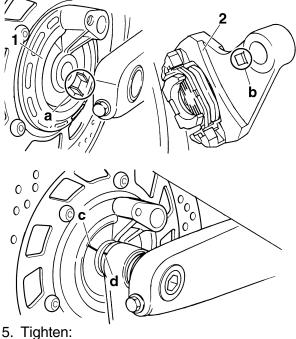
- Align the slot "a" of the rear wheel sensor housing "1" with the projection "b" of the rear brake caliper bracket "2", and then assemble them.
- After assembling the rear wheel sensor housing and the rear brake caliper bracket, make sure that the projection "c" on the housing is aligned with the projection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

### ECA14470

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

### WARNING

Make sure the brake hose is routed properly.



- . Tigriteri. • Broko torguo ra
- Brake torque rod nuts
- Rear wheel axle nut
- Rear wheel axle pinch bolt

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

6. Install:

Rear wheel sensor

Rear wheel sensor bolt 30 Nm (3.0 m·kg, 22 ft·lb)

CAUTION:

To route the rear wheel sensor lead, refer to "CABLE ROUTING (FJR13A)" on page 2-47 and "CABLE ROUTING (FJR13AE)" on page 2-67.

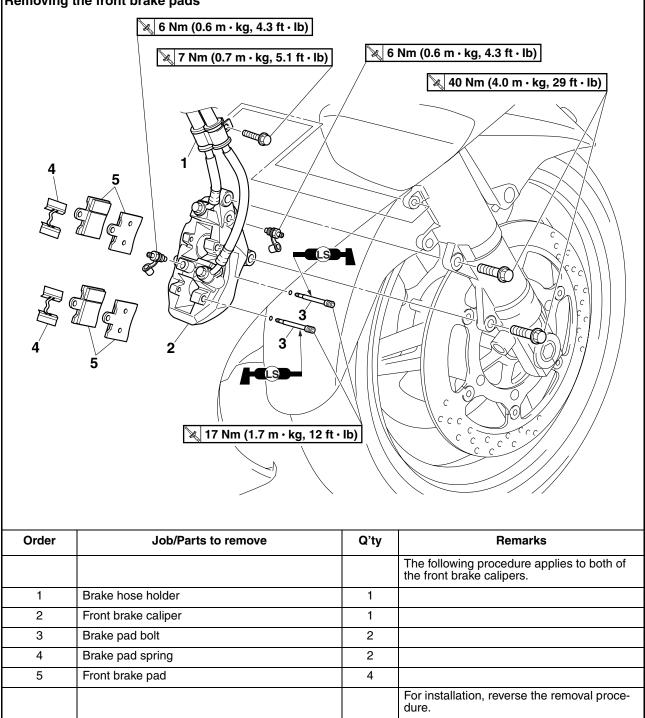
#### NOTE:

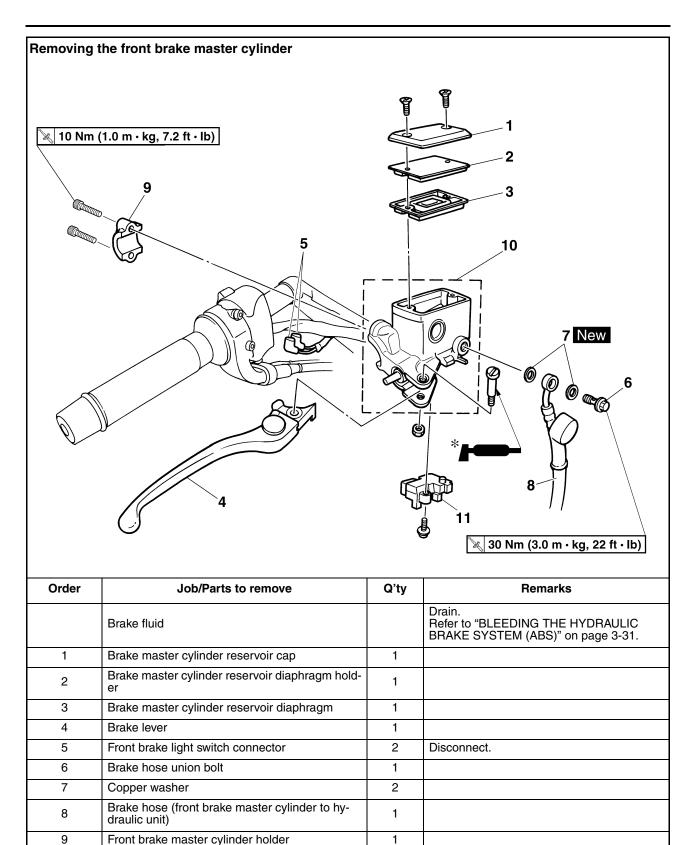
When installing the rear wheel sensor, check the rear wheel sensor lead for twists and the sensor electrode for foreign materials.

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

## FRONT BRAKE







* Apply silicon grease

Front brake master cylinder

Front brake light switch

10

11

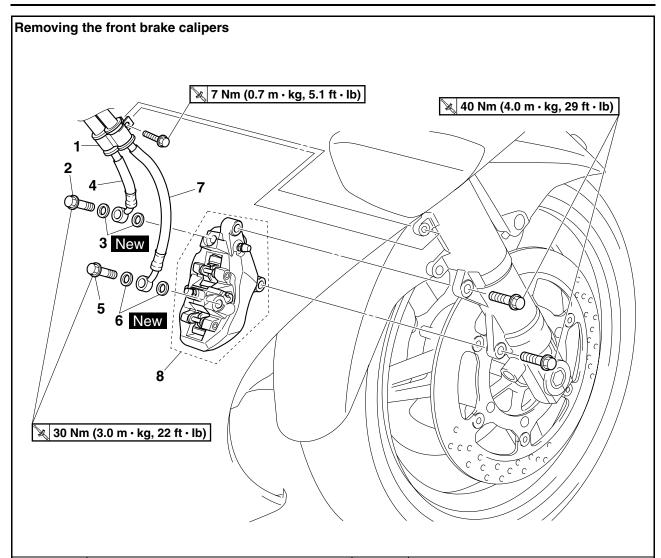
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dure.

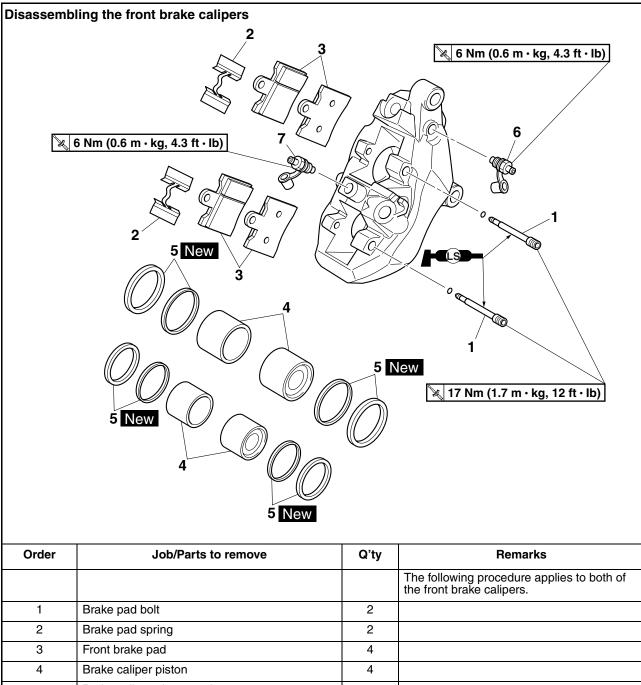
For installation, reverse the removal proce-

Disassemb	ling the front brake master cylinder		
		4	<image/> <image/>
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder push rod	1	
2	Dust boot	1	
3	Circlip	1	
4	Brake master cylinder kit	1	
5	Brake master cylinder body	1	
			For assembly, reverse the disassembly pro- cedure.

* Apply silicon grease



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.
1	Brake hose holder	1	
2	Brake hose union bolt	1	
3	Copper washer	2	
4	Brake hose (hydraulic unit to front brake calipers)	1	
5	Brake hose union bolt (unified brake system)	1	Right side only.
6	Copper washer	2	Right side only.
7	Brake hose (metering valve to right front brake caliper)	1	Right side only.
8	Front brake caliper	1	
			For installation, reverse the removal proce- dure.



4	Brake caliper pistori	4	
5	Brake caliper piston seal	8	
6	Bleed screw	1	
7	Bleed screw	1	Right side only.
			For assembly, reverse the disassembly pro- cedure.

### 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 4-17. 2. Check:

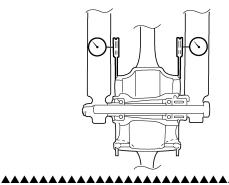
- Brake disc Damage/galling  $\rightarrow$  Replace.
- 3. Measure:
- Brake disc deflection Out of specification → Correct the brake disc deflection or replace the brake disc.

Bra 0.

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.

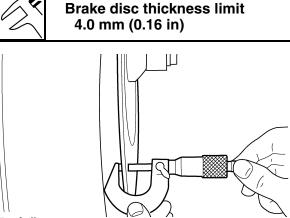
e. Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.



4. Measure:

 Brake disc thickness
 Measure the brake disc thickness at a few different locations.
 Out of apparises a Depleted

Out of specification  $\rightarrow$  Replace.



- 5. Adjust:
- Brake disc deflection

#### *******

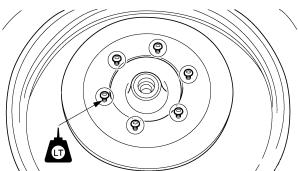
- a. Remove the brake disc.
- b. Rotate the brake disc by one bolt hole.
- c. Install the brake disc.



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

#### NOTE:_

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



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

#### *****

- 6. Install:
- Front wheel Refer to "FRONT WHEEL" on page 4-17.

#### REPLACING THE FRONT BRAKE PADS

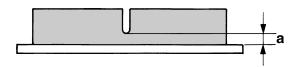
The following procedure applies to both brake calipers.

#### 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.

Brake pad lining thickness (inner) 5.5 mm (0.22 in) Limit 0.5 mm (0.02 in) Brake pad lining thickness (outer) 5.5 mm (0.22 in) Limit 0.5 mm (0.02 in)



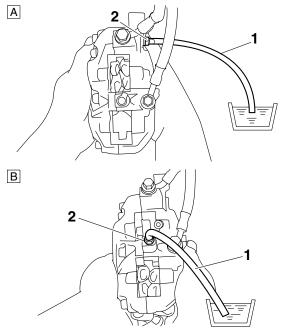
- 2. Install:
  - Brake pads
- Brake pad spring

#### NOTE: ____

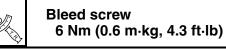
Always install new brake pads and a new brake pad spring as a set.

#### *****

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



- A. Front brake
- B. Unified brake system
- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
- c. Tighten the bleed screw.



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

#### 3. Lubricate:

Brake pad bolts

## -----1

ECA14150

#### Recommended lubricant Lithium-soap-based grease

#### CAUTION:

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

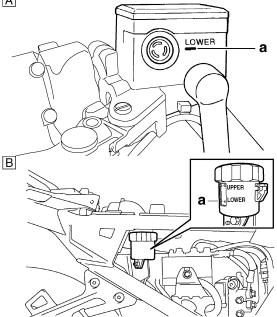


Brake pad bolt 17 Nm (1.7 m·kg, 12 ft·lb) Brake caliper bolt 40 Nm (4.0 m·kg, 29 ft·lb)

- 5. 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 3-29.

А



#### A. Front brake

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

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.

### REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

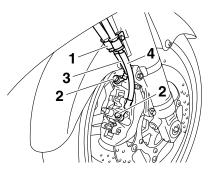
#### NOTE: _

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

- 1. Remove:
- Brake hose holder "1"
- Brake hose union bolts "2"
- Copper washers
- Brake hose (hydraulic unit to front brake calipers) "3"
- Brake hose (metering valve to right front brake caliper) "4"

#### NOTE:

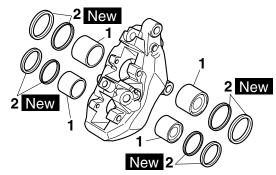
Put the end of the brake hoses into a container and pump out the brake fluid carefully.



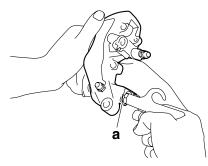
#### DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

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



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



### EWA13560

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

### CHECKING THE FRONT BRAKE CALIPERS

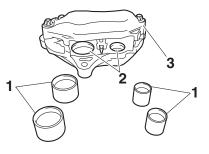
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Recommended brake component replace- ment schedule			
Brake pads	If necessary		
Piston seals	Every two years		
Brake hoses	Every four years		
Brake fluid	Every two years and whenever the brake is disassembled		

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

### WARNING

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



### 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

### EAS222440 INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

- 1. Install:
- Front brake caliper "1" (temporarily)
- Copper washers New
- Brake hose (hydraulic unit to front brake calipers) "2"
- Brake hose (metering valve to right front brake caliper) "3"
- Brake hose union bolts "4"



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

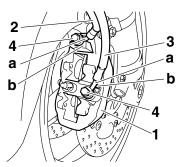
### WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (FJR13A)" on page 2-47 and "CA-BLE ROUTING (FJR13AE)" on page 2-67.

#### ECA14170

#### CAUTION:

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



- 2. Remove:
- Brake caliper
- 3. Install:
  - Brake pads
  - Brake pad springs
  - Brake pad bolts
  - Brake caliper
  - Brake hose holder Refer to "REPLACING THE FRONT BRAKE PADS" on page 4-35.

Brake pad bolt 17 Nm (1.7 m·kg, 12 ft·lb) Brake caliper bolt 40 Nm (4.0 m·kg, 29 ft·lb) Brake hose holder bolt 7 Nm (0.7 m·kg, 5.1 ft·lb)

4. Fill:

- Brake master cylinder reservoir
- Brake fluid reservoir (with the specified amount of the 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 master cylinder reservoir and brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

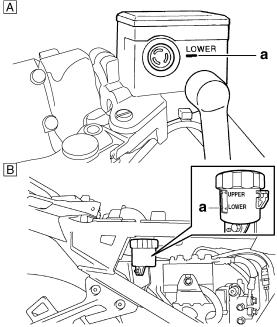
#### CAUTION:

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 (ABS)" on page 3-31.
- 6. Check:
  - Brake fluid level Below the minimum leve

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 3-29.



- A. Front brake
- B. Unified brake system
- 7. Check:
- Brake lever and brake pedal operation Soft or spongy feeling → Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.

### REMOVING THE FRONT BRAKE MASTER CYLINDER

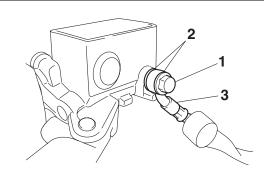
#### NOTE: ____

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

- 1. Remove:
- Brake hose union bolt "1"
- Copper washers "2"
- Brake hose (front brake master cylinder to hydraulic unit) "3"

#### NOTE:

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



#### EAS22500

#### CHECKING THE FRONT BRAKE MASTER CYLINDER

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



#### EAS22530

### INSTALLING THE FRONT BRAKE MASTER CYLINDER

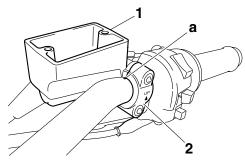
- 1. Install:
- Brake master cylinder "1"
- Brake master cylinder holder "2"



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

#### NOTE: _

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



- 2. Install:
  - Copper washers New
  - Brake hose (front brake master cylinder to hydraulic unit)
  - Brake hose union bolt



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 (FJR13A)" on page 2-47 and "CA-BLE ROUTING (FJR13AE)" on page 2-67.

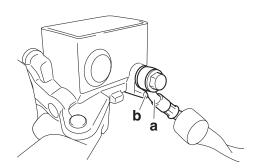
#### EC3P61025

CAUTION:

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

#### NOTE:

Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



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

#### Recommended fluid DOT 4

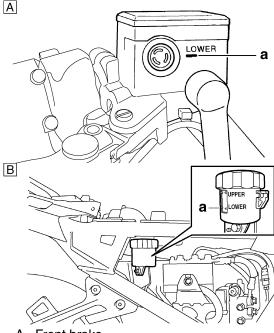
### WARNING

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

### CAUTION:

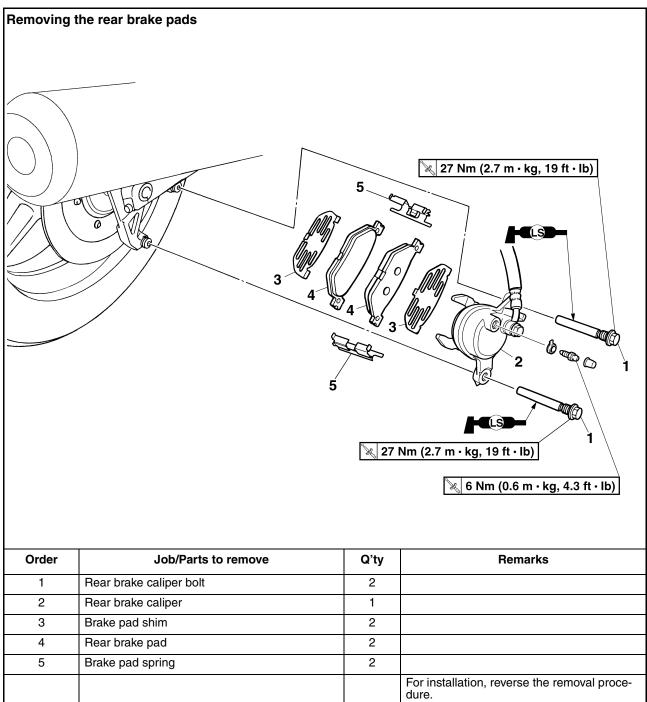
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

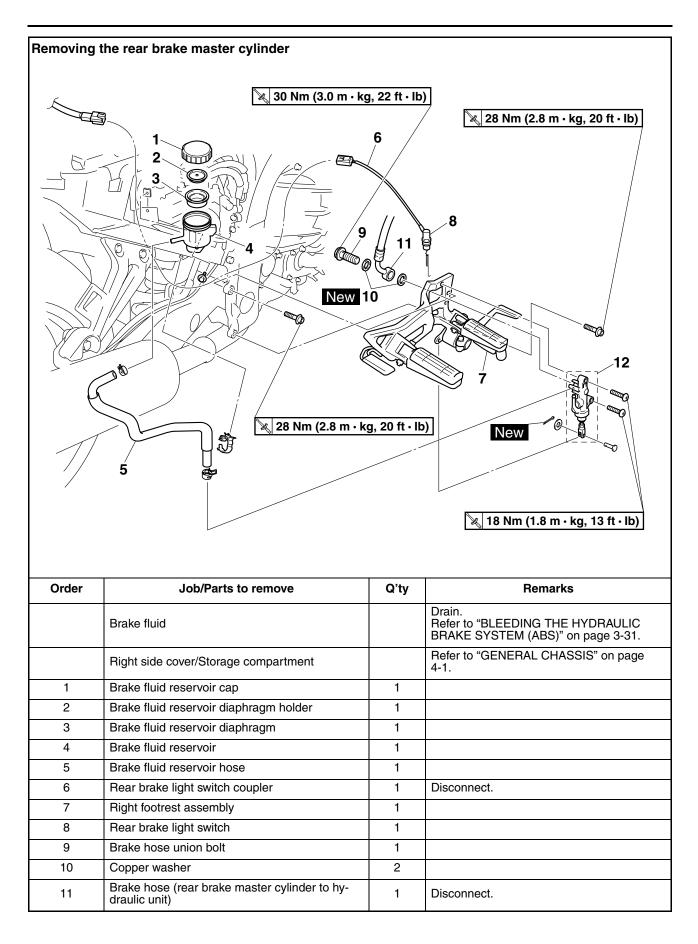
- 4. Bleed:
  - Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.
- 5. Check:
- Brake fluid level Below the minimum level mark "a" → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-29.

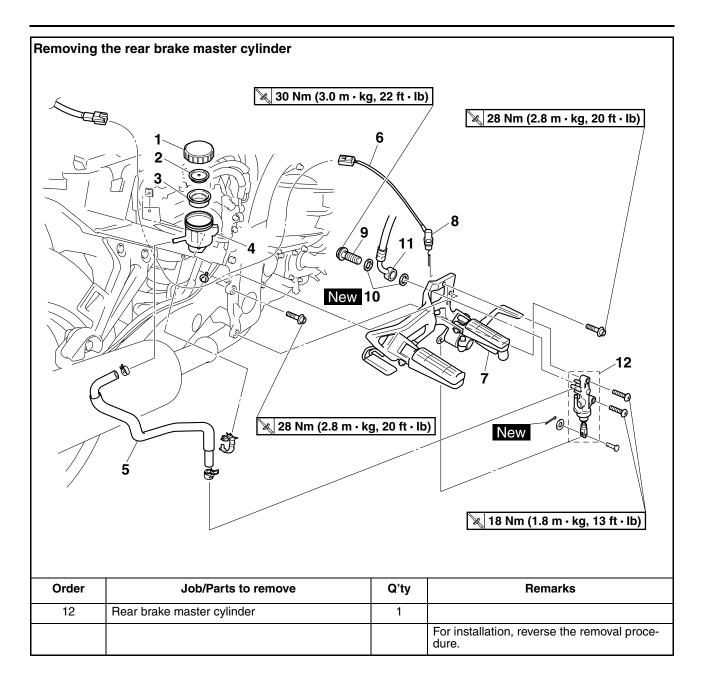


- A. Front brake
- B. Unified brake system
- 6. Check:
- Brake lever and brake pedal operation Soft or spongy feeling → Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.

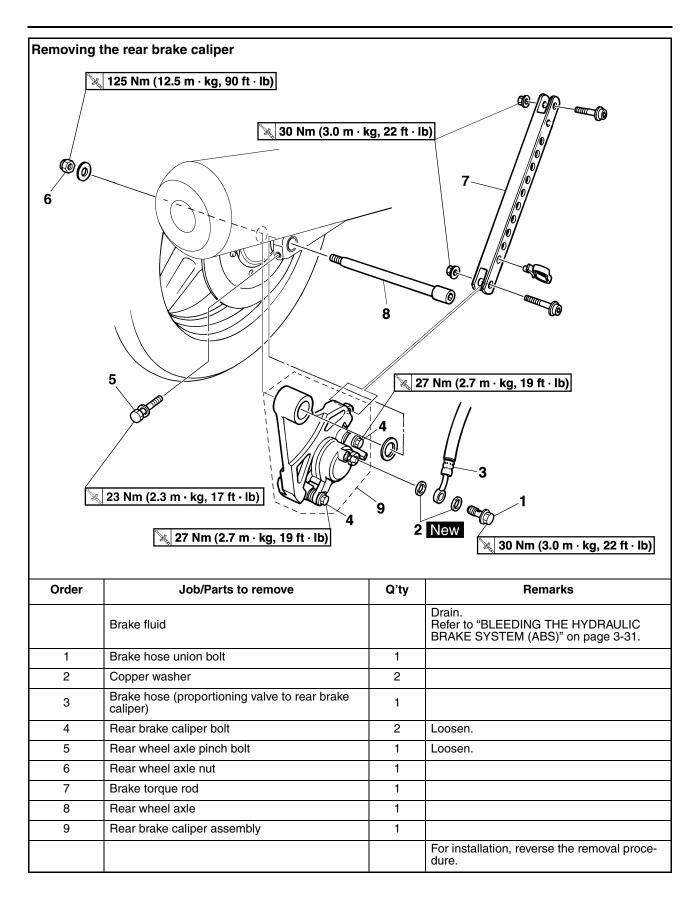






<b>16 Nm</b>	(1.6 m · kg, 11 ft · lb) * * * * * * * * * * * * *	A A A	tere
Order	Job/Parts to remove	Q'ty	Remarks
1	Dust boot	1	
2	Circlip	1	
3	Brake master cylinder push rod	1	
4	Brake master cylinder kit	1	
5	Brake master cylinder body	1	
			For assembly, reverse the disassembly pro- cedure.

* Apply silicon grease



Disassembling the rear brake caliper				
Order 1	Job/Parts to remove	Q'ty 2	Solution Set No.6 m ⋅ kg, 4.3 ft ⋅ lb) Remarks	
2	Brake pad shim	2		
3	Rear brake pad	2		
4	Brake pad spring	2		
5	Rear brake caliper bracket	1		
6	Brake caliper piston	1		
7	Brake caliper piston seal	2		
8	Bleed screw	1		
			For assembly, reverse the disassembly pro- cedure.	

#### 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 4-24.
- 2. Check:
  - Brake disc Damage/galling → Replace.
- 3. Measure:
- Brake disc deflection Out of specification → Correct the brake disc deflection or replace the brake disc. Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-34.



#### 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 4-34.



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

5. Adjust:

• Brake disc deflection Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-34.

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

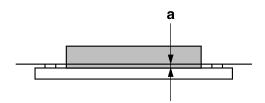
6. Install:

• Rear wheel Refer to "REAR WHEEL" on page 4-24.

# REPLACING THE REAR BRAKE PADS

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

- 1. Measure:
- Brake pad wear limit "a" Out of specification → Replace the brake pads as a set.
  - Brake pad lining thickness (inner) 6.3 mm (0.25 in) Limit 0.8 mm (0.03 in) Brake pad lining thickness (outer) 6.3 mm (0.25 in) Limit 0.8 mm (0.03 in)

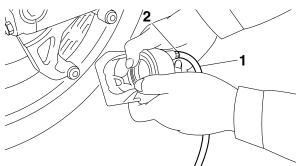


- 2. Install:
- Brake pad springs
- Brake pad shims
- (onto the brake pads)
- Brake pads

#### NOTE: _

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

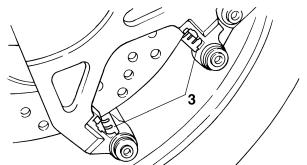
- a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.
- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.



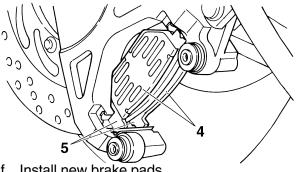
c. Tighten the bleed screw.



d. Install new brake pad springs "3".



e. Install a new brake pad shim "4" onto each new brake pad "5".



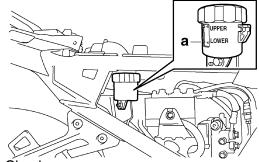
- f. Install new brake pads.
- 3. Install:
  - Rear brake caliper



#### Rear brake caliper bolt 27 Nm (2.7 m·kg, 19 ft·lb)

- 4. 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 3-29.



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

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.

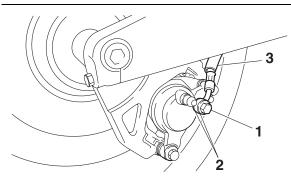
## REMOVING THE REAR BRAKE CALIPER

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

- 1. Remove:
- Brake hose union bolt "1"
- Copper washers "2"
- Brake hose (proportioning valve to rear brake caliper) "3"

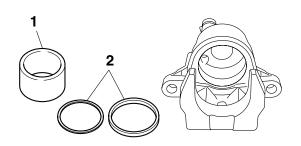
#### NOTE:_

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"

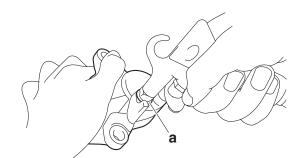


#### *****

 Blow compressed air into the brake hose joint opening "a" to force out the piston 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 caliper.
- Never try to pry out the brake caliper piston.



b. Remove the brake caliper piston seals.

#### *****

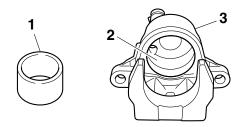
### CHECKING THE REAR BRAKE CALIPER

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 passage (brake caliper body)
   Obstruction → Blow out with compressed air.

### WARNING

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



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

#### EAS222650 ASSEMBLING THE REAR BRAKE CALIPER EWA13620

### WARNING

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



Recommended fluid DOT 4

EAS222670
INSTALLING THE REAR BRAKE CALIPER

- 1. Install:
- Rear brake caliper assembly (temporarily)
- Rear wheel axle
- Brake torque rod

• Rear wheel axle nut

#### NOTE:

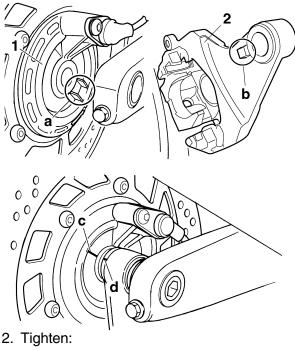
- Do not install the brake pads, brake pad shims, and brake pad springs.
- Align the slot "a" of the rear wheel sensor housing "1" with the projection "b" of the rear brake caliper bracket "2", and then assemble them.
- After assembling the rear wheel sensor housing and the rear brake caliper bracket, make sure that the projection "c" on the housing is aligned with the projection "d" on the bracket.

### CAUTION:

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

### WARNING

Make sure the brake hose is routed properly.



- Brake torque rod nuts
- Rear wheel axle nut
- Rear wheel axle pinch bolt



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

- 3. Install:
- Copper washers New
- Brake hose (proportioning valve to rear brake caliper) "1"
- Brake hose union bolt "2"



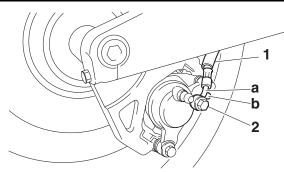
Brake hose union bolt 30 Nm (3.0 m·kg, 22 ft·lb)

### WARNING

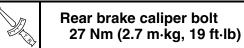
Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (FJR13A)" on page 2-47 and "CA-BLE ROUTING (FJR13AE)" on page 2-67.

#### EC3P61044 CAUTION:

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



- 4. Remove:
- Rear brake caliper bolts
- Rear brake caliper
- 5. Install:
- Brake pad springs
- Rear brake pads
- Brake pad shims
- Rear brake caliper bolts
- Rear brake caliper Refer to "REPLACING THE REAR BRAKE PADS" on page 4-47.



#### 6. Fill:

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



Recommended fluid DOT 4

### WARNING

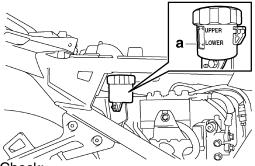
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

- 7. Bleed:
  - Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.
- 8. 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 3-29.



- 9. Check:
- Brake pedal operation

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

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.

### REMOVING THE REAR BRAKE MASTER CYLINDER

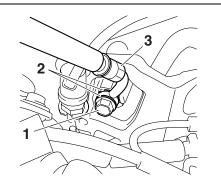
#### NOTE:

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

- 1. Remove:
- Brake hose union bolt "1"
- Copper washers "2"
- Brake hose (rear brake master cylinder to hydraulic unit) "3"

#### NOTE: _

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



#### EAS22720 CHECKING THE REAR BRAKE MASTER CYLINDER

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

Recommended fluid DOT 4

#### EAS22740

#### INSTALLING THE REAR BRAKE MASTER CYLINDER

- 1. Install:
- Copper washers New
- Brake hose (rear brake master cylinder to hydraulic unit) "1"
- Rear brake hose union bolt "2"



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

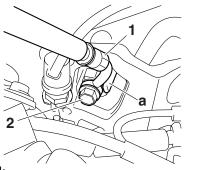
### WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (FJR13A)" on page 2-47 and "CA-BLE ROUTING (FJR13AE)" on page 2-67.

#### ECA14160

#### CAUTION:

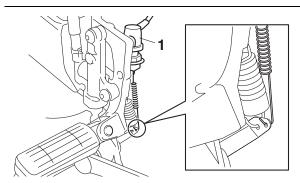
When installing the brake hose onto the brake master cylinder, make sure the brake pipe touches the projection "a" as shown.



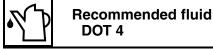
- 2. Install:
- Rear brake light switch "1"

#### NOTE:

Install the rear brake light switch spring as shown in the illustration.



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



### WARNING

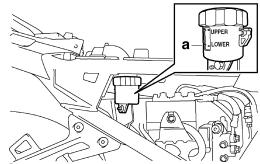
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake 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 (ABS)" on page 3-31.
- 5. 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 3-29.

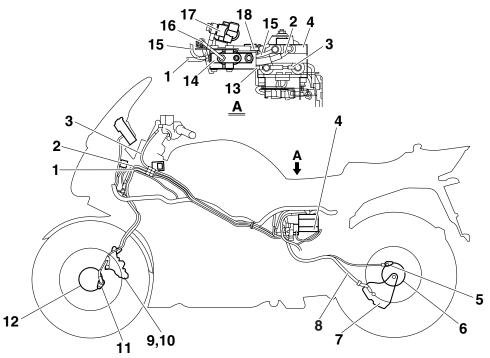


- 6. Check:
  - Brake pedal operation Soft or spongy feeling → Bleed the brake system.

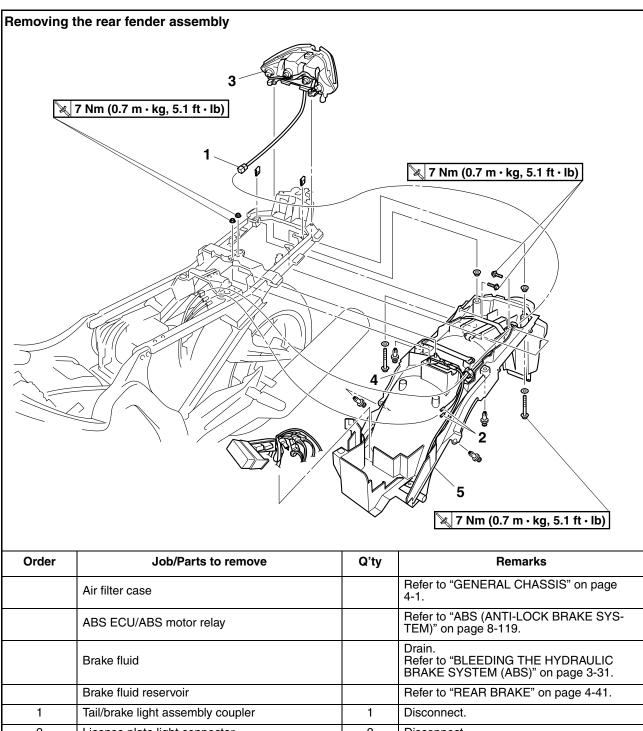
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.

- 7. Adjust:
  - Brake pedal position
     Refer to "ADJUSTING THE REAR DISC
     BRAKE" on page 3-28.
- 8. Adjust:
- Rear brake light operation timing Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-30.

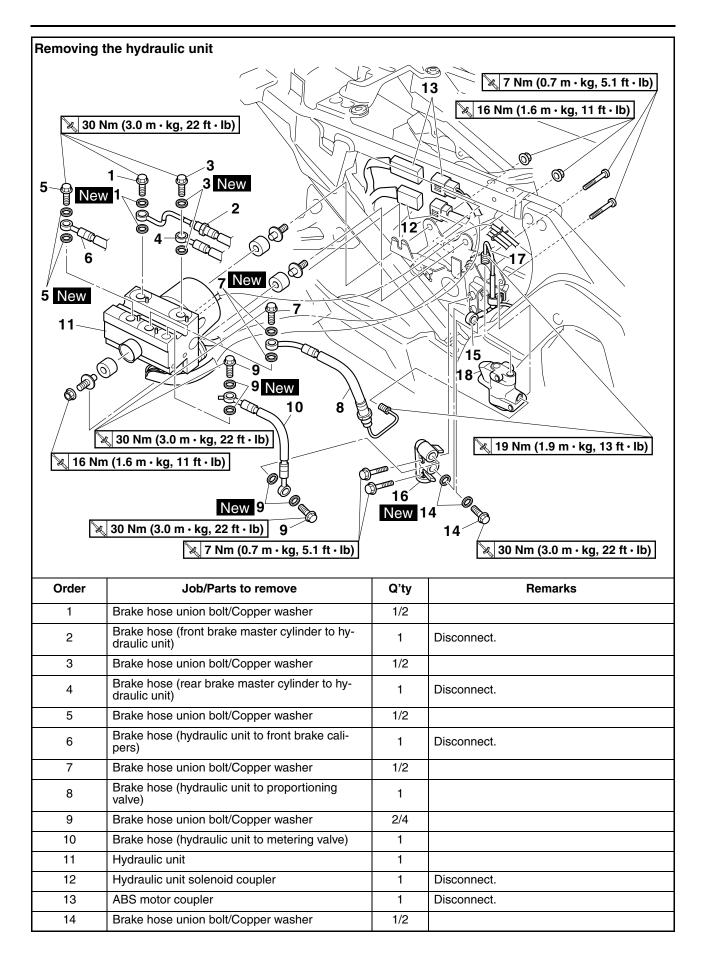
### ABS COMPONENTS CHART

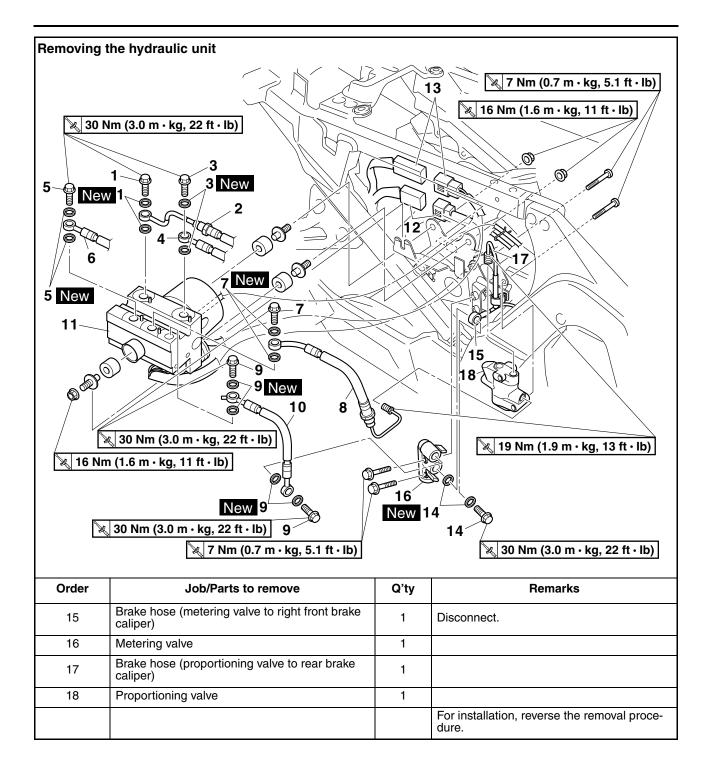


- 1. Brake hose (metering valve to right front brake caliper)
- 2. Brake hose (hydraulic unit to front brake calipers)
- 3. Brake hose (front brake master cylinder to hydraulic unit)
- 4. Hydraulic unit (HU)
- 5. Rear wheel sensor rotor
- 6. Rear wheel sensor
- 7. Rear brake caliper
- 8. Brake hose (proportioning valve to rear brake caliper)
- 9. Left front brake caliper
- 10. Right front brake caliper (partially operated together with the rear brake)
- 11. Front wheel sensor
- 12. Front wheel sensor rotor
- 13. Brake hose (rear brake master cylinder to hydraulic unit)
- 14. Proportioning valve
- 15. Brake hose (hydraulic unit to proportioning valve)
- 16. Brake hose (proportioning valve to rear brake caliper)
- 17. Metering valve
- 18. Brake hose (hydraulic unit to metering valve)



	Brake fluid reservoir		Refer to "REAR BRAKE" on page 4-41.
1	Tail/brake light assembly coupler	1	Disconnect.
2	License plate light connector	2	Disconnect.
3	Tail/brake light assembly	1	
4	Seat lock cable assembly	1	
5	Rear fender assembly	1	
			For installation, reverse the removal proce- dure.

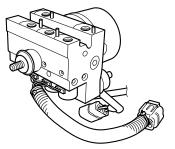




#### ET3P61055

#### REMOVING THE HYDRAULIC UNIT ECA14510 CAUTION:

Do not remove the hydraulic unit to check the resistance of the solenoid valves and the ABS motor for continuity.



### WARNING

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

#### EC3P61010

#### CAUTION:

- Handle the ABS components with care, since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.
- The wheel sensors cannot be disassembled. Do not attempt to disassemble the sensors. If faulty, replace with new sensors.
- Do not turn the main switch to "ON" when removing the hydraulic unit.
- Do not clean with compressed air.
- Do not reuse the brake fluid.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Do not allow any brake fluid to contact the couplers. Brake fluid may damage the couplers and cause bad contacts.
- If the union bolts for the hydraulic unit have been removed, be sure to tighten them to the specified torque and bleed the brake system.
- 1. Remove:
- Brake hose "1" (front brake master cylinder to hydraulic unit)
- Brake hose "2" (rear brake master cylinder to hydraulic unit)

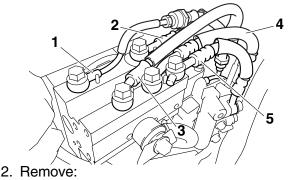
- Brake hose "3" (hydraulic unit to front brake calipers)
- Brake hose "4" (hydraulic unit to proportioning valve)
- Brake hose "5" (hydraulic unit to metering valve)

#### NOTE:

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

### CAUTION:

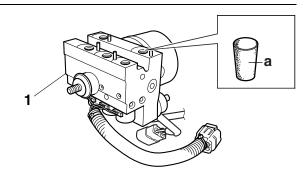
When removing the brake hoses, cover the area around the hydraulic unit to catch any spilt brake fluid. Do not allow the brake fluid to contact other parts.



• Hydraulic unit "1"

#### NOTE:

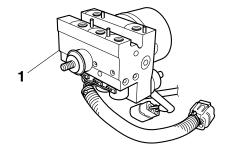
To avoid brake fluid leakage and to prevent foreign materials from entering the hydraulic unit, insert a rubber plug "a" or a bolt ( $M10 \times 1.25$ ) into each union bolt hole.



ET3P61056

#### CHECKING THE HYDRAULIC UNIT

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



#### ET3P61057

#### CHECKING THE PROPORTIONING VALVE AND METERING VALVE

- 1. Check:
- Proportioning valve Cracks/damage → Replace the proportioning valve.
- Metering valve Cracks/damage → Replace the metering valve

#### ET3P61058

#### **INSTALLING THE HYDRAULIC UNIT**

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

- 1. Install:
- Hydraulic unit

#### NOTE:

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

### CAUTION:

Do not remove the rubber plugs or bolts (M10  $\times$  1.25) installed in the union bolt holes before installing the hydraulic unit.

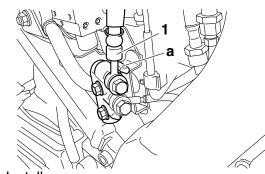
- 2. Remove:
- Rubber plugs or bolts (M10  $\times$  1.25)
- 3. Install:
- Copper washer New
- Brake hose (hydraulic unit to metering valve) "1"
  - (to the metering valve)
- Brake hose union bolt



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

#### NOTE:

The brake hose "1" contacts the stopper "a" on the metering valve.



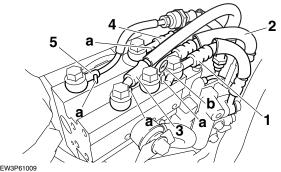
- 4. Install:
- Copper washers New
- Brake hose "1" (hydraulic unit to metering valve)
- Brake hose "2" (hydraulic unit to proportioning valve)
- Brake hose "3" (hydraulic unit to front brake calipers)
- Brake hose "4" (rear brake master cylinder to hydraulic unit)
- Brake hose "5" (front brake master cylinder to hydraulic unit)
- Brake hose union bolts



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

#### NOTE: _

- Make sure that the brake hoses "1", "3", "4", and "5" contact the stoppers "a" on the hydraulic unit.
- Make sure that the brake hose "2" contacts the end "b" of the brake hose "1".



#### 

Be sure to connect each brake hose to the correct union bolt hole.

### CAUTION:

To route the brake hoses, refer to "CABLE ROUTING (FJR13A)" on page 2-47 and "CA-BLE ROUTING (FJR13AE)" on page 2-67.

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

#### **Recommended fluid** DOT 4

#### EWA13090 WARNING

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

#### ECA13540

#### CAUTION:

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

- 6. Bleed:
- Brake system Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.
- 7. Check the operation of the hydraulic unit according to the brake lever and the brake pedal response. (Refer to "HYDRAULIC UNIT **OPERATION TESTS**" on page 4-60.) ECA14770

#### CAUTION:

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

- 8. Delete the malfunction codes. (Refer to "[D-1] DELETING THE MALFUNCTION CODES" on page 8-155.)
- 9. Perform a trial run. (Refer to "TRIAL RUN" on page 4-63.)

#### E4522800 HYDRAULIC UNIT OPERATION TESTS

The reaction-force pulsating action generated in the brake lever and brake pedal when the ABS is activated can be tested when the vehicle is stopped.

The hydraulic unit operation can be tested using the following two methods.

- Hydraulic unit operation test 1: this test checks the function of the ABS after the system was disassembled, adjusted, or serviced.
- Hydraulic unit operation test 2: this test generates the same reaction-force pulsating action that is generated in the brake lever and brake pedal when the ABS is activated.

#### Hydraulic unit operation test 1

#### EWA13120

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

#### NOTE:

Two people are necessary to perform hydraulic unit operation test 1.

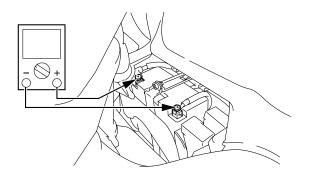
- 1. Place the vehicle on the centerstand.
- 2. Turn the main switch to "OFF".
- 3. Remove:
- Front cowling right inner panel 1 Refer to "GENERAL CHASSIS" on page 4-1.
- 4. Check:
- Battery voltage Lower than 12.8 V  $\rightarrow$  Charge or replace the battery.

#### **Battery voltage** 0

### Higher than 12.8 V

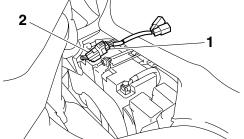
#### NOTE:

- If the battery voltage is lower than 12.8 V, charge the battery, and then perform hydraulic unit operation test 1.
- If the battery voltage is lower than 10 V, the ABS warning light comes on and the ABS does not operate.



5. Connect the test coupler adapter "1" to the ABS test coupler "2".

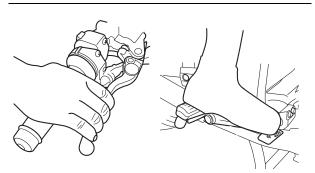




6. Turn the main switch to "ON" while operating the brake lever and the brake pedal simultaneously.

#### NOTE:

This check cannot be performed unless both the brake lever and the brake pedal are operated simultaneously when the main switch is turned to "ON".



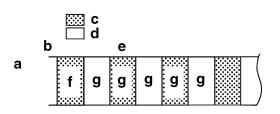
#### 7. Check:

• Hydraulic unit operation

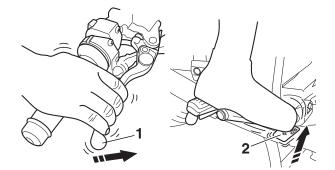
When the main switch is turned to "ON", the ABS warning light comes on for 2 seconds, goes off for 0.5 second, and then starts flashing. When the ABS warning light starts flashing, a single pulse will be generated in the brake lever "1". After the pulse is generated in the brake lever, it is generated in the brake pedal "2" twice.

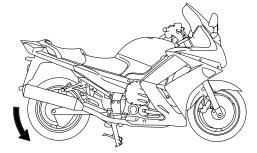
#### NOTE:

A single pulse will be felt in the brake lever once, then in the brake pedal twice. The second person should confirm that the rear brake force is released during the second pulse in the brake pedal, third pulse overall, by manually applying force to rotate the rear wheel. If the rear brake force is released during the second pulse in the brake pedal, the second person will be able to rotate the rear wheel for 0.1 second.



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





### CAUTION:

- Check that the pulse is felt in the brake lever once, and then in the brake pedal twice.
- If the pulse is felt in the brake pedal before it is felt in the brake lever, check that the brake hoses are connected correctly to the hydraulic unit.
- If the rear brake force is not released during the second pulse in the brake pedal, but during the pulse in the brake lever or during

the first pulse in the brake pedal, check that the brake hoses are connected correctly to the hydraulic unit.

- If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses are connected correctly to the hydraulic unit.
- If the operation of the hydraulic unit is normal, delete all of the malfunction codes.

#### Hydraulic unit operation test 2 EWA13120

#### A WARNING

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

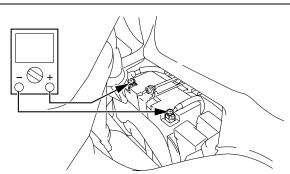
- 1. Place the vehicle on the centerstand.
- 2. Turn the main switch to "OFF".
- 3. Remove:
- Front cowling right inner panel 1 Refer to "GENERAL CHASSIS" on page 4-1.
- 4. Check:
- Battery voltage Lower than 12.8 V → Charge or replace the battery.

## 0

Battery voltage Higher than 12.8 V

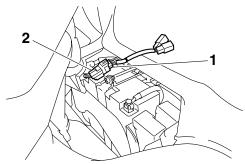
#### NOTE:

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



5. Connect the test coupler adapter "1" to the ABS test coupler "2".

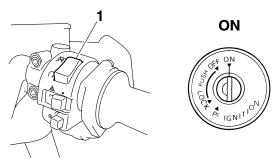




- 6. Set the engine stop switch "1" to " $\boxtimes$ ".
- 7. Turn the main switch to "ON".

#### NOTE:

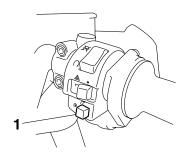
After turning the main switch to "ON", wait approximately 2 seconds until the ABS warning light goes off.



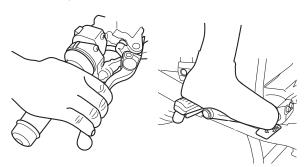
 Push the start switch "1" for at least 4 seconds.

### CAUTION:

Do not operate the brake lever or the brake pedal.



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



10.A reaction-force pulsating action is generated in the brake lever "1" 0.5 second after the brake lever and the brake pedal are operated simultaneously and continues for approximately 2 seconds.

#### NOTE: _

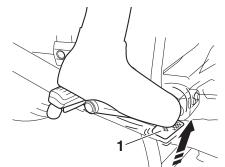
- The reaction-force pulsating action consists of two series of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.



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

NOTE:

- The reaction-force pulsating action consists of two series of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.



 After the pulsating action has stopped in the brake pedal, it is generated in the brake lever 0.5 second later and continues for approximately 2 seconds.

#### NOTE: _

The reaction-force pulsating action consists of two series of quick pulses.

#### EC3P61018 CAUTION:

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

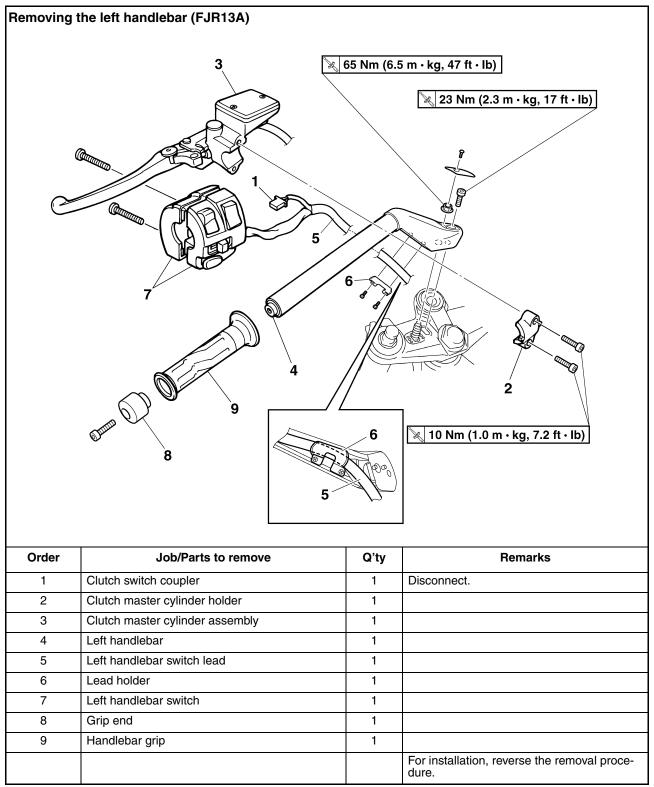
13.Turn the main switch to "OFF".

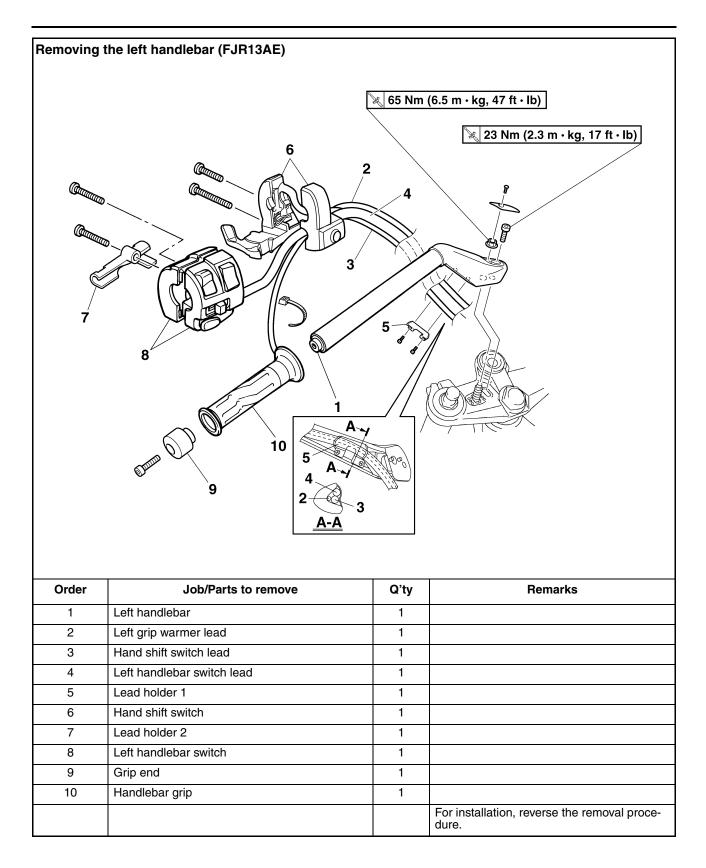
- 14.Remove the test coupler adapter from the ABS test coupler.
- 15.Turn the main switch to "ON".
- 16.Set the engine stop switch to " $\bigcirc$ ".

#### EAS22820 TRIAL RUN

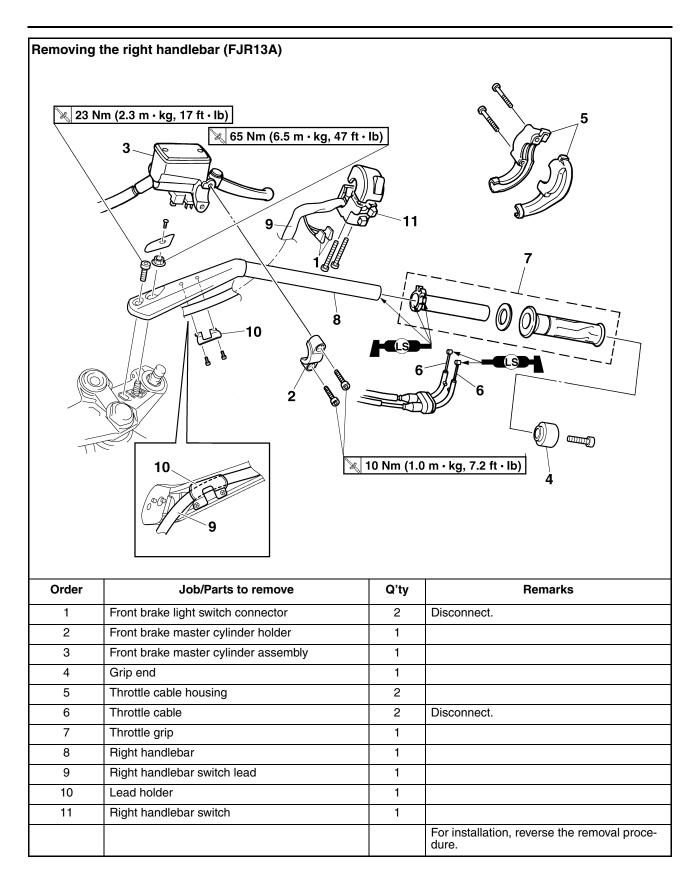
After all checks and servicing are completed, always ensure the vehicle has no problems by performing a trial run at a speed of faster than 10 km/h.

### HANDLEBARS

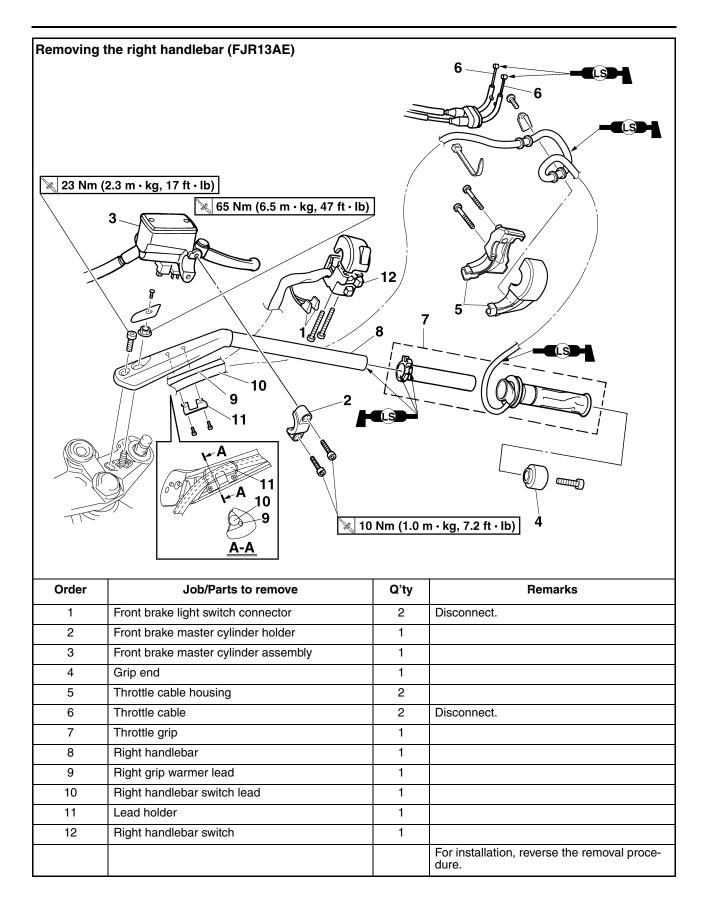




## HANDLEBARS



## HANDLEBARS



#### EAS22870 REMOVING THE HANDLEBARS

1. Stand the vehicle on a level surface.

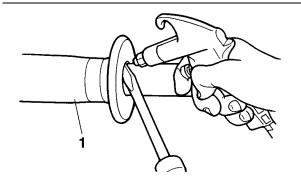
## 

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 (FJR13A)**

1. Stand the vehicle on a level surface.

## EWA13120

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

- 2. Install:
- Handlebar grip
- Grip end "1"

## ****

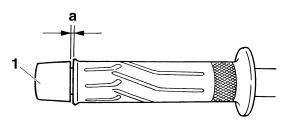
- a. Apply a thin coat of rubber adhesive onto the end of the left handlebar.
- b. Slide the handlebar grip onto the left handlebar.
- c. Wipe off any excess rubber adhesive with a clean rag.

## 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.



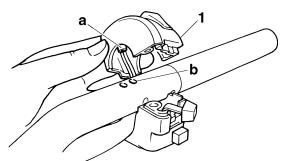
## _____

3. Install:

• Right handlebar switch "1"

NOTE:

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

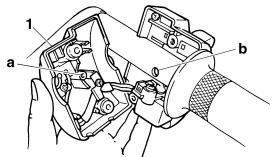


4. Install:

• Left handlebar switch "1"

## NOTE:

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

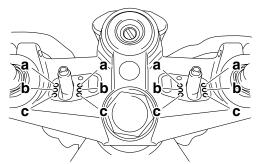


- 5. Install:
- Right handlebar

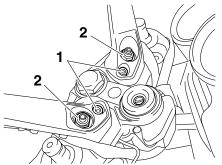
## Left handlebar

## NOTE: _

Fit the projections on each handlebar into the holes in the upper bracket, making sure that the handlebars are installed in the same position.



- a. Front position
- b. Standard position
- c. Rear position
- 6. Install:
  - Handlebar bolts "1" (temporarily)
- Handlebar nuts "2"
   (temporarily)



- 7. Tighten:
- Handlebar bolts
- Handlebar nuts



Handlebar bolt 23 Nm (2.3 m·kg, 17 ft·lb) Handlebar nut 65 Nm (6.5 m·kg, 47 ft·lb)

## NOTE:

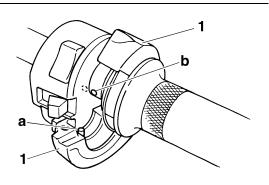
First tighten the bolts, then tighten the nuts.

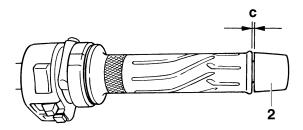
- 8. Install:
  - Throttle grip
  - Throttle cables
  - Throttle cable housing "1"
  - Grip end "2"

## NOTE:

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

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





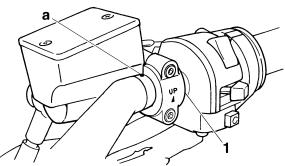
- 9. Install:
  - Front brake master cylinder assembly
  - Front brake master cylinder holder "1"



#### Front brake master cylinder holder bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

## NOTE:

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



- 10.Install:
- Clutch master cylinder assembly
- Clutch master cylinder holder "1"

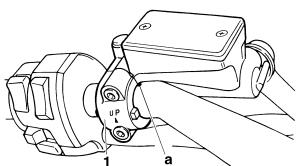


## Clutch master cylinder holder bolt

## 10 Nm (1.0 m·kg, 7.2 ft·lb)

## NOTE: _

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



## 11.Adjust:

• Throttle cable free play Refer to "ADJUSTING THE THROTTLE CA-BLE FREE PLAY" on page 3-10.

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

### ET3P66031

## **INSTALLING THE HANDLEBARS (FJR13AE)**

1. Stand the vehicle on a level surface.

## WARNING

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

- 2. Install:
  - Handlebar grip
- Grip end "1"

### ****

a. Apply a thin coat of rubber adhesive onto the end of the left handlebar.

## Recommended adhesive Three Bond 1530[®]

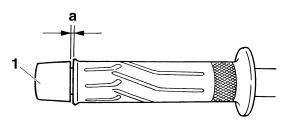
- b. Slide the handlebar grip onto the left handlebar.
- c. Wipe off any excess rubber adhesive with a clean rag.

## 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.



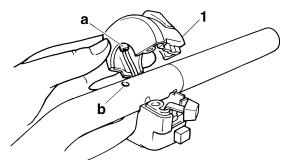
### _____

3. Install:

• Right handlebar switch "1"

NOTE:

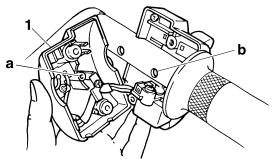
Align the projection "a" on the right handlebar switch with the hole "b" on the right handlebar.



- 4. Install:
- Left handlebar switch "1"

## NOTE:

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



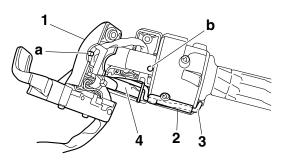
- 5. Install:
- Hand shift switch "1"

## HANDLEBARS

• Lead holder 2 "2"

## NOTE:

- Align the projection "a" on the hand shift switch with hole "b" on the left handlebar.
- When installing the hand shift switch, route the left grip warmer lead "3" and left handlebar switch lead "4" through the switch as shown in the illustration, making sure to fasten the left grip warmer lead with the lead holder 2.
- After installing the hand shift switch, check that the left grip warmer lead does not interfere with the movement of the hand shift lever.

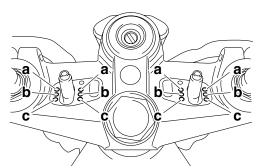


## 6. Install:

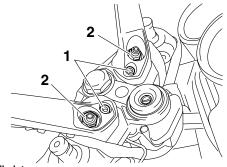
- Right handlebar
- Left handlebar

## NOTE:

Fit the projections on each handlebar into the holes in the upper bracket, making sure that the handlebars are installed in the same position.



- a. Front position
- b. Standard position
- c. Rear position
- 7. Install:
  - Handlebar bolts "1" (temporarily)
  - Handlebar nuts "2" (temporarily)



- 8. Tighten:
- Handlebar bolts
- Handlebar nuts

Handlebar bolt 23 Nm (2.3 m·kg, 17 ft·lb) Handlebar nut 65 Nm (6.5 m·kg, 47 ft·lb)

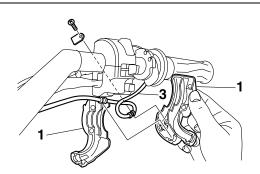
## NOTE:

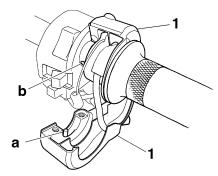
First tighten the bolts, then tighten the nuts.

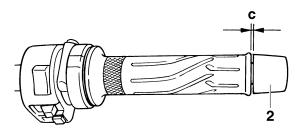
- 9. Install:
  - Throttle grip
  - Throttle cables
  - Throttle cable housing "1"
  - Grip end "2"

## NOTE: _

- Make a loop in the right grip warmer lead "3" as shown in the illustration, making sure that the section of the lead from the grip warmer crosses to the rear of the other section of the lead, and route the lead through the throttle cable housing.
- When installing the throttle cable housing, align the projection "a" on the housing with the hole "b" in the right handlebar and be sure not to pinch the right grip warmer lead.
- There should be 1–3 mm (0.04–0.12 in) of clearance "c" between the throttle grip and the grip end.

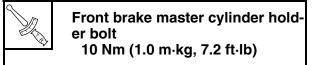






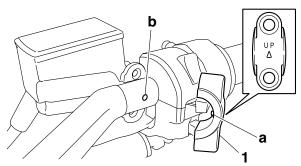
### 10.Install:

- Front brake master cylinder assembly
- Front brake master cylinder holder "1"



## NOTE:

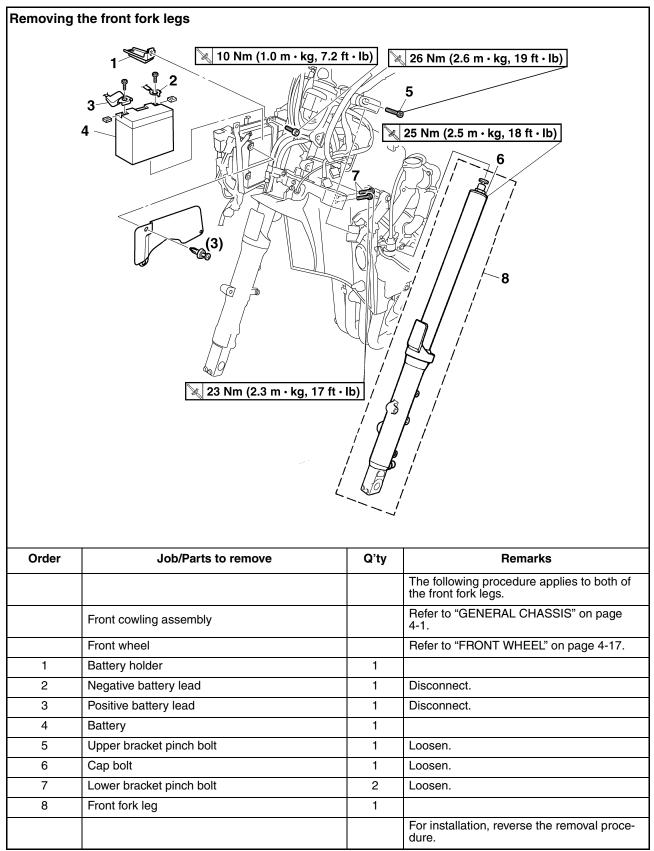
- Install the brake master cylinder holder with the "UP" mark facing up.
- Align the projection "a" on the front brake master cylinder with hole "b" on the right handlebar.
- First, tighten the upper bolt, then the lower bolt.

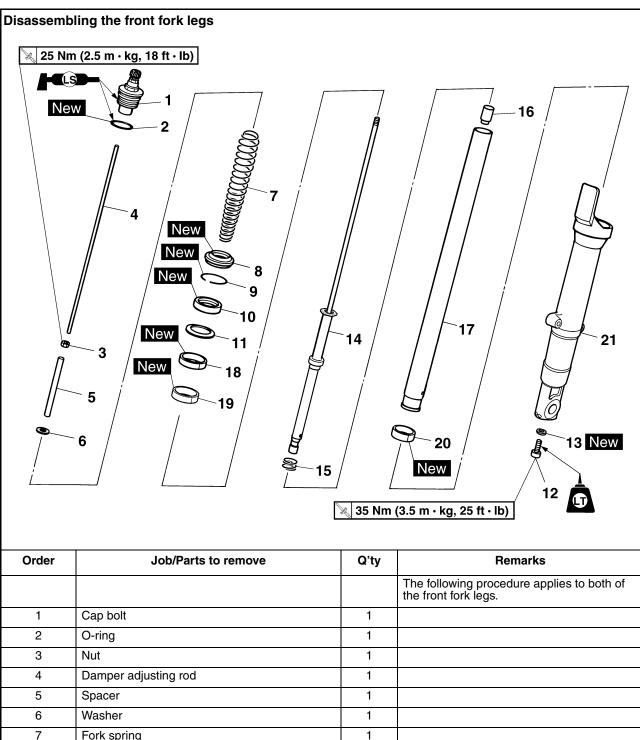


11.Adjust:

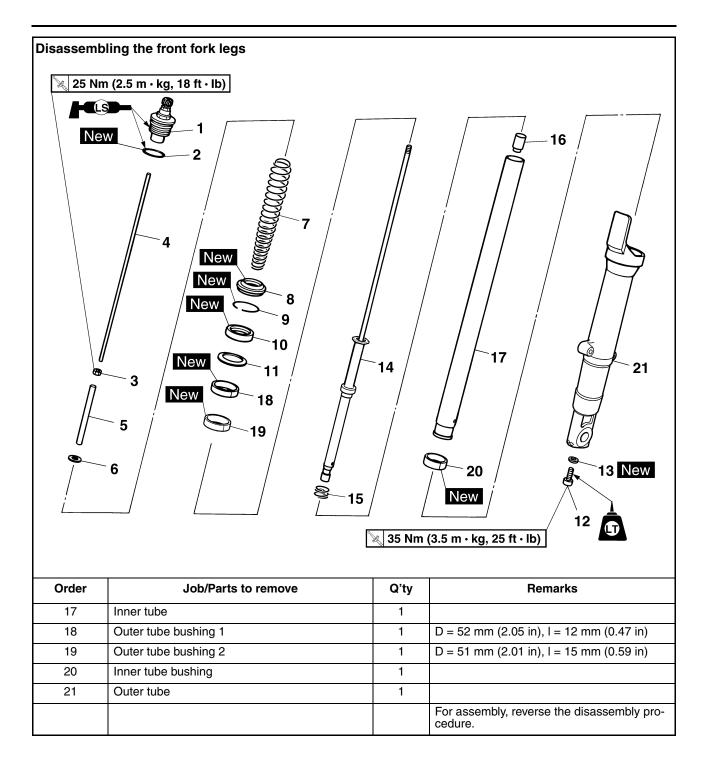
• Throttle cable free play Refer to "ADJUSTING THE THROTTLE CA-BLE FREE PLAY" on page 3-10.

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





6	Washer	1	
7	Fork spring	1	
8	Dust seal	1	
9	Oil seal clip	1	
10	Oil seal	1	
11	Washer	1	
12	Damper rod assembly bolt	1	
13	Copper washer	1	
14	Damper rod assembly	1	
15	Spring	1	
16	Oil flow stopper	1	



## 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:

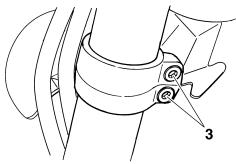
Place the vehicle on a suitable stand so that the front wheel is elevated.

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

## WARNING

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



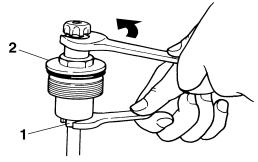


#### EAS22980

**DISASSEMBLING THE FRONT FORK LEGS** The following procedure applies to both of the

front fork legs.

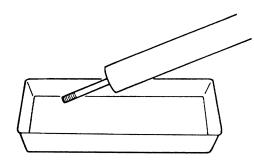
1. Hold the nut "1" and loosen the cap bolt "2".



- 2. Drain:
- Fork oil

#### NOTE:

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



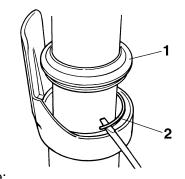
- 3. Remove:
  - Dust seal "1"
  - Oil seal clip "2" (with a flat-head screwdriver)

## CAUTION:

Do not scratch the inner tube.

### NOTE:

- Do not remove the fork leg protector from the outer tube.
- If the front fork leg protector must be removed, always install a new one.



- 4. Remove:
  - Oil seal
- Washer

#### ******

a. Pull up the inner tube completely, fill it with oil up to the top, and then install the cap bolt.

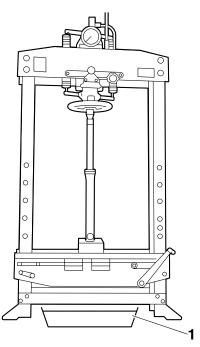
### NOTE:

Do not install the fork spring.

b. Place the front fork leg in a press and gradually apply pressure to remove the oil seal.

### **CAUTION:**

- Be careful not to damage the top of the cap bolt.
- Place an oil drain pan under the press before applying pressure to the front fork leg.
- Stop applying pressure when oil begins to leak from between the oil seal and the outer tube.



1. Oil drain pan

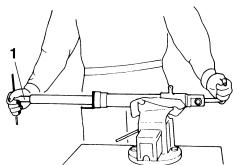
### *****

- 5. Remove:
- Damper rod assembly bolt
- Copper washer

#### NOTE:

While holding the damper rod assembly with the damper rod holder "1", loosen the damper rod assembly bolt.

Damper rod holder 90890-01447 YM-01447



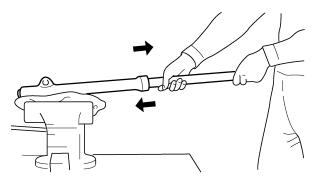
- 6. Remove:
  - Inner tube

#### ****

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

## EC3P61027

- Excessive force will damage the bushings. Damaged bushings must be replaced.
- Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.



#### EAS23010 CHECKING THE FRONT FORK LEGS

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

- 1. Check:
- Inner tube
- Outer tube

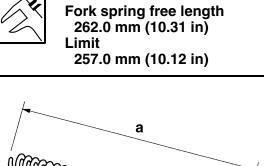
Bends/damage/scratches  $\rightarrow$  Replace.

## 

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

2. Measure:

• Spring free length "a" Out of specification  $\rightarrow$  Replace.





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

## EAS23030

## ASSEMBLING THE FRONT FORK LEGS

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

## WARNING

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

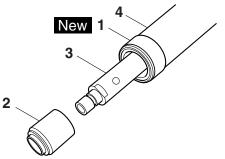
## NOTE:

- When assembling the front fork leg, be sure to replace the following parts:
  - Inner tube bushing
  - Outer tube bushing 1
  - Outer tube bushing 2
  - Oil seal
  - Dust seal

- Before assembling the front fork leg, make sure all of the components are clean.
- 1. Install:
- Inner tube bushing "1" New
- Oil flow stopper "2"
- Spring
- Damper rod assembly "3"

## CAUTION:

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



2. Lubricate:

• Inner tube's outer surface



Recommended oil Ohlins R & T43 (ACC-RT43F-00-00)

- 3. Tighten:
  - Damper rod assembly bolt

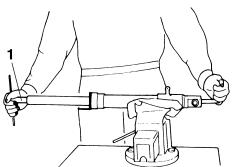
Damper rod assembly bolt 35 Nm (3.5 m⋅kg, 25 ft⋅lb) LOCTITE[®]

## NOTE:

While holding the damper rod assembly with the damper rod holder "1", tighten the damper rod assembly bolt.



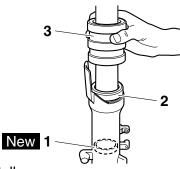
Damper rod holder 90890-01447 YM-01447



- 4. Install:
- Outer tube bushing 2 (D = 51 mm (2.01 in), I

= 15 mm (0.59 in)) "1" New (with the slide metal installer "2" and fork seal driver "3")

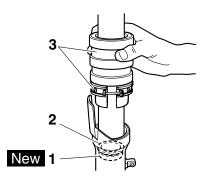




- 5. Install:
- Outer tube bushing 1 (D = 52 mm (2.05 in), I
  - = 12 mm (0.47 in)) "1" New
- Washer "2" (with the fork seal driver "3")



Fork seal driver 90890-01502 YM-A0948



- 6. Install:
- Oil seal "1" New (with the fork seal driver "2")

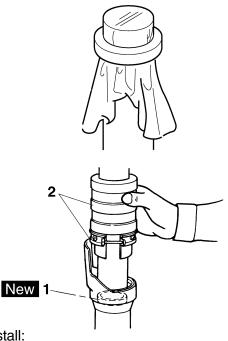
Fork seal driver 90890-01502 YM-A0948

ECA14220

### CAUTION: Make sure the numbered side of the oil seal faces up.

## NOTE:

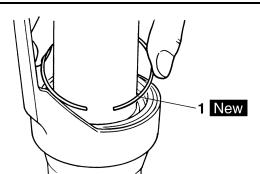
- Before installing the oil seal, lubricate its lips with lithium-soap-based grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.



- 7. Install:
- Oil seal clip "1" New

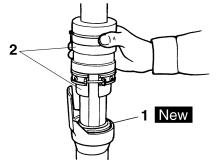
NOTE: _

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



- 8. Install:
- Dust seal "1" New (with the fork seal driver "2")





- 9. Fill:
  - Front fork leg (with the specified amount of the recommended fork oil)

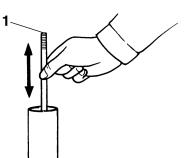


CAUTION:

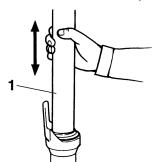
- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.
- 10.After filling the front fork leg, slowly stroke the damper rod assembly "1" up and down (at least ten times) to distribute the fork oil.

### NOTE:

Be sure to stroke the damper rod assembly slowly because the fork oil may spurt out.



11.Slowly stroke the inner tube "1" up and down.



12.Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

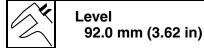
## NOTE:_

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

13.Measure:

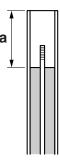
• Front fork leg oil level "a" (from the top of the inner tube, with the outer tube fully compressed and without the fork spring)

Out of specification  $\rightarrow$  Correct.



## NOTE:_

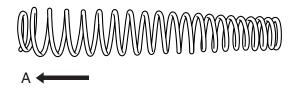
- While filling the front fork leg, keep it upright.
- After filling, slowly pump the front fork leg up and down to distribute the fork oil.



14.Install:

## NOTE: _

Install the fork spring so that the end "A" shown in the illustration is facing up.



- 15.Install:
- Nut "1"
- Damper adjusting rod "2"
- Cap bolt "3"

## *****

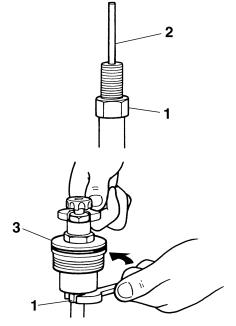
- a. Install the nut "1" and finger tighten it.
- b. Install the damper adjusting rod "2".
- c. Install the cap bolt "3" and finger tighten it.

## WARNING

## Always use a new cap bolt O-ring.

d. Hold the cap bolt and tighten the nut "1" to specification.

Nut 25 Nm (2.5 m·kg, 18 ft·lb)



- 16.Install:
- Cap bolt
  - (to the outer tube)

### NOTE: _

Temporarily tighten the cap bolt.

#### EAS23050 INSTALLING THE FRONT FORK LEGS

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

- 1. Install:
- Front fork leg Temporarily tighten the upper and lower bracket pinch bolts.

## NOTE:_

Make sure the inner tube is flush with the top of the upper bracket.

- 2. Tighten:
  - Lower bracket pinch bolts "1"



Lower bracket pinch bolt 23 Nm (2.3 m·kg, 17 ft·lb)

Cap bolt "2"

```
25 Nm (2.5 m·kg, 18 ft·lb)
```

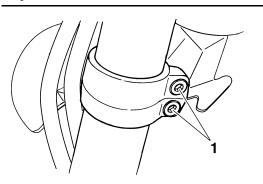
## • Upper bracket pinch bolt "3"



## Upper bracket pinch bolt 26 Nm (2.6 m·kg, 19 ft·lb)

## 

Make sure the brake hoses are routed properly.



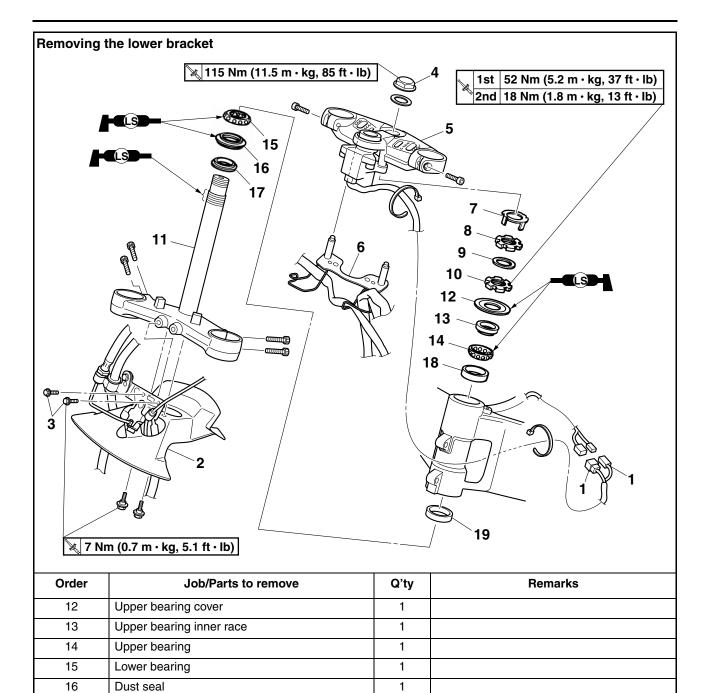


- 3. Adjust:
  Spring preload
  Rebound damping
  Compression damping Refer to "ADJUSTING THE FRONT FORK LEGS" on page 3-36.

## STEERING HEAD

Removing the lower bracket				
Removing the lower bracket         115 Nm (11.5 m · kg, 85 ft · lb)         4         1st 52 Nm (5.2 m · kg, 37 ft · lb)           2nd 18 Nm (1.8 m · kg, 13 ft · lb)         15         16         7         10         5           10         17         7         8         9         10         12         13           11         14         18         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         14         15         14         14         15         14         14         15         14         14         15         14         14         15         14         15         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16				
Order Job/Parts to remove Q'ty Remarks				
	Rider seat/T-bar		Refer to "GENERAL CHASSIS" on page	
			4-1.	
	Fuel tank		Refer to "FUEL TANK" on page 7-1.	
	Handlebars		Refer to "HANDLEBARS" on page 4-64.	
Front fork legs			Refer to "FRONT FORK" on page 4-73.	
1	Main switch coupler	2	Disconnect.	
2	Lower bracket cover			
3	Brake hose joint bracket bolt			
4				
	5 Upper bracket			
6	Handlebar bracket	1		
7	Lock washer	1		
8	Upper ring nut	1		
9	Rubber washer	1		
10	Lower ring nut	1		
11	Lower bracket	1		

## **STEERING HEAD**



1

1

1

dure.

For installation, reverse the removal proce-

17

18

19

Lower bearing inner race

Upper bearing outer race

Lower bearing outer race

#### EAS23110

### **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
- Rubber washer
- Lower ring nut "1"
- Lower bracket

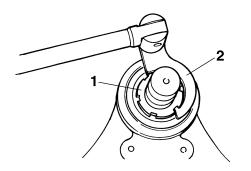
## WARNING

Securely support the lower bracket so that there is no danger of it falling.

## NOTE:

Remove the lower ring nut with the steering nut wrench "2".

Steering nut wrench 90890-01403 Spanner wrench YU-33975



EAS23120

## CHECKING THE STEERING HEAD

- 1. Wash:
- Bearings
- Bearing races

Recommended cleaning solvent Kerosene

- 2. Check:
  - Bearings

Bearing races
 Damage/pitting → Replace.

- 3. Replace:
  - Bearings
  - Bearing races

## *****

a. Remove the bearing races from the steering head pipe "1" with a long rod "2" and hammer.

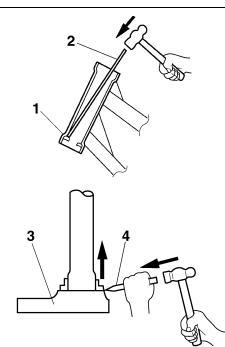
- b. Remove the bearing race from the lower bracket "3" with a floor chisel "4" and hammer.
- c. Install new bearing races.

## 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.

## 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"

## **STEERING HEAD**

• Lock washer "4" Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-33.



- 3. Install:
- Upper bracket
- Steering stem nut

### NOTE: _

Temporarily tighten the steering stem nut.

- 4. Install:
- Front fork legs
- Refer to "FRONT FORK" on page 4-73.

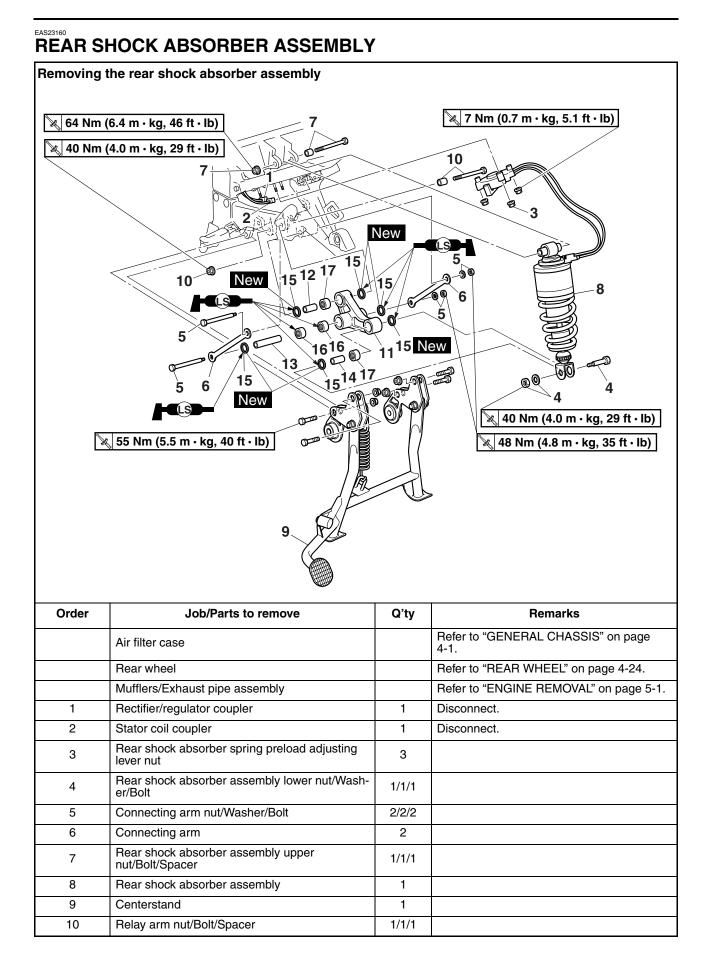
### NOTE: _

Temporarily tighten the upper and lower bracket pinch bolts.

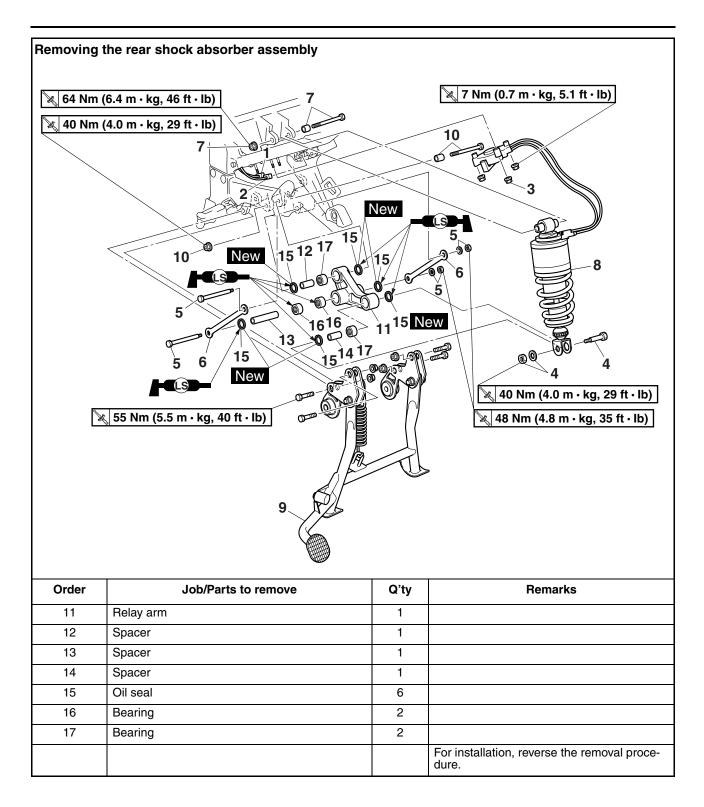
- 5. Tighten:
  - Steering stem nut



Steering stem nut 115 Nm (11.5 m·kg, 85 ft·lb)



## **REAR SHOCK ABSORBER ASSEMBLY**



#### EAS23180

## HANDLING THE REAR SHOCK ABSORBER

## 

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.

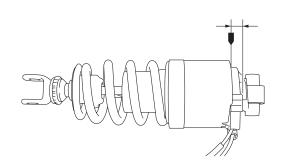
#### EAS23190

## **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 15–20 mm (0.59–0.79 in) from its end as shown.

## **WARNING**

Wear eye protection to prevent eye damage from released gas or metal chips.



## REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

## 

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

### NOTE: ____

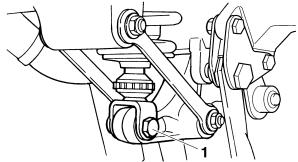
Place the vehicle on a suitable stand so that the rear wheel is elevated.

### 2. Remove:

- Rear shock absorber assembly lower bolt "1"
- Connecting arms

## NOTE: _

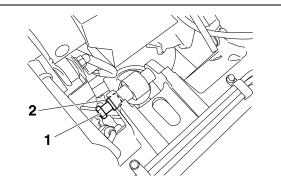
While removing the connecting arm bolts, hold the swingarm so that it does not drop down.



- 3. Remove:
- Rear shock absorber assembly upper bolt "1"
- Spacer "2"
- Rear shock absorber assembly

### NOTE:_

- Partially pull out the rear shock absorber assembly upper bolt, slide the spacer "1" towards the bolt head to create some clearance between the bolt and the frame, and then remove the bolt completely.
- Raise the swingarm and then remove the rear shock absorber assembly from between the swingarm and relay arm.



### EAS23240

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Check:
- Rear shock absorber rod
  - Bends/damage  $\rightarrow$  Replace the rear shock absorber assembly.

## REAR SHOCK ABSORBER ASSEMBLY

- Rear shock absorber Gas leaks/oil leaks  $\rightarrow$  Replace the rear shock absorber assembly.
- Spring Damage/wear → Replace the rear shock absorber assembly.
- Bushing Damage/wear → Replace the rear shock absorber assembly.
- Spacer Damage/scratches  $\rightarrow$  Replace.
- Bolts Bends/damage/wear  $\rightarrow$  Replace.

#### EAS23260

# CHECKING THE CONNECTING ARM AND RELAY ARM

- 1. Check:
- Connecting arms
- Relay arm Damage/wear  $\rightarrow$  Replace.
- 2. Check:
- Bearings
- Oil seals

 $\label{eq:def_Damage} \mbox{Damage/pitting} \rightarrow \mbox{Replace}.$ 

3. Check:
 • Spacers
 Damage/scratches → Replace.

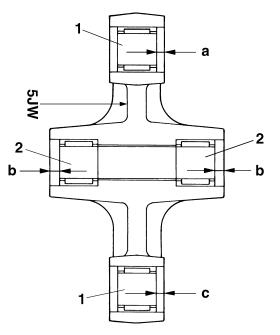
#### EAS23270 INSTALLING THE RELAY ARM

- 1. Lubricate:
- Spacer
- Bearings

### Recommended lubricant Lithium-soap-based grease

- 2. Install:
  - Bearing "1", "2" (to the relay arm)

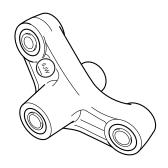
Installed depth "a" 4.5 mm (0.18 in) Installed depth "b" 3.5–4.5 mm (0.14–0.18 in) Installed depth "c" 4.0 mm (0.16 in)



- 3. Install:
- Relay arm

## NOTE:

Make sure that the embossed mark "5JW" on the relay arm faces to the left.



## INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Install:
- Rear shock absorber assembly

## NOTE: _

- Make sure that the warning label on the rear shock absorber assembly faces to the right.
- When installing the rear shock absorber assembly, lift up the swingarm.

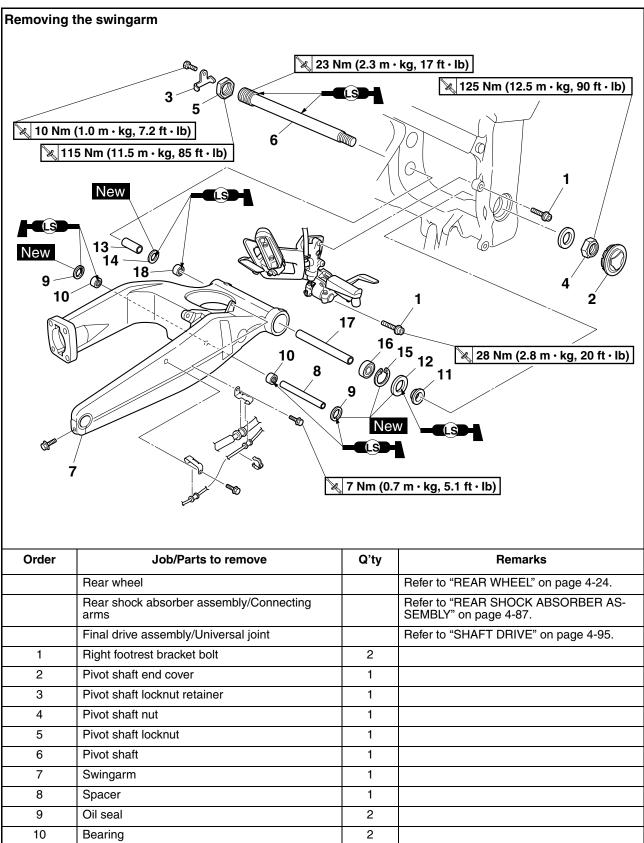
## SWINGARM

11

12

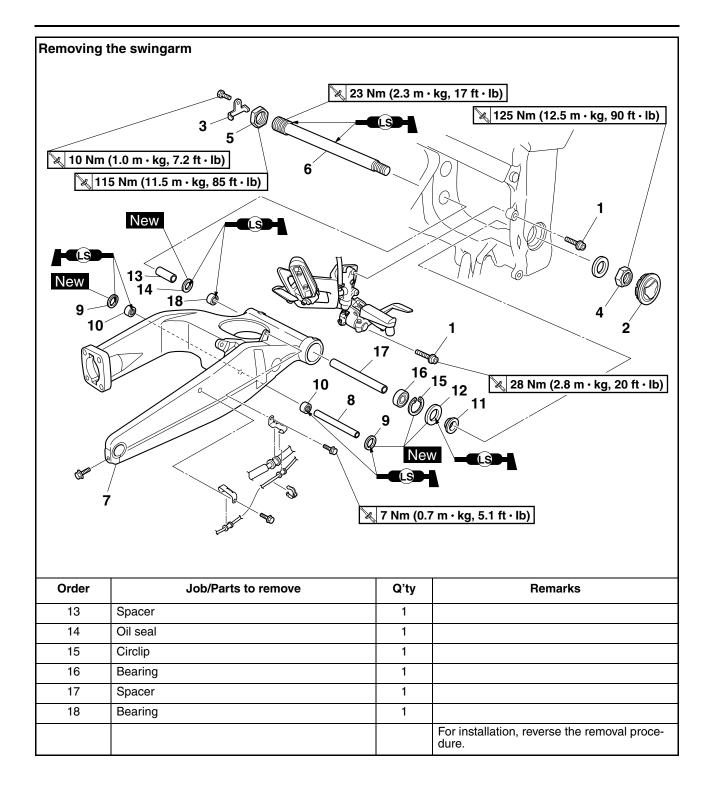
Collar

Oil seal



1

1



#### EAS23350 REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

## A 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. Measure:
  - Swingarm side play
- Swingarm vertical movement
- *****
- a. Measure the tightening torque of the pivot shaft, pivot shaft nut, and pivot shaft locknut.

#### Pivot shaft 23 Nm (2.3 m·kg, 17 ft·lb) Pivot shaft nut

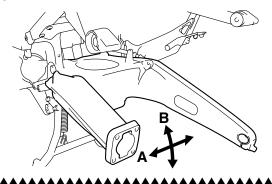
125 Nm (12.5 m·kg, 90 ft·lb) Pivot shaft locknut 115 Nm (11.5 m·kg, 85 ft·lb)

- 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) 0 mm (0 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.



## 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.

## WARNING

# Do not attempt to straighten a bent pivot shaft.

3. Wash:

- Pivot shaft
- Spacers
- Washer
- Bearings
- Collar

## Recommended cleaning solvent Kerosene

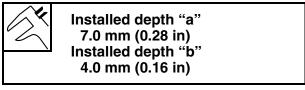
- 4. Check:
- Spacers
- Washer
- Collar
- Oil seals Damage/wear  $\rightarrow$  Replace.
- Bearings Damage/pitting  $\rightarrow$  Replace.

## EAS23390 INSTALLING THE SWINGARM

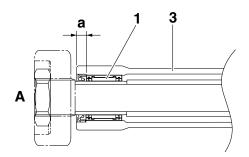
- 1. Lubricate:
- Bearings
- Oil seals
- Pivot shaft

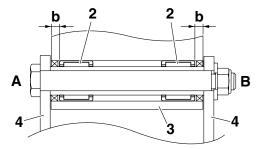


- 2. Install:
- Bearing "1"
- Bearings "2"



## SWINGARM





- 3. Swingarm
- 4. Connecting arm
- A. Left side
- B. Right side
- 3. Tighten:
- Pivot shaft



Pivot shaft 23 Nm (2.3 m·kg, 17 ft·lb)

• Pivot shaft locknut



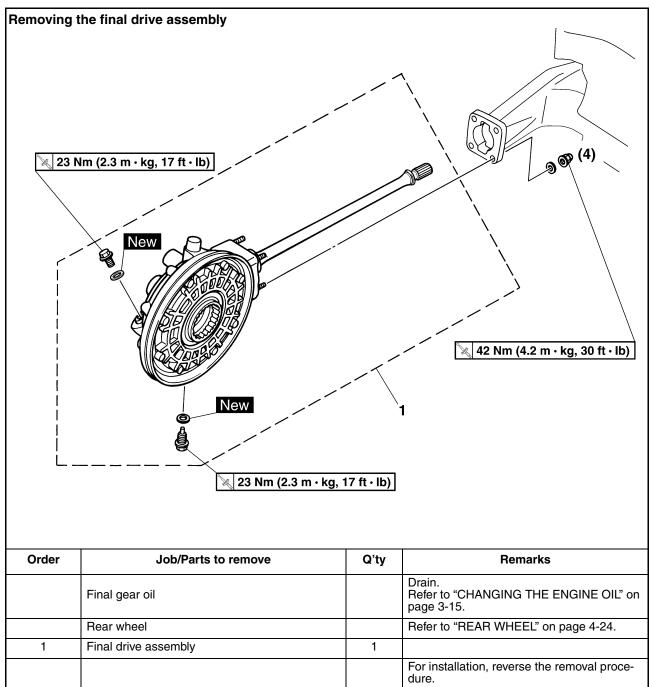
Pivot shaft locknut 115 Nm (11.5 m·kg, 85 ft·lb)

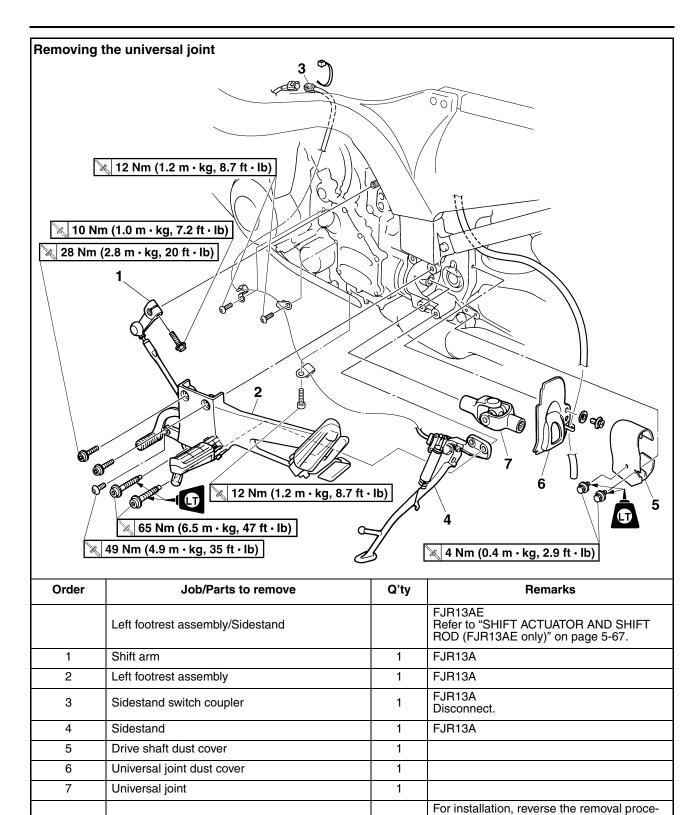
Pivot shaft nut



Pivot shaft nut 125 Nm (12.5 m·kg, 90 ft·lb)

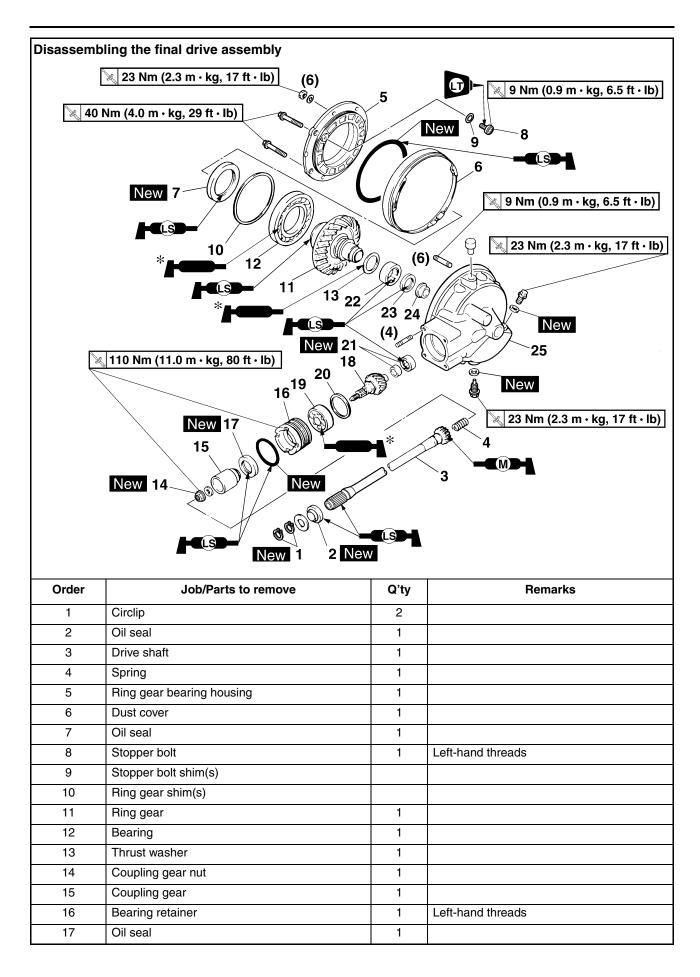
## SHAFT DRIVE

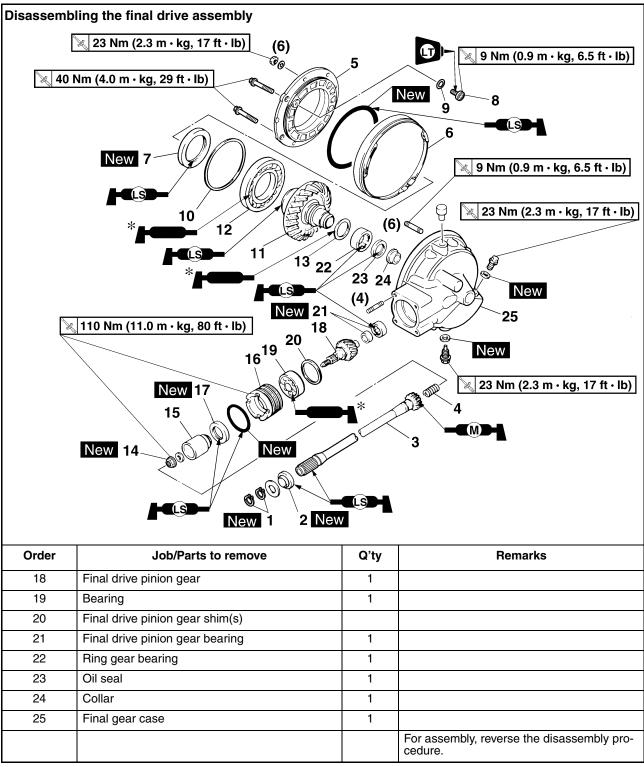




4-96

dure.





* Apply shaft drive gear oil (Part No.: 9079E-SH001-00)

#### EAS23560 TROUBLESHOOTING

Symptom	Possible cause
<ol> <li>A pronounced hesitation or jerky movement during acceleration, deceleration or sus- tained speeds (not to be confused with en- gine surging or transmission-related movements).</li> <li>A rolling "rumble" noticeable at low speeds, a high-pitched whine or a "clunk" from a shaft drive component, or from the vicinity of the shaft drive.</li> <li>The shaft drive is locked up or no power is transmitted from the engine to the rear wheel.</li> </ol>	<ul> <li>A. Bearing damage</li> <li>B. Improper gear backlash</li> <li>C. Damaged gear teeth</li> <li>D. Broken drive shaft</li> <li>E. Broken gear teeth</li> <li>F. Seizure due to lack of lubrication</li> <li>G. Small foreign objects lodged between moving parts</li> </ul>

### NOTE: _

Causes A, B and C may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal operating noises. If there is reason to believe that these components are damaged, remove them and check them individual.

## Inspection notes

1. Investigate any unusual noises.

- The following noises may indicate a mechanical defect:
- A rolling "rumble" during coasting, acceleration or deceleration (increases with the rear wheel speed, but does not increase with higher engine or transmission speeds).
   Wheel bearing damage
- b. A whining noise that varies with acceleration and deceleration Incorrect reassembly or too little gear backlash

## 

Insufficient gear backlash is extremely destructive to the gear teeth. If a test ride, following reassembly, indicates these symptoms, stop riding immediately to minimize gear damage.

c. A slight "clunk" evident at low speed operation (not to be confused with normal vehicle operation). Broken gear teeth

## WARNING

Stop riding immediately if broken gear teeth are suspected. This condition could result in the shaft drive assembly locking up, causing a loss of control and possible injury to the rider.

### 

## **Troubleshooting chart**

When causes (A) or (B) shown in the table at the beginning of the "TROUBLESHOOTING" section exist, check the following points.

1. Place the vehicle on a suitable stand so that the front wheel is elevated and then spin the front wheel. Are the wheel bearings damaged?

•	Replace	the	wheel	bearing	(s).
---	---------	-----	-------	---------	------

• Refer to "FRONT WHEEL" on page 4-17.

2. Place the vehicle on a suitable stand so that the rear wheel is elevated and then spin the rear wheel. Is the wheel bearing damaged?

 $\mathsf{YES}\downarrow$ 

3. Remove the rear wheel. Are the wheel bearings damaged?

NO↓

Remove and check the drive shaft components.

EAS23570

## CHECKING THE FINAL DRIVE OIL FOR CONTAMINATION AND CHECKING THE SHAFT DRIVE FOR LEAKS

- 1. Drain:
- Final gear oil (from the final gear case) Refer to "CHANGING THE FINAL GEAR OIL" on page 3-33.
- 2. Check:
- Final gear oil Large amount of metal particles → Check for bearing seizure.

## NOTE:

A small amount of metal particles in the final gear oil is normal.

- 3. Check:
- Shaft drive housing (for oil leaks)

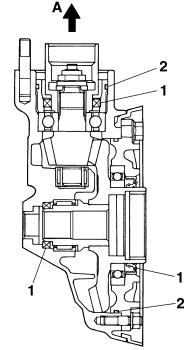
- a. Thoroughly clean the entire vehicle and then completely dry it.
- b. Apply a leak-locating compound or dry powder spray to the shaft drive.
- c. Test ride the vehicle long enough to locate a leak.

Oil leak  $\rightarrow$  Repair or replace the faulty part(s).

- NOTE:
- What may appear to be an oil leak on a new or fairly new vehicle, may result from the application of a rust preventive coating or excessive seal lubrication.
- Always clean the vehicle and recheck the area where the leak is thought to originate from.

$NO \rightarrow$	Rear wheel bearings and shaft drive bear- ings are probably not damaged. Repeat the test or remove and check the compo- nents.
	nents.

 $\begin{array}{lll} \mbox{YES} \rightarrow & \bullet \mbox{ Replace the rear wheel bearing(s).} \\ & \bullet \mbox{ Refer to "REAR WHEEL" on page 4-24.} \end{array}$ 



- 1. Oil seal
- 2. O-ring
- A. Forward

## *****

## MEASURING THE FINAL GEAR BACKLASH

- 1. Secure the final drive assembly in a vise.
- 2. Remove:
- Final gear oil drain bolt
- 3. Drain:

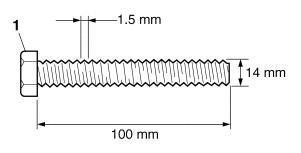
EAS23580

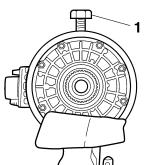
- Final gear oil
  - (from the final drive assembly)
- 4. Measure:
  - Final gear backlash Out of specification → Adjust.

## Final gear backlash 0.22–0.45 mm (0.0087–0.0177 in)

### ****

a. Install a bolt "1" of the specified size, into the final gear oil drain hole.





b. Finger tighten the bolt until it stops the ring gear from moving.

### NOTE:

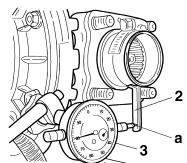
- Do not overtighten the bolt.
- c. Install the final gear backlash band "2" and dial gauge "3".

### NOTE: _

Make sure that the dial gauge plunger contacts the groove "a" in the final gear backlash band as shown in the illustration.



Final gear backlash band 90890-01511 YM-01230



d. Gently rotate the coupling gear from engagement to engagement.

- e. Record the reading on the dial gauge.
- f. Remove the dial gauge, final gear backlash band, and bolt.
- g. Rotate the final drive pinion gear 90°.
- h. Reinstall the bolt, final gear backlash band, and dial gauge.
- i. Repeat steps (d) to (h) three more times (for a total of four measurements).
- j. If any of the readings are over specification, adjust the final gear backlash.

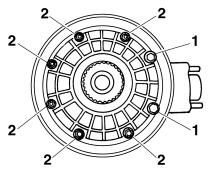
## *****

## ADJUSTING THE FINAL GEAR BACKLASH

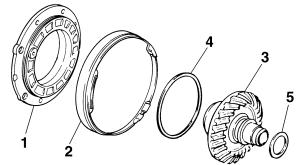
- 1. Remove:
- Ring gear bearing housing bolts "1"
- Ring gear bearing housing nuts "2"

## NOTE:

Working in a crisscross pattern, loosen each bolt and nut 1/4 of a turn. After all of the bolts and nuts are fully loosened, remove them.



- 2. Remove:
  - Ring gear bearing housing "1"
- Dust cover "2"
- Ring gear "3"
- Ring gear shim(s) "4"
- Thrust washer "5"



- 3. Adjust:Final gear backlash
- ****
- a. Select the suitable shim(s) and thrust washer with the following chart.

# SHAFT DRIVE

Thinner shim	Final gear backlash is in- creased.		
Thicker shim	Final gear backlash is de- creased.		

- b. If it is necessary to increase the final gear backlash by more than 0.2 mm, reduce the thrust washer thickness by 0.2 mm for every 0.2 mm increase of ring gear shim thickness.
- c. If it is necessary to reduce the final gear backlash by more than 0.2 mm, increase the thrust washer thickness by 0.2 mm for every 0.2 mm decrease of ring gear shim thickness.

Ring gear shims Thickness (mm) 0.25 0.30 0.40 0.50

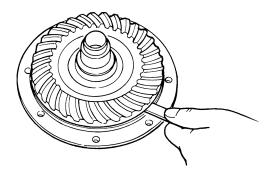
Thrust washers Thickness (mm) 1.2 1.4 1.6 1.8 2.0

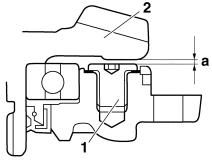
#### EAS23600

#### MEASURING THE RING-GEAR-TO-STOPPER-BOLT CLEARANCE

- 1. Remove:
- Ring gear bearing housing (along with the ring gear)
   Refer to "ADJUSTING THE FINAL GEAR BACKLASH" on page 4-101.
- 2. Measure:
  - Ring-gear-to-stopper-bolt clearance "a" Out of specification → Adjust.



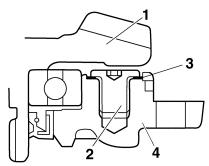




- 1. Stopper bolt
- 2. Ring gear
- 3. Install:
- Ring gear bearing housing (along with the ring gear)

# ADJUSTING THE RING-GEAR-TO-STOPPER-BOLT CLEARANCE

- 1. Remove:
- Ring gear "1"
- Stopper bolt "2"
- Stopper bolt shim(s) "3"
- Ring gear bearing housing "4"



2. Select:

• Stopper bolt shim(s)



Stopper bolt shims Thickness (mm) 0.15 0.20

- 3. Install:
- Ring gear bearing housing "1"

Stopper bolt

- Stopper bolt shim(s) "2"
- Stopper bolt "3"
- Ring gear "4"



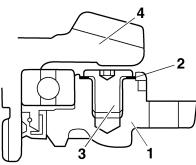
9 Nm (0.9 m·kg, 6.5 ft·lb)

ECA14320

#### CAUTION:

• The stopper bolt has left-hand threads. To tighten the stopper bolt, turn it counter-clockwise.

# • Apply LOCTITE[®] onto the stopper bolt.



4. Measure:

• Ring-gear-to-stopper-bolt clearance



Ring-gear-to-stopper-bolt clearance 0.30–0.60 mm (0.0118–0.0236 in)

#### NOTE: _

If the ring-gear-to-stopper-bolt clearance is out of specification, repeat the above procedure.

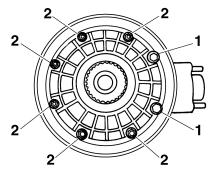
#### EAS23620

#### DISASSEMBLING THE FINAL DRIVE ASSEMBLY

- 1. Remove:
- Ring gear bearing housing bolts "1"
- Ring gear bearing housing nuts "2"

#### NOTE:

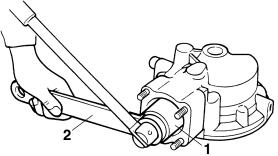
Working in a crisscross pattern, loosen each bolt and nut 1/4 of a turn. After all of the bolts and nuts are fully loosened, remove them.



- 2. Remove:
- Coupling gear nut
- Coupling gear "1"

(with the coupling gear/middle shaft tool "2")



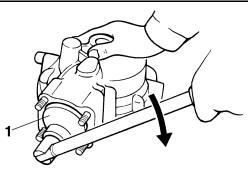


- 3. Remove:
  - Bearing retainer (with the bearing retainer wrench "1")



# CAUTION:

The bearing retainer has left-hand threads. To loosen the bearing retainer, turn it clockwise.



- 4. Remove:
- Final drive pinion gear

WARNING

Always use new bearings.

# ECA14340

The final drive pinion gear should only be removed if ring gear replacement is necessary.

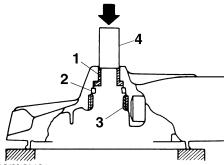
#### NOTE: _

Lightly tap on the end of the final drive pinion gear with a soft hammer.

# REMOVING AND INSTALLING THE BEARINGS

- 1. Check:
- Bearings
  - $\mathsf{Damage} \to \mathsf{Replace}.$
- 2. Remove:
  - Collar "1"
  - Oil seal "2"
  - Bearing "3"

(with an appropriate press tool "4" and an appropriate support for the final gear case)

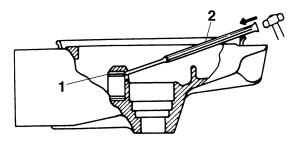


### 3. Remove:

Bearing "1"

### ****

- a. Heat the final gear case to approximately 150 °C (302 °F).
- b. Remove the bearing outer races with an appropriately shaped punch "2".



c. Remove the inner race from the final drive pinion gear.

#### NOTE:

The removal of the bearing is a difficult procedure and is rarely necessary.

# 4. Install:

# Bearing New

- a. Heat the final gear case to approximately 150 °C (302 °F).
- b. Install the bearing outer races with a socket or appropriate tool that matches the diameter of the races.

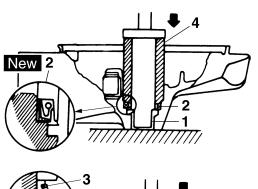
c. Install the inner race onto the final drive pinion gear.

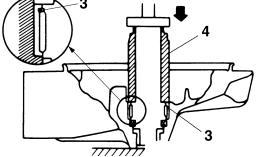
*****

- 5. Install:
- Collar "1"
- Oil seal "2" New
- Bearing "3" (with an appropriate press tool "4" and press)

#### NOTE:

The bearing can be reused, but Yamaha recommends installing a new one.





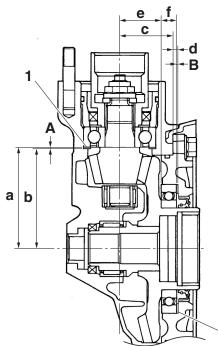
EAS23640

# ALIGNING THE FINAL DRIVE PINION GEAR AND RING GEAR

#### NOTE:

Aligning the final drive pinion gear and ring gear is necessary when any of the following parts are replaced:

- Final gear case
- Ring gear bearing housing
- Any bearing
- 1. Select:
- Final drive pinion gear shim(s)
- Ring gear shim(s)
- *****
- a. Position the final drive pinion gear shim(s) "1" and the ring gear with shim(s) "2". Calculate the respective thicknesses from information marked on the final gear case and the final drive pinion gear.



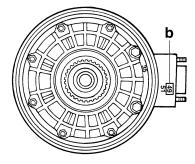
b. To find final drive pinion gear shim thickness "A", use the following formula:

Final drive pinion gear shim thickness A = (84 + a/100) - (83 + b/100)

Where:

a = 84

b = a numeral on the final gear case, to be divided by 100 and added to "83".



Example:

If the final drive pinion gear is marked "+01" and the final gear case is marked "50":

A = 84 - (83 + 50/100)

- = 84 (83 + 0.49)
- = 84 83.49
- = 0.51

Therefore, the calculated final drive pinion gear shim thickness is 0.51 mm. Shim sizes are supplied in the following thicknesses.



Final drive pinion gear shims Thickness (mm) 0.30 0.40 0.50

Since the final drive pinion gear shims are only available in 0.10 mm increments, round off to the hundredths digit.

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

In the example above, the calculated final drive pinion gear shim thickness is 0.51 mm. The chart instructs you to round off the 1 to 0. Thus, you should use a 0.50 mm final drive pinion gear shim.

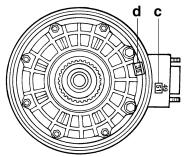
c. To find ring gear shim thickness "B", use the following formula:

Ring gear shim thickness B = (45 + c/100) + (3 + d/100) - [(35.40 - e/100) + f]

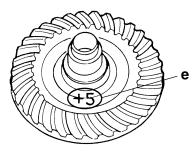
Where:

c = a numeral on the final gear case, to be divided by 100 and added to "45".

d = a numeral usually on the outside of the ring gear bearing housing, to be divided by 100 and added to "3".



e = a numeral (positive or negative) on the inside of the ring gear, to be divided by 100 and added to "35.40".



f = the ring gear bearing thickness constant.

# Ring gear bearing thickness 13.00 mm (0.51 in)

Example:

If the final gear case is marked "51", the ring gear bearing housing is marked "35", the ring gear is marked "- 05", and "f" is 13.00:

- B = (45 + 51/100) + (3 + 35/100) [(35.40 + 5/100) + 13]
  - = (45 + 0.51) + (3 + 0.35) [(35.40 + 0.05) + 13]
  - = 45.51 + 3.35 [(35.40 + 0.05) + 13]
  - = 48.86 [35.45 + 13]
  - = 48.86 48.45
  - = 0.41

Therefore, the calculated ring gear shim thickness is 0.41 mm.

Shim sizes are supplied in the following thicknesses.

# Ring gear shims Thickness (mm) 0.25 0.30 0.40 0.50

Since the ring gear shims are only available in 0.10 mm increments, round off the hundredths digit.

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

In the example above, the calculated ring gear shim thickness is 0.41 mm. The chart instructs you to round off the 1 to 0. Thus, you should use a 0.40 mm ring gear shim.

#### *****

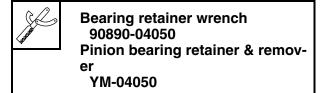
- 2. Install:
  - Shims (as calculated)
  - Final drive pinion gear
- Bearing retainer (with the bearing retainer wrench "1")

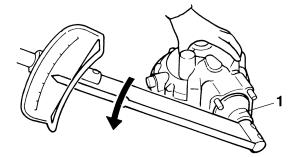
Bearing retainer

110 Nm (11.0 m·kg, 72 ft·lb)

# CAUTION:

The bearing retainer has left-hand threads. To tighten the bearing retainer, turn it counterclockwise.

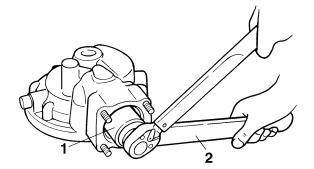




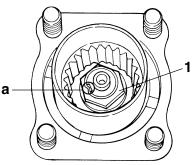
- 3. Install:
  - Coupling gear "1"
- Coupling gear nut (with the coupling gear/middle shaft tool "2")



Coupling gear/middle shaft tool 90890-01229 Gear holder YM-01229



4. Stake the coupling gear nut "1" at a cutout "a" in the final drive pinion gear.



- 5. Install:
  - Ring gear bearing housing (along with the ring gear, but without the thrust washer)
- 6. Adjust:
- Final gear backlash Refer to "MEASURING THE FINAL GEAR BACKLASH" on page 4-100 and "ADJUST-ING THE FINAL GEAR BACKLASH" on page 4-101.
- 7. Measure:
- Ring-gear-to-thrust-washer clearance

### ******

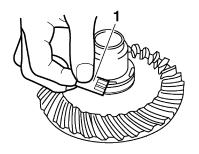
- a. Remove the ring gear bearing housing (along with the ring gear).
- b. Place four pieces of Plastigauge[®] between the original thrust washer and the ring gear.
- c. Install the ring gear bearing housing and tighten the bolts and nuts to specification.

Ring gear bearing housing bolt 40 Nm (4.0 m·kg, 29 ft·lb) Ring gear bearing housing nut 23 Nm (2.3 m·kg, 17 ft·lb)

### NOTE:

Do not turn the final drive pinion gear and ring gear while measuring the ring-gear-to-thrustwasher clearance with Plastigauge[®].

- d. Remove the ring gear bearing housing.
- e. Measure the width of the flattened Plastigauge[®] "1".





Ring-gear-to-thrust-washer clearance 0.10-0.20 mm (0.0039-0.0079 in)

- f. If the ring-gear-to-thrust-washer clearance is within specification, install the ring gear bearing housing (along with the ring gear).
- g. If the ring-gear-to-thrust-washer clearance is out of specification, select the correct thrust washer as follows.
- h. Select the suitable thrust washer from the following chart.

Thrust washers Thickness (mm) 1.2 1.4 1.6 1.8 2.0

i. Repeat the measurement steps until the ringgear-to-thrust-washer clearance is within the specified limits.

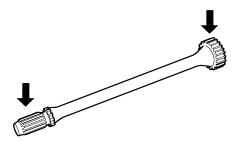


0.10-0.20 mm (0.0039-0.0079 in)

#### 

#### EAS23650

- **CHECKING THE DRIVE SHAFT**
- 1. Check:
- Drive shaft splines Damage/wear  $\rightarrow$  Replace the drive shaft.



#### EAS23660 INSTALLING THE DRIVE SHAFT AND FINAL **DRIVE ASSEMBLY (FJR13A)**

- 1. Lubricate:
- Drive shaft spline (final drive pinion gear side)



**Recommended lubricant** Molybdenum disulfide grease

- 2. Lubricate:
- Drive shaft spline (universal joint side)

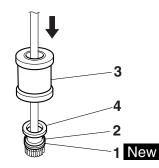
#### **Recommended lubricant** Lithium-soap-based grease

- 3. Install:
  - Oil seal "1" New
- Washer "2"

(with the fork seal driver weight "3" and fork seal driver attachment "4")



YM-A9409-7 Fork seal driver attachment 90890-01186 **Replacement 27 mm** YM-A9409-1



- 4. Install:
- Circlip New
- 5. Install:
  - Universal joint
  - Final drive assembly

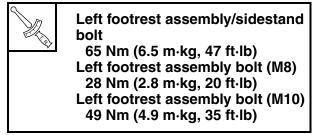
#### NOTE:

Align the drive shaft splines with the driven yoke of the universal joint.

- 6. Tighten:
- Final drive assembly nuts

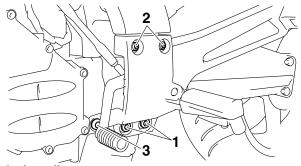
Final gear case nut 42 Nm (4.2 m·kg, 30 ft·lb)

- 7. Install:
- Sidestand
- Left footrest assembly



#### NOTE:

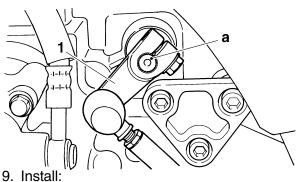
Install the left footrest assembly/sidestand bolts "1", left footrest assembly bolts (M8) "2" and left footrest assembly bolt (M10) "3" temporarily and then tighten them to the specified torques in the proper tightening sequence as shown.



- 8. Install:
- Shift arm "1"

NOTE:

Align the punch mark "a" in the shift shaft with the slot in the shift arm.



- Rear wheel Refer to "REAR WHEEL" on page 4-24.

10.Fill:

• Final gear case Refer to "CHECKING THE FINAL GEAR OIL LEVEL" on page 3-33.

### 11.Check:

 Shift pedal position Refer to "ADJUSTING THE SHIFT PEDAL (FJR13A)" on page 3-32.

#### ET3P66032

# INSTALLING THE DRIVE SHAFT AND FINAL DRIVE ASSEMBLY (FJR13AE)

- 1. Lubricate:
- Drive shaft spline (final drive pinion gear side)

# Recommended lubricant Molybdenum disulfide grease

- 2. Lubricate:
- Drive shaft spline (universal joint side)

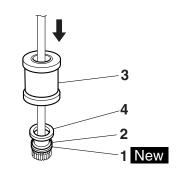


Recommended lubricant Lithium-soap-based grease

- 3. Install:
  - Oil seal "1" New
- Washer "2"

(with the fork seal driver weight "3" and fork seal driver attachment "4")





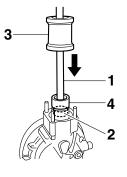
- 4. Install:
- Circlip New
- 5. Install:
- Drive shaft "1"
- (to the final drive pinion gear)
- Oil seal "2"

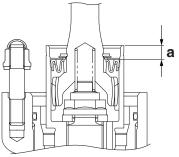
(to the final gear case with the fork seal driver weight "3" and oil seal installing tool "4")



#### Fork seal driver weight 90890-01184 Replacement hammer YM-A9409-7 Oil seal installing tool 90890-01512 YM-01512

Installed depth "a" 8.5–10.0 mm (0.33–0.39 in)





- 6. Install:
- Universal joint
- Final drive assembly

#### NOTE: _

Align the drive shaft splines with the driven yoke of the universal joint.

- 7. Tighten:
  - Final drive assembly nuts



Final gear case nut 42 Nm (4.2 m·kg, 30 ft·lb)

- 8. Install:
- Sidestand
- Left footrest assembly Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-67.
- 9. Install:
- Rear wheel Refer to "REAR WHEEL" on page 4-24.

# SHAFT DRIVE

# 10.Fill:

• Final gear case Refer to "CHECKING THE FINAL GEAR OIL LEVEL" on page 3-33.

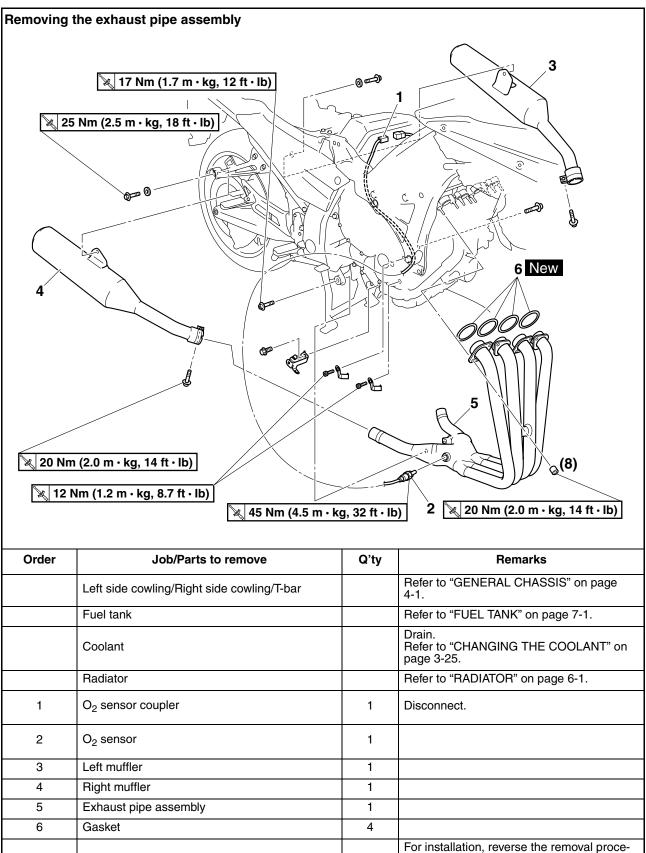
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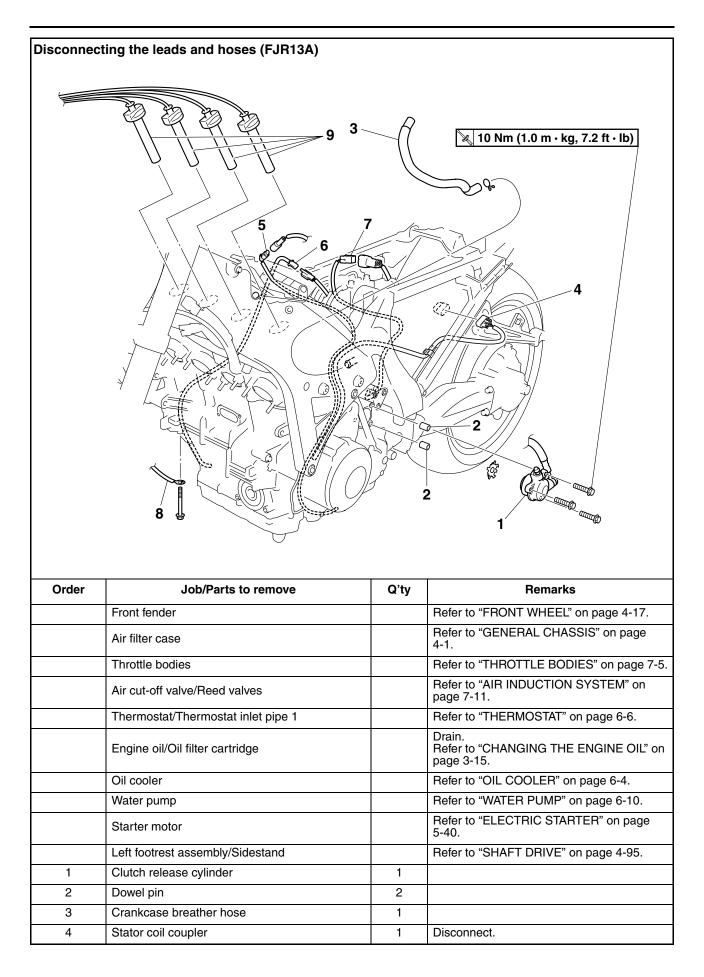
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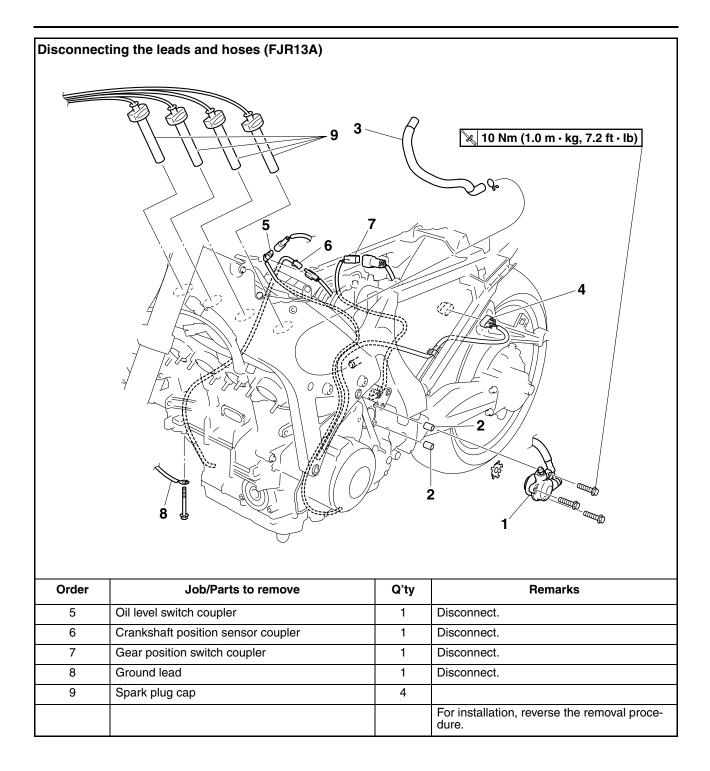
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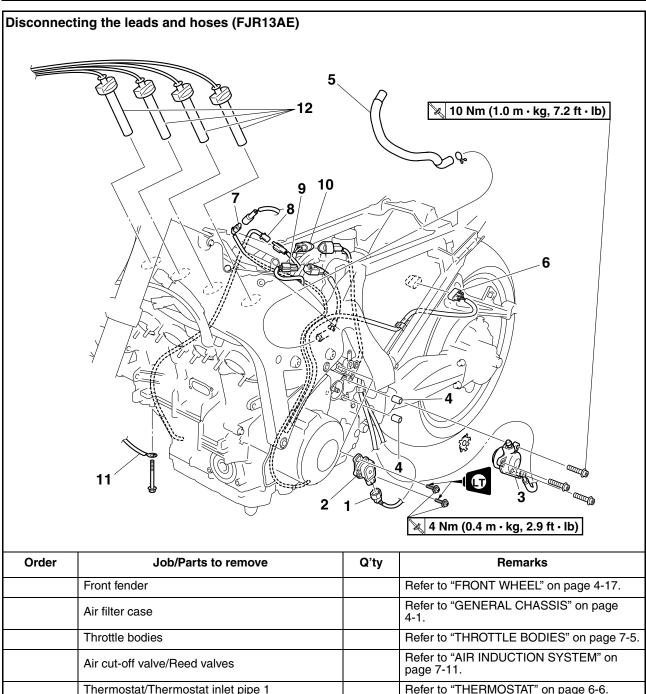
# ENGINE REMOVAL



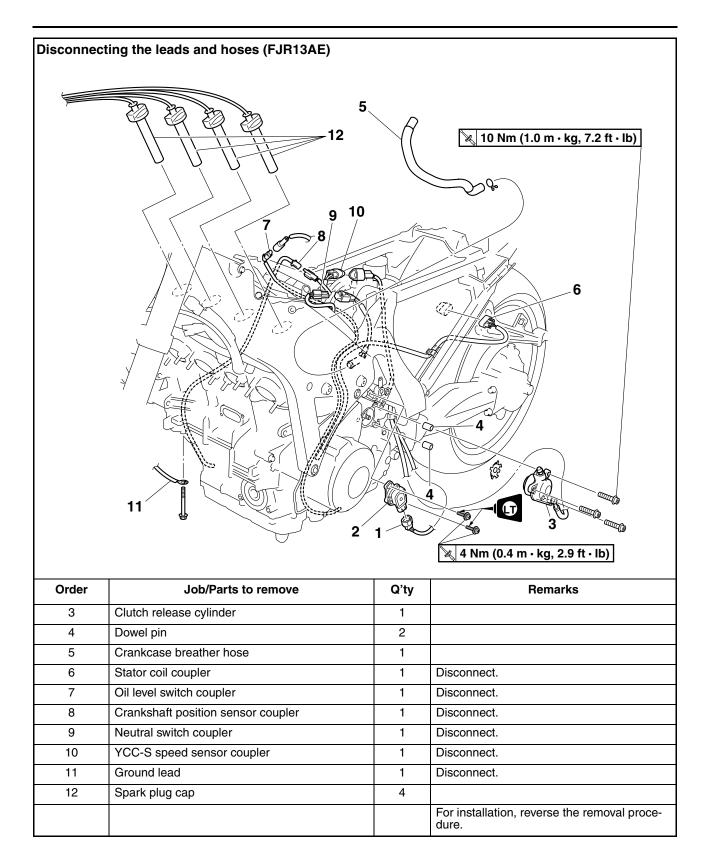
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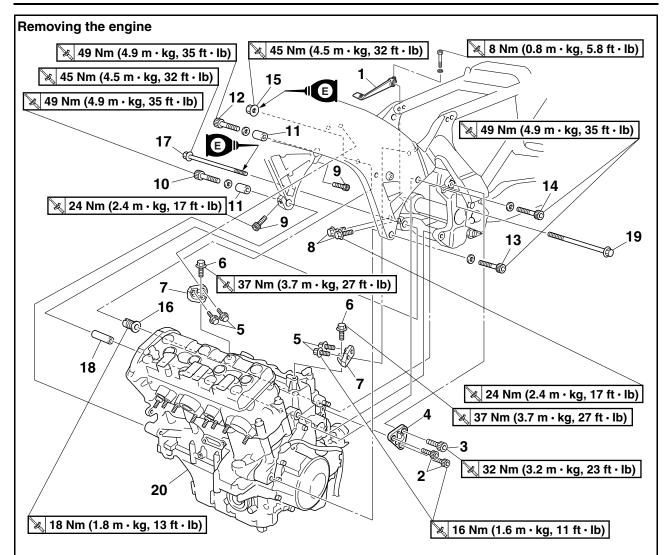




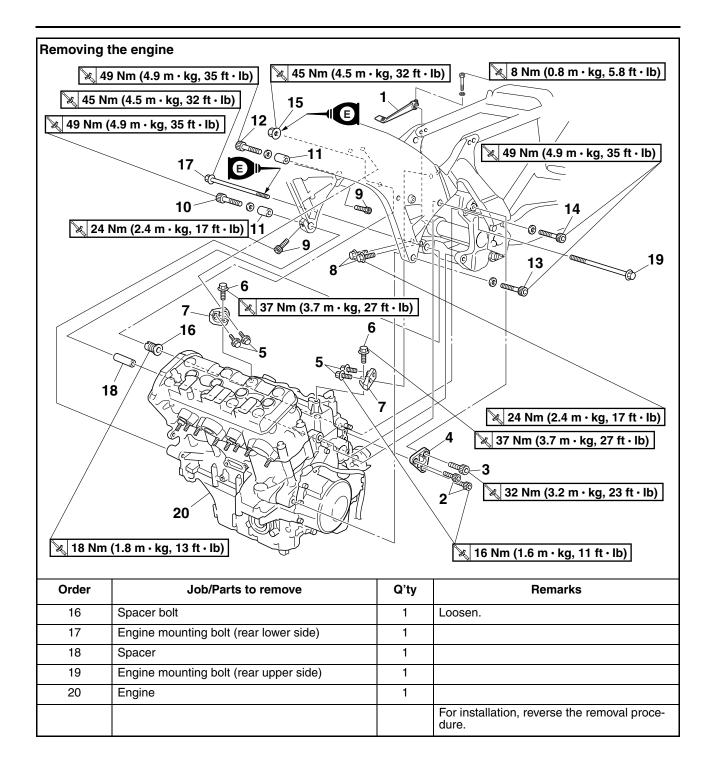


	Air cut-off valve/Reed valves		page 7-11.
	Thermostat/Thermostat inlet pipe 1		Refer to "THERMOSTAT" on page 6-6.
	Engine oil/Oil filter cartridge		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-15.
	Oil cooler		Refer to "OIL COOLER" on page 6-4.
	Water pump		Refer to "WATER PUMP" on page 6-10.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-40.
	Left footrest assembly/Sidestand		Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-67.
	Gear position sensor cover		Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-67.
1	Gear position sensor coupler	1	Disconnect.
2	Gear position sensor	1	





Order	Job/Parts to remove	Q'ty	Remarks
			NOTE:
			Place a suitable stand under the engine.
1	Brake pedal	1	
2	Engine mounting bolt (left rear side)	2	
3	Engine bracket bolt (left rear side)	1	
4	Engine bracket (left rear side)	1	
5	Engine bracket bolt (top)	4	
6	Engine mounting bolt (top)	2	
7	Engine bracket (top)	2	
8	Pinch bolt (rear side)	2	
9	Pinch bolt (front side)	2	
10	Engine mounting bolt (right front lower side)	1	
11	Spacer	2	
12	Engine mounting bolt (right front upper side)	1	
13	Engine mounting bolt (left front lower side)	1	
14	Engine mounting bolt (left front upper side)	1	
15	Engine mounting nut (rear upper side)	1	

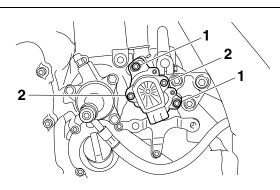


# REMOVING THE GEAR POSITION SENSOR (FJR13AE only)

- 1. Disconnect:
- Gear position sensor coupler
- 2. Remove:
- Gear position sensor

#### NOTE: _

Remove only the screws "1" when removing the gear position sensor. Do not remove the screws "2".



ET3P61023

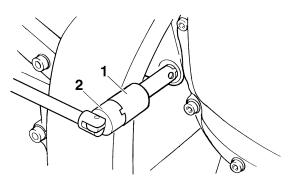
# **REMOVING THE ENGINE (FJR13A)**

- 1. Loosen:
- Spacer bolt

#### NOTE:

Loosen the spacer bolt with the pivot shaft wrench "1" and pivot shaft wrench adapter "2".





ET3P66034

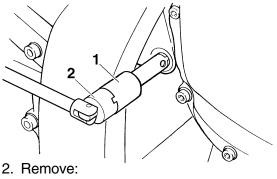
# REMOVING THE ENGINE (FJR13AE)

- 1. Loosen:
- Spacer bolt

#### NOTE: ____

Loosen the spacer bolt with the pivot shaft wrench "1" and pivot shaft wrench adapter "2".

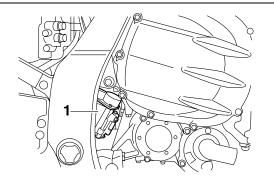
 Pivot shaft wrench 90890-01471
 Frame spanner socket YM-01471
 Pivot shaft wrench adapter 90890-01476



Engine

# NOTE:

Make sure that the engine does not strike the clutch actuator "1" when removing it.



#### EAS23720 INSTALLING THE ENGINE

- 1. Install:
- Engine

#### NOTE: _

When mounting the engine to the frame, be sure to align the splines on the middle driven shaft with the splines on the universal joint.

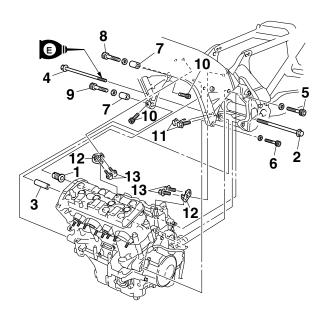
#### 2. Install:

- Spacer bolt "1"
- Engine mounting bolt (rear upper side) "2"
- Spacer "3"
- Engine mounting bolt (rear lower side) "4"
- Engine mounting bolt (left front upper side) "5"
- Engine mounting bolt (left front lower side) "6"

- Spacers "7"
- Engine mounting bolt (right front upper side) "8"
- Engine mounting bolt (right front lower side) "**Q**"
- Pinch bolts (front side) "10"
- Pinch bolts (rear side) "11"
- Engine brackets (top) "12"
- Engine bracket bolts (top) "13"

### NOTE:

- Lubricate the engine mounting bolt (rear lower side) threads with engine oil.
- Do not fully tighten the bolts.



# 3. Tighten:

 Engine mounting bolt (left front upper side) "5"



Engine mounting bolt (left front upper side) 49 Nm (4.9 m·kg, 35 ft·lb)

- 4. Tighten:
- Engine mounting bolt (rear lower side) "4"



Engine mounting bolt (rear lower side) 45 Nm (4.5 m·kg, 32 ft·lb)

- 5. Tighten:
- Spacer bolt "1"

Spacer bolt 18 Nm (1.8 m·kg, 13 ft·lb)

### NOTE: _

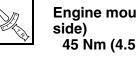
- Tighten the spacer bolt "1" to specification with a pivot shaft wrench.
- When tightened, the spacer bolt should be flat against the engine surface.



#### Pivot shaft wrench 90890-01471 Frame spanner socket YM-01471 Pivot shaft wrench adapter 90890-01476

### 6. Tighten:

• Engine mounting nut (rear upper side) "14"



Engine mounting nut (rear upper 45 Nm (4.5 m·kg, 32 ft·lb)

### NOTE: _

Lubricate the engine mounting nut (rear upper side) threads with engine oil.

- 7. Tighten:
  - Engine mounting bolt (left front lower side) "6"
  - Engine mounting bolt (right front upper side) "8"
  - Engine mounting bolt (right front lower side) "9"
    - Engine mounting bolt (left front lower side) 49 Nm (4.9 m·kg, 35 ft·lb) Engine mounting bolt (right front upper side) 49 Nm (4.9 m·kg, 35 ft·lb) Engine mounting bolt (right front lower side) 49 Nm (4.9 m·kg, 35 ft·lb)
- 8. Install:
- Engine mounting bolts (top) "15"
- 9. Tighten:
  - Pinch bolts (front side) "10"



Pinch bolt (front side) 24 Nm (2.4 m·kg, 17 ft·lb)

10.Tighten:

• Pinch bolts (rear side) "11"



Pinch bolt (rear side) 24 Nm (2.4 m·kg, 17 ft·lb)

### NOTE: _

Tighten the pinch bolts (rear side) one at a time, making sure to tighten the first bolt again after tightening the second bolt.

### 11.Tighten:

- Engine mounting bolts (top) "15" (temporarily tighten)
- Engine bracket bolts (top) "13" (temporarily tighten)

### NOTE:

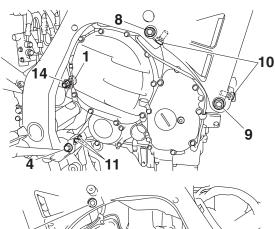
When temporarily tightened, the bolts "15" and "13" should be flat against the engine and frame surface.

### 12.Tighten:

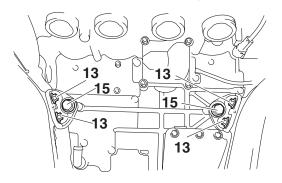
- Engine mounting bolts (top) "15"
- Engine bracket bolts (top) "13"



Engine mounting bolt (top) 37 Nm (3.7 m·kg, 27 ft·lb) Engine bracket bolt (top) 16 Nm (1.6 m·kg, 11 ft·lb)







- 13.Install:
- Engine bracket (left rear side) "1"
- Engine bracket bolt (left rear side) "2"
- Engine mounting bolts (left rear side) "3"

#### NOTE:

### Do not fully tighten the bolts.

#### 14.Tighten:

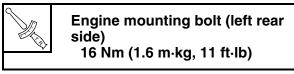
• Engine bracket bolt (left rear side) "2"

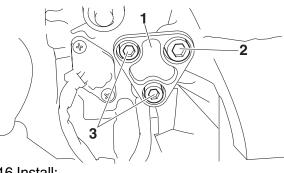


Engine bracket bolt (left rear side) 32 Nm (3.2 m·kg, 23 ft·lb)

# 15.Tighten:

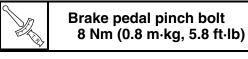
• Engine mounting bolts (left rear side) "3"





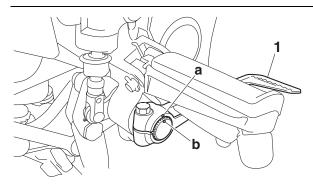
16.Install:

• Brake pedal "1"



### NOTE:

Align the punch mark "a" on the brake pedal with the punch mark "b" on the brake pedal pivot shaft.



#### ET3P66035

# INSTALLING THE GEAR POSITION SENSOR (FJR13AE only)

- 1. Connect:
- MCU coupler
- ECU coupler

Refer to "GENERAL CHASSIS" on page 4-1. 2. Install:

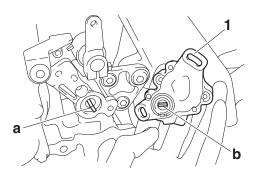
• Gear position sensor "1"

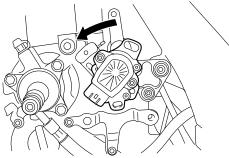
# EC3P66001

Shift the transmission into neutral before installing the gear position sensor, otherwise the sensor may be damaged.

#### NOTE:

Fit the end "a" of the shift drum assembly into the opening "b" in the gear position sensor "1", and then rotate the sensor counterclockwise and temporarily install the screws.





- 3. Adjust:
  - Gear position sensor Refer to "ADJUSTING THE GEAR POSI-TION SENSOR (FJR13AE only)" on page 5-11.

#### ET3P66036

### ADJUSTING THE GEAR POSITION SENSOR (FJR13AE only)

- 1. Check:
- Gear position sensor Refer to "CHECKING THE GEAR POSITION SENSOR (FJR13AE only)" on page 8-235.

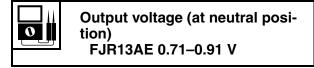
- 2. Adjust:
- Gear position sensor angle

#### ****

- a. Connect the gear position sensor coupler to the gear position sensor.
- b. Connect the digital circuit tester to the gear position sensor.
- Positive tester probe  $\rightarrow$
- yellow "1"
- Negative tester probe → black/blue "2"



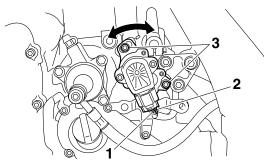
- c. Turn the main switch to "ON".
- d. Measure the gear position sensor voltage.
- e. Adjust the gear position sensor angle so that the voltage is within the specified range.



f. After adjusting the gear position sensor angle, tighten the gear position sensor screws
"3" to specification.



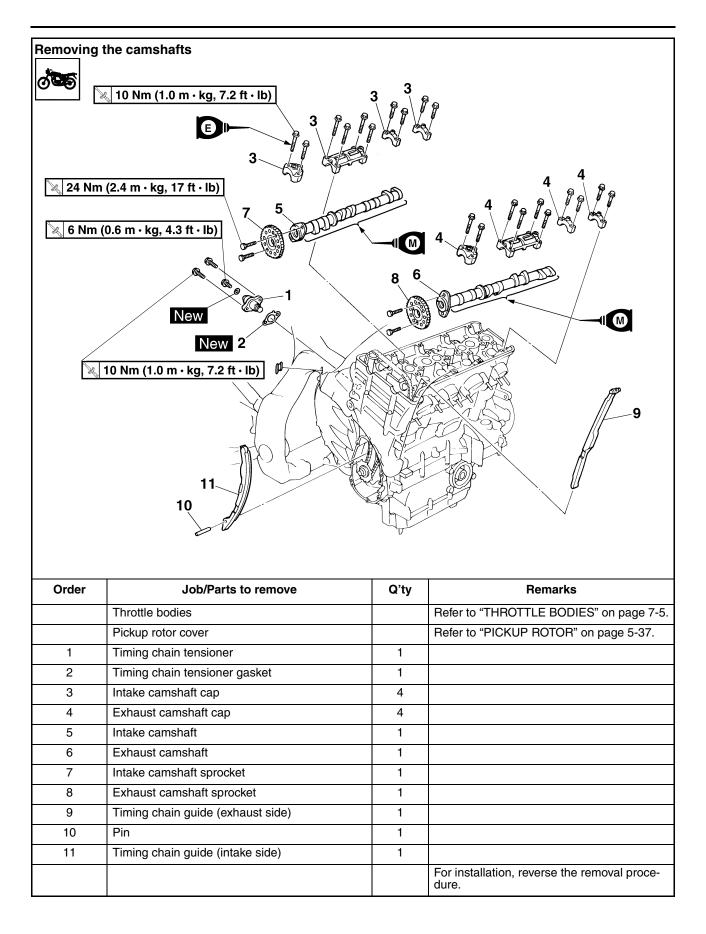
Gear position sensor screw 4 Nm (0.4 m·kg, 2.9 ft·lb) LOCTITE[®]



- *****
- 3. Check:
- Gear position setting Refer to "Diagnostic code table (Diagnostic code No. Sh_ _65)".

#### EAS23760 CAMSHAFTS

Removing the cylinder head cover				
المعنى المعن معنى المعنى معنى معنى المعنى المعنى معنى معنى معنى معنى معنى معنى معنى	(1.3 m · kg, 9.4 ft · lb)		10 Nm (1.0 m · kg, 7.2 ft · lb)	
Order	Job/Parts to remove	Q'ty	Remarks	
	Right side cowling		Refer to "GENERAL CHASSIS" on page 4-1.	
	Air cut-off valve/Reed valves		Refer to "AIR INDUCTION SYSTEM" on page 7-11.	
1	Spark plug	4		
2	Cylinder identification sensor	1		
3	Cylinder head cover	1		
4	Cylinder head cover gasket	1		
5	Dowel pin	4		
6	Timing chain guide (upper side)	1		
			For installation, reverse the removal proce- dure.	

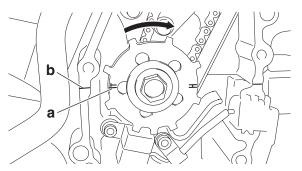


# REMOVING THE CAMSHAFTS

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

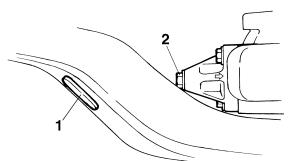
#### NOTE:

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



#### ......

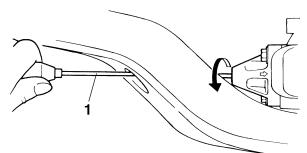
- 2. Remove:
- Rubber cap "1"
- Timing chain tensioner cap bolt "2"
- Washer



3. Turn the timing chain tensioner rod fully clockwise with a thin screwdriver "1".

#### NOTE:

Make sure that the tensioner rod has been fully set clockwise.



- 4. Remove:
- Timing chain tensioner
- Timing chain tensioner gasket
- 5. Remove:
- Camshaft caps
- Dowel pins

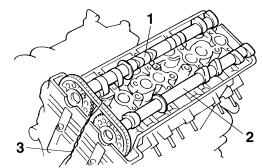
# CAUTION:

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.

- 6. Remove:
  - Intake camshaft "1"
- Exhaust camshaft "2"

#### NOTE:

To prevent the timing chain from falling into the crankcase, fasten it with a wire "3".

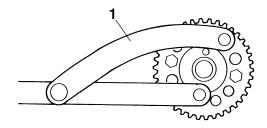


- 7. Remove:
  - Intake camshaft sprocket
- Exhaust camshaft sprocket

#### NOTE:

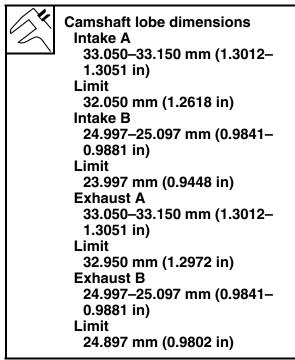
While holding the camshaft sprockets with the rotor holding tool "1", loosen the camshaft sprocket bolts.

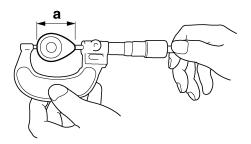
Rotor holding tool 90890-01235 Universal magneto & rotor holder YU-01235

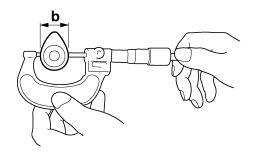


#### EAS23850 CHECKING THE CAMSHAFTS

- 1. Check:
- Camshaft lobes Blue discoloration/pitting/scratches  $\rightarrow$  Replace the camshaft.
- 2. Measure:
- Camshaft lobe dimensions "a" and "b"
   Out of specification → Replace the camshaft.

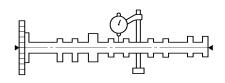






- 3. Measure:
  - Camshaft runout Out of specification  $\rightarrow$  Replace.



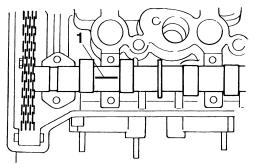


- 4. Measure:
- Camshaft-journal-to-camshaft-cap clearance Out of specification → Measure the camshaft journal diameter.



Camshaft-journal-to-camshaftcap clearance 0.028–0.062 mm (0.0011–0.0024 in)

- ****
- a. Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
- b. Position a strip of Plastigauge[®] "1" onto the camshaft journal as shown.



c. Install the dowel pins and camshaft caps.

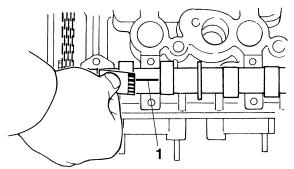
#### NOTE: ____

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge[®].



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

d. Remove the camshaft caps and then measure the width of the Plastigauge[®] "1".

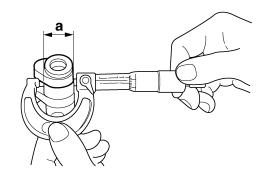


#### ____

- Measure:
- Camshaft journal diameter "a" Out of specification  $\rightarrow$  Replace the camshaft. Within specification  $\rightarrow$  Replace the cylinder head and the camshaft caps as a set.



Camshaft journal diameter 24.459-24.472 mm (0.9630-0.9635 in)

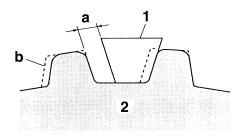


#### EAS23870

# CHECKING THE CAMSHAFT SPROCKETS

- 1. Check:
- Camshaft sprockets

More than 1/4 tooth wear "a"  $\rightarrow$  Replace the camshaft sprockets, timing chain, and crankshaft as a set.



- a. 1/4 tooth
- b. Correct
- 1. Timing chain roller
- 2. Camshaft sprocket

#### EAS23950 **CHECKING THE TIMING CHAIN GUIDES** 1. Check:

- Timing chain guide (exhaust side)
- Timing chain guide (intake side)
- Timing chain guide (upper side) Damage/wear  $\rightarrow$  Replace the defective part(s).

EAS23970

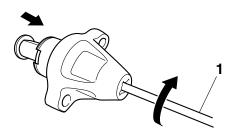
# CHECKING THE TIMING CHAIN TENSIONER

- 1. Check:
- Timing chain tensioner Cracks/damage/rough movement  $\rightarrow$  Replace.

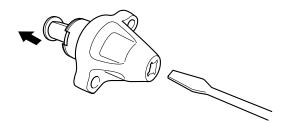
a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

#### NOTE: ____

While pressing the timing chain tensioner rod, wind it clockwise with a thin screwdriver "1" until it stops.



- b. Remove the screwdriver and slowly release the timing chain tensioner rod.
- c. Make sure that the timing chain tensioner rod comes out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.



#### *****

EAS24010

#### **INSTALLING THE CAMSHAFTS**

- 1. Install:
- Exhaust camshaft sprocket
- Intake camshaft sprocket



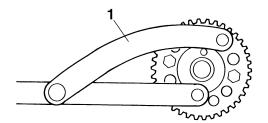
24 Nm (2.4 m·kg, 17 ft·lb)

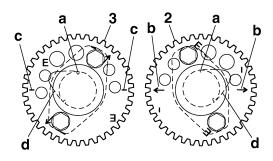
Camshaft sprocket bolt

#### NOTE:

- While holding the camshaft sprockets with the rotor holding tool "1", tighten the camshaft sprocket bolts.
- Make sure that the holes "a" in the cylinder-#4 cam and match marks "b" and "c" on the camshaft sprockets are in the position shown in the illustration.
- 2: Exhaust camshaft sprocket
- 3: Intake camshaft sprocket
- b: Exhaust side " $\rightarrow$ "
- c: Intake side "-"
- d: Cylinder-#1 cam

Rotor holding tool 90890-01235 Universal magneto & rotor holder YU-01235





- 2. Install:
  - Timing chain "1"
- Exhaust camshaft "2"
- Intake camshaft "3" (with the camshaft sprockets)

#### **CAUTION:**

Do not turn the crankshaft when installing the camshaft(s) to avoid damage or improper valve timing.

#### *****

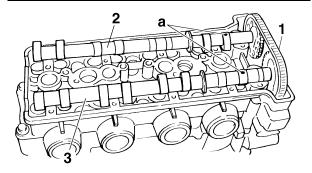
a. Install the timing chain onto both camshaft sprockets, and then install the camshafts.

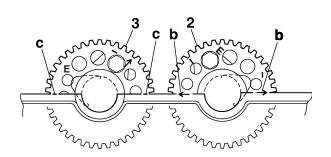
NOTE: _

- Make sure the holes "a" on each camshaft faces up.
- When installing the timing chain, start with the exhaust camshaft and be sure to keep the timing chain as tight as possible on the exhaust side.
- Make sure the match marks "b" and "c" on the camshaft sprockets are aligned with the cylinder head edge.

b: Exhaust side " $\rightarrow$ "

c: Intake side "-"





#### *****

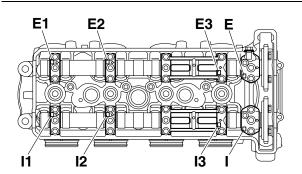
- 3. Install:
- Exhaust camshaft caps
- Intake camshaft caps

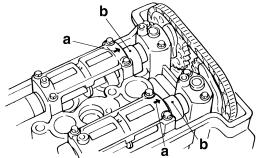
#### NOTE:

 Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:

"E", "E1", "E2", "E3": Exhaust

- "I", "I1", "I2", "I3": Intake
- Make sure the arrow mark "a" on each camshaft points towards the right side of the engine.
- Make sure the holes "b" in the camshafts are aligned with arrow mark "a" on the camshaft caps.





- 4. Install:
- Camshaft cap bolts

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

# CAUTION:

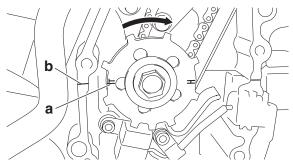
#### The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.

#### NOTE:

Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

#### 5. Align:

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



#### *****

- 6. Install:
  - Timing chain tensioner
  - Timing chain tensioner gasket New

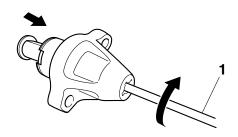
#### ****

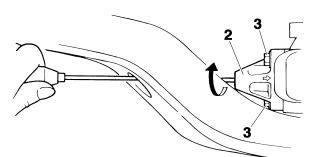
- a. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver "1".
- b. With the timing chain tensioner rod turned all the way into the timing chain tensioner housing (with the thin screwdriver still installed), install the gasket and the timing chain tensioner "2" onto the cylinder block.
- c. Tighten the timing chain tensioner bolts "3" to the specified torque.

# Timing chain tensioner bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

5-18

# CAMSHAFTS





d. Remove the screwdriver, make sure the timing chain tensioner rod releases, and then tighten the cap bolt to the specified torque.



Timing chain tensioner cap bolt 6 Nm (0.6 m·kg, 4.3 ft·lb)

#### 

- 7. Turn:
- Crankshaft
   (several turns clockwise)
- 8. Check:
- "T" mark

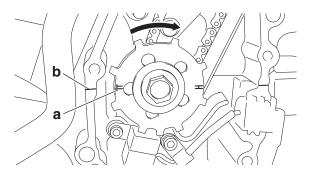
Make sure the "T" mark "a" on the pickup rotor is aligned with the crankcase mating surface "b".

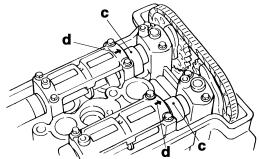
Camshaft holes

Make sure the holes "c" in the camshafts are aligned with the arrow marks "d" on the camshaft caps.

Out of alignment  $\rightarrow$  Adjust.

Refer to the installation steps above.





- 9. Measure:
  - Valve clearance Out of specification → Adjust. Refer to "ADJUSTING THE VALVE CLEAR-ANCE" on page 3-6.

10.Install:

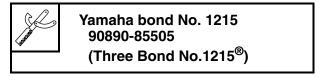
- Cylinder head cover gasket New
- Cylinder head cover

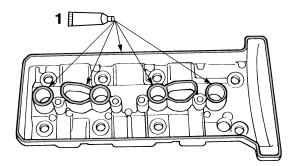


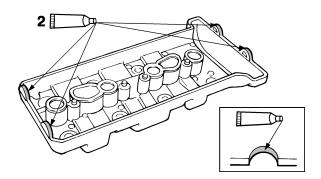
Cylinder head cover bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

#### NOTE: ____

- Apply Three Bond 1514[®] "1" onto the mating surfaces of the cylinder head cover and cylinder head cover gasket.
- Apply Yamaha bond No.1215 "2" onto the mating surfaces of the cylinder head cover gasket and cylinder head.
- Tighten the cylinder head cover bolts in stages and in a crisscross pattern.







# CYLINDER HEAD

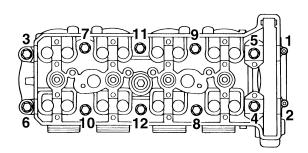
Removing the cylinder head			
	1st 25 Nm (2.5 m ⋅ kg, 18		
	× 2nd 25 Nm (2.5 m ⋅ kg, 18 Final Specified angle 175–	185°	New
			Tall
		°°°°°2∎ °°°°2∎	New 20 Nm (2.0 m·kg, 14 ft·lb)
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Camshafts		Refer to "CAMSHAFTS" on page 5-12.
1	Cylinder head	1	
2	Cylinder head gasket	1	
3	Dowel pin	2	
			For installation, reverse the removal proce- dure.

# REMOVING THE CYLINDER HEAD

- 1. Remove:
- Cylinder head bolts

#### NOTE:

- Loosen the bolts in the proper sequence as shown.
- Loosen each bolt 1/2 of a turn at a time. After all of the bolts are fully loosened, remove them.



#### EAS24160

### CHECKING THE CYLINDER HEAD

- 1. Eliminate:
- Combustion chamber carbon deposits (with a rounded scraper)

#### NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

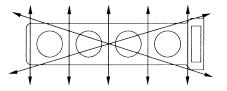
- Spark plug bore threads
- Valve seats

#### 2. Check:

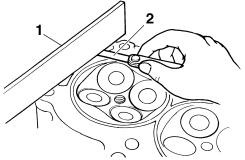
- Cylinder head Damage/scratches  $\rightarrow$  Replace.
- Cylinder head water jacket Mineral deposits/rust → Eliminate.
- 3. Measure:
- Cylinder head warpage Out of specification → Resurface the cylinder head.



# Warpage limit 0.10 mm (0.0039 in)



- a. Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



- 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 bolts (M10) "1"-"10" New
- Cylinder head bolts (M6) "11", "12"

# WARNING

#### Replace the bolts with new ones.

#### NOTE: _

Tighten the bolts using the following procedure.

#### .....

- a. Lubricate the cylinder head bolts and washers with engine oil.
- b. Install the washers and cylinder head bolts.
- c. Tighten the cylinder head bolts (M10) in the proper tightening sequence as shown.

Cylinder head bolt (M10) 1st 25 Nm (2.5 m·kg, 18 ft·lb)

d. Loosen and retighten the cylinder head bolts in the proper tightening sequence as shown.

# **CYLINDER HEAD**



#### Cylinder head bolt (M10) 2nd

25 Nm (2.5 m·kg, 18 ft·lb)

e. Tighten the cylinder head bolts further to reach the specified angle 175–185° in the proper tightening sequence as shown.



Cylinder head bolt (M10) Final Specified angle 175–185°

# WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

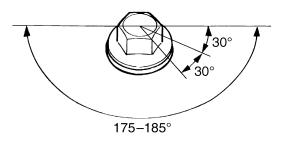
### CAUTION:

EC3P61033

- Do not use a torque wrench to tighten the bolt to the specified angle.
- Tighten the bolt until it is at the specified angle.

#### NOTE:

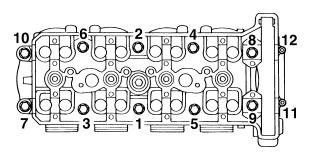
On a hexagonal bolt, note that the angle from one corner to another is  $60^{\circ}$ .



f. Tighten the cylinder head bolts (M6) in proper tightening sequence as shown.

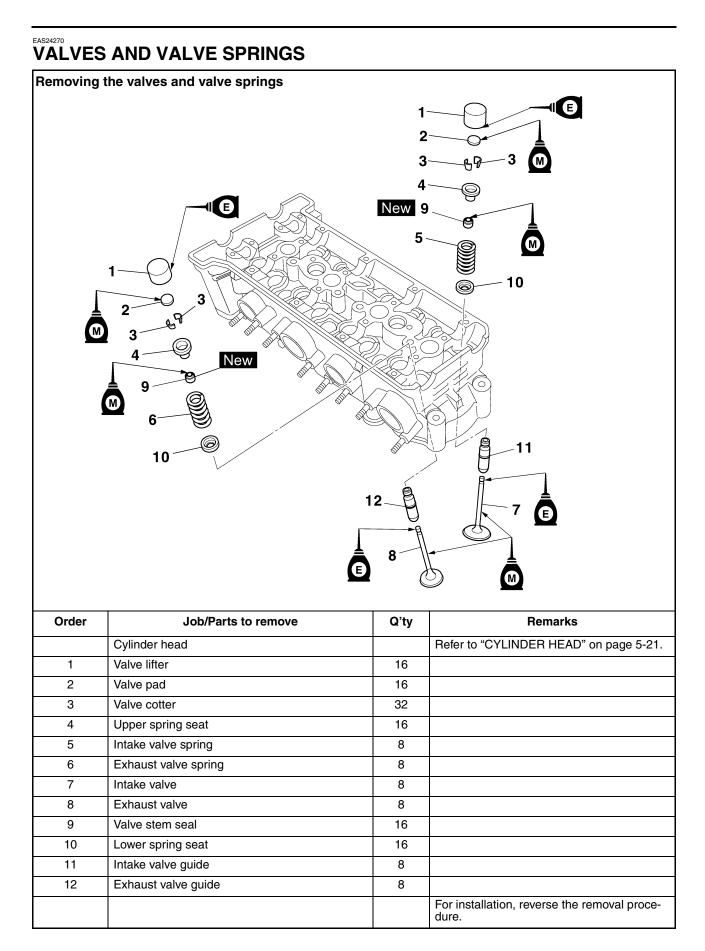


Cylinder head bolt (M6) 12 Nm (1.2 m·kg, 8.7 ft·lb)



*****

5-23



#### EAS24280

### **REMOVING THE VALVES**

The following procedure applies to all of the valves and related components.

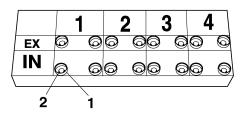
#### NOTE: _

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

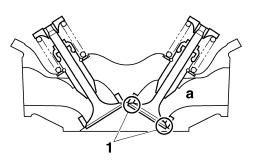
Leakage at the valve seat  $\rightarrow$  Check the valve face, valve seat, and valve seat width. Refer to "CHECKING THE VALVE SEATS" on page 5-27.

### ****

- 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".

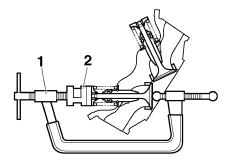


- 3. Remove:
- Valve cotters

### NOTE: ____

Remove the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".

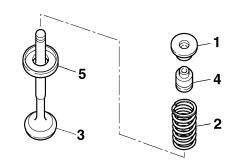
Valve spring compressor 90890-04019 YM-04019 Valve spring compressor attachment 90890-04114 Valve spring compressor adapter 19.5 mm YM-04114



- 4. Remove:
- Upper spring seat "1"
- Valve spring "2"
- Valve "3"
- Valve stem seal "4"
- Lower spring seat "5"

### NOTE:

Identify the position of each part very carefully so that it can be reinstalled in its original place.

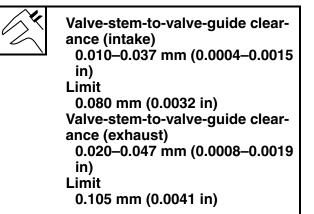


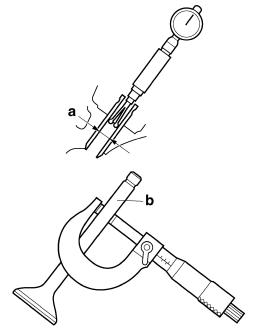
#### EAS24290

# CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

- 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"





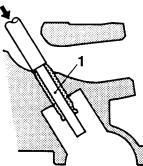
- 2. Replace:
- Valve guide

#### NOTE: _

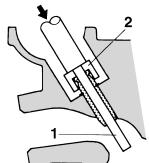
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100  $^{\circ}$ C (212  $^{\circ}$ F) in an oven.

#### ****

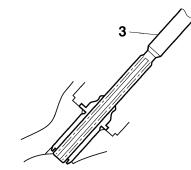
a. Remove the valve guide with the valve guide remover "1".



 b. Install the new valve guide with the valve guide installer "2" and valve guide remover "1".



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:

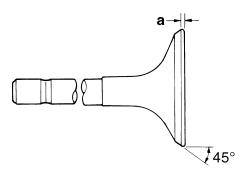
After replacing the valve guide, reface the valve seat.

Juget C	Valve guide remover (ø5) 90890-04097 Valve guide remover (5.0 mm) YM-04097 Valve guide installer (ø5) 90890-04098 Valve guide installer (5.0 mm) YM-04098 Valve guide reamer (ø5) 90890-04099 Valve guide reamer (5.0 mm)
	Valve guide reamer (5.0 mm) YM-04099

### 3. Eliminate:

- Carbon deposits (from the valve face and valve seat)
- 4. Check:
- Valve face Pitting/wear  $\rightarrow$  Grind the valve face.
- Valve stem end Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
   Measure:
- Valve margin thickness D "a"
   Out of specification → Replace the valve.
  - Valve margin thickness D (intake) 0.80–1.20 mm (0.0315–0.0472 in) Valve margin thickness D (exhaust)

0.50–0.90 mm (0.0197–0.0354 in)

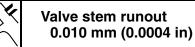


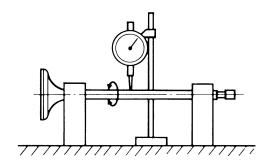
- 6. Measure:
  - Valve stem runout

Out of specification  $\rightarrow$  Replace the value.

### NOTE: _

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.





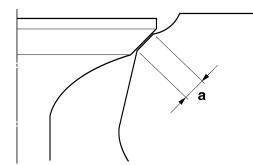
#### EAS24300 CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

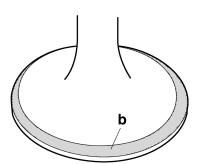
- 1. Eliminate:
- Carbon deposits (from the valve face and valve seat)
- 2. Check:
- Valve seat
  - $\label{eq:Pitting} \ensuremath{\text{wear}} \rightarrow \ensuremath{\text{Replace}} \ensuremath{\text{the cylinder head}}.$
- 3. Measure:
- Valve seat width C "a" Out of specification → Replace the cylinder head.



Valve seat width C (intake) 0.90–1.10 mm (0.0354–0.0433 in) Valve seat width C (exhaust) 0.90–1.10 mm (0.0354–0.0433 in)



- ****
- a. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



- 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: _

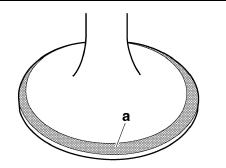
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

#### ****

a. Apply a coarse lapping compound "a" to the valve face.

### CAUTION:

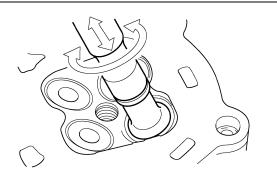
Do not let the lapping compound enter the gap between the valve stem and the valve guide.



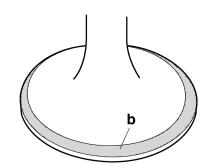
- b. Apply molybdenum disulfide oil onto the valve stem.
- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

### NOTE:

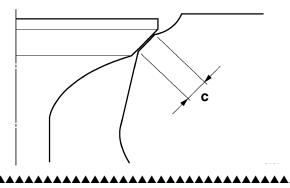
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



- 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.



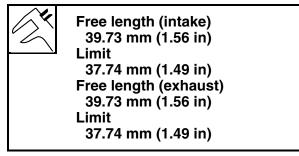
- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width "c" again. If the valve seat width is out of specification, reface and lap the valve seat.

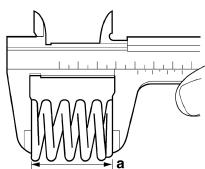


#### EAS24310 CHECKING THE VALVE SPRINGS

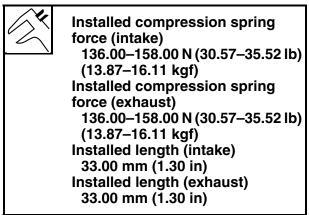
The following procedure applies to all of the valve springs.

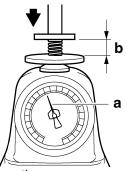
- 1. Measure:
- Valve spring free length "a" Out of specification → Replace the valve spring.





- 2. Measure:
- Compressed valve spring force "a" Out of specification → Replace the valve spring.

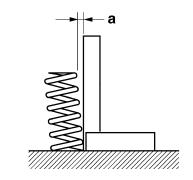




- b. Installed length
- 3. Measure:
- Valve spring tilt "a"
  - Out of specification  $\rightarrow$  Replace the valve spring.



Spring tilt (intake) 2.5°/1.7 mm (2.5°/0.067 in) Spring tilt (exhaust) 2.5°/1.7 mm (2.5°/0.067 in)



#### EAS24320 CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

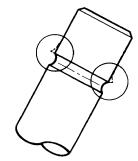
- 1. Check:
- Valve lifter Damage/scratches → Replace the valve lifters and cylinder head.



### INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

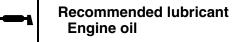
- 1. Deburr:
- Valve stem end (with an oil stone)

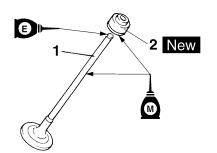


- 2. Lubricate:
- Valve stem "1"
- Valve stem seal "2" (with the recommended lubricant)



- 3. Lubricate:
  - Valve stem end (with the recommended lubricant)

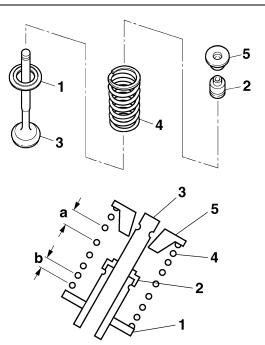




- 4. Install:
  - Lower spring seat "1"
- Valve stem seal "2" New
- Valve "3"
- Valve spring "4"
- Upper spring seat "5" (into the cylinder head)

### NOTE:

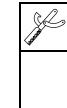
- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch "a" facing up.



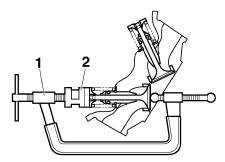
- b. Smaller pitch
- 5. Install:
- Valve cotters

### NOTE: _

Install the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".



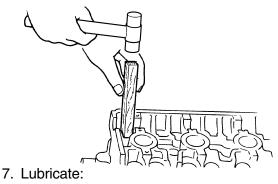
 Valve spring compressor 90890-04019 YM-04019
 Valve spring compressor attachment 90890-04114
 Valve spring compressor adapter er 19.5 mm YM-04114



 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.



- Valve lifter
  - (with the recommended lubricant)

### Recommended lubricant Engine oil

- 8. 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

Starter clutch idle gear shaft

Starter clutch idle gear

Generator rotor

Starter clutch gear

Woodruff key

5

6

7

8

9

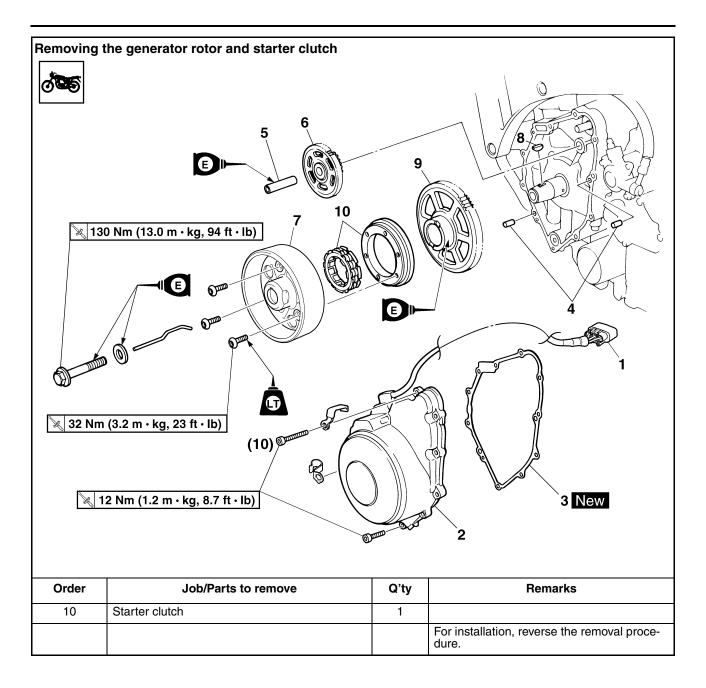
Removing	the generator rotor and starter clutch			
32 Nm	5 6 9 130 Nm (13.0 m · kg, 94 ft · lb) 7 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
Order	Job/Parts to remove	Q'ty	Remarks	
	Fuel tank		Refer to "FUEL TANK" on page 7-1.	
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.	
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-15.	
1	Stator coil coupler	1	Disconnect.	
2	Generator cover	1		
3	Generator cover gasket	1		
4	Dowel pin	2		

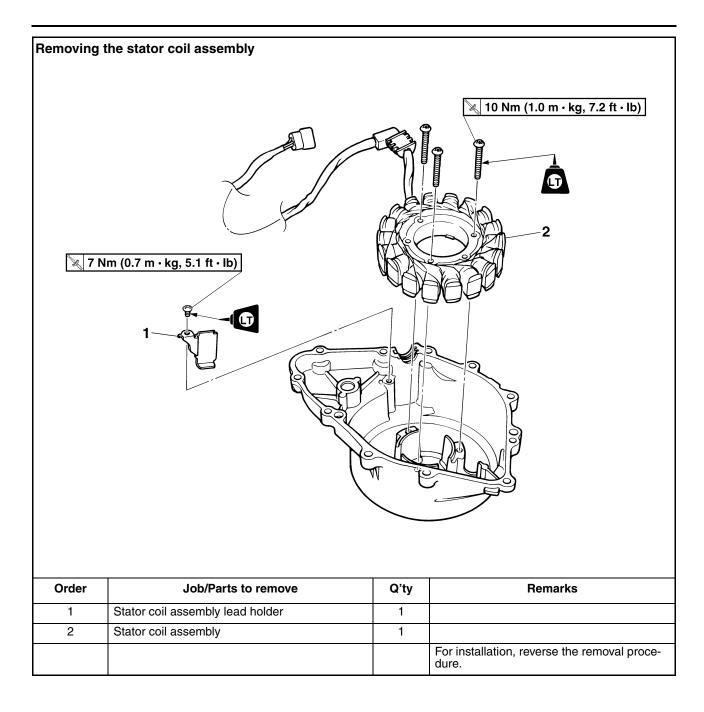
1

1

1

1





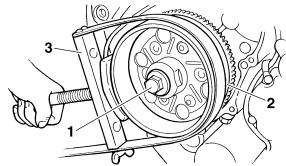
# REMOVING THE GENERATOR

- 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")
- Woodruff key

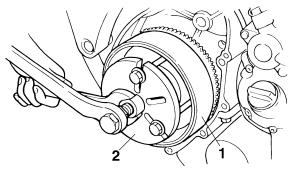
### CAUTION:

To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set's center bolt and the crankshaft.

### NOTE:

Make sure the flywheel puller is centered over the generator rotor.





# REMOVING THE STARTER CLUTCH

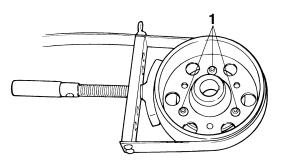
- 1. Remove:
- Starter clutch bolts "1"

### NOTE:

While holding the generator rotor with the sheave holder, remove the starter clutch bolts.



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

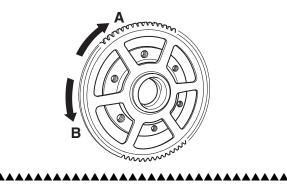


#### EAS24570 CHECKING THE STARTER CLUTCH

- 1. Check:
- Starter clutch rollers
   Damage/wear → Replace.
- 2. Check:
  - Starter clutch idle gear
  - Starter clutch gear Burrs/chips/roughness/wear → Replace the defective part(s).
- 3. Check:
- Starter clutch gear's contacting surfaces Damage/pitting/wear  $\rightarrow$  Replace the starter clutch gear.
- 4. Check:
- Starter clutch operation

### *****

- a. Install the starter clutch gear onto the starter clutch and hold the starter clutch.
- 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
- Starter clutch bolts "1"

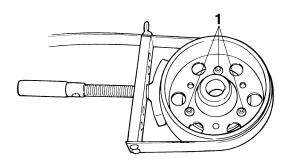


Starter clutch bolt 32 Nm (3.2 m·kg, 23 ft·lb) **LOCTITE[®]** 

#### NOTE:

While holding the generator rotor with the sheave holder, tighten the starter clutch bolts.

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



EAS24500

### INSTALLING THE GENERATOR

- 1. Install:
- Woodruff key
- Generator rotor
- Washer
- Generator rotor bolt

#### NOTE:

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- When installing the generator rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.

• Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.

#### 2. Tighten:

Generator rotor bolt "1"



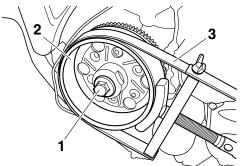
Generator rotor bolt 130 Nm (13.0 m·kg, 94 ft·lb)

#### NOTE: _

While holding the generator rotor "2" with the sheave holder "3", tighten the generator rotor bolt.

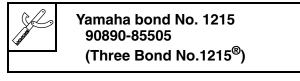


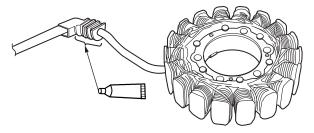
Sheave holder 90890-01701 Primary clutch holder YS-01880-A



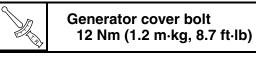
- 3. Apply:
- Sealant

(onto the stator coil assembly lead grommet)





- 4. Install:
  - Generator cover gasket New
  - Generator cover



### NOTE:

Tighten the generator cover bolts in stages and in a crisscross pattern.

_

#### EAS24520 PICKUP ROTOR

Removing	the pickup rotor			
<b>উট্ট</b>			<ul> <li>№ 12 Nm (1.2 m · kg, 8.7 ft · lb)</li> <li>2 New</li> </ul>	
	15 Nm (1.5 m · kg, 11 ft · lb) 45 Nm (4.5 m · kg, 32 ft · lb) 6 6 6 6 6 6 6 6 6 6 6 6 6			
Order	Job/Parts to remove	Q'ty	Remarks	
	Side cowlings/Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.	
	Fuel tank		Refer to "FUEL TANK" on page 7-1.	
	Generator cover		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-31.	
1	Pickup rotor cover	1		
2	Pickup rotor cover gasket	1		
3	Dowel pin	2		
4	Crankshaft position sensor coupler	1	Disconnect.	
5	Crankshaft position sensor	1		
6	Pickup rotor	1	For installation, reverse the removal proce- dure.	

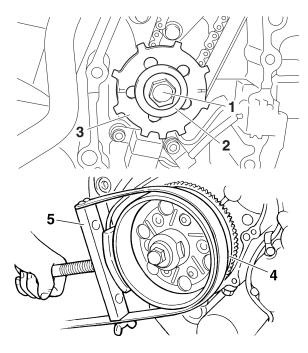
# REMOVING THE PICKUP ROTOR

- 1. Remove:
- Pickup rotor bolt "1"
- Washer "2"
- Pickup rotor "3"

### NOTE:

While holding the generator rotor "4" with the sheave holder "5", loosen the pickup rotor bolt.



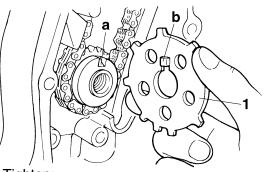


#### EAS24540 INSTALLING THE PICKUP ROTOR

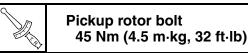
- 1. Install:
- Pickup rotor "1"
- Washer
- Pickup rotor bolt

### NOTE:

When installing the pickup rotor, align the groove "a" in the crankshaft sprocket with the projection "b" in the pickup rotor.



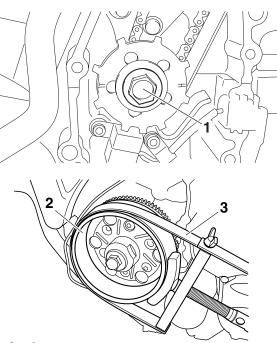
2. Tighten:Pickup rotor bolt "1"



### NOTE:

While holding the generator rotor "2" with the sheave holder "3", tighten the pickup rotor bolt.



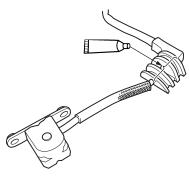


3. Apply:

 Sealant (onto the crankshaft position sensor lead grommet)



Yamaha bond No. 1215 90890-85505 (Three Bond No.1215[®])



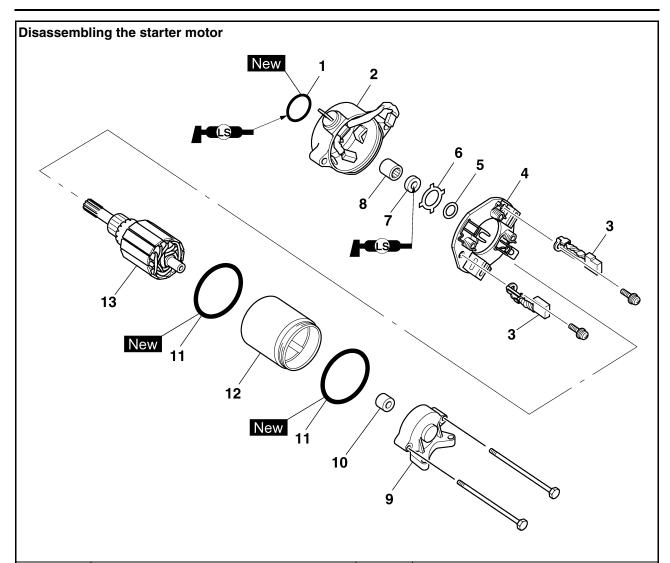
- 4. Install:
  - Pickup rotor cover gasket New
  - Pickup rotor cover

Pickup rotor cover bolt 12 Nm (1.2 m·kg, 8.7 ft·lb)

### NOTE:

Tighten the pickup rotor cover bolts in stages and in a crisscross pattern.

Removing t	the starter motor	Zoz	$\frac{1}{\sqrt{10 \text{ Nm (1.0 m \cdot kg, 7.2 ft \cdot lb)}}}$
Order	Job/Parts to remove	Q'ty	Remarks
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
1	Starter motor lead	1	Disconnect.
2	Starter motor assembly	1	
			For installation, reverse the removal proce- dure.

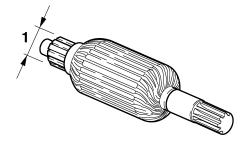


Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Starter motor front cover	1	
3	Brush	2	
4	Brush seat (along with brushes)	1	
5	Washer	1	
6	Lock washer	1	
7	Oil seal	1	
8	Bearing	1	
9	Starter motor rear cover	1	
10	Collar	1	
11	O-ring	2	
12	Starter motor yoke	1	
13	Armature assembly	1	
			For assembly, reverse the disassembly pro- cedure.

#### EAS24790 CHECKING THE STARTER MOTOR

- 1. Check:
- Commutator
- $\mbox{Dirt} \rightarrow \mbox{Clean}$  with 600 grit sandpaper.
- 2. Measure:
  - Commutator diameter "1" Out of specification → Replace the starter motor.





- 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) 1.50 mm (0.06 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  $\rightarrow$  Replace the starter motor.

### *******

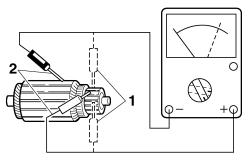
a. Measure the armature assembly resistances with the pocket tester.



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

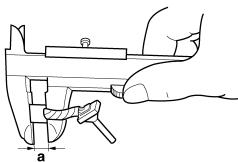
Armature coil Commutator resistance "1" 0.024–0.030 Ω at 20 °C (68 °F) Insulation resistance "2" Above 1 MΩ at 20 °C (68 °F)

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.

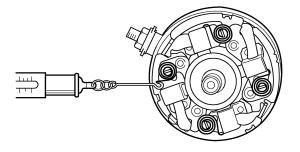
Limit 3.65 mm (0.14 in)



- 6. Measure:
  - Brush spring force Out of specification → Replace the brush springs as a set.



Brush spring force 5.28–7.92 N (19.01–28.51 oz) (538–808 gf)



- 7. Check:
  - Gear teeth
    - $\label{eq:def-Damage} \text{Damage/wear} \rightarrow \text{Replace the gear}.$
- 8. Check:
  - Bearing
- Oil seal

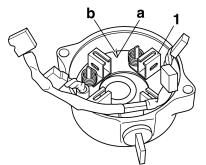
#### EAS24800

### ASSEMBLING THE STARTER MOTOR

- 1. Install:
- Brush seat "1"

#### NOTE: _

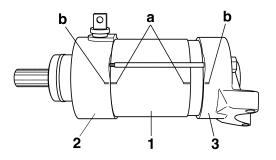
Align the slot "a" on the brush seat with the tab "b" in the starter motor front cover.

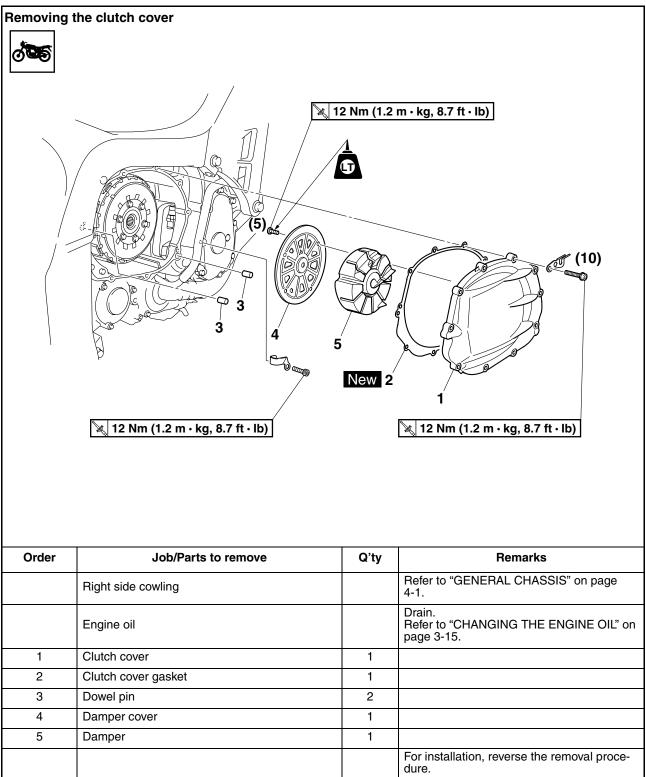


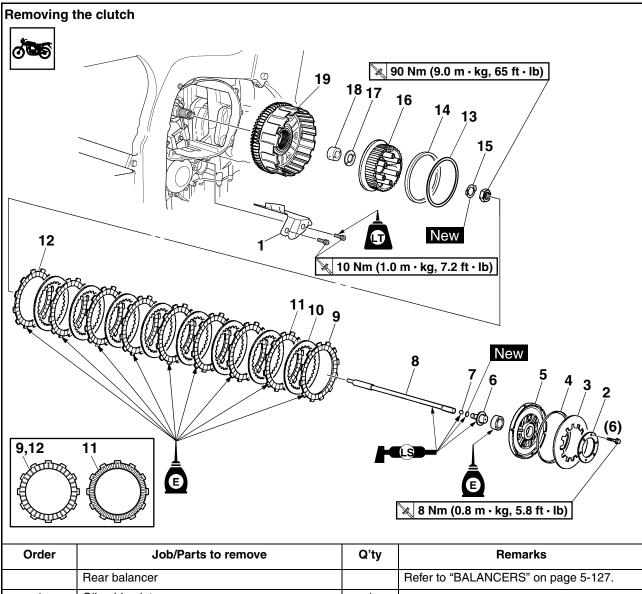
- 2. Install:
  - Starter motor yoke "1"
  - Starter motor front cover "2"
  - Starter motor rear cover "3"

#### NOTE: ____

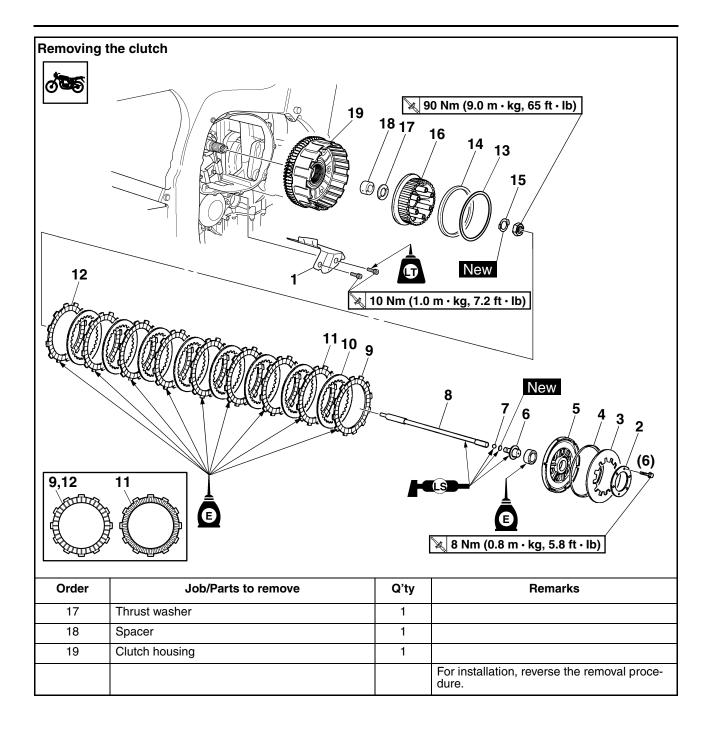
Align the match marks "a" on the starter motor yoke with the match marks "b" on the starter motor front and rear covers.

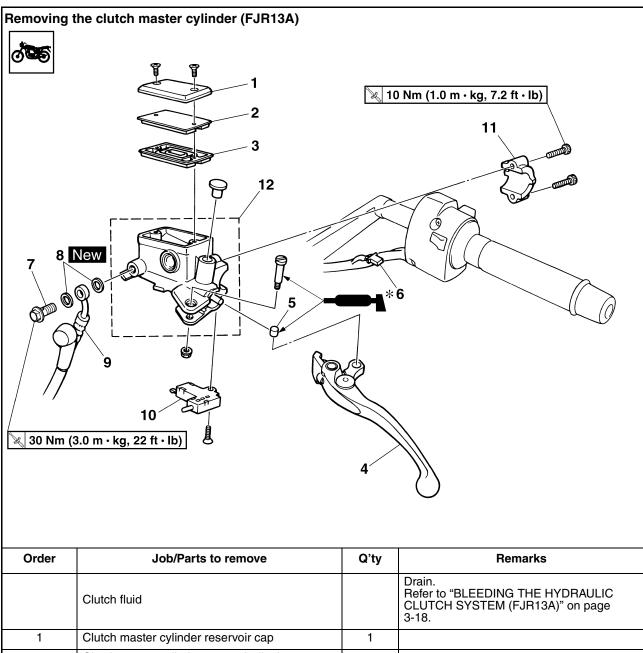




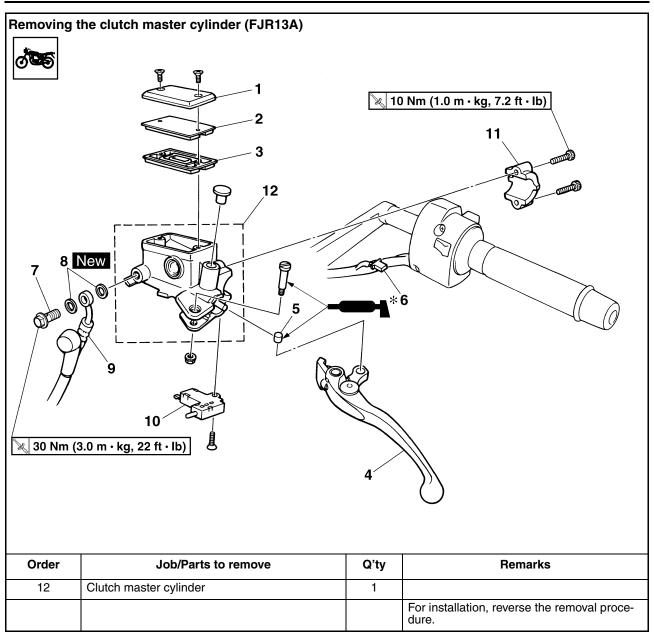


Order	Job/Parts to remove	Q'ty	Remarks
	Rear balancer		Refer to "BALANCERS" on page 5-127.
1	Oil guide plate	1	
2	Clutch spring plate retainer	1	
3	Clutch spring plate	1	
4	Clutch spring plate seat	1	
5	Pressure plate	1	
6	Short clutch push rod	1	
7	Ball	1	
8	Long clutch push rod	1	
9	Friction plate 1	1	Inside diameter: 124 mm (4.88 in)
10	Clutch plate	8	
11	Friction plate 2	7	Inside diameter: 124 mm (4.88 in)
12	Friction plate 3	1	Inside diameter: 135 mm (5.31 in)
13	Clutch damper spring	1	
14	Clutch damper spring seat	1	
15	Lock washer	1	
16	Clutch boss	1	

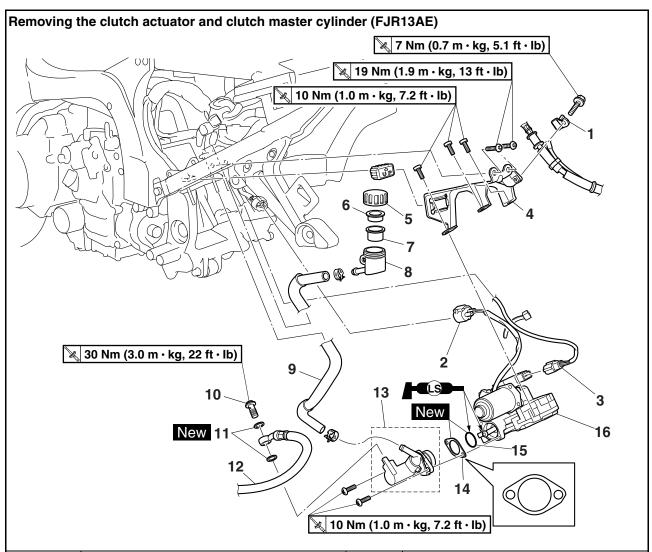




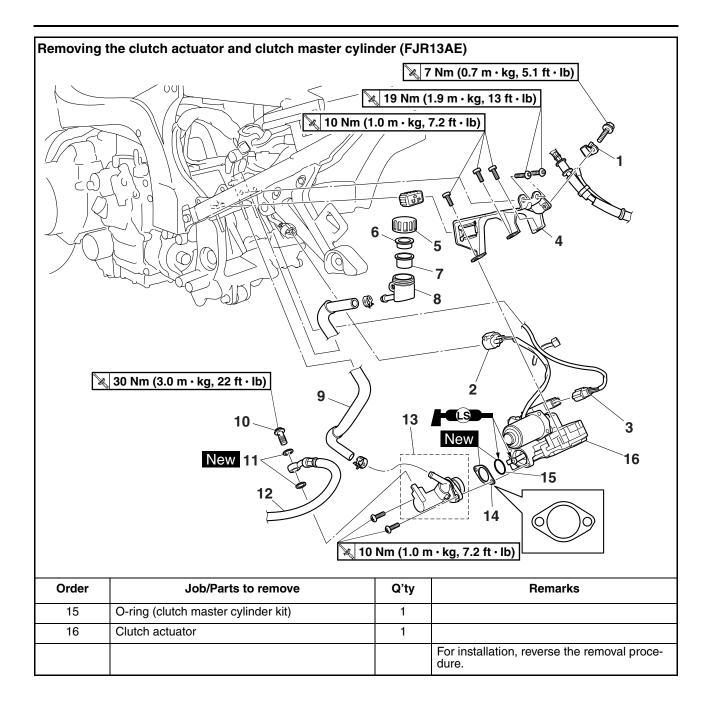
	Clutch fluid		Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)" on page 3-18.
1	Clutch master cylinder reservoir cap	1	
2	Clutch master cylinder reservoir diaphragm holder	1	
3	Clutch master cylinder reservoir diaphragm	1	
4	Clutch lever	1	
5	Clutch master cylinder push rod pin	1	
6	Clutch switch coupler	1	Disconnect.
7	Clutch hose union bolt	1	
8	Copper washer	2	
9	Clutch hose	1	Disconnect.
10	Clutch switch	1	
11	Clutch master cylinder holder	1	



* Apply silicon grease



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
	Swingarm		Refer to "SWINGARM" on page 4-91.
1	Rear brake hose/rear wheel sensor lead holder	1	
2	Clutch actuator motor coupler	1	Disconnect.
3	Clutch actuator sensor coupler	1	Disconnect.
4	Clutch actuator bracket	1	
5	Clutch fluid reservoir cap	1	
6	Clutch fluid reservoir diaphragm holder	1	
7	Clutch fluid reservoir diaphragm	1	
8	Clutch fluid reservoir	1	
9	Clutch fluid reservoir hose	1	
10	Clutch hose union bolt	1	
11	Copper washer	2	
12	Clutch hose	1	Disconnect.
13	Clutch master cylinder	1	
14	Shim (clutch master cylinder kit)	1	



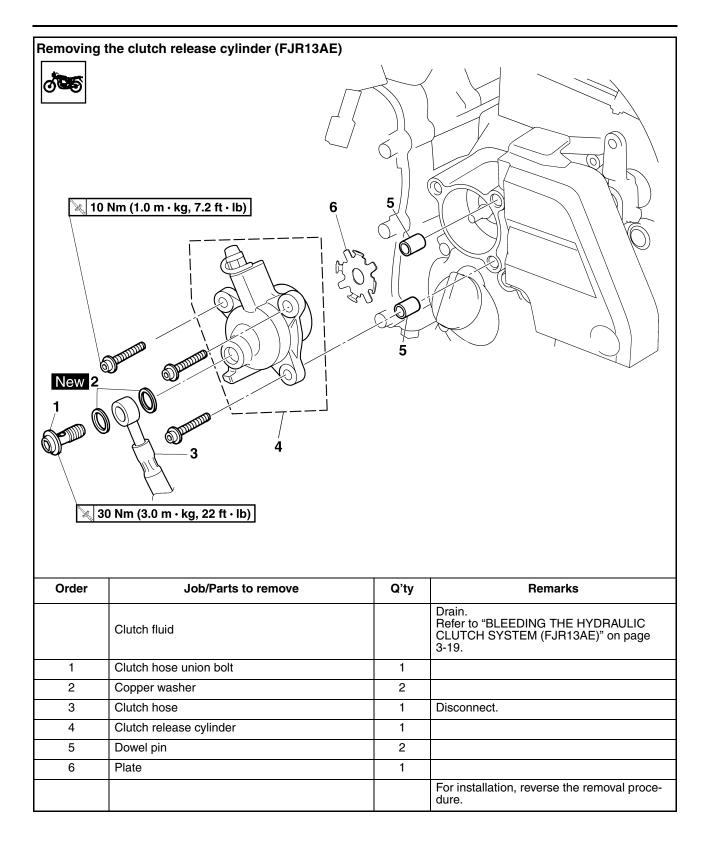
Disassembling the clutch master cylinder (FJR13A)			
			Remarks
2	Dust boot	1	
3	Circlip	1	
4	Washer	1	
5	Clutch master cylinder kit	1	
6	Clutch master cylinder body	1	For assembly, reverse the disassembly pro- cedure.

* Apply silicon grease

Disassembling the clutch master cylinder (FJR13AE)			
Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch master cylinder kit	1	
2	Clutch master cylinder body	1	
			For assembly, reverse the disassembly pro- cedure.

* Apply silicon grease

Removing the clutch release cylinder (FJR13A)			
6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5			
Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)" on page 3-18.
1	Clutch hose union bolt	1	1
2	Copper washer	2	
3	Clutch hose	1	Disconnect.
4	Clutch release cylinder	1	
5	Dowel pin	2	
6	Plate	1	
			For installation, reverse the removal proce- dure.



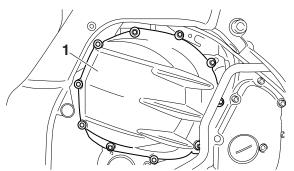
Disassembling the clutch release cylinder			
Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch release cylinder piston	1	
2	Clutch release cylinder spring	1	
3	Clutch release cylinder piston seal	1	
4	Bleed screw	1	
5	Clutch release cylinder body	1	
			For assembly, reverse the disassembly pro- cedure.

# REMOVING THE CLUTCH

- 1. Remove:
- Clutch cover "1"

### NOTE: ____

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



- 2. Remove:
- Rear balancer weight Refer to "BALANCERS" on page 5-127.
- 3. Remove:
- Clutch spring bolt

### NOTE:

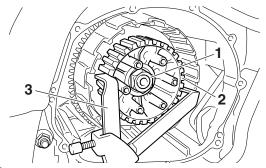
Loosen the clutch spring bolts in stages and in a crisscross pattern.

- 4. Straighten the lock washer tab.
- 5. Loosen:
- Clutch boss nut "1"

### NOTE:

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

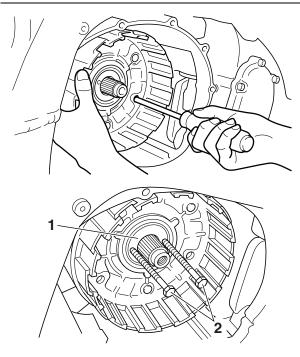
Universal clutch holder 90890-04086 YM-91042



- 6. Remove:
  - Spacer "1"
  - Clutch housing

### NOTE: ____

- Insert a cross-headed screwdriver into one of the holes of the clutch housing and primary driven gear, and then rotate the inner primary driven gear until both primary drive gears are aligned. The teeth of both primary driven gears must be aligned for installation.
- Insert two 5 mm bolts "2" into the spacer and then remove the spacer by pulling on the bolts.



#### EAS25100

### CHECKING THE FRICTION PLATES

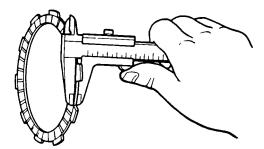
The following procedure applies to all of the friction plates.

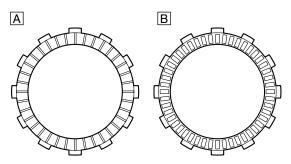
- 1. Check:
- Friction plate Damage/wear → Replace the friction plates as a set.
- 2. Measure:
- Friction plate thickness Out of specification  $\rightarrow$  Replace the friction plates as a set.

### NOTE: _

Measure the friction plate at four places.







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

#### EAS25110

### CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

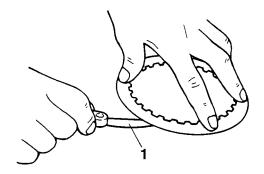
- 1. Check:
- Clutch plate Damage  $\rightarrow$  Replace the clutch plates as a set.
- 2. Measure:
- Clutch plate warpage

(with a surface plate and thickness gauge "1") Out of specification  $\rightarrow$  Replace the clutch plates as a set.



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

Clutch plate thickness 1.90–2.10 mm (0.075–0.083 in) Warpage limit 0.10 mm (0.0039 in)



# CHECKING THE CLUTCH SPRING PLATE

- 1. Check:
- Clutch spring plate Damage → Replace.
- 2. Check:
- Clutch spring plate seat Damage  $\rightarrow$  Replace.

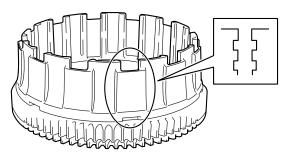
### EAS25150

### CHECKING THE CLUTCH HOUSING

- 1. Check:
- Clutch housing dogs Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

### NOTE: _

Pitting on the clutch housing dogs will cause erratic clutch operation.



- 2. Check:
- Bearing

Damage/wear  $\rightarrow$  Replace the bearing and clutch housing.

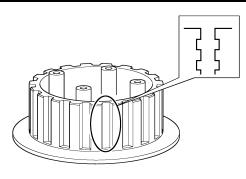
### EAS25160

### CHECKING THE CLUTCH BOSS

- 1. Check:
- Clutch boss splines

### NOTE: _

Pitting on the clutch boss splines will cause erratic clutch operation.



#### EAS25170

### CHECKING THE PRESSURE PLATE

- 1. Check:
- Pressure plate
- Cracks/damage  $\rightarrow$  Replace.
- Bearing Damage/wear → Replace.

EAS25190

### CHECKING THE CLUTCH PUSH RODS

- 1. Check:
- O-ring
- Short clutch push rod
- Long clutch push rod
- Ball Cracks/damage/wear → Replace the defective part(s).
- 2. Measure:
- Long clutch push rod bending limit Out of specification → Replace the long clutch push rod.



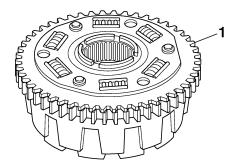
Long clutch push rod bending limit 0.37 mm (0.015 in)

#### EAS25210

### CHECKING THE PRIMARY DRIVEN GEAR

- 1. Check:
- Primary driven gear "1"

Damage/wear  $\rightarrow$  Replace the primary drive and primary driven gears as a set. Excessive noise during operation  $\rightarrow$  Replace the clutch housing and crankshaft as a set.

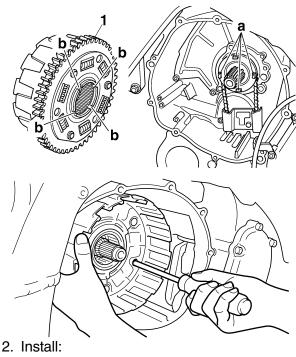


#### EAS25250 INSTALLING THE CLUTCH

- 1. Install:
- Clutch housing "1"

### NOTE:_

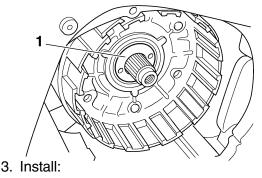
- Make sure that the projections "a" in the clutch housing align with the slots "b" in the oil pump drive sprocket.
- Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.
- Insert a cross-headed screwdriver into one of the holes of the clutch housing and primary driven gear, and then rotate the inner primary driven gear until both primary drive gears are aligned. The teeth of both primary driven gears must be aligned for installation.



• Spacer "1"

NOTE:

Install the spacer with the two screw holes facing towards the clutch boss.



Clutch boss "1"

- Lock washer "2" New
- Clutch boss nut "3"

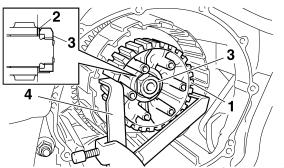


Clutch boss nut 90 Nm (9.0 m·kg, 65 ft·lb)

### NOTE:

- Install the clutch boss nut with its large inner diameter side facing inward as shown in the illustration.
- While holding the clutch boss with the universal clutch holder "4", tighten the clutch boss nut.

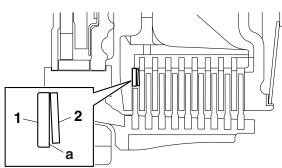
#### Universal clutch holder 90890-04086 YM-91042



- 4. Bend the lock washer tab along a flat side of the nut.
- 5. Install:
  - Clutch damper spring seat "1"
  - Clutch damper spring "2"

### NOTE:

- Install the clutch damper spring seat with the white paint mark and the sharp edge "a" facing outward.
- Install the clutch damper spring as shown in the illustration.



- 6. Lubricate:
- Friction plates
- Clutch plates (with the recommended lubricant)

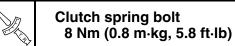
### Recommended lubricant Engine oil

- 7. Install:
- Friction plates
- Clutch plates

#### NOTE: _

First, install a friction plate and then alternate between a clutch plate and a friction plate.

- 8. Install:
  - Clutch spring bolts



### NOTE:

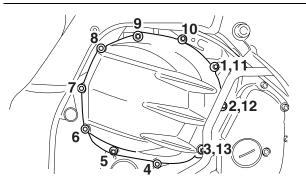
Tighten the clutch spring bolts in stages and in a crisscross pattern.

- 9. Install:
  - Rear balancer weight
  - Refer to "BALANCERS" on page 5-127.
- 10.Install:
- Clutch cover

Clutch cover bolt 12 Nm (1.2 m·kg, 8.7 ft·lb)

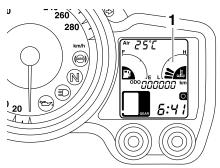
### NOTE:_

Tighten the clutch cover bolts in the proper tightening sequence as shown.



### BREAKING IN THE FRICTION PLATES AFTER REPLACEMENT (FJR13AE only)

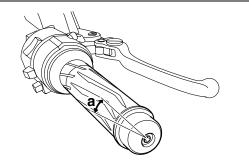
- 1. If the friction plates are replaced, perform the following procedure to break them in.
- *****
- a. Start the engine and warm it up until at least three segments appear on the coolant temperature meter "1" as shown in the illustration.



- b. Apply the rear brake forcefully.
- c. Shift the transmission into 1st gear.
- d. Turn the throttle grip to 1/4 "a" of the fully open position ten times, each time for less than 0.5 second.

#### NOTE:

It is not unusual for the engine to stall when performing this procedure. If the engine stalls, restart the engine, let it idle for at least 90 seconds, and then repeat steps (b) to (d).



#### 

#### FAS25280

**DISASSEMBLING THE CLUTCH MASTER** CYLINDER

#### ECA13840 CAUTION:

- · Clutch components rarely require disassembly.
- Therefore, always follow these preventive measures:
- Never disassemble clutch components unless absolutely necessary.
- If any connection on the hydraulic clutch system is disconnected, the entire clutch system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal clutch components.
- Use only clean or new clutch fluid for cleaning clutch components.

- Clutch fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt fluid immediately.
- Avoid clutch fluid coming into contact with the eyes as it can cause serious injury.
- First aid for clutch fluid entering the eyes:
- Flush with water for 15 minutes and get immediate medical attention.

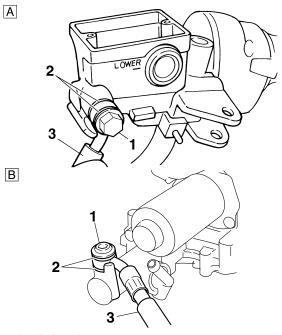
#### NOTE:

Before disassembling the clutch master cylinder, drain the clutch fluid from the entire clutch system.

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

#### NOTE

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



A. FJR13A

B. FJR13AE

EAS25290

#### CHECKING THE CLUTCH MASTER CYLINDER

Recommended clutch component replace ment schedule	
Piston seal	Every two years
Clutch hose	Every four years

Recommended clutch component replace- ment schedule	
Clutch fluid	Every two years and whenever the clutch is disassembled

- 1. Check:
  - Clutch master cylinder body Cracks/damage  $\rightarrow$  Replace the clutch master cylinder.
- Clutch fluid delivery passage (clutch master cylinder body)
   Obstruction → Blow out with compressed air.
- 2. Check:
- Clutch master cylinder
- Clutch master cylinder kit Rust/scratches/wear → Replace the clutch master cylinder and clutch master cylinder kit as a set.
- 3. Check:
- Clutch master cylinder reservoir Cracks/damage → Replace.
- Clutch master cylinder reservoir diaphragm Damage/wear → Replace.
- 4. Check:
- Clutch hose

Cracks/damage/wear  $\rightarrow$  Replace.

#### EAS25300

# ASSEMBLING THE CLUTCH MASTER CYLINDER

#### WARNING

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

Recommended fluid DOT 4

#### EAS25310

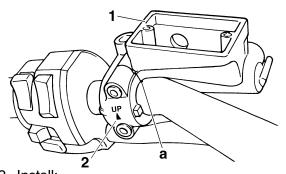
#### INSTALLING THE CLUTCH MASTER CYLINDER (FJR13A)

- 1. Install:
- Clutch master cylinder "1"
- Clutch master cylinder holder "2"

#### EW3P61016 WARNING

- Install the clutch lever holder with the "UP" mark facing up.
- Align the end of the clutch lever holder with the punch mark "a" on the left handlebar.

• First, tighten the upper bolt, then the lower bolt.



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



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

## WARNING

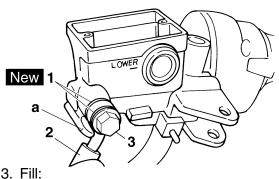
Proper clutch hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (FJR13A)" on page 2-47.

### CAUTION:

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

#### NOTE: _

Turn the handlebars to the left and to the right to make sure the clutch hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



 Clutch master cylinder reservoir (with the specified amount of the recommended clutch fluid)



### WARNING

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

### CAUTION:

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

#### NOTE:

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

- 4. Bleed:
  - Clutch system Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)" on page 3-18.
- 5. Check:
- Clutch fluid level

Below the minimum level mark "a"  $\rightarrow$  Add the recommended clutch fluid to the proper level. Refer to "CHECKING THE CLUTCH FLUID LEVEL (FJR13A)" on page 3-17.



#### 6. Check:

 Clutch lever operation Soft or spongy feeling → Bleed the clutch system.

Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)" on page 3-18.

### INSTALLING THE CLUTCH MASTER CYLINDER (FJR13AE)

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



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

### WARNING

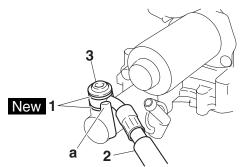
Proper clutch hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (FJR13AE)" on page 2-67.

### CAUTION:

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

#### NOTE:_

Turn the handlebars to the left and to the right to make sure the clutch hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



- 2. Fill:
- Clutch master cylinder reservoir (with the specified amount of the recommended clutch fluid)



Recommended fluid DOT 4

#### WARNING

• Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.

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

#### ECA13420

CAUTION:

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

#### NOTE: _

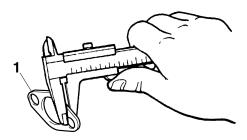
In order to ensure a correct reading of the clutch fluid level, make sure the top of the reservoir is horizontal.

- 3. Bleed:
  - Clutch system Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
- 4. Check:
  - Clutch fluid level Below the minimum level mark "a" → Add the recommended clutch fluid to the proper level. Refer to "CHECKING THE CLUTCH FLUID LEVEL (FJR13AE)" on page 3-17.

ET3P66069

#### REPLACING THE CLUTCH MASTER CYLINDER (FJR13AE only)

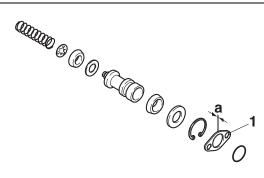
- 1. Check:
- Pressure plate stroke Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
- 2. Measure
  - Shim (clutch master cylinder kit) "1" thickness



- 3. Replace:
- Clutch master cylinder kit

#### NOTE: ____

The thickness of the new shim "1" is 1.5 mm (0.06 in).



- a. 1.5 mm (0.06 in)
- 4. Bleed:
  - Hydraulic clutch system Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
- 5. Check:
- Pressure plate stroke Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
- 6. Adjust:
- Clutch engagement point Refer to "Diagnostic code table (Diagnostic code No. Sh__66)".

#### 

a. If the thickness of the shim installed on the vehicle is 1.0 mm (0.04 in), refer to the following table.

Pressure plate stroke	Action
Pressure plate stroke before replacing the clutch master cylin- der kit was 2.90 mm (0.11 in) or more, or the difference in the pressure plate stroke before and after re- placing is 0.10 mm (0.004 in) or more	Select diagnostic code No. Sh66 in the diagnostic mode and operate the hand shift lever switch (shift up) three times.
For all other cases	Select diagnostic code No. Sh66 in the diagnostic mode and operate the hand shift lever switch (shift up) one time.

b. If the thickness of the shim installed on the vehicle is 1.5 mm (0.06 in), refer to the following table.

Pressure plate stroke	Action
Pressure plate stroke before replacing the clutch master cylin- der kit was 2.90 mm (0.11 in) or more, or the difference in the pressure plate stroke before and after re- placing is 0.10 mm (0.004 in) or more	Select diagnostic code No. Sh66 in the diagnostic mode and operate the hand shift lever switch (shift up) two times.
For all other cases	No adjustment is nec- essary.

#### *****

- 7. Check:
- Rear wheel drag torque Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.
- 8. Check:
  - Shift operation Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.
- 9. Check:
- Starting-off performance of vehicle Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.

#### ET3P66070

#### INSTALLING THE CLUTCH ACTUATOR (FJR13AE only)

- 1. Install:
- Clutch actuator
- Clutch master cylinder
- Clutch hose
- Clutch fluid reservoir hose
- 2. Bleed:
- Hydraulic clutch system Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
- 3. Check:
  - Pressure plate stroke Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.

- 4. Adjust:
- Clutch engagement point Refer to "Diagnostic code table (Diagnostic code No. Sh_ _66)".

#### NOTE:

Adjust the clutch engagement point if the clutch actuator was replaced.

#### *****

a. Select diagnostic code No. Sh_ _66 in the diagnostic mode and operate the hand shift lever switch (shift up) until the clutch en-gagement point is at the maximum setting.

#### NOTE:

The hand shift select indicator light stops coming on when the maximum setting is reached.

b. Operate the hand shift lever switch (shift down) ten times and check that the hand shift select indicator light comes on.

#### *****

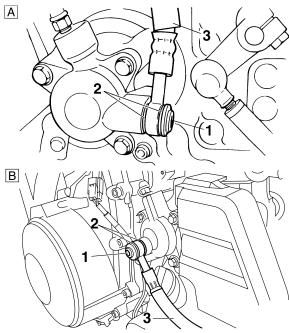
- 5. Check:
- Rear wheel drag torque Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.
- 6. Check:
- Shift operation Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.
- 7. Check:
- Starting-off performance of vehicle Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.

### REMOVING THE CLUTCH RELEASE CYLINDER

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

#### NOTE:

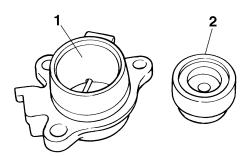
Put the end of the clutch hose into a container and pump out the clutch fluid carefully.



- A. FJR13A
- B. FJR13AE

# CHECKING THE CLUTCH RELEASE

- 1. Check:
- Clutch release cylinder body Cracks/damage → Replace the clutch release cylinder.
- 2. Check:
  - Clutch release cylinder "1"
  - Clutch release cylinder piston "2" Rust/scratches/wear → Replace the clutch release cylinder and clutch release cylinder piston as a set.



#### 

ASSEMBLING THE CLUTCH RELEASE CYLINDER EW3P61018

#### A WARNING

• Before installation, all internal clutch components must be cleaned and lubricated with clean or new clutch fluid.

- Never use solvents on internal clutch components as they will cause the piston seal to swell and distort.
- Whenever a clutch release cylinder is disassembled, replace the piston seal.



#### INSTALLING THE CLUTCH RELEASE CYLINDER

- 1. Check:
- Copper washers "1" New
- Clutch hose "2"
- Clutch hose union bolt "3"



W3P66003

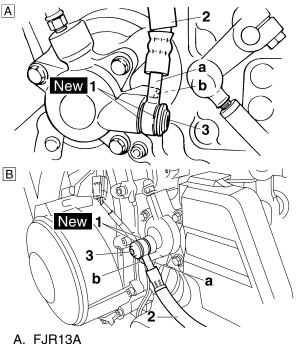
Clutch hose union bolt 30 Nm (3.0 m·kg, 22 ft·lb)

#### 

Proper clutch hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (FJR13A)" on page 2-47 and "CA-BLE ROUTING (FJR13AE)" on page 2-67.

### CAUTION:

When installing the clutch hose onto the clutch release cylinder, make sure the pipe "a" touches the projection "b" on the clutch release cylinder body.



B. FJR13A

### CLUTCH

- 2. Fill:
  - Clutch master cylinder reservoir (with the specified amount of the recommended clutch fluid)

Recommended fluid DOT 4

## WARNING

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

### ECA13420

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

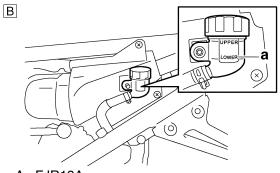
#### NOTE:

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

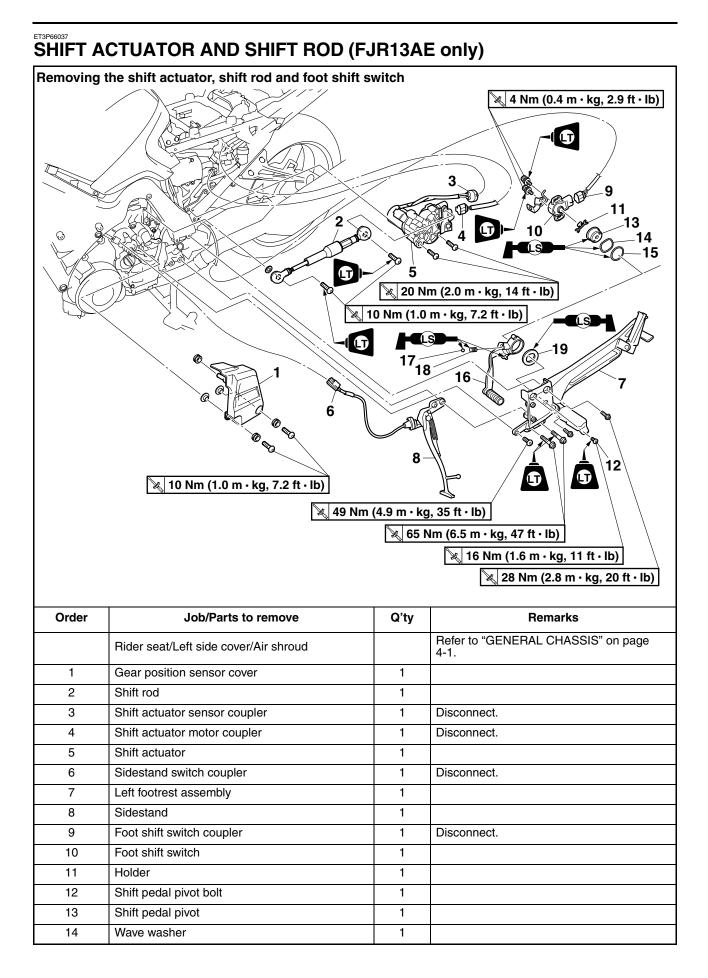
- 3. Bleed:
  - Clutch system Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)" on page 3-18 and "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
- 4. Check:
- Clutch fluid level

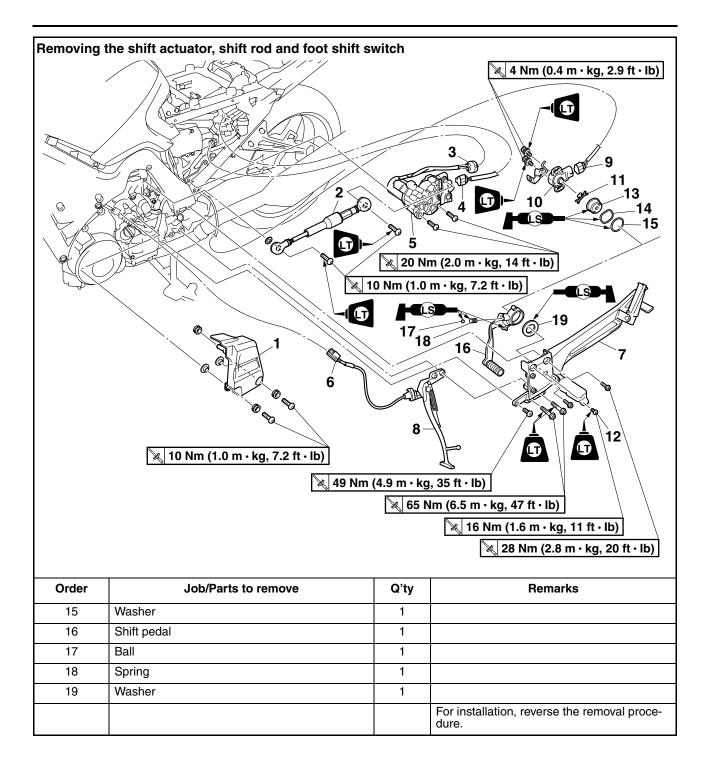
Below the minimum level mark "a"  $\rightarrow$  Add the recommended clutch fluid to the proper level. Refer to "CHECKING THE CLUTCH FLUID LEVEL (FJR13A)" on page 3-17 and "CHECKING THE CLUTCH FLUID LEVEL (FJR13AE)" on page 3-17. Α





- A. FJR13A
- B. FJR13AE
- 5. Check:
  - Clutch lever operation Soft or spongy feeling → Bleed the clutch system.
     Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)" on page 3-18 and "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.





#### ET3P66038

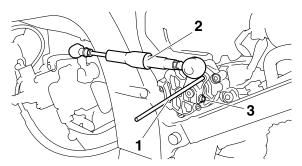
#### **REMOVING THE SHIFT ACTUATOR**

- 1. Remove:
- Shift actuator
- ****
- a. Pass a suitable 5 mm diameter rod "1" through the holes in the rear shift arm and shift actuator to secure the shift rod.
- b. Remove the shift rod "2".

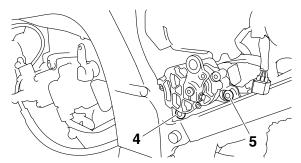
#### CAUTION:

Do not loosen the rear shift arm bolt "3" when removing the shift rod, otherwise the rear shift arm and shift actuator could become misaligned, preventing the shift rod from being installed correctly during assembly.

c. Pull out the rod from the holes.



- d. Disconnect the shift actuator sensor coupler and shift actuator motor coupler.
- e. Remove the shift actuator front bolt "4", and then remove the rear bolt "5".

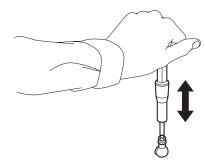


f. Remove the shift actuator.

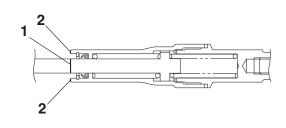
#### _____

### CHECKING THE SHIFT ROD

- 1. Check:
- Shift rod operation Rough movement  $\rightarrow$  Replace.



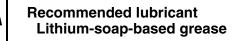
- 2. Check:
  - Shift rod groove Groove and end of rod cover are not aligned → Replace.



- 1. Shift rod groove
- 2. End of shift rod cover
- 3. Check:
  - Shift rod Bends → Replace.

#### ET3P66039

- INSTALLING THE FOOT SHIFT SWITCH
- 1. Lubricate:
- Washers
- Shift pedal pivot
- Spring
- Ball
- Wave washer
- Shift pedal spring
- Shift pedal projection



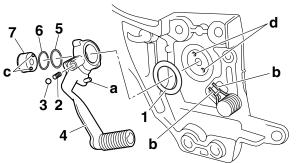
- 2. Install:
- Washer "1"
- Spring "2"
- Ball "3"
- Shift pedal "4"
- (to the left footrest assembly)
- Washer "5"
- Wave washer "6"
- Shift pedal pivot "7"
- Shift pedal pivot bolt
- 5-69



#### Shift pedal pivot bolt 16 Nm (1.6 m·kg, 11 ft·lb) LOCTITE[®]

#### NOTE: _

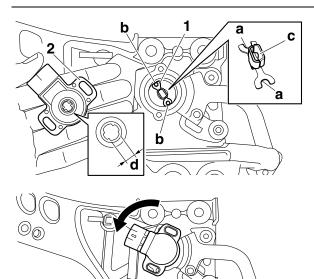
- Position the projection "a" on the shift pedal between the ends "b" of the spring on the left footrest assembly.
- Be sure to fit the projections "c" on the shift pedal pivot into the holes "d" in the left footrest assembly.



- 3. Install:
- Holder "1"
- Foot shift switch "2"

#### NOTE:

- Be sure to align the cutouts "a" in the holder with the projections "b" on the shift pedal pivot.
- Fit the foot shift switch onto the holder, and then rotate the sensor counterclockwise and temporarily install the screws. Be sure to fit the section "c" of the holder into the opening "d" shown in the illustration.



- 4. Adjust:
  - Foot shift switch Refer to "ADJUSTING THE FOOT SHIFT SWITCH" on page 5-70.

#### ET3P66040

#### ADJUSTING THE FOOT SHIFT SWITCH

- 1. Check:
  - Foot shift switch Refer to "CHECKING THE FOOT SHIFT SWITCH (FJR13AE only)" on page 8-235.
- 2. Adjust:
- Foot shift switch angle
- *****
- a. Connect the foot shift switch coupler to the foot shift switch.
- b. Connect the digital circuit tester to the foot shift switch coupler.
- Positive tester probe  $\rightarrow$
- orange "1"
- Negative tester probe → black "2"



Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927

- c. Turn the main switch to "ON".
- d. Measure the foot shift switch voltage.
- e. Adjust the foot shift switch angle so that the voltage is within the specified range.

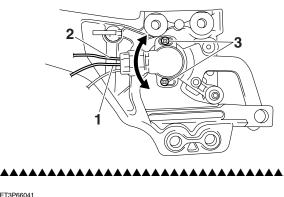


Output voltage FJR13AE 2.4–2.6 V

f. After adjusting the foot shift switch angle, tighten the foot shift switch screws "3" to specification.



Foot shift switch screw 4 Nm (0.4 m·kg, 2.9 ft·lb) LOCTITE[®]



#### ET3P66041

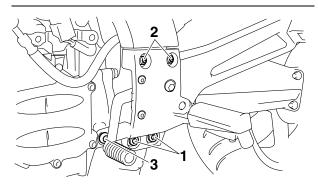
#### INSTALLING THE LEFT FOOTREST ASSEMBLY

- 1. Install:
- Sidestand
- Left footrest assembly

Left footrest assembly/sidestand bolt 65 Nm (6.5 m·kg, 47 ft·lb) **LOCTITE[®]** Left footrest assembly bolt (M8) 28 Nm (2.8 m·kg, 20 ft·lb) Left footrest assembly bolt (M10) 49 Nm (4.9 m·kg, 35 ft·lb)

#### NOTE:

Install the left footrest assembly/sidestand bolts "1", left footrest assembly bolts (M8) "2" and left footrest assembly bolt (M10) "3" temporarily and then tighten them to the specified torgues in the proper tightening sequence as shown.

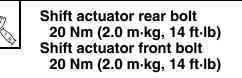


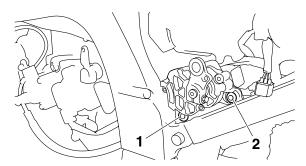
#### ET3P66042

#### INSTALLING THE SHIFT ACTUATOR

- 1. Install:
- Shift actuator

- a. Install the shift actuator front bolt "1" temporarily.
- b. Tighten the shift actuator rear bolt "2", and then tighten the front bolt "1" to specification.



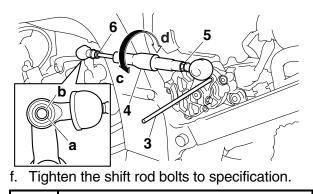


- c. Connect the shift actuator motor coupler and shift actuator sensor coupler.
- d. Pass a suitable 5 mm diameter rod "3" through the holes in the rear shift arm and shift actuator to secure the shift rod.
- e. Install the shift rod "4".

#### NOTE:

Check that the hole "a" in the shift rod is aligned with the hole "b" in the front shift arm. If the holes are not aligned, loosen the shift rod rear locknut "5" and front locknut "6", and then turn the shift rod to adjust its length.

**Direction "c"** Shift rod length is increased. Direction "d" Shift rod length is decreased.



Shift rod bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

g. If the shift rod front locknut and rear locknut were loosened, tighten them to specification.



Shift rod front locknut 7 Nm (0.7 m·kg, 5.1 ft·lb) Shift rod rear locknut 10 Nm (1.0 m·kg, 7.2 ft·lb)

h. Pull out the rod from the holes.

*****

#### EAS25410 SHIFT SHAFT

Removing	the shift shaft and stemper lawer	Dimit i Shari i		
	the shift shaft and stopper lever		10 Nm (1.0 m · kg, 7.2 ft · lb)	
Om-	10 Nm (1.0 m · kg, 7.2 ft · lb)		[ ℁  10 Nm (1.0 m ⋅ kg, 7.2 ft ⋅ lb) ]	
Order	Job/Parts to remove	Q'ty	Remarks	
	Clutch housing			
			Refer to "CLUTCH" on page 5-44.	
	Shift rod		Refer to "CLUTCH" on page 5-44. FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-67.	
1		1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
1 2	Shift rod	1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
	Shift rod Oil baffle plate 1		FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
2	Shift rod Oil baffle plate 1 Shift arm	1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
2 3	Shift rod Oil baffle plate 1 Shift arm Circlip	1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
2 3 4	Shift rod Oil baffle plate 1 Shift arm Circlip Shift shaft	1 1 1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
2 3 4 5	Shift rod         Oil baffle plate 1         Shift arm         Circlip         Shift shaft         Shift shaft         Shift shaft spring         Spacer	1 1 1 1 1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
2 3 4 5 6 7	Shift rodOil baffle plate 1Shift armCirclipShift shaftShift shaftShift shaft springSpacerStopper lever spring	1 1 1 1 1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
2 3 4 5 6 7 8	Shift rodOil baffle plate 1Shift armCirclipShift shaftShift shaft springSpacerStopper lever springStopper lever	1 1 1 1 1 1 1 1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
2 3 4 5 6 7 8 9	Shift rodOil baffle plate 1Shift armCirclipShift shaftShift shaftShift shaft springSpacerStopper lever springStopper leverCirclip	1 1 1 1 1 1 1 1 1 1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
2 3 4 5 6 7 8 9 10	Shift rodOil baffle plate 1Shift armCirclipShift shaftShift shaft springSpacerStopper lever springStopper leverCirclipCirclipCollar	1 1 1 1 1 1 1 1 1 1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	
2 3 4 5 6 7 8 9	Shift rodOil baffle plate 1Shift armCirclipShift shaftShift shaftShift shaft springSpacerStopper lever springStopper leverCirclip	1 1 1 1 1 1 1 1 1 1	FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT	

#### EAS25420 CHECKING THE SHIFT SHAFT

- 1. Check:
- Shift shaft Bends/damage/wear  $\rightarrow$  Replace.
- Shift shaft spring Damage/wear → Replace.

#### EAS25430

#### CHECKING THE STOPPER LEVER

- 1. Check:
- Stopper lever Bends/damage → Replace. Roller turns roughly → Replace the stopper lever.
- Shift lever spring Damage/wear  $\rightarrow$  Replace.

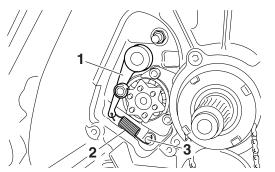
#### EAS25450

#### INSTALLING THE SHIFT SHAFT (FJR13A)

- 1. Install:
- Stopper lever "1"
- Stopper lever spring "2"

#### NOTE:

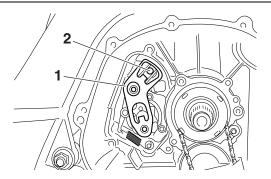
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss "3".
- Mesh the stopper lever with the shift drum segment assembly.



- 2. Install:
- Shift shaft "1"

#### NOTE:

Hook the end of the shift shaft spring onto the shift shaft spring stopper "2".



3. Install:

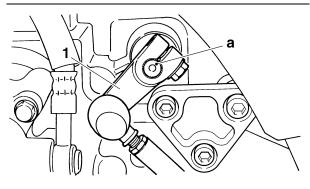
• Shift arm "1"



Shift arm bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

#### NOTE:

Align the punch mark "a" in the shift shaft with the slot in the shift arm.

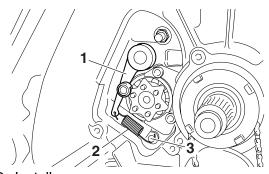


#### 

- INSTALLING THE SHIFT SHAFT (FJR13AE) 1. Install:
- Stopper lever "1"
- Stopper lever spring "2"

#### NOTE:

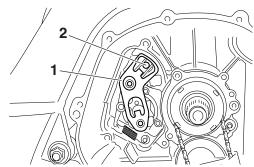
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss "3".
- Mesh the stopper lever with the shift drum segment assembly.



- 2. Install:
- Shift shaft "1"

#### NOTE: _

Hook the end of the shift shaft spring onto the shift shaft spring stopper "2".

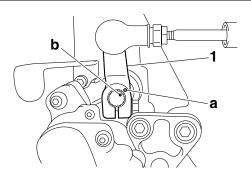


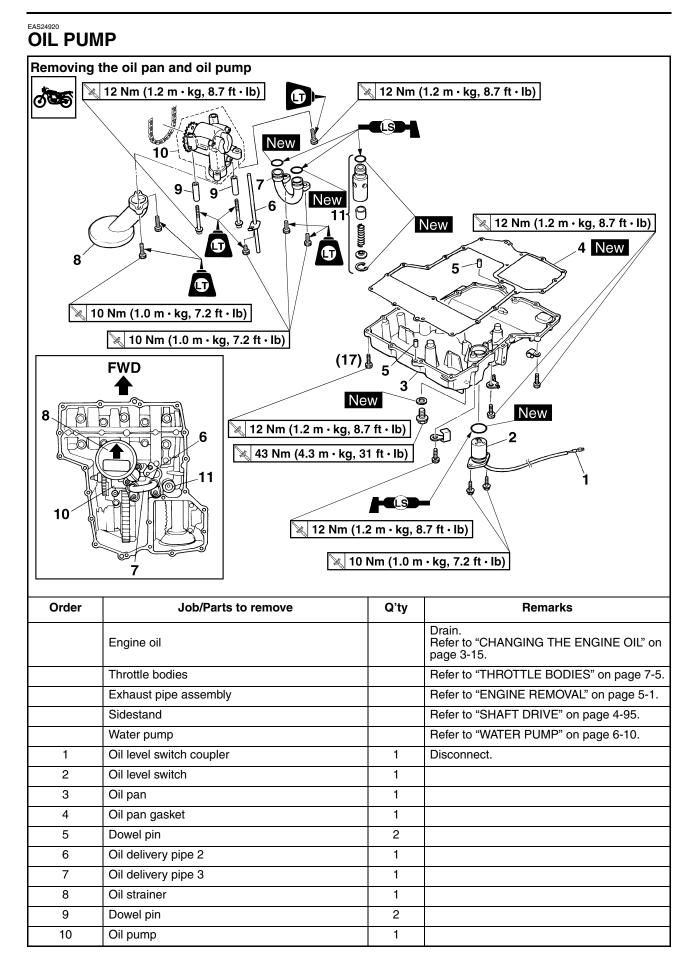
- 3. Install:
- Front shift arm "1"

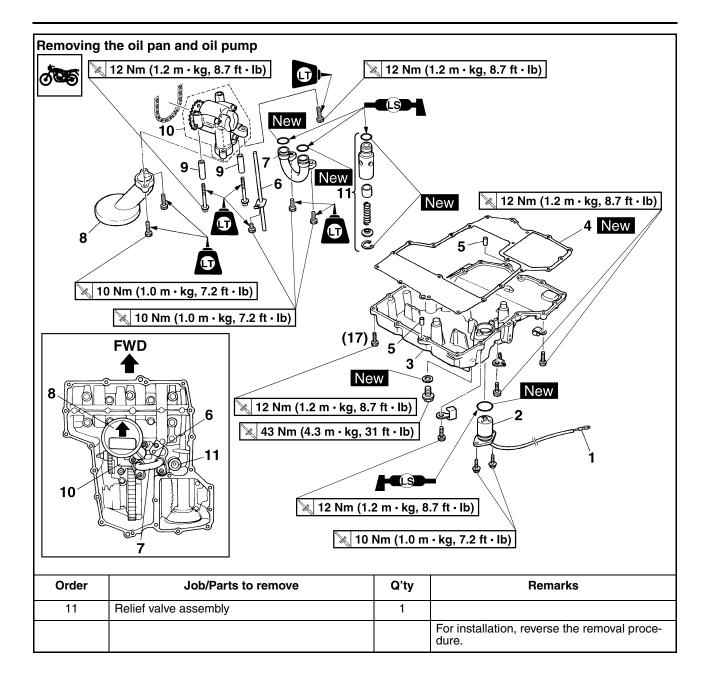


#### NOTE: _

Align the punch mark "a" on the front shift arm with the punch mark "b" on the shift shaft.







### **OIL PUMP**

Disassemt	bling the oil pump		
7 Toologie			12 Nm (1.2 m · kg, 8.7 ft · lb)
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump housing cover	1	
2	Pin Oil nump inner reter	2	
3	Oil pump inner rotor	1	
4	Oil pump outer rotor	1	
5	Pin	1	
6	Washer	1	
7	Oil pump driven sprocket	1	
8	Oil pump housing	1	For assembly, reverse the disassembly pro- cedure.

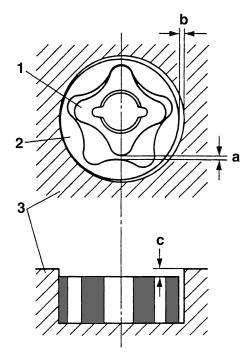
### **OIL PUMP**

#### 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.



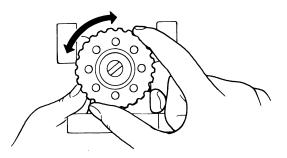
- 1. Inner rotor
- 2. Outer rotor
- 3. Oil pump housing



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 0.03-0.08 mm (0.0012-0.0032 in) Limit 0.15 mm (0.0059 in)

3. Check:

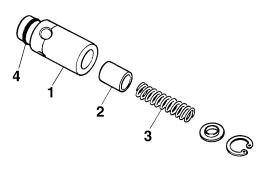
- Oil pump operation
- Rough movement  $\rightarrow$  Repeat steps (1) and (2) or replace the defective part(s).



### 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).



#### EAS24980

#### CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes.

- 1. Check:
- Oil delivery pipes Damage → Replace.
   Obstruction → Wash and blow out with compressed air.

#### EAS24990

#### CHECKING THE OIL STRAINER

- 1. Check:
- Oil strainer
   Damage → Replace.
   Contaminants → Clean with solvent.

#### EAS25010

#### ASSEMBLING THE OIL PUMP

- 1. Lubricate:
- Inner rotor
- Outer rotor
- Oil pump shaft (with the recommended lubricant)

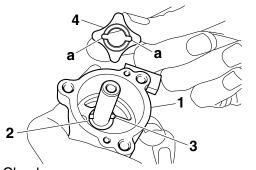


#### Recommended lubricant Engine oil

- 2. Install:
  - Oil pump driven sprocket
  - Oil pump housing "1"
  - Washer "2"
  - Pin "3"
  - Oil pump inner rotor "4"
- Oil pump outer rotor

#### NOTE: _

When installing the inner rotor, align the pin "3" in the oil pump shaft with the groove "a" in the inner rotor "4".



- 3. Check:
  - Oil pump operation Refer to "CHECKING THE OIL PUMP" on page 5-79.

#### EAS25050 INSTALLING THE OIL PAN

- 1. Install:
- Oil pan gasket New
- Oil pan

Oil pan bolt 12 Nm (1.2 m·kg, 8.7 ft·lb)

#### NOTE: _

Tighten the oil pan bolts in stages and in a crisscross pattern.

7

8

9

10

11

12

13

14

Bearing

Lock washer

Middle driven shaft end cover

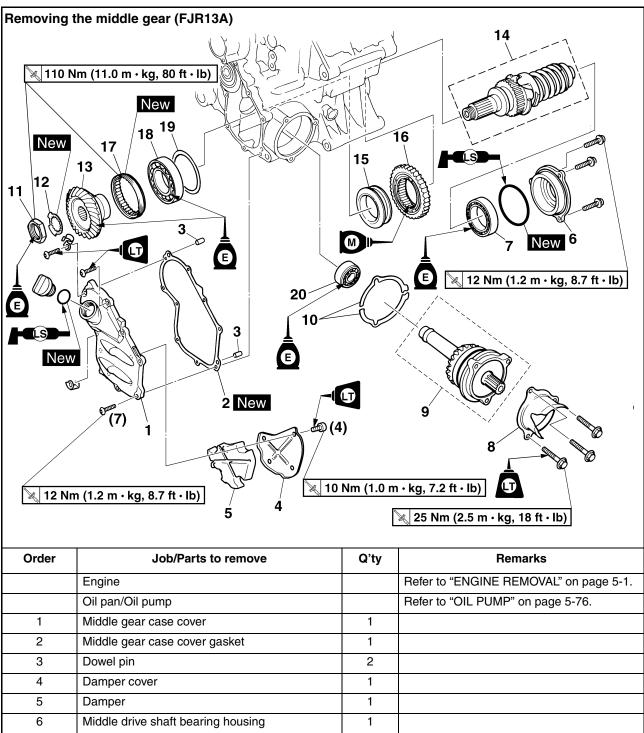
Middle driven shaft assembly

Middle drive pinion gear nut

Middle drive shaft assembly

Middle drive pinion gear

Middle driven pinion gear shim



1

1

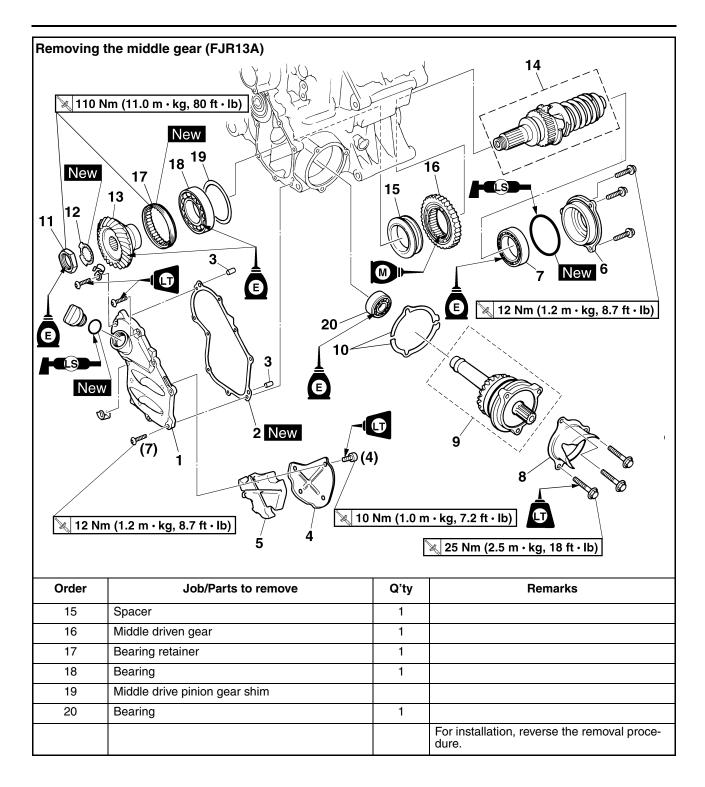
1

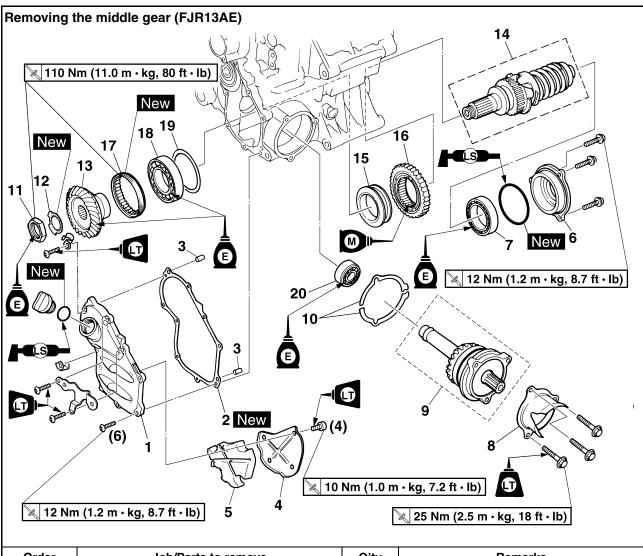
1

1

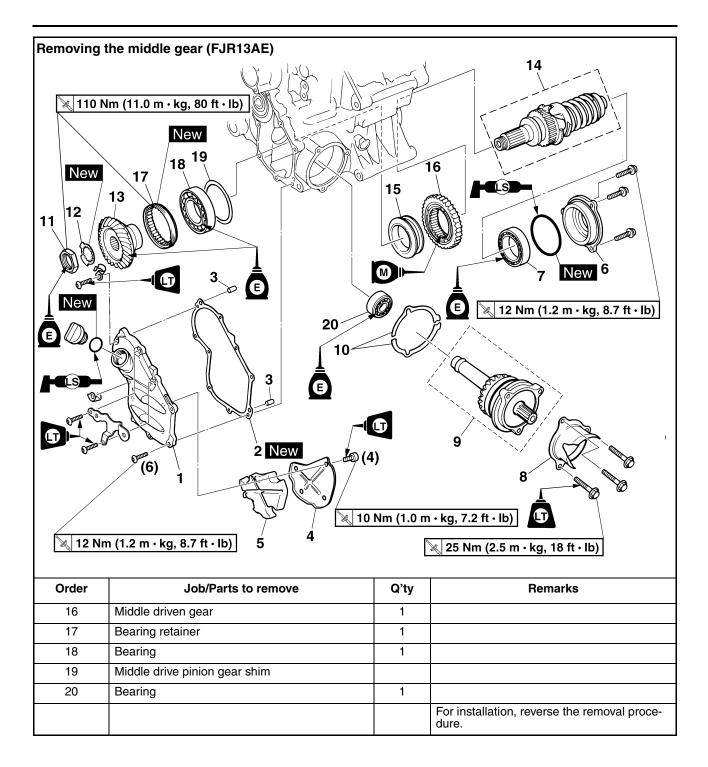
1

1

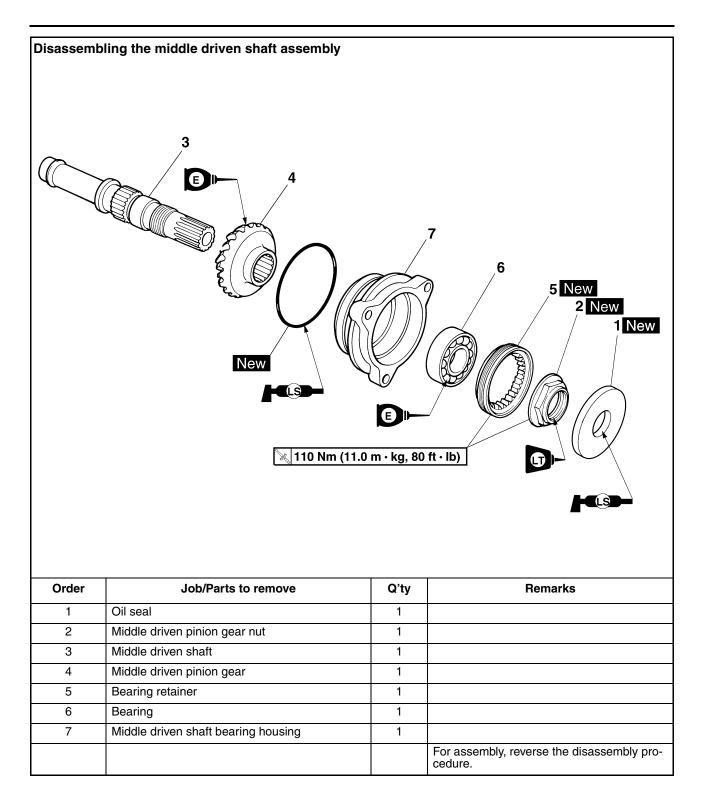




Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Oil pan/Oil pump		Refer to "OIL PUMP" on page 5-76.
1	Middle gear case cover	1	
2	Middle gear case cover gasket	1	
3	Dowel pin	2	
4	Damper cover	1	
5	Damper	1	
6	Middle drive shaft bearing housing	1	
7	Bearing	1	
8	Middle driven shaft end cover	1	
9	Middle driven shaft assembly	1	
10	Middle driven pinion gear shim		
11	Middle drive pinion gear nut	1	
12	Lock washer	1	
13	Middle drive pinion gear	1	
14	Middle drive shaft assembly	1	
15	Spacer	1	



	bling the middle drive shaft assembly	3	
Order	Job/Parts to remove	Q'ty	Remarks
1	Job/Parts to remove Spring retainer	Q'ty 2	Remarks
1 2	Job/Parts to remove Spring retainer Spring seat	Q'ty 2 1	Remarks
1 2 3	Job/Parts to remove Spring retainer Spring seat Damper spring	Q'ty 2 1 1	Remarks
1 2 3 4	Job/Parts to remove Spring retainer Spring seat Damper spring Damper driven cam	Q'ty 2 1 1 1 1	Remarks
1 2 3	Job/Parts to remove Spring retainer Spring seat Damper spring	Q'ty 2 1 1	Remarks

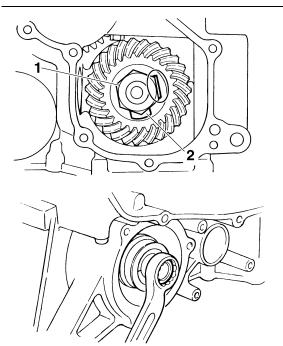


#### REMOVING THE MIDDLE DRIVE SHAFT ASSEMBLY

- 1. Remove:
- Middle drive pinion gear nut "1"
- Lock washer "2"
- a. Straighten the lock washer tab.
- b. Loosen the middle drive pinion gear nut.

#### NOTE:

While holding the middle drive shaft.



c. Remove the middle drive pinion gear nut and lock washer.

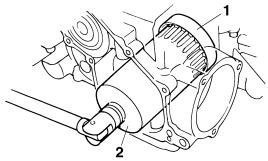
#### *****

- 2. Remove:
- Bearing retainer "1"
- *****
- a. Straighten the thread on the bearing retainer.

b. Attach the bearing retainer wrench "2".



c. Loosen the bearing retainer.



d. Remove the bearing retainer.

#### *****

### DISASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY

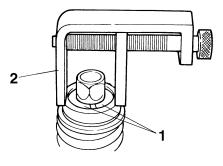
- 1. Remove:
- Spring retainers "1"

#### NOTE:_

While compressing the spring with the damper spring compressor "2", remove the spring retainers.



Damper spring compressor 90890-04090



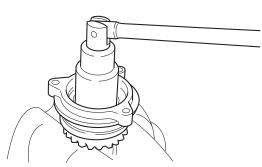
EAS25770

#### DISASSEMBLING THE MIDDLE DRIVEN SHAFT ASSEMBLY

- 1. Remove:
- Middle driven pinion gear nut
- ********************************
- a. Straighten the thread on the middle driven pinion gear nut.
- b. Loosen the middle driven pinion gear nut.

#### NOTE:

Secure the middle driven shaft in a vise, making sure to tighten the vise jaws onto the flat sections of the shaft.



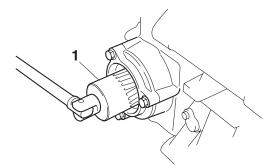
c. Remove the middle driven pinion gear nut.

#### *****

- 2. Remove:
- Bearing retainer
- *****
- a. Temporarily install the middle driven shaft bearing housing onto the lower crankcase.
- b. Straighten the thread on the bearing retainer.
- c. Attach the bearing retainer wrench "1".



d. Loosen the bearing retainer.



e. Remove the bearing retainer.

#### CHECKING THE MIDDLE DRIVE SHAFT ASSEMBLY

- 1. Check:
- Middle drive pinion gear Galling/pitting/wear  $\rightarrow$  Replace.
- 2. Check:
- Damper drive cam surface
- Damper driven cam surface Scratches/wear → Replace.
- 3. Check:
  - Damper spring Cracks/damage  $\rightarrow$  Replace.

- 4. Check:
- Bearings
  - Damage/pitting  $\rightarrow$  Replace.

EAS25790

#### CHECKING THE MIDDLE DRIVEN SHAFT ASSEMBLY

- 1. Check:
- Middle driven pinion gear Galling/pitting/wear  $\rightarrow$  Replace.
- 2. Check:
  - Bearings Damage/pitting  $\rightarrow$  Replace.

EAS25800

#### ASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY

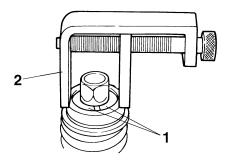
- 1. Install:
- Spring retainers "1"

#### NOTE:

While compressing the spring with the damper spring compressor "2", install the spring retainers.



Damper spring compressor 90890-04090



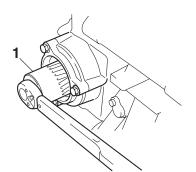
### ASSEMBLING THE MIDDLE DRIVEN SHAFT ASSEMBLY

- 1. Tighten:
- Bearing retainer New
- *******
- a. Temporarily install the middle driven shaft bearing housing onto the lower crankcase.
- b. Attach the bearing retainer wrench "1".

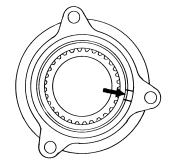
Bearing retainer wrench 90890-04140 Middle drive shaft bearing retainer wrench YM-04140

c. Tighten the bearing retainer to specification.

#### **Bearing retainer** 110 Nm (11.0 m·kg, 80 ft·lb)



d. Lock the threads with a drift punch.

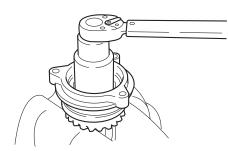


- 2. Tighten:
- Middle driven pinion gear nut New
- *** a. Tighten the middle driven pinion gear nut to
- specification.

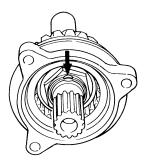
Middle driven pinion gear nut 110 Nm (11.0 m·kg, 80 ft·lb) LOCTITE®

#### NOTE:

Secure the middle driven shaft in a vise, making sure to tighten the vise jaws onto the flat sections of the shaft.



b. Lock the threads with a drift punch.



#### . . . . . . . . .

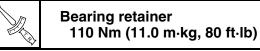
#### EAS25860 INSTALLING THE MIDDLE DRIVE SHAFT ASSEMBLY

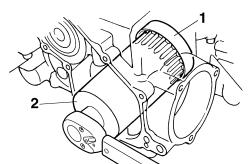
- 1. Tighten:
- Bearing retainer "1" New
- *****
- a. Attach the bearing retainer wrench "2".



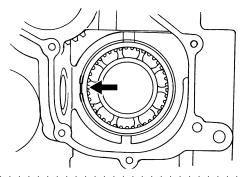
**Bearing retainer wrench** 90890-04137 Middle drive shaft bearing retain-

b. Tighten the bearing retainer to specification.





c. Lock the threads with a drift punch.



- 2. Install:
- Lock washer "1" New
- Middle drive pinion gear nut "2"
- 5-89

#### ******************************

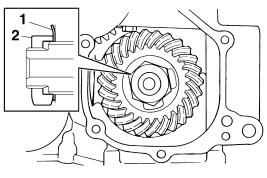
a. Tighten the middle drive pinion gear nut to specification.

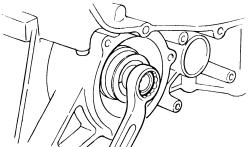


#### Middle drive pinion gear nut 110 Nm (11.0 m·kg, 80 ft·lb)

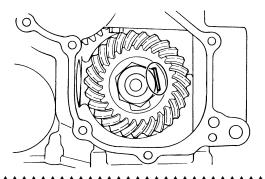
#### NOTE:

- Lubricate the nut threads with engine oil.
- Install the middle drive pinion gear nut with its large inner diameter side facing inward as shown in the illustration.
- While holding the middle drive shaft.





b. Bend the lock washer tab along a flat side of the nut.



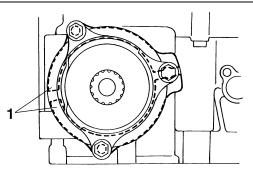
#### EAS25870

#### INSTALLING THE MIDDLE DRIVEN SHAFT ASSEMBLY

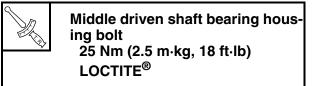
- 1. Install:
- Middle driven shaft assembly
- Middle driven pinion gear shims "1"
- Middle driven shaft end cover
- Middle driven shaft bearing housing bolts

#### NOTE: ____

Finger tighten the middle driven shaft bearing housing bolts.



- 2. Tighten:
  - · Middle driven shaft bearing housing bolts



#### NOTE: _

Before tightening the bolts:

- 1. Adjust the middle gear backlash. Refer to "ADJUSTING THE MIDDLE GEAR BACKLASH" on page 5-91.
- 2. Check that the middle gears turns smoothly.

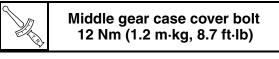
#### ET3P61025

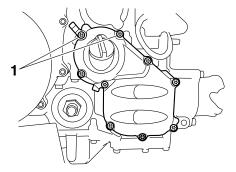
# INSTALLING THE MIDDLE GEAR CASE COVER

- 1. Install:
- Middle gear case cover
- Middle gear case cover bolts

#### NOTE: _

Apply locking agent (LOCTITE[®]) to the threads of the bolts "1".





### MEASURING THE MIDDLE GEAR BACKLASH

1. Measure:

 Middle gear backlash Out of specification → Refer to "ADJUSTING THE MIDDLE GEAR BACKLASH" on page 5-91.

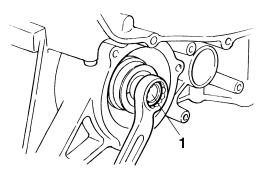
#### Middle gear backlash 0.10–0.20 mm (0.0039–0.0079 in)

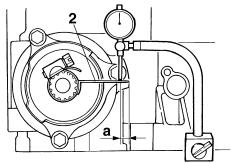
#### *****

- a. Hold the middle drive shaft "1".
- b. Install the gear lash measurement tool "2" as shown.
- c. Make sure the dial gauge plunger contacts the measuring point "a" on the gear lash measurement tool as shown.



#### Gear lash measurement tool 90890-01467 YM-01467





a. 14 mm (0.55 in)

d. While gently turning the middle driven shaft back and forth, measure the middle gear backlash.

#### NOTE: _

Measure the middle gear backlash at four positions. Rotate the middle driven shaft 90° each time and observe the reading on the dial gauge.

### ADJUSTING THE MIDDLE GEAR BACKLASH

1. Loosen:

EAS25900

- Middle driven shaft bearing housing bolts
- 2. Remove:
- Middle driven pinion gear shim(s)
- 3. Tighten:
  - Middle driven shaft bearing housing bolts

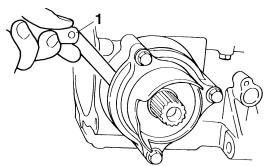


### CAUTION:

Do not overtighten the middle driven shaft bearing housing bolts or you may obtain too little middle gear backlash and damage the middle gears. If the bolts are overtightened, loosen them until the crankcase-to-middledriven-shaft-bearing-housing clearance is within specification, as stated below. Then, repeat all of the previous steps.

#### NOTE:

- Tighten the middle driven shaft bearing housing bolts carefully, one thread turn at a time only. Push in the middle driven shaft bearing housing and then tighten the bolts to specification.
- After tightening the middle driven shaft bearing housing bolts, loosen them until the clearance between the crankcase and the housing is approximately 2 mm (0.08 in), when measured with a thickness gauge "1".

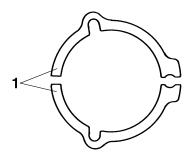


- 4. Hold the middle drive shaft.
- 5. Turn:
- Middle driven shaft

#### NOTE:

While carefully tightening the middle driven shaft bearing housing bolts in stages and in a crisscross pattern, turn the middle driven shaft back and forth until the dial gauge reads 0.10–0.20 mm (0.0039–0.0079 in).

- 6. Measure:
- Crankcase-to-middle-driven-shaft-bearinghousing clearance (with a thickness gauge)
- 7. Select:
- Middle driven pinion gear shim(s) "1"



#### *****

- a. Shims can only be selected in 0.05 mm increments, therefore round off to the hundredth's digit of the calculated thickness and select the appropriate shims with the following chart.
- b. For example, the clearance between the crankcase and the middle driven shaft bearing housing is 0.42 mm. Therefore, the chart instructs you to round off the 2 to 0. Thus, you should use one 0.40 mm shim.

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

Shims are supplied in the following thicknesses.

Middle driven pinion gear shim Thickness (mm) 0.10 0.15 0.20 0.30 0.40 0.50

*****

- 8. Loosen:
- Middle driven shaft bearing housing bolts
- 9. Install:
- Middle driven pinion gear shim(s)
- 10.Tighten:
- Middle driven shaft bearing housing bolts

Middle driven shaft bearing housing bolt 25 Nm (2.5 m·kg, 18 ft·lb) LOCTITE[®]

- 11.Measure:
- Middle gear backlash Out of specification → Refer to "MEASUR-ING THE MIDDLE GEAR BACKLASH" on page 5-91.

### ALIGNING THE MIDDLE GEAR

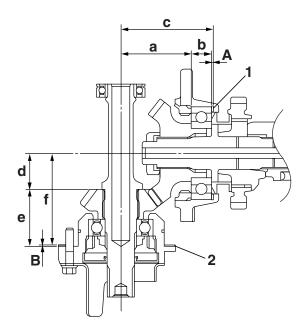
#### NOTE:

Aligning the middle gear is necessary when any of the following parts are replaced:

- Crankcase
- Middle drive shaft
- Middle driven shaft bearing housing
- 1. Select:
- Middle drive pinion gear shim(s) "1"
- Middle driven pinion gear shim(s) "2"

#### NOTE:

Select the middle driven gear shim(s) "2" by calculating the middle drive gear shim thickness and then measuring the middle gear backlash.



- A. Middle drive pinion gear shim thickness
- B. Middle driven pinion gear shim thickness

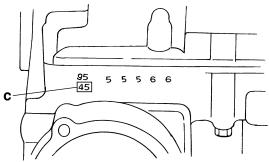
#### *****

- a. Position the middle gears with the appropriate shim(s) that has had its respective thickness calculated from information marked on the crankcase and middle driven pinion gear.
- b. To find middle drive pinion gear shim thickness "A", use the following formula.

Middle drive pinion gear shim thickness "A" = "c" - "a" - "b"

"b"= 18.94

"c"= a numeral on the lower crankcase, to be divided by 100 and added to "84"



Example:

"a" is 65.00

"b" is 18.94

If the lower crankcase is marked "45"

"c" is 84.45 (i.e., 84.00 + 0.45 = 84.45)

"A" = 84.45 - 65.00 - 18.94 = 0.51

Round off to the hundredths digit and select the appropriate shim(s).

#### NOTE:

In the above example, the calculated number is 0.51. The chart instructs you to round off the 1 to 0. Thus, the shim thickness is 0.50 mm.

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

Shims are supplied in the following thicknesses.

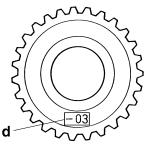


#### Middle drive pinion gear shim Thickness (mm) 0.15 0.30 0.50

c. To find middle driven pinion gear shim thickness "B", use the following formula.

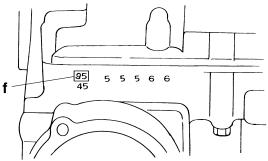
Middle driven pinion gear shim thickness "B" = "d" + "e" - "f"

"d" = a numeral on the middle driven pinion gear, to be divided by 100 and either added to or subtracted from "34"



"e" = Measured value

"f" = a numeral on the lower crankcase, to be divided by 100 and added to "87".





If the middle driven pinion gear is marked "-03"

"d" is 33.97 (i.e., 34.00 + (- 0.03) = 33.97) "e" is 54.49

If the lower crankcase is marked "95" "f" is 87.95 (i.e., 87.00 + 0.95 = 87.95) "B" = 33.97 + 54.49 - 87.95 = 0.51Round off to the hundredths digit and select the appropriate shim(s).

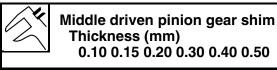
NOTE:

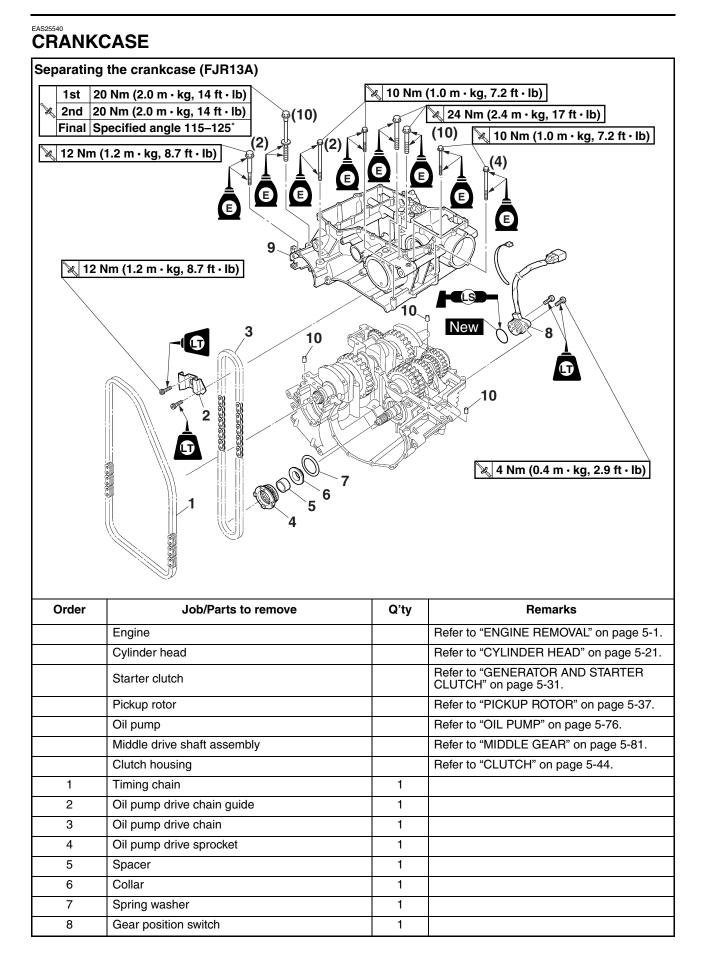
In the above example, the calculated number is 0.51. The chart instructs you to round off the 1 to 0. Thus, the shim thickness is 0.50 mm.

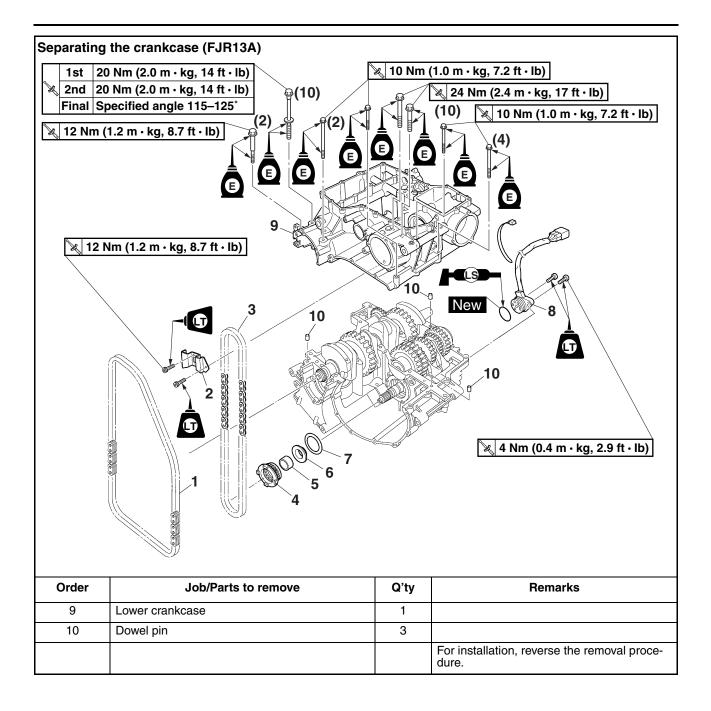
Hundredth	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

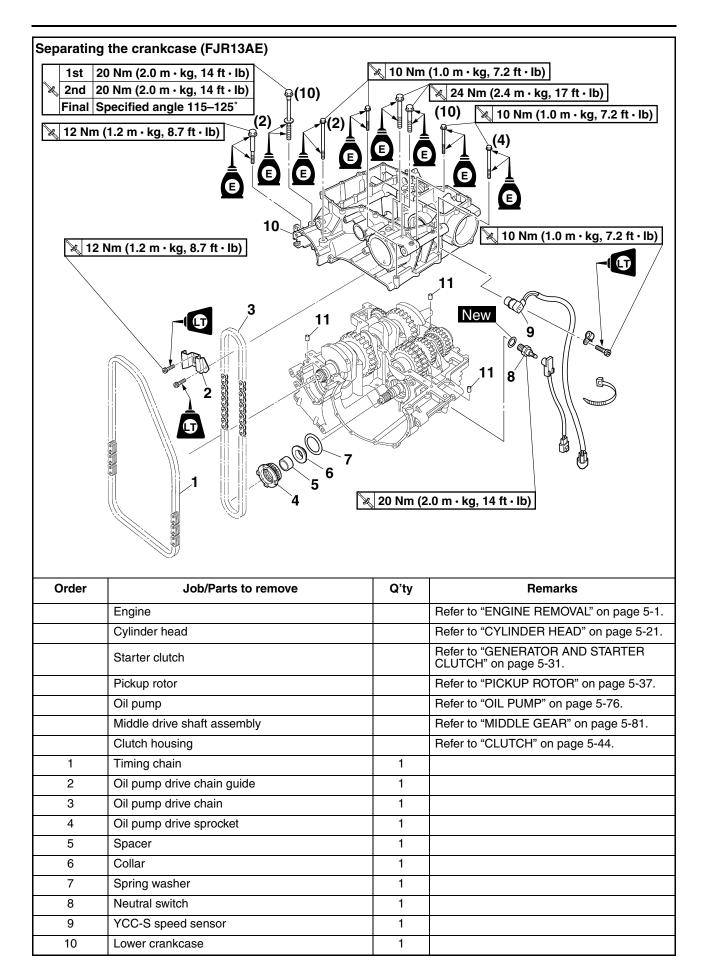
Shims are supplied in the following thicknesses.

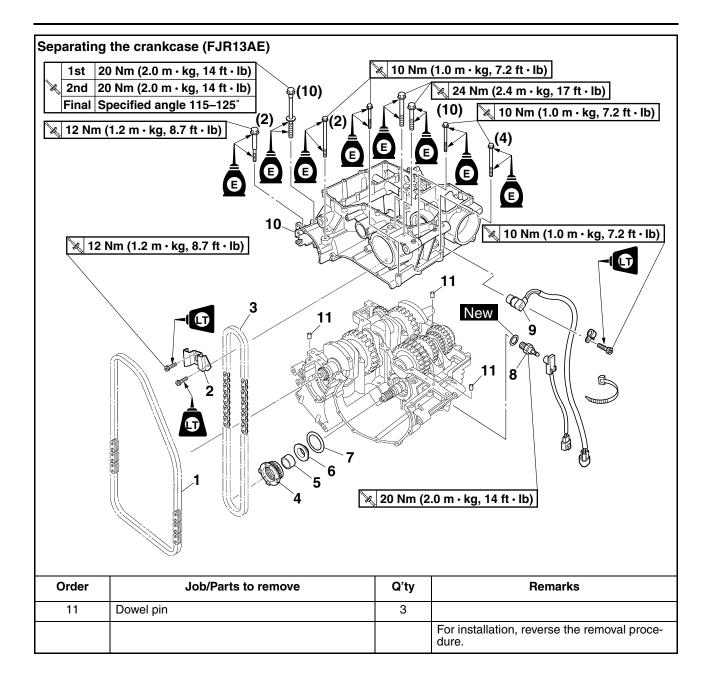
.....

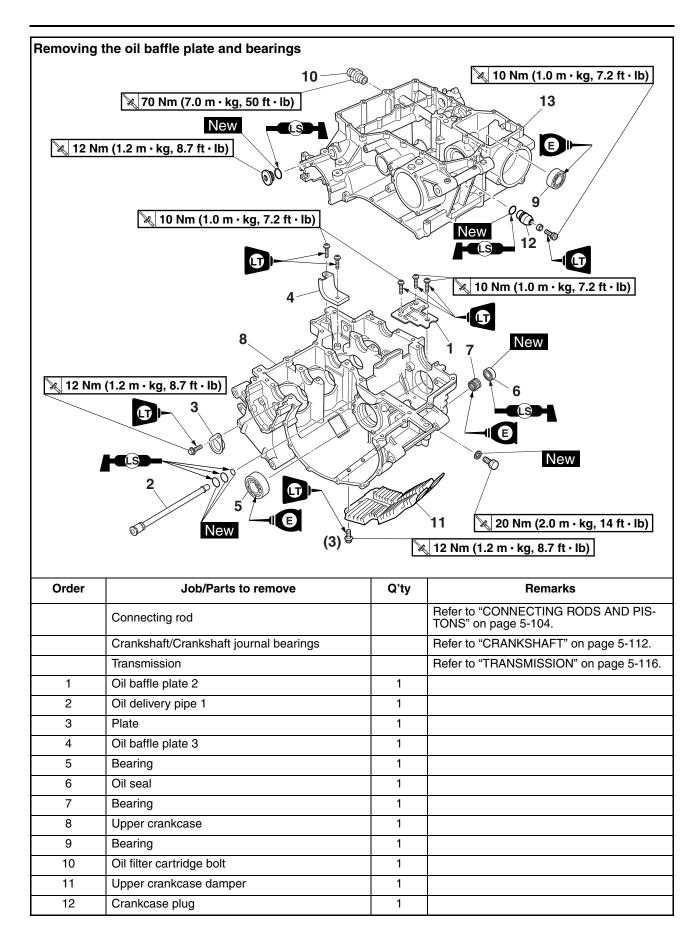




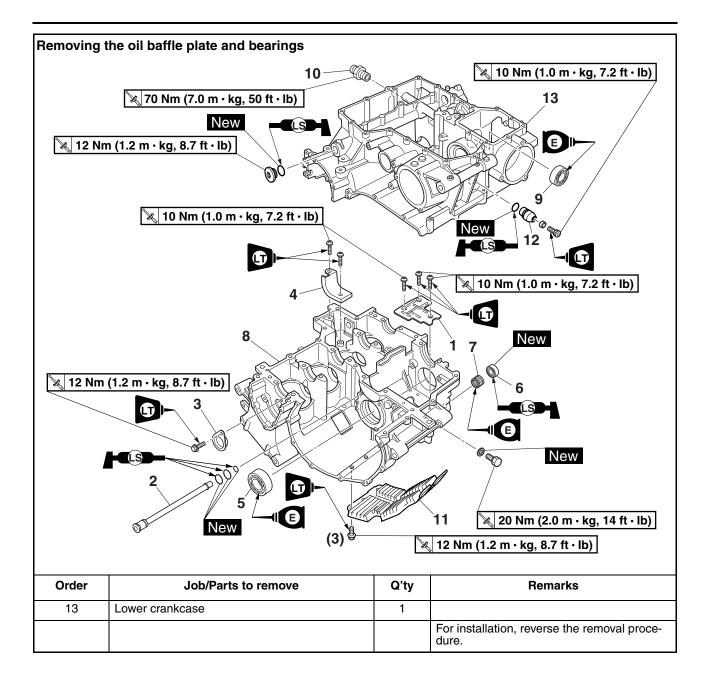








## CRANKCASE

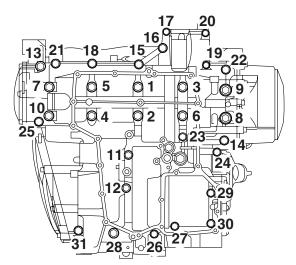


#### EAS25550 DISASSEMBLING THE CRANKCASE

- 1. Place the engine upside down.
- 2. Remove:
- Crankcase bolts

### NOTE: _

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.
- M9 × 115 mm bolts: "1"-"10"
- M8 × 65 mm bolt: "11"
- M8 × 50 mm bolt: "12"
- M6 × 80 mm bolts: "23", "25"
- M6 × 65 mm shoulder bolts: "13", "14"
- M6 × 65 mm bolts: "19", "22", "24", "26"
- M6 × 55 mm bolts: "15"–"18", "20", "21", "27"– "30"
- M6 × 45 mm bolt: "31"



- 3. Remove:
- Lower crankcase

## 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 Cracks/damage  $\rightarrow$  Replace.
- Oil delivery passages Obstruction  $\rightarrow$  Blow out with compressed air.

## CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes.

- 1. Check:
- Oil delivery pipe Damage → Replace.
   Obstruction → Wash and blow out with compressed air.

## CHECKING THE BEARINGS AND OIL SEAL

- 1. Check:
- Bearings
   Clean and lubricate the bearings, then rotate the inner race with your finger.

   Rough movement → Replace.
- Oil seal Damage/wear → Replace.

### CHECKING THE TIMING CHAIN AND OIL PUMP DRIVE CHAIN

- 1. Check:
- Timing chain Damage/stiffness → Replace the timing chain and camshaft sprockets as a set.
- Oil pump drive chain
   Damage/stiffness → Replace the oil pump drive chain, oil pump drive sprocket and oil pump shaft as a set.
- 2. Check:
- Oil pump drive sprocket Cracks/damage/wear → Replace the oil pump drive sprocket and the oil pump drive chain as a set.

## ASSEMBLING THE CRANKCASE

- 1. Lubricate:
- Crankshaft journal bearings (with the recommended lubricant)

### Recommended lubricant Engine oil

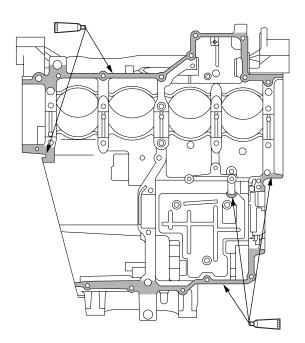
- 2. Apply:
- Sealant

(onto the crankcase mating surfaces and oil baffle plate 2)

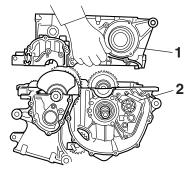
Yamaha bond No. 1215
 90890-85505
 (Three Bond No.1215[®])

### 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.



- 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:

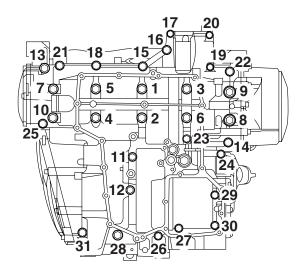
ECA13980

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 and washers with engine oil.
- Lubricate the bolts "11"–"31" thread part and mating surface with engine oil.
- Apply locking agent (LOCTITE[®]) to the threads of the bolt "16".
- Finger tighten the crankcase bolts.
- M9 × 115 mm bolts: "1"–"10" New
- $\bullet$  M8  $\times$  65 mm bolt: "11"
- M8 × 50 mm bolt: "12"
- M6 × 80 mm bolts: "23", "25"
- M6 × 65 mm shoulder bolts: "13", "14"
- M6 × 65 mm bolts: "19", "22", "24", "26"
- M6 × 55 mm bolts: "15"–"18", "20", "21", "27"– "30"
- M6 × 45 mm bolt: "31"



### EW3P61014 WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

## EC3P61033

- Do not use a torque wrench to tighten the bolt to the specified angle.
- Tighten the bolt until it is at the specified angle.

### NOTE:

On a hexagonal bolt, note that the angle from one corner to another is  $60^{\circ}$ .

- 7. Tighten:
- Crankcase bolts (M9 × 115 mm) "1"–"10" New

### EW3P61013

### 

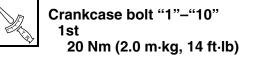
Replace the bolts with new ones.

### NOTE:

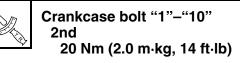
The tightening procedure of crankcase bolts "1"– "10" is angle controlled, therefore tighten the bolts using the following procedure.

### *****

a. Tighten the crankcase bolts in the proper tightening sequence as shown.



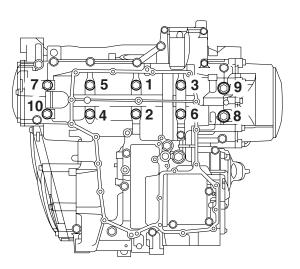
b. Loosen and retighten the crankcase bolts in the proper tightening sequence as shown.

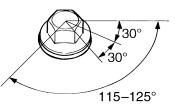


c. Tighten the crankcase bolts further to reach the specified angle 115–125° in the proper tightening sequence as shown.



Crankcase bolt "1"-"10" Final Specified angle 115-125°

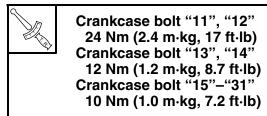




### *****

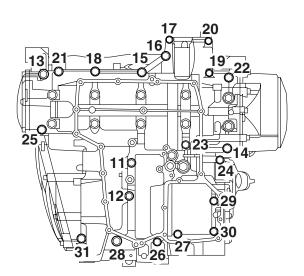
- 8. Tighten:
  - Crankcase bolts "11"-"31"

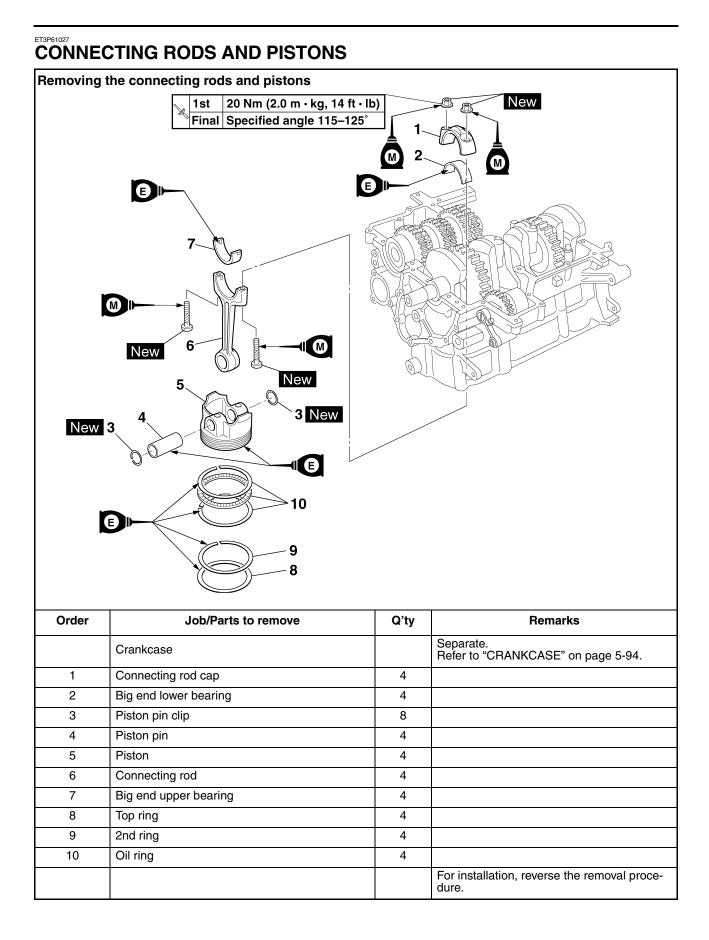
## CRANKCASE



### NOTE: _

Tighten the crankcase bolts in the proper tightening sequence as shown.





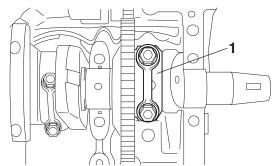
## REMOVING THE CONNECTING RODS AND PISTONS

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

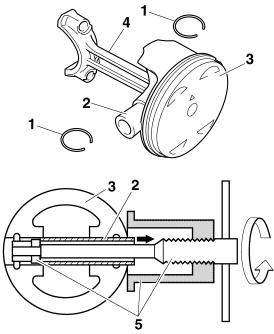
### CAUTION:

## 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".

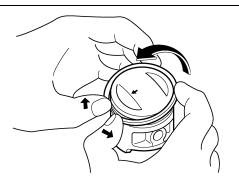
Piston pin puller set 90890-01304 Piston pin puller YU-01304



- 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 → 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.

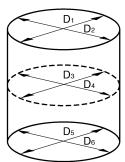
# **A**

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

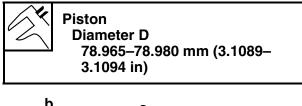
"C" = maximum of  $D_1 - D_6$ 

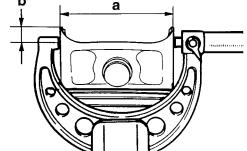
"T" = maximum of  $D_1$  or  $D_2$  - maximum of  $D_5$  or  $D_6$ 

"R" = maximum of D₁, D₃ or D₅ - minimum of D₂, D₄ or D₆



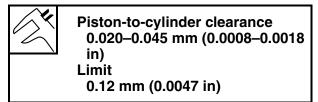
- b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.
- c. Measure piston skirt diameter "D" "a" with the micrometer.





b. 5 mm (0.20 in) from the bottom edge of the piston

- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.
- 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.

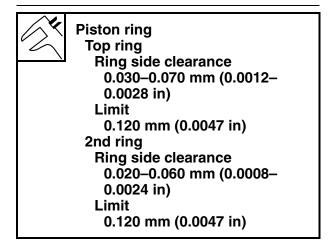
### *****

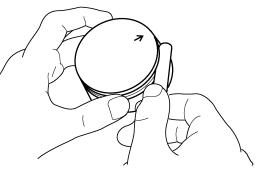
### CHECKING THE PISTON RINGS

- 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.

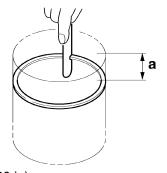




- 2. Install:
- Piston ring (into the cylinder)

### 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.

Piston ring Top ring End gap (installed) 0.35–0.45 mm (0.0138–0.0177 in) Limit 0.70 mm (0.0276 in) 2nd ring End gap (installed) 0.75–0.85 mm (0.0295–0.0335 in) Limit 1.20 mm (0.0472 in) Oil ring End gap (installed)
· · ·
End gap (installed) 0.20–0.60 mm (0.0079–0.0236 in)

EAS24440

### CHECKING THE PISTON PIN

The following procedure applies to all of the piston pins.

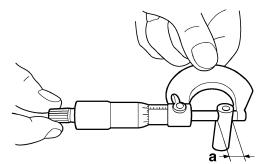
- 1. Check:
- Piston pin

Blue discoloration/grooves  $\rightarrow$  Replace the piston pin and then check the lubrication system.

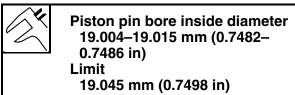
- 2. Measure:
  - Piston pin outside diameter "a" Out of specification → Replace the piston pin.

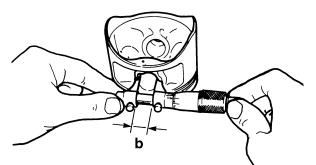


Piston pin outside diameter 18.991–19.000 mm (0.7477– 0.7480 in) Limit 18.971 mm (0.7469 in)



- 3. Measure:
- Piston pin bore diameter "b" Out of specification  $\rightarrow$  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"



Piston-pin-to-piston-pin-bore clearance 0.004–0.024 mm (0.00016– 0.00094 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[®]) 0.031–0.048 mm (0.0012–0.0019 in)

### *****

The following procedure applies to all of the connecting rods.

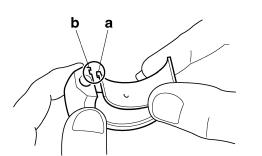
### CAUTION:

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.

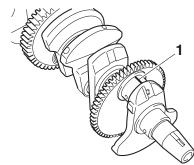
- a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rod halves.
- b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

### NOTE:

Align the projections "a" on the big end bearings with the notches "b" in the connecting rod and connecting rod cap.



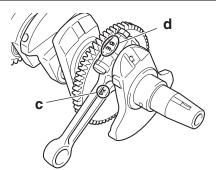
c. Put a piece of Plastigauge[®] "1" on the crankshaft pin.



d. Assemble the connecting rod halves.

### NOTE: _

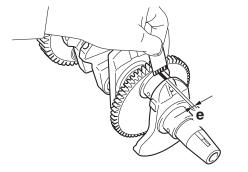
- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads and nut seats with molybdenum disulfide grease.
- Make sure the "Y" mark "c" on the connecting rod faces towards the left side of the crank-shaft.
- Make sure the characters "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 5-109.
- f. Remove the connecting rod and big end bearings.
   Peter to "REMOVING THE CONNECTING

Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-105.

g. Measure the compressed Plastigauge[®] width "e" on the crankshaft pin.
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.

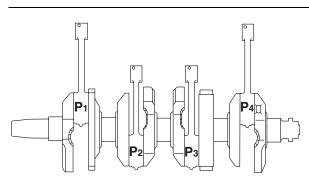


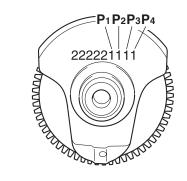
### *****

- 2. Select:
- Big end bearings (P₁-P₄)

### NOTE:

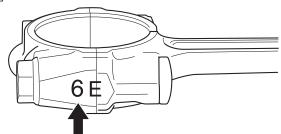
- The numbers "A" stamped into the crankshaft web and the numbers "B" on the connecting rods are used to determine the replacement big end bearing sizes.
- P₁-P₄ refer to the bearings shown in the crankshaft illustration.





В

А



For example, if the connecting rod  $P_1$  and the crankshaft web  $P_1$  numbers are 6 and 1 respectively, then the bearing size for  $P_1$  is:

P₁ (connecting rod) - P₁ (crankshaft)

6 - 1 = 5 (yellow)



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

### EAS26170

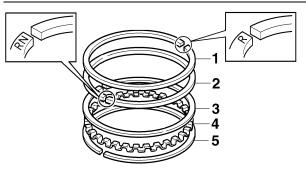
## INSTALLING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the pistons and connecting rods.

- 1. Install:
- Top ring "1"
- 2nd ring "2"
- Upper oil ring rail "3"
- Oil ring expander "4"
- Lower oil ring rail "5"

### NOTE:

Be sure to install the piston rings so that the manufacturer's marks face up.

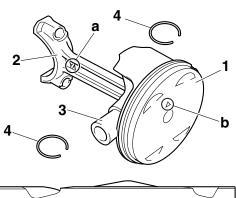


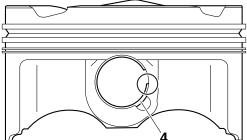
- 2. Install:
  - Piston "1"
    - (onto the respective connecting rod "2")
  - Piston pin "3"
  - Piston pin clips "4" New

### NOTE:_

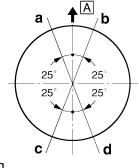
- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark "a" on the connecting rod is facing to the left when the punch mark "b" on the piston is pointing up. Refer to the illustration.
- When installing a piston pin clip, make sure that the clip ends are positioned away from the cutout in the piston as shown in the illustration.

 Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).





- 3. Offset:
- Piston ring end gaps



- a. Top ring
- b. Lower oil ring railc. Upper oil ring rail
- d. 2nd ring
- A. Intake 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)

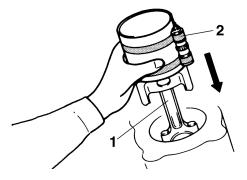


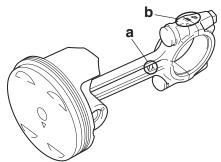
- 7. Install:
- Big end bearings
- Connecting rod assembly "1" (into the cylinder and onto the crankshaft pin)
- Connecting rod cap (onto the crankshaft pin)

### 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 with piston ring compressor "2", install the connecting rod assembly "1" into the cylinder with the other hand.
- Make sure the "Y" marks "a" on the connecting rods face towards the left side of the crank-shaft.
- Make sure the characters "b" on both the connecting rod and connecting rod cap are aligned.







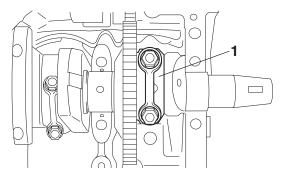
- 8. Tighten:
- Connecting rod nuts "1"

## WARNING

Replace the connecting rod bolts and nuts with new ones.

### NOTE:

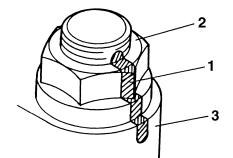
Tighten the connecting rod nuts using the following procedure.



a. Tighten the connecting rod nuts with a torque wrench.

Connecting rod nut (1st) 20 Nm (2.0 m·kg, 14 ft·lb)

b. Put a mark "1" on the corner of the connecting rod nut "2" and the connecting rod "3".



c. Tighten the connecting rod nuts further to reach the specified angle 115–125°.

Connecting rod nut (final) Specified angle 115–125°

## WARNING

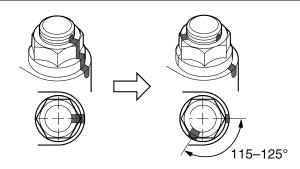
If the connecting rod nut is tightened more than the specified angle, do not loosen the nut and then retighten it. Instead, replace the connecting rod bolt and nut with a new one and perform the procedure again.

## 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°.



*****

## CRANKSHAFT

Removing	<image/>	3	
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-94.
	Front balancer weight		Refer to "BALANCERS" on page 5-127.
	Connecting rod caps		Refer to "CONNECTING RODS AND PIS- TONS" on page 5-104.
1	Crankshaft	1	
2	Crankshaft journal upper bearing	5	
3	Crankshaft journal lower bearing	5	
4	Oil nozzle	4	
			For installation, reverse the removal proce- dure.

## REMOVING THE CRANKSHAFT JOURNAL BEARINGS

- 1. Remove:
- Crankshaft journal upper bearings (from the upper crankcase)
- Crankshaft journal lower bearings (from the lower crankcase)

### NOTE:

Identify the position of each crankshaft journal bearing so that it can be reinstalled in its original place.

### ET3P61029

### CHECKING THE OIL NOZZLES

The following procedure applies to all of the oil nozzles.

- 1. Check:
- Oil nozzle

Damage/wear  $\rightarrow$  Replace the oil nozzle.

• Oil passage Obstruction  $\rightarrow$  Blow out with compressed air.

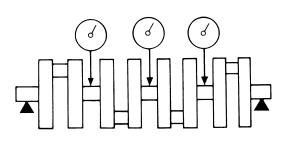
### EAS26070

### CHECKING THE CRANKSHAFT

- 1. Measure:
- Crankshaft runout

Out of specification  $\rightarrow$  Replace the crank-shaft.

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 crank-

shaft journal bearings.



Journal oil clearance (using plastigauge[®]) 0.027–0.045 mm (0.0011–0.0018

## CAUTION:

in)

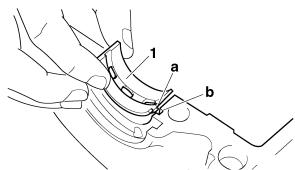
Do not interchange the crankshaft journal bearings. To obtain the correct crankshaftjournal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

### *****

- 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: _

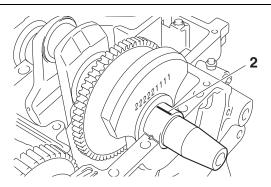
Align the projections "a" on the crankshaft journal upper bearings with the notches "b" in the upper crankcase.



d. Put a piece of Plastigauge[®] "2" on each crankshaft journal.

### NOTE: _

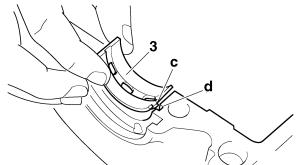
Do not put the Plastigauge[®] over the oil hole in the crankshaft journal.



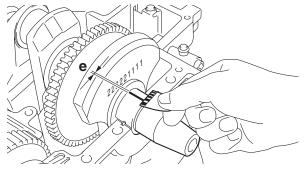
e. Install the crankshaft journal lower bearings "3" into the lower crankcase and assemble the crankcase halves.

### NOTE:

- Align the projections "c" of the crankshaft journal lower bearings with the notches "d" in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



- f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.
   Refer to "CRANKCASE" on page 5-94.
- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- Measure the compressed Plastigauge[®] width "e" on each crankshaft journal. If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.



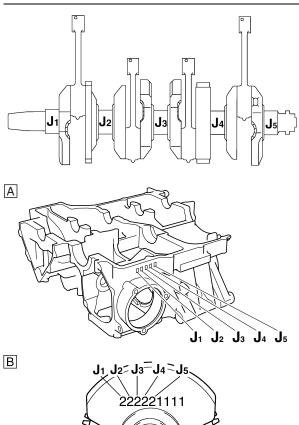
### *****

- 4. Select:
- Crankshaft journal bearings (J₁–J₅)

### NOTE:

- The numbers "A" stamped into the lower crankcase and the numbers "B" stamped into the crankshaft web are used to determine the replacement crankshaft journal bearing sizes.
- J₁–J₅ refer to the bearings shown in the lower crankcase and crankshaft web illustration.

• If J₁–J₅ are the same, use the same size for all of the bearings.





For example, if the lower crankcase  $J_1$  and crankshaft web  $J_1$  numbers are 6 and 2 respectively, then the bearing size for  $J_1$  is:

J₁ (crankcase) - J₁ (crankshaft web) + 2

6 - 2 + 2 = 6 (pink)



Bearing color code 2.Black 3.Brown 4.Green 5.Yellow 6.Pink 7.Red 8.White

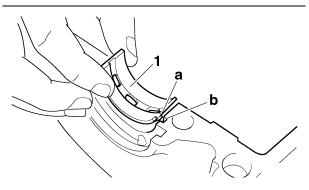
```
EAS26200
INSTALLING THE CRANKSHAFT
```

1. Install:

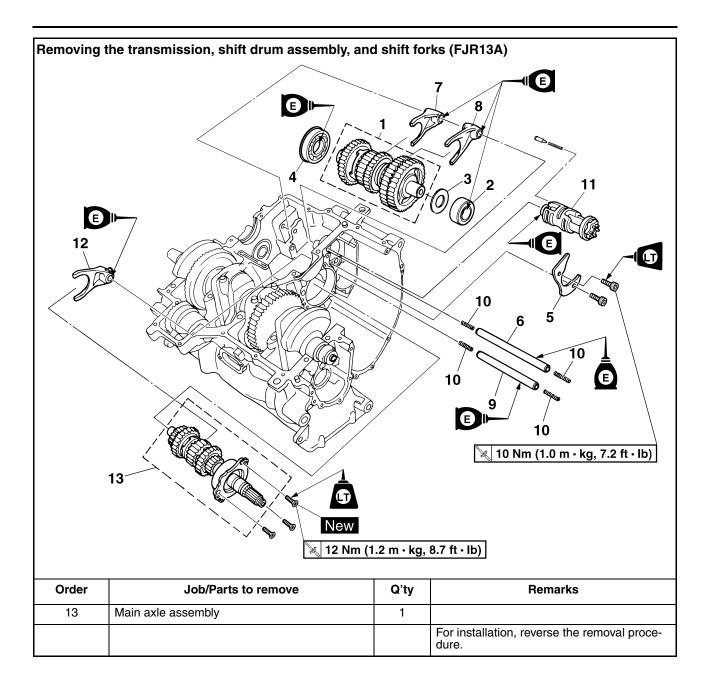
- Crankshaft journal upper bearings (into the upper crankcase)
- Crankshaft journal lower bearings (into the lower crankcase)

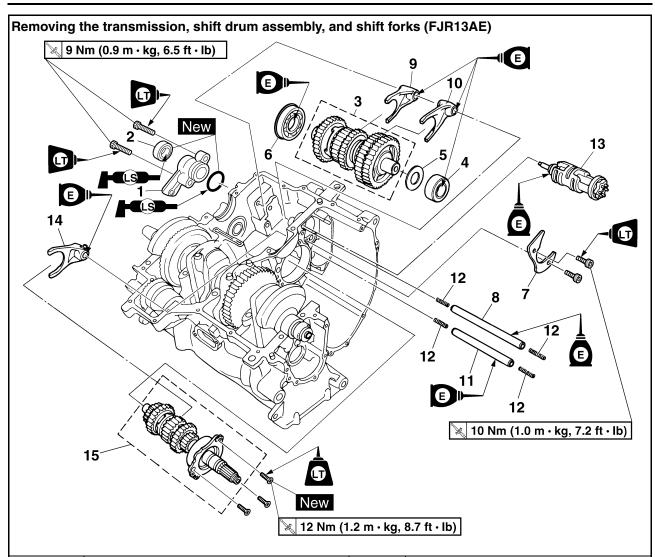
### NOTE: __

- 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.

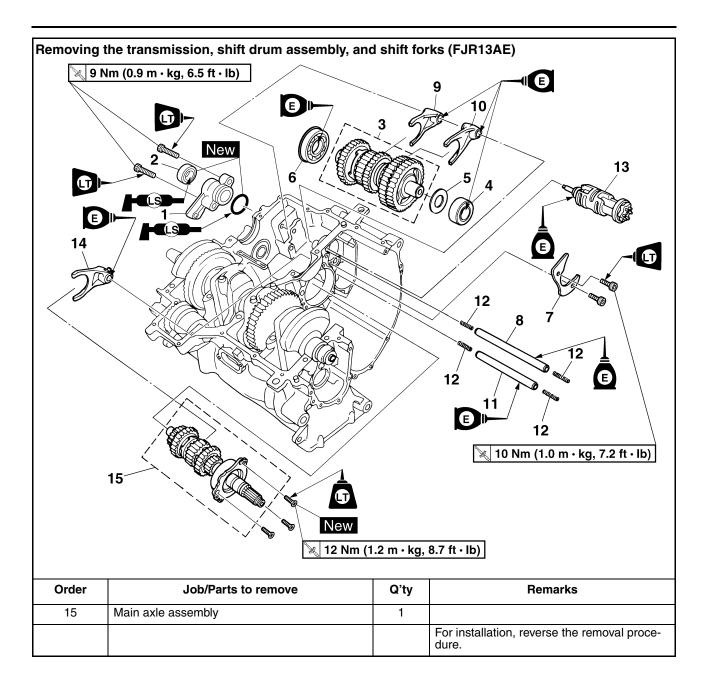


#### EAS26240 TRANSMISSION Removing the transmission, shift drum assembly, and shift forks (FJR13A) E Ξ 2 11 E 12 (E G 10 5 6 10 B 10 9 B 10 🔌 10 Nm (1.0 m • kg, 7.2 ft • lb) 13 LT New 🔌 12 Nm (1.2 m · kg, 8.7 ft · lb) Order Q'ty Job/Parts to remove Remarks Separate. Refer to "CRANKCASE" on page 5-94. Crankcase Refer to "SHIFT SHAFT" on page 5-73. Stopper lever 1 1 Drive axle assembly 1 2 Bearing 3 Washer 1 4 1 Bearing 5 Shift drum retainer 1 Long shift fork guide bar 1 6 7 Shift fork-L 1 8 Shift fork-R 1 9 Short shift fork guide bar 1 10 4 Spring 11 Shift drum assembly 1 12 Shift fork-C 1

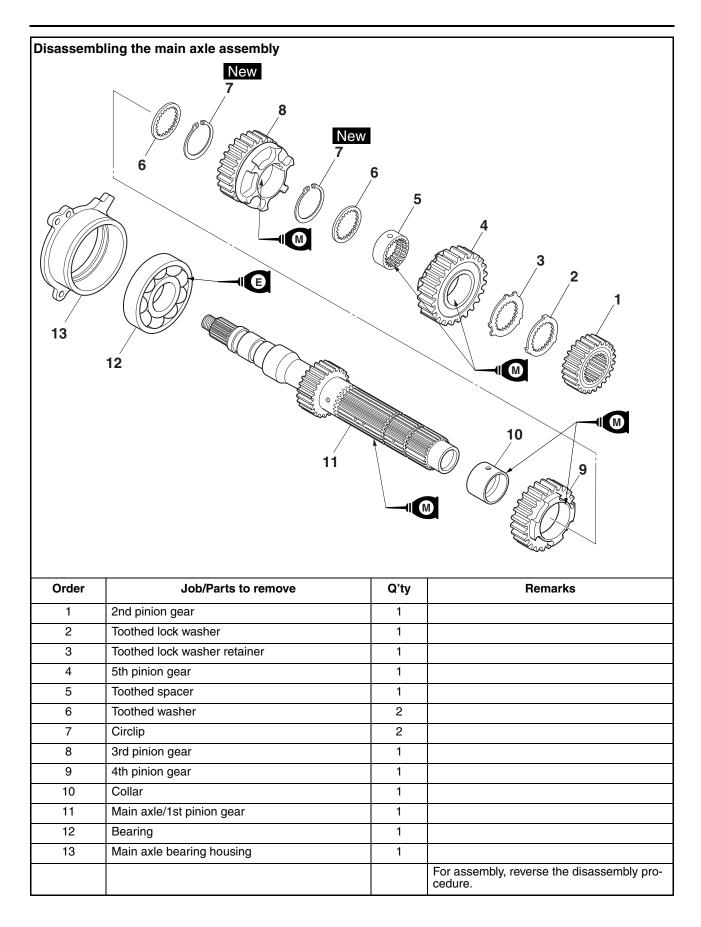


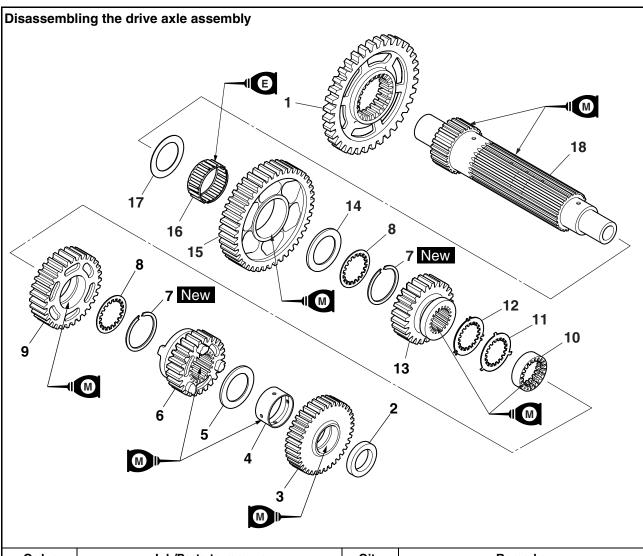


Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-94.
	Stopper lever		Refer to "SHIFT SHAFT" on page 5-73.
1	Gear position sensor bracket	1	
2	Oil seal	1	
3	Drive axle assembly	1	
4	Bearing	1	
5	Washer	1	
6	Bearing	1	
7	Shift drum retainer	1	
8	Long shift fork guide bar	1	
9	Shift fork-L	1	
10	Shift fork-R	1	
11	Short shift fork guide bar	1	
12	Spring	4	
13	Shift drum assembly	1	
14	Shift fork-C	1	

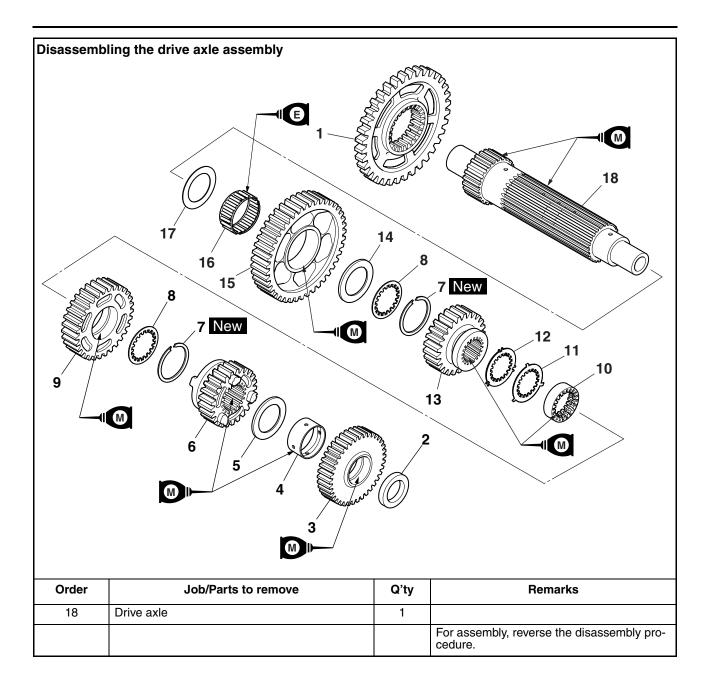


### TRANSMISSION





Order	Job/Parts to remove	Q'ty	Remarks
1	Middle drive gear	1	
2	Washer	1	
3	2nd wheel gear	1	
4	Collar	1	
5	Washer	1	
6	5th wheel gear	1	
7	Circlip	2	
8	Toothed washer	2	
9	3rd wheel gear	1	
10	Toothed spacer	1	
11	Toothed lock washer	1	
12	Toothed lock washer retainer	1	
13	4th wheel gear	1	
14	Washer	1	
15	1st wheel gear	1	
16	Bearing	1	
17	Washer	1	



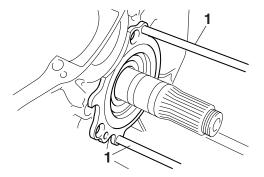
## REMOVING THE TRANSMISSION

- 1. Remove:
- Main axle assembly

### NOTE:

Remove the main axle assembly with the slide hammer bolts "1" and weight.





### EAS26260

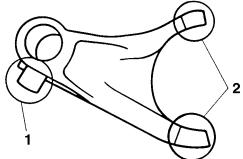
### **CHECKING THE SHIFT FORKS**

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.

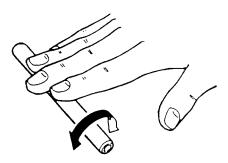


- 2. Check:
  - Shift fork guide bar Roll the shift fork guide bar on a flat surface. Bends  $\rightarrow$  Replace.

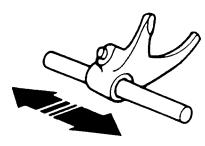
### EWA12840

### 

Do not attempt to straighten a bent shift fork guide bar.



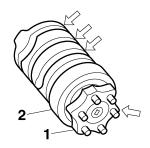
- 3. Check:
  - Shift fork movement (along the shift fork guide bar) Rough movement → Replace the shift forks and shift fork guide bar as a set.



EAS26270

### CHECKING THE SHIFT DRUM ASSEMBLY

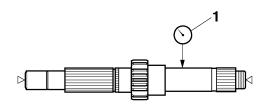
- 1. Check:
- Shift drum groove Damage/scratches/wear → Replace the shift drum assembly.
- Shift drum segment "1" Damage/wear → Replace the shift drum assembly.
- Shift drum bearing "2" Damage/pitting → Replace the shift drum assembly.



## CHECKING THE TRANSMISSION

- 1. Measure:
- Main axle runout (with a centering device and dial gauge "1") Out of specification → Replace the main axle.

### Main axle runout limit 0.08 mm (0.0032 in)

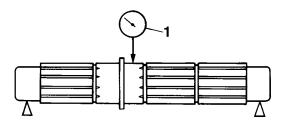


- 2. Measure:
  - Drive axle runout

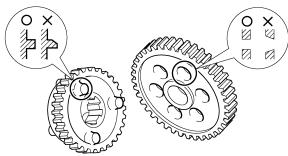
(with a centering device and dial gauge "1") Out of specification  $\rightarrow$  Replace the drive axle.



Drive axle runout limit 0.08 mm (0.0032 in)



- 3. Check:
  - Transmission gears Blue discoloration/pitting/wear → Replace the defective gear(s).
  - Transmission gear dogs Cracks/damage/rounded edges → Replace the defective gear(s).



- 4. Check:
  - Transmission gear engagement (each pinion gear to its respective wheel gear)

Incorrect  $\rightarrow$  Reassemble the transmission axle assemblies.

- 5. Check:
- Transmission gear movement Rough movement → Replace the defective part(s).
- 6. Check:

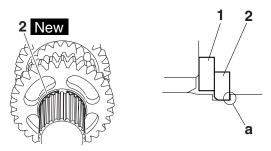
• Circlips Bends/damage/looseness  $\rightarrow$  Replace.

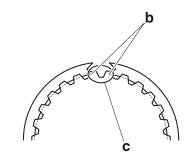
# ASSEMBLING THE MAIN AXLE AND DRIVE

- 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. (For main axle)
- Install the circlip so that both ends "b" rest on the sides of a spline "c" with both axles aligned.

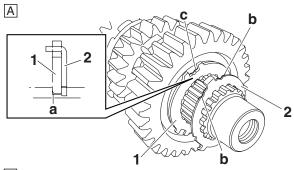




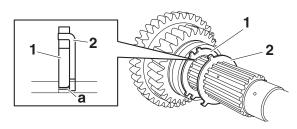
- 2. Install:
- Toothed lock washer retainer "1"
- Toothed lock washer "2"

NOTE:

- With the toothed lock washer retainer "1" in the groove "a" in the axle, align the projection on the retainer with an axle spline, and then install the toothed lock washer "2".
- Be sure to align the projection on the toothed lock washer that is between the alignment marks "b" with the alignment mark "c" on the retainer.



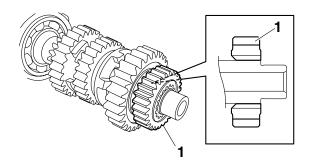
В



- A. Main axle
- B. Drive axle
- 3. Install:
- 2nd pinion gear "1"

### NOTE:

Install the 2nd pinion gear with its chamfered side facing inward as shown in the illustration.



### EAS26350

### INSTALLING THE TRANSMISSION

1. Install:

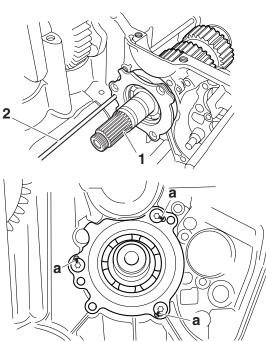
- Main axle assembly "1"
- Main axle bearing housing bolts

### Main axle bearing housing bolt 12 Nm (1.2 m·kg, 8.7 ft·lb) LOCTITE[®]

### NOTE:

• When installing the main axle assembly, use a pin "2" to align the bearing housing hole with the corresponding hole in the upper crankcase.

• Stake the main axle bearing housing bolts at a cutout "a" in the main axle bearing housing.



- 2. Install:
- Shift fork-C
  - Shift drum assembly
  - Springs
  - Short shift fork guide bar
- Shift fork-R
- Shift fork-L
- Long shift fork guide bar

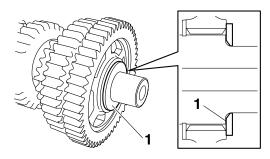
### NOTE:

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".

- 3. Install:
- Washer "1"

### NOTE: _

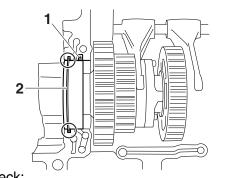
Install the washer with its chamfered side facing towards the drive axle assembly as shown in the illustration.



- 4. Install:
- Drive axle assembly

### NOTE: __

- The bearing pin "1" must face towards the rear of the upper crankcase.
- Make sure the bearing circlip "2" is inserted into the groove in the upper crankcase.



5. Check:
Transmission
Bough movement > Principal Principal

Rough movement  $\rightarrow$  Repair.

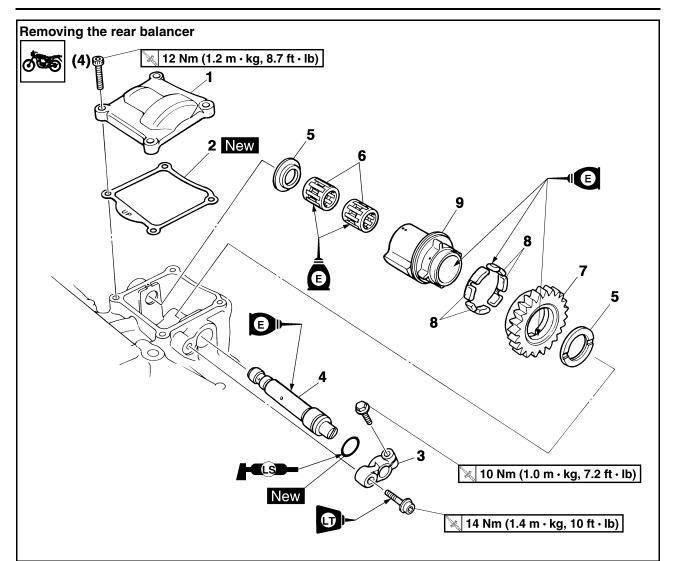
NOTE: ____

Oil each gear, shaft, and bearing thoroughly.

## BALANCERS

moving	the front balancer		
1-	10 Nm (1.0 m · kg, 7.2 ft · lb)		
Order	Job/Parts to remove	Q'ty	Remarks Separate.
	Crankcase		Refer to "CRANKCASE" on page 5-94.
1	Front balancer lever	1	
2	Front balancer shaft	1	
3	Washer	2	
4	Bearing	2	
5	Front balancer gear	1	
6	Damper	4	
-		· · · ·	
7	Front balancer weight	1	For installation, reverse the removal proce

## BALANCERS



Order	Job/Parts to remove	Q'ty	Remarks
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Pickup rotor cover		Refer to "PICKUP ROTOR" on page 5-37.
	Clutch cover		Refer to "CLUTCH" on page 5-44.
1	Rear balancer cover	1	
2	Rear balancer cover gasket	1	
3	Rear balancer lever	1	
4	Rear balancer shaft	1	
5	Washer	2	
6	Bearing	2	
7	Rear balancer gear	1	
8	Damper	4	
9	Rear balancer weight	1	
			For installation, reverse the removal proce- dure.

### EAS26120 CHECKING THE BALANCERS

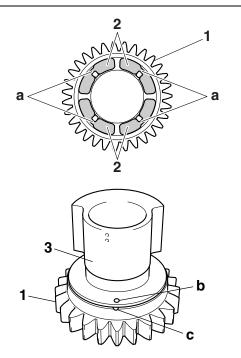
- 1. Check:
- Front balancer gear Damage/wear  $\rightarrow$  Replace the front balancer gear and crankshaft.
- Rear balancer gear Damage/wear  $\rightarrow$  Replace the rear balancer gear and clutch housing.
- 2. Check:
  - Balancer shafts Cracks/damage/wear  $\rightarrow$  Replace the balancer shaft and bearings. Dirt  $\rightarrow$  Clean.
  - Bearings Damage/wear  $\rightarrow$  Replace.
  - Dampers Damage/wear  $\rightarrow$  Replace.

### ET3P61032

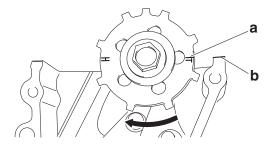
- INSTALLING THE FRONT BALANCER
- 1. Install:
- Front balancer gear "1"
- Dampers "2"
- Front balancer weight "3"
- Bearings
- Washers

### NOTE:

- Install the dampers onto the balancer gear so that the middle section "a" of each damper is positioned to the outside of the gear projections as shown in the illustration.
- Align the punch mark "b" in the balancer weight with the mark "c" in the balancer gear.



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

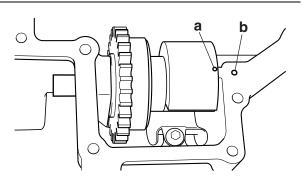


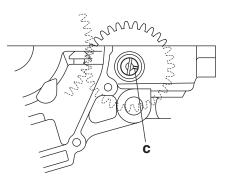
- 3. Install:
- Front balancer shaft

a. Align the punch mark "a" in the balancer weight with the oil hole "b" in the upper crankcase.

### NOTE:

- Make sure that the front balancer gear teeth and the balancer drive gear teeth mesh correctly.
- Make sure that the slot "c" is facing in the direction indicated in the illustration when installing the balancer shaft.



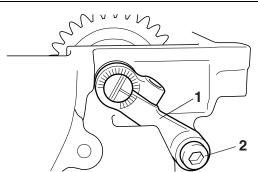


### *****

- 4. Install:
- Front balancer lever "1"
- Front balancer lever bolt "2"

NOTE: _

- Apply locking agent (LOCTITE[®]) to the threads of the balancer lever bolt.
- Temporarily tighten the balancer lever bolt.

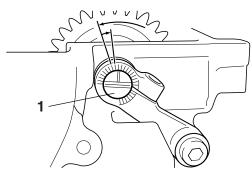


- 5. Tighten:
- Front balancer shaft "1"

Front balancer shaft 0.4 Nm (0.04 m·kg, 0.29 ft·lb)

### NOTE: _____

Tighten the balancer shaft to the specified torque by turning it counterclockwise, and then turn it one mark back on the balancer lever scale.



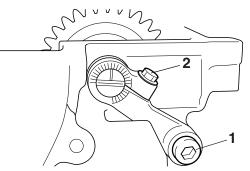
- 6. Tighten:
  - Front balancer lever bolt "1"
  - Front balancer shaft pinch bolt "2"



Front balancer lever bolt 14 Nm (1.4 m·kg, 10 ft·lb) Front balancer shaft pinch bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

### NOTE: _

Make sure that the balancer shaft does not rotate.



 Start the engine and check that there is no abnormal noise coming from the balancer gear. If noise is abnormal, adjust the gear lash by turning the balancer shaft.

### NOTE: _

With each adjustment, turn the balancer shaft one scale.

Clockwise	Gear lash decreased		
Counterclockwise	Gear lash increased		

### ET3P61033

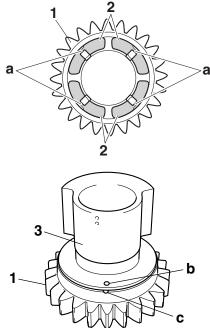
### INSTALLING THE REAR BALANCER

- 1. Install:
- Rear balancer gear "1"
- Dampers "2"
- Rear balancer weight "3"
- Bearings
- Washers

### NOTE:

- Install the dampers onto the balancer gear so that the middle section "a" of each damper is positioned to the outside of the gear projections as shown in the illustration.
- Align the punch mark "b" in the balancer weight with the mark "c" in the balancer gear.

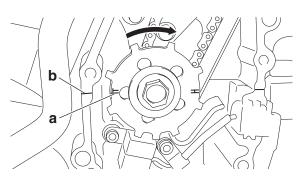
## BALANCERS



- 2. Align:
- "T" mark on the pickup rotor (with the crankcase mating surface)
- a. Turn the grankshaft glockwise
- a. Turn the crankshaft clockwise.
- b. When piston #1 is at TDC on the compression stroke, align the "T" mark "a" on the pickup rotor with the crankcase mating surface "b".

### NOTE:

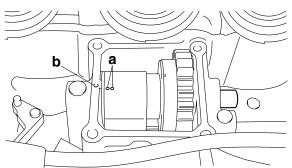
TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.



- *****
- 3. Install:
- Rear balancer shaft

### ****

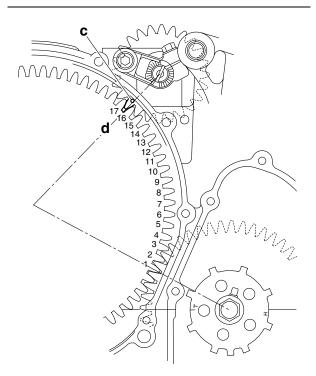
a. Align the punch marks "a" in the balancer weight with the punch mark "b" in the upper crankcase.

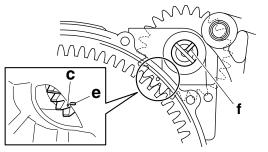


b. Align the balancer gear punch mark "c" with the primary driven gear point "d" as shown.

NOTE:_

- Make sure that the rear balancer gear teeth and the primary driven gear teeth mesh correctly.
- Make sure that the balancer gear punch mark "c" is aligned with the projection "e" on the upper crankcase.
- Make sure that the slot "f" is facing in the direction indicated in the illustration when installing the balancer shaft.



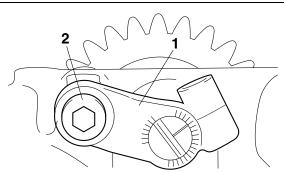


#### *****

- 4. Install:
- Rear balancer lever "1"
- Rear balancer lever bolt "2"

NOTE: _

- Apply locking agent (LOCTITE[®]) to the threads of the balancer lever bolt.
- Temporarily tighten the balancer lever bolt.

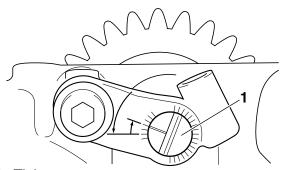


- 5. Tighten:
- Rear balancer shaft "1"

Rear balancer shaft 0.4 Nm (0.04 m·kg, 0.29 ft·lb)

#### NOTE: _

Tighten the balancer shaft to the specified torque by turning it counterclockwise, and then turn it two marks back on the balancer lever scale.



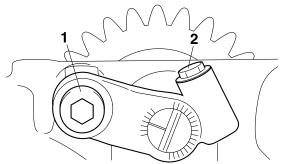
- 6. Tighten:
  - Rear balancer lever bolt "1"
- Rear balancer shaft pinch bolt "2"



Rear balancer lever bolt 14 Nm (1.4 m·kg, 10 ft·lb) Rear balancer shaft pinch bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

#### NOTE: _

Make sure that the balancer shaft does not rotate.



7. Start the engine and check that there is no abnormal noise coming from the balancer gear. If noise is abnormal, adjust the gear lash by turning the balancer shaft.

#### NOTE: ____

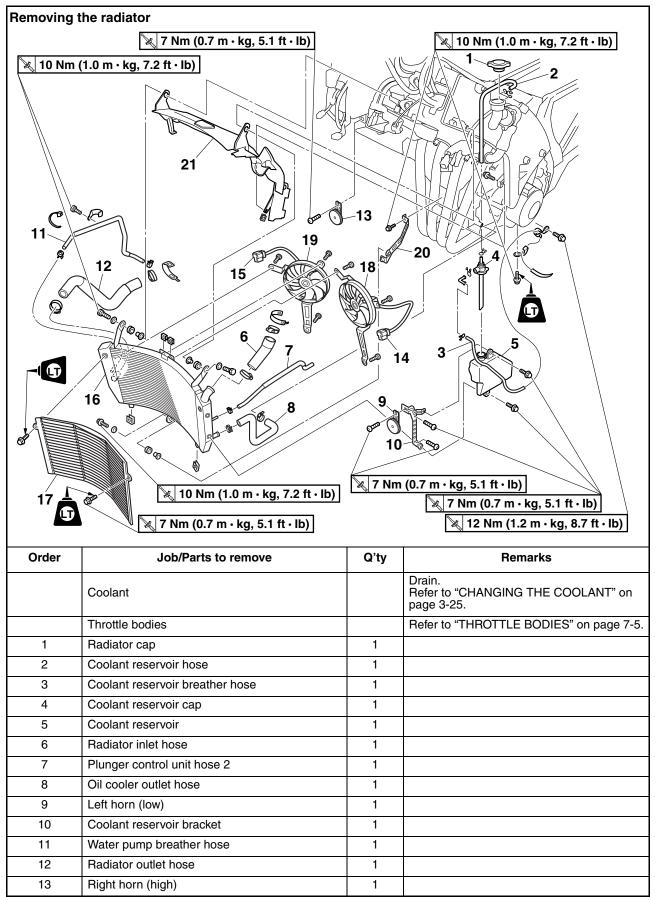
With each adjustment, turn the balancer shaft one scale.

Clockwise	Gear lash decreased
Counterclockwise	Gear lash increased

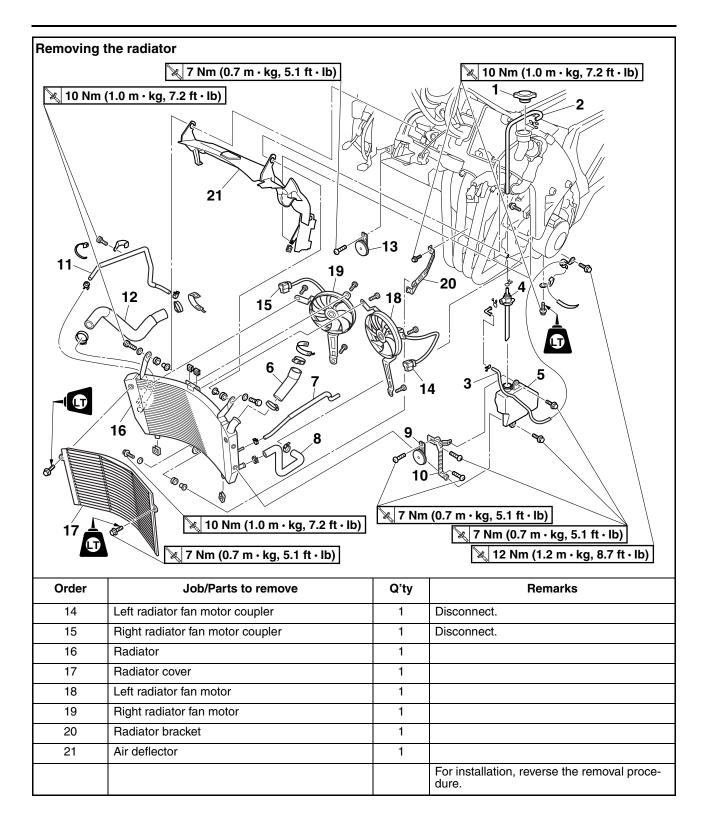
## **COOLING SYSTEM**

RADIATOR	6-1
CHECKING THE RADIATOR	
INSTALLING THE RADIATOR	6-3
OIL COOLER	
CHECKING THE OIL COOLER	
INSTALLING THE OIL COOLER	6-5
THERMOSTAT	
CHECKING THE THERMOSTAT	
INSTALLING THE THERMOSTAT ASSEMBLY	6-8
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DISASSEMBLING THE WATER PUMP	6-12
CHECKING THE WATER PUMP	6-12
ASSEMBLING THE WATER PUMP	6-12
INSTALLING THE WATER PUMP	6-13

## RADIATOR



## RADIATOR



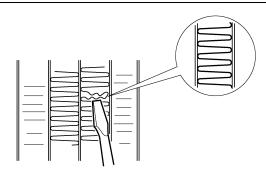
#### EAS26390 CHECKING THE RADIATOR

- 1. Check:
- Radiator fins
   Obstruction → 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.

K

Radiator cap opening pressure 93.3–122.7 kPa (13.5–17.8 psi) (0.93–1.23 kgf/cm²)

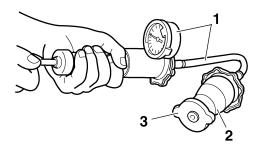
- ****
- a. Install the radiator cap tester "1" and radiator cap tester adapter "2" to the radiator cap "3".

Radiator cap tester 90890-01325 Radiator pressure tester YU-24460-01

Radiator cap tester adapter

90890-01352

Radiator pressure tester adapter YU-33984



b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

#### *****

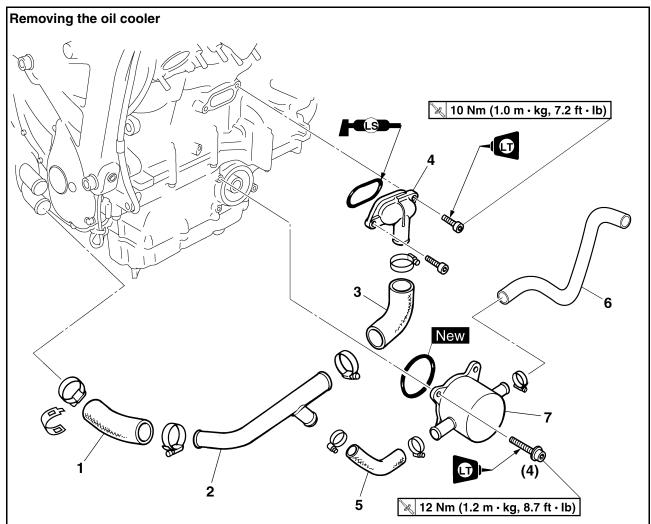
- 4. Check:
- Radiator fan Damage → Replace. Malfunction → Check and repair. Refer to "COOLING SYSTEM" on page 8-53.

#### EAS26400 INSTALLING THE RADIATOR

- 1. Fill:
  - Cooling system (with the specified amount of the recommended coolant) Refer to "CHANGING THE COOLANT" on page 3-25.
- 2. Check:
  - Cooling system
     Leaks → Repair or replace any faulty part.
- 3. Measure:
  - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

Refer to "CHECKING THE RADIATOR" on page 6-3.

# OIL COOLER



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-15.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-25.
	Radiator		Refer to "RADIATOR" on page 6-1.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-1.
1	Water pump outlet hose	1	
2	Water pump outlet pipe	1	
3	Water jacket joint inlet hose	1	
4	Water jacket joint	1	
5	Oil cooler inlet hose	1	
6	Oil cooler outlet hose	1	
7	Oil cooler	1	
			For installation, reverse the removal proce- dure.

#### EAS26420 CHECKING THE OIL COOLER

- 1. Check:
- Oil cooler Cracks/damage  $\rightarrow$  Replace.
- 2. Check:
  - Oil cooler inlet hose
  - Oil cooler outlet hose
- Water pump outlet hose
- Water pump outlet pipe
- Water jacket joint inlet hose Cracks/damage/wear → Replace.

EAS26430

#### INSTALLING THE OIL COOLER

- 1. Clean:
- Mating surfaces of the oil cooler and the crankcase

(with a cloth dampened with lacquer thinner) 2. Install:

- O-ring New
- Oil cooler

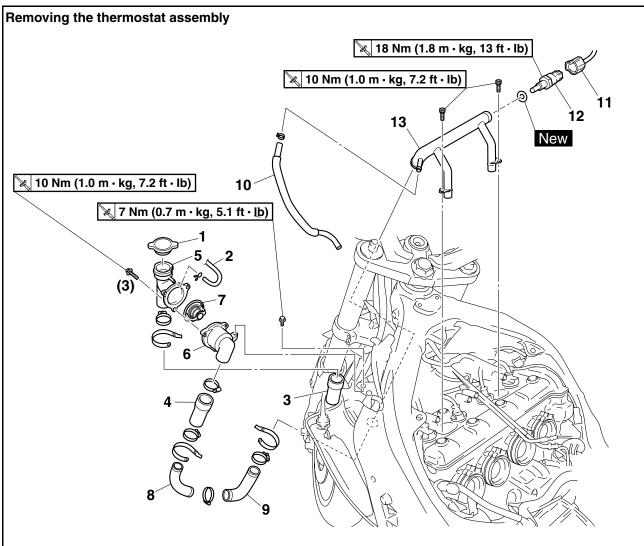
Oil cooler bolt 12 Nm (1.2 m·kg, 8.7 ft·lb) LOCTITE[®]

#### NOTE:

Make sure the O-ring is positioned properly.

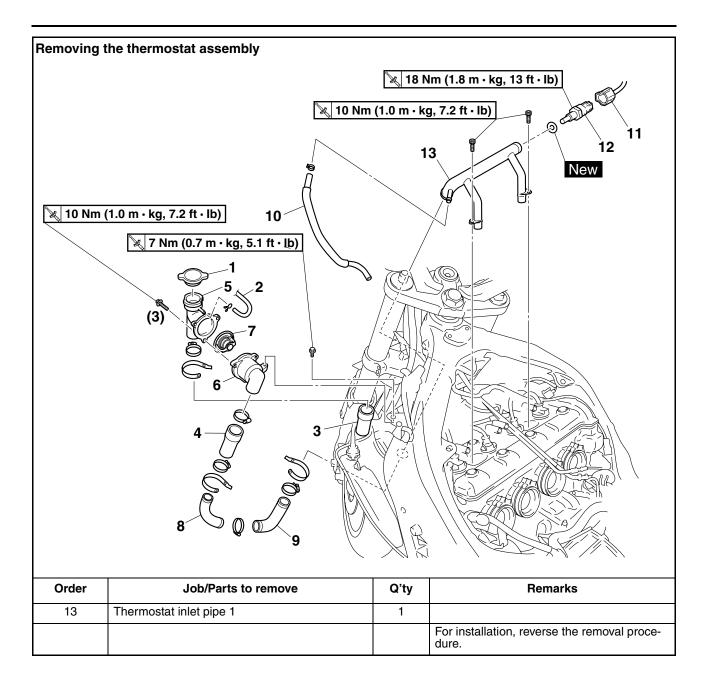
- 3. Fill:
- Cooling system (with the specified amount of the recommended coolant) Refer to "CHANGING THE COOLANT" on page 3-25.
- Crankcase (with the specified amount of the recommended engine oil) Refer to "CHANGING THE ENGINE OIL" on page 3-15.
- 4. Check:
- Cooling system
   Leaks → Repair or replace any faulty part.
- 5. Measure:
  - Radiator cap opening pressure Below the specified pressure → Replace the radiator cap.
     Refer to "CHECKING THE RADIATOR" on page 6-3.

#### EAS26440 THERMOSTAT



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-25.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
1	Radiator cap	1	
2	Coolant reservoir hose	1	Disconnect.
3	Radiator inlet hose	1	Disconnect.
4	Thermostat inlet hose 2	1	
5	Thermostat cover/radiator filler pipe	1	
6	Thermostat housing	1	
7	Thermostat	1	
8	Thermostat inlet pipe 2	1	
9	Thermostat inlet hose 1	1	
10	Plunger control unit hose 1	1	
11	Coolant temperature sensor coupler	1	Disconnect.
12	Coolant temperature sensor	1	

## THERMOSTAT

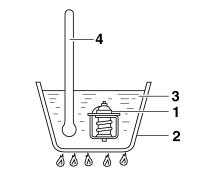


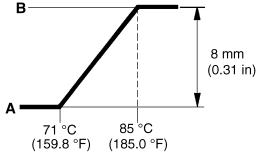
#### EAS26450 CHECKING THE THERMOSTAT

- 1. Check:
- Thermostat Does not open at 71–85 °C (159.8–185.0 °F)
   → Replace.



- 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 housing Cracks/damage → Replace.
- 3. Check:
  - Thermostat hoses
  - Thermostat pipes
  - Radiator inlet hose
  - Thermostat cover/radiator filler pipe
  - Plunger control unit hose 1 Cracks/damage/wear → Replace.

EAS26490

#### INSTALLING THE THERMOSTAT ASSEMBLY

- 1. Install:
- Copper washer New
- Coolant temperature sensor



#### Coolant temperature sensor 18 Nm (1.8 m·kg, 13 ft·lb)

#### EC3P61019

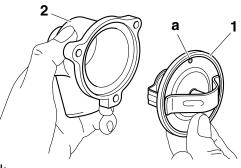
#### CAUTION:

Use extreme care when handling the coolant temperature sensor. Replace any part that was dropped or subjected to a strong impact.

- 2. Install:
- Thermostat "1"
- Thermostat housing "2"

#### NOTE:

Install the thermostat with its breather hole "a" facing up.



- 3. Fill:
  - Cooling system (with the specified amount of the recommended coolant) Refer to "CHANGING THE COOLANT" on page 3-25.
- 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.

# WATER PUMP

Removing	the water pump		12 Nm (1.2 m ⋅ kg, 8.7 ft ⋅ lb)
			12 Nm (1.2 m · kg, 8.7 ft · lb)
Order	Job/Parts to remove	Q'ty	Remarks
		,	It is not necessary to remove the water pump unless the coolant level is extremely low or the coolant contains engine oil.
	Right side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-25.
1	Water pump breather hose	1	Disconnect.
2	Radiator outlet hose	1	Disconnect.
3	Water pump outlet hose	1	Disconnect.
4	Water pump assembly	1	
			For installation, reverse the removal proce- dure.

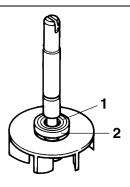
Disassembling the water pump			
Order	Job/Parts to remove	Q'ty	Remarks
1	Water pump housing cover	1	
2	O-ring	1	
3	Circlip	1	
4	Impeller shaft	1	
5	Rubber damper holder	1	
6	Rubber damper	1	
7	Water pump seal	1	
8	Oil seal	1	
9	Bearing	2	
10	Water pump housing	1	
			For assembly, reverse the disassembly pro- cedure.

## DISASSEMBLING THE WATER PUMP

- 1. Remove:
- Rubber damper holder "1"
- Rubber damper "2" (from the impeller, with a thin, flat-head screwdriver)

#### NOTE:

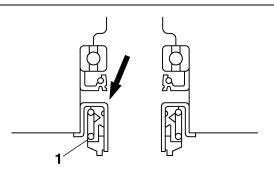
Do not scratch the impeller shaft.



- 2. Remove:
- Water pump seal "1"

#### NOTE:

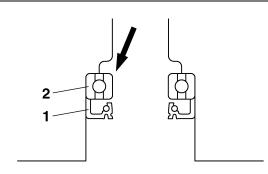
Remove the water pump seal from the inside of the water pump housing.



- 3. Remove:
- Oil seal "1"
- Bearing "2"

#### NOTE:

Remove the bearing and oil seal from the inside of the water pump housing.



#### EAS26540 CHECKING THE WATER PUMP

- 1. Check:
- Water pump housing cover
- Water pump housing
- Impeller shaft
  - $Cracks/damage/wear \rightarrow Replace.$
- 2. Check:
  - Bearing Rough movement  $\rightarrow$  Replace.

# ASSEMBLING THE WATER PUMP

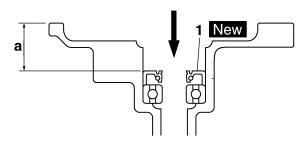
- 1. Install:
- Oil seal "1" New (into the water pump housing)

#### NOTE:

- Before installing the oil seal, apply tap water or coolant onto its outer surface.
- Install the oil seal with a socket that matches its outside diameter.



Installed depth of oil seal "a" 20.7–21.2 mm (0.81–0.83 in)



- 2. Install:
- Water pump seal "1" New

## CAUTION:

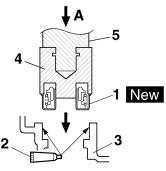
# Never lubricate the water pump seal surface with oil or grease.

#### NOTE:

- Install the water pump seal with the special tools.
- Before installing the water pump seal, apply Yamaha bond No.1215 (Three Bond
- No.1215[®]) "2" to the water pump housing "3".

## WATER PUMP

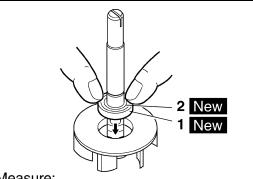




- A. Push down
- 4. Mechanical seal installer
- 5. Middle driven shaft bearing driver
- 3. Install:
  - Rubber damper "1" New
  - Rubber damper holder "2" New

#### NOTE:

Before installing the rubber damper, apply tap water or coolant onto its outer surface.

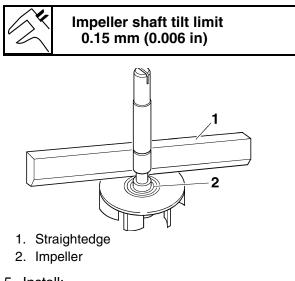


- 4. Measure:
- Impeller shaft tilt

Out of specification  $\rightarrow$  Repeat steps (3) and (4).

#### CAUTION:

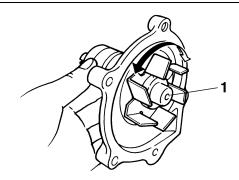
Make sure the rubber damper and rubber damper holder are flush with the impeller.



- 5. Install:
- Impeller "1"
- Circlip New

#### NOTE: _____

After installation, check that the impeller shaft rotates smoothly.



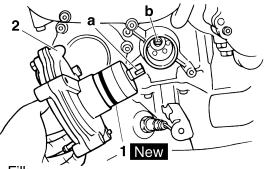
#### EAS26580 INSTALLING THE WATER PUMP

- 1. Install:
- O-ring "1" New
- Water pump assembly "2"

#### NOTE:

- Align the slit "a" on the impeller shaft with the projection "b" on the oil pump driven sprocket.
- Lubricate the O-ring with a thin coat of lithium soap base grease.

## WATER PUMP



2. Fill:

 Cooling system (with the specified amount of the recommended coolant) Refer to "CHANGING THE COOLANT" on page 3-25.

- 3. Check:
- Cooling system Leaks → Repair or replace any faulty part.
- 4. Measure:

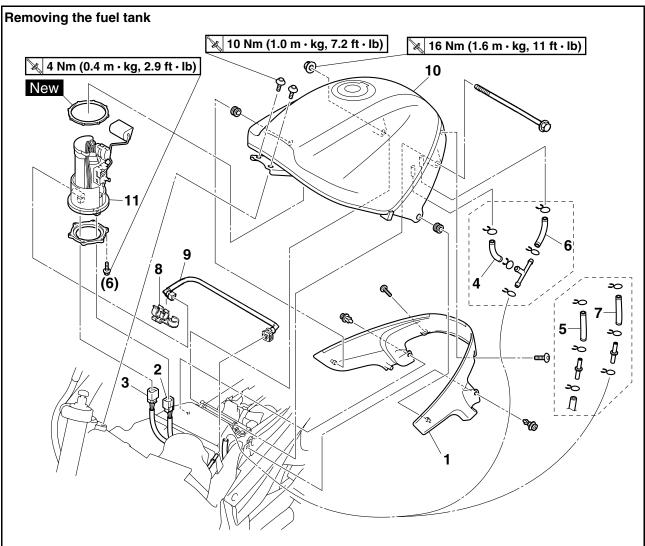
 Radiator cap opening pressure Below the specified pressure → Replace the radiator cap.
 Refer to "CHECKING THE RADIATOR" on

page 6-3.

## **FUEL SYSTEM**

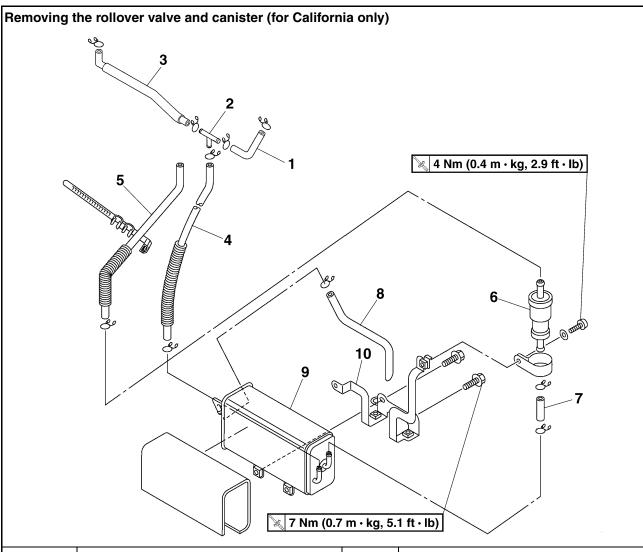
FUEL TANK	7-1
REMOVING THE FUEL TANK	7-3
REMOVING THE FUEL PUMP	7-3
CHECKING THE FUEL PUMP BODY	7-3
CHECKING THE ROLLOVER VALVES (for California only)	7-3
INSTALLING THE FUEL PUMP	7-3
INSTALLING THE FUEL TANK	7-4
THROTTLE BODIES	7-5
CHECKING THE INJECTORS	
CHECKING THE THROTTLE BODIES	
CHECKING THE FUEL PRESSURE	
ADJUSTING THE THROTTLE POSITION SENSOR	7-8
	7 1 1
CHECKING THE PRESSURE REGULATOR	
CHECKING THE AIR INDUCTION SYSTEM	
INSTALLING THE AIR INDUCTION SYSTEM	7-15

# FUEL TANK



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Fuel tank panel	1	
2	Fuel sender coupler	1	Disconnect.
3	Fuel pump coupler	1	Disconnect.
4	Fuel tank breather hose	1	Except for California
5	Fuel tank breather hose (fuel tank to joint)	1	For California only
6	Fuel tank overflow hose	1	Except for California
7	Fuel tank overflow hose (fuel tank to joint)	1	For California only
8	Fuel hose holder	1	
9	Fuel hose	1	
10	Fuel tank	1	
11	Fuel pump	1	
			For installation, reverse the removal proce- dure.

## **FUEL TANK**



Order	Job/Parts to remove	Q'ty	Remarks
	Side cowlings		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Canister purge hose (throttle body-#1 to 3-way joint)	1	
2	3-way joint	1	
3	Canister purge hose (throttle body-#4 to 3-way joint)	1	
4	Canister purge hose (3-way joint to canister)	1	
5	Fuel tank breather hose (joint to rollover valve)	1	
6	Rollover valve	1	
7	Fuel tank breather hose (rollover valve to canister)	1	
8	Canister breather hose	1	
9	Canister	1	
10	Canister bracket	1	
			For installation, reverse the removal proce- dure.

#### EAS26630 REMOVING THE FUEL TANK

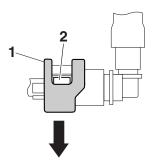
- 1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
- 2. Remove:
- Fuel hose

#### 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 rail, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, press the two buttons "2" on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.



- 3. Remove:
- Fuel tank

#### NOTE: _

Do not set the fuel tank down on the installation surface of the fuel pump. Be sure to lean the fuel tank against a wall or the like.

#### EAS26640

#### REMOVING THE FUEL PUMP

- 1. Remove:
- Fuel pump

#### CAUTION:

- Do not drop the fuel pump or give it a strong shock.
- Do not touch the base section of the fuel sender.

#### EAS26670 CHECKING THE FUEL PUMP BODY

- 1. Check:
- Fuel pump body Obstruction → Clean. Cracks/damage → Replace fuel pump assembly.

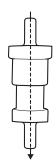
ET3P66071

# CHECKING THE ROLLOVER VALVES (for California only)

- 1. Check:
- Rollover valve Damage/faulty → Replace.

NOTE: ____

- Check that air flows smoothly only in the direction of the arrow shown in the illustration.
- The rollover valve must be in an upright position when checking the airflow.



## INSTALLING THE FUEL PUMP

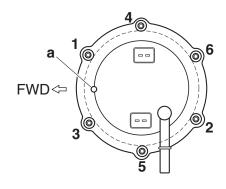
- 1. Install:
  - Fuel pump



Fuel pump bolts 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.



#### ET3P61018 INSTALLING THE FUEL TANK

1. Install:

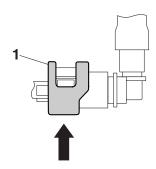
• Fuel hose (fuel rail side)

## EC3P61007

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 rail until a distinct "click" is heard.
- To install the fuel hose onto the fuel rail, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown.



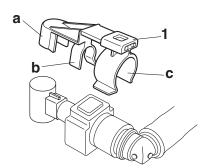
- 2. Install:
  - Fuel hose (fuel pump side)
- Fuel hose holder

#### CAUTION:

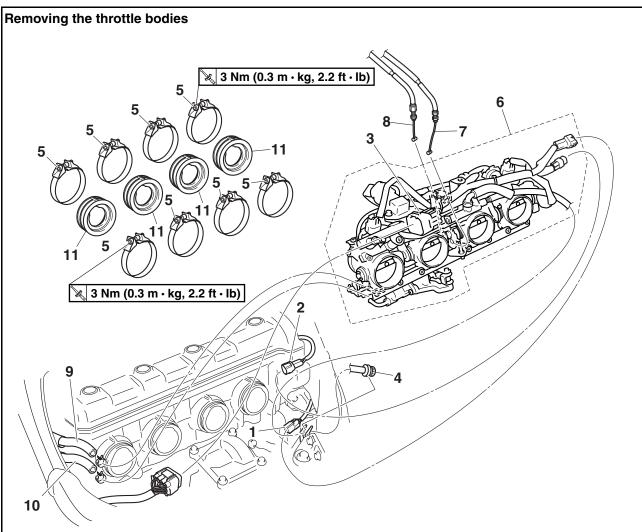
When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holder is in the correct position, otherwise the fuel hose will not be properly installed.

#### NOTE: _

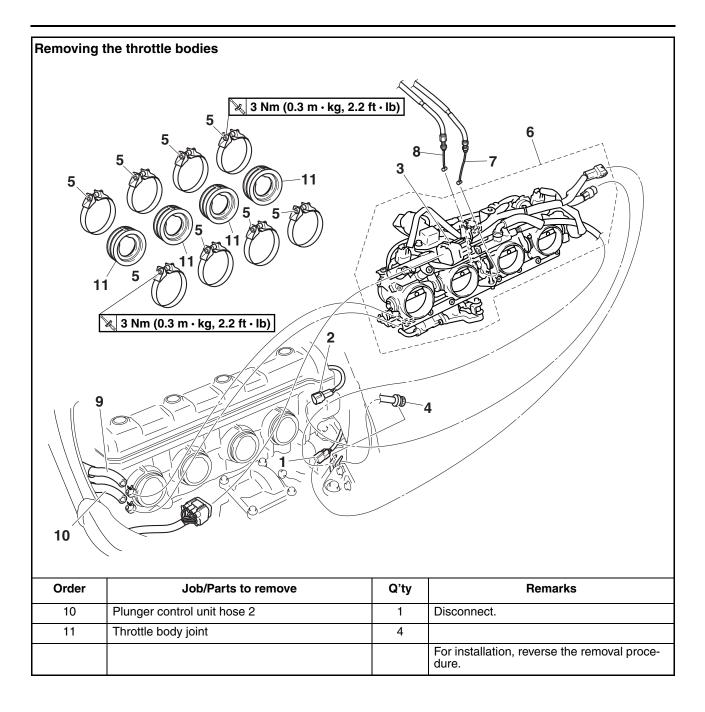
• Install the fuel hose connector securely onto the fuel tank until a distinct "click" is heard, and then make sure that it does not come loose. • After installing the fuel hose holder "1", make sure that the sections "a", "b", and "c" of the holder are installed securely.

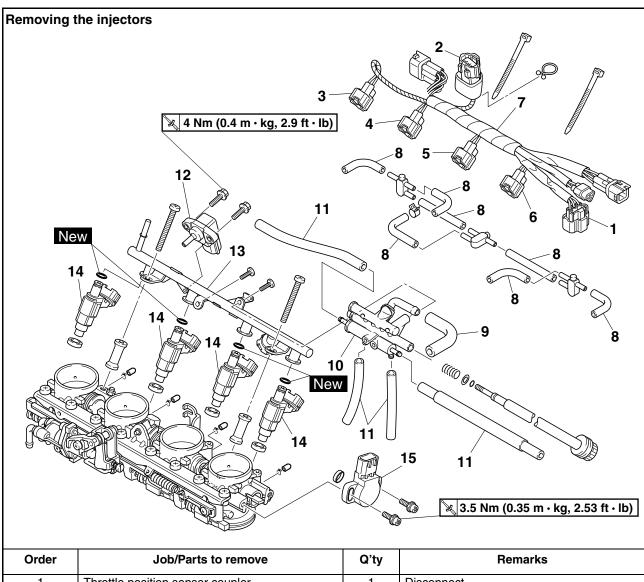


# THROTTLE BODIES



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	T-bar/Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-11.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-25.
1	O ₂ sensor coupler	1	Disconnect.
2	Cylinder identification sensor coupler	1	Disconnect.
3	Sub-wire harness coupler	1	Disconnect.
4	Engine idle speed adjusting screw	1	Disconnect.
5	Throttle body joint clamp screw	8	Loosen.
6	Throttle bodies	1	
7	Throttle cable (accelerator cable)	1	Disconnect.
8	Throttle cable (decelerator cable)	1	Disconnect.
9	Plunger control unit hose 1	1	Disconnect.





Order	Job/Parts to remove	Q'ty	Remarks
1	Throttle position sensor coupler	1	Disconnect.
2	Intake air pressure sensor coupler	1	Disconnect.
3	Cylinder-#1 injector coupler	1	Disconnect.
4	Cylinder-#2 injector coupler	1	Disconnect.
5	Cylinder-#3 injector coupler	1	Disconnect.
6	Cylinder-#4 injector coupler	1	Disconnect.
7	Sub-wire harness	1	
8	Negative pressure hose	7	
9	Bypass air unit inlet hose	1	
10	Bypass air unit	1	
11	Bypass air unit outlet hose	4	
12	Intake air pressure sensor	1	
13	Fuel rail	1	
14	Injector	4	
15	Throttle position sensor	1	
			For installation, reverse the removal proce- dure.

## CHECKING THE INJECTORS

- 1. Check:
- Injectors
   Damage → Replace.

## CHECKING THE THROTTLE BODIES

- 1. Check:
- 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.

#### *****

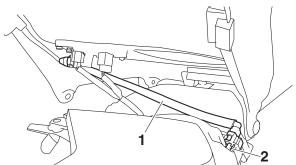
#### ET3P61044

#### 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 "1" from the fuel rail "2".

#### EW3P61012 WARNING

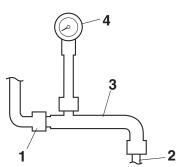
Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.



- c. Connect the fuel pressure adapter "3" between the fuel hose "1" and fuel rail "2".
- d. Connect the pressure gauge "4" to fuel pressure adapter "3".



Pressure gauge 90890-03153 YU-03153 Fuel pressure adapter 90890-03176 YM-03176



- e. Start the engine.
- f. Measure the fuel pressure.



Output pressure 324.0 kPa (47.0 psi) (3.24 kgf/cm²)

Faulty  $\rightarrow$  Replace the fuel pump.

#### *****

#### EAS27

# ADJUSTING THE THROTTLE POSITION SENSOR

NOTE: _

Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.

- 1. Check:
- Throttle position sensor Refer to "CHECKING THE THROTTLE PO-SITION SENSOR" on page 8-232.
- 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 → yellow "1"
- Negative tester probe → black/blue "2"

# **A**

Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927

- c. Turn the main switch to "ON".
- d. Measure the throttle position sensor voltage.
- e. Adjust the throttle position sensor angle so that the voltage is within the specified range.

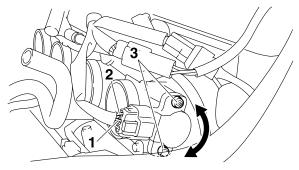


#### Output voltage (at idle) 0.63–0.73 V

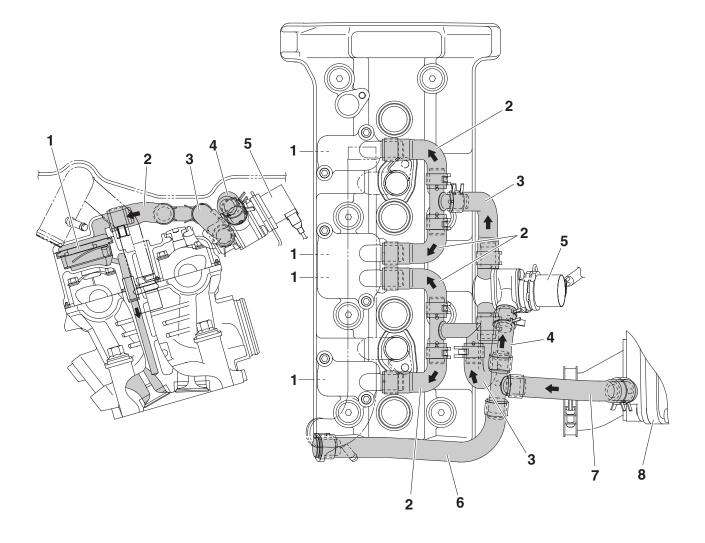
f. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws "3" to specification.



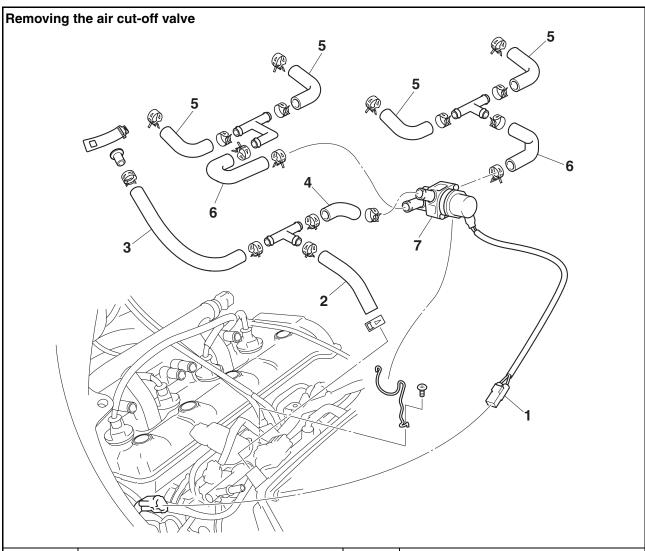
Throttle position sensor screw 3.5 Nm (0.35 m·kg, 2.53 ft·lb)



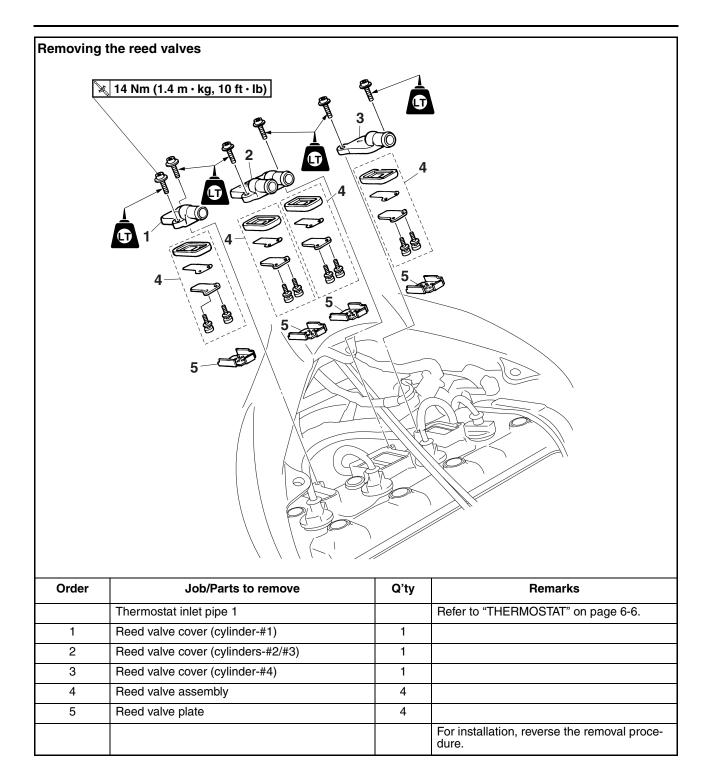
*****



- 1. Reed valve assembly
- 2. Air induction system hose (3-way joint to reed valve cover)
- 3. Air induction system hose (air cut-off valve to 3-way joint)
- 4. Air induction system hose (3-way joint to air cut-off valve)
- 5. Air cut-off valve
- 6. Air induction system hose (3-way joint to hose plug)
- 7. Air induction system hose (air filter case joint assembly to 3-way joint)
- 8. Air filter case joint assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
1	Air induction system solenoid coupler	1	Disconnect.
2	Air induction system hose (air filter case joint assembly to 3-way joint)	1	
3	Air induction system hose (3-way joint to hose plug)	1	
4	Air induction system hose (3-way joint to air cut- off valve)	1	
5	Air induction system hose (3-way joint to reed valve cover)	4	
6	Air induction system hose (air cut-off valve to 3- way joint)	2	
7	Air cut-off valve	1	
			For installation, reverse the removal proce- dure.



#### EAS27050

#### CHECKING THE PRESSURE REGULATOR

- 1. Check:
- Pressure regulator
   Damage → Replace.

## CHECKING THE AIR INDUCTION SYSTEM

#### Air injection

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons. When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700 °C (1112 to 1292 °F).

#### Air cut-off valve

The air cut-off valve is controlled by the signals from the ECU in accordance with the combustion conditions. Ordinarily, the air cut-off valve opens to allow the air to flow during idle and closes to cut-off the flow when the vehicle is being driven. However, if the coolant temperature is below the specified value, the air cut-off valve remains open and allows the air to flow into the exhaust pipe until the temperature becomes higher than the specified value.



- Hoses
   Loose connections → Connect properly. Cracks/damage → Replace.
- Pipes
- Cracks/damage  $\rightarrow$  Replace.
- 2. Check:
- Reed valve
- Reed valve stopper
- Reed valve seat Cracks/damage  $\rightarrow$  Replace the reed valve.
- 3. Check:
  - Air cut-off valve
  - Cracks/damage  $\rightarrow$  Replace.
- 4. Check:
  - Air induction system solenoid Refer to "CHECKING THE AIR INDUCTION SYSTEM SOLENOID" on page 8-232.

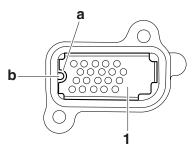
#### EAS27070

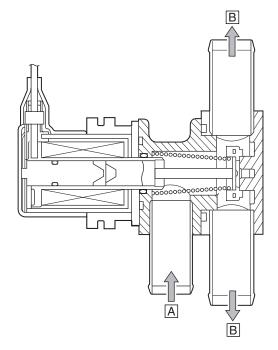
#### **INSTALLING THE AIR INDUCTION SYSTEM** 1. Install:

• Reed valve plate "1"

#### NOTE:

Align the notch "a" in each plate with the projection "b" of each reed valve seat on the cylinder head cover.





- A. From the air filter case
- B. To the reed valve

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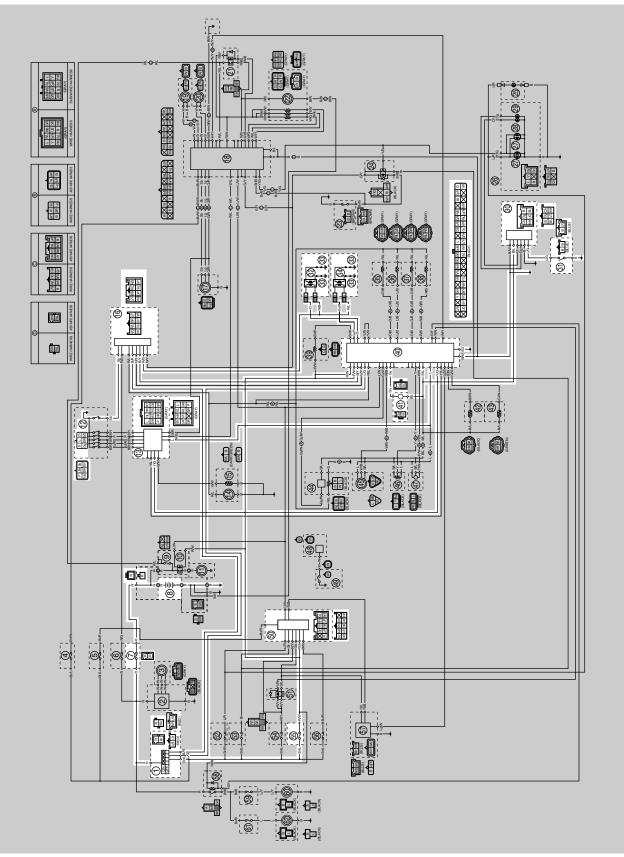
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CHECKING THE GRIP WARMERS (FJR13AE only)	8-235
CHECKING THE GRIP WARMER CONTROL UNIT	
(FJR13AE only)	8-236
CHECKING THE DIODE 2 (FJR13AE only)	8-236

# IGNITION SYSTEM

#### EAS27110

### CIRCUIT DIAGRAM (1/2) (FJR13A)

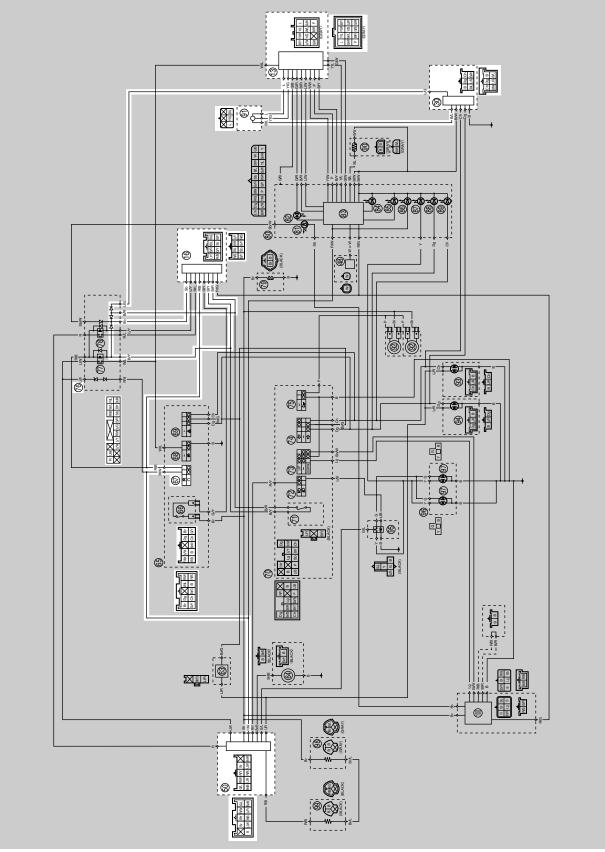


### **IGNITION SYSTEM**

- 1. Main switch
- 7. Main fuse
- 8. Battery
- 12.Gear position switch
- 13.Coupler 1 (wire harness–front cowling wire harness)
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 30.Coupler 3 (wire harness-front cowling wire harness)
- 31.Sidestand switch
- 32.Cylinders-#1/#4 ignition coil
- 33.Spark plug
- 34.Cylinders-#2/#3 ignition coil
- 40.ECU (engine control unit)
- 41.Crankshaft position sensor
- 50.Coupler 5 (wire harness–front cowling wire harness)
- 55.Ignition fuse

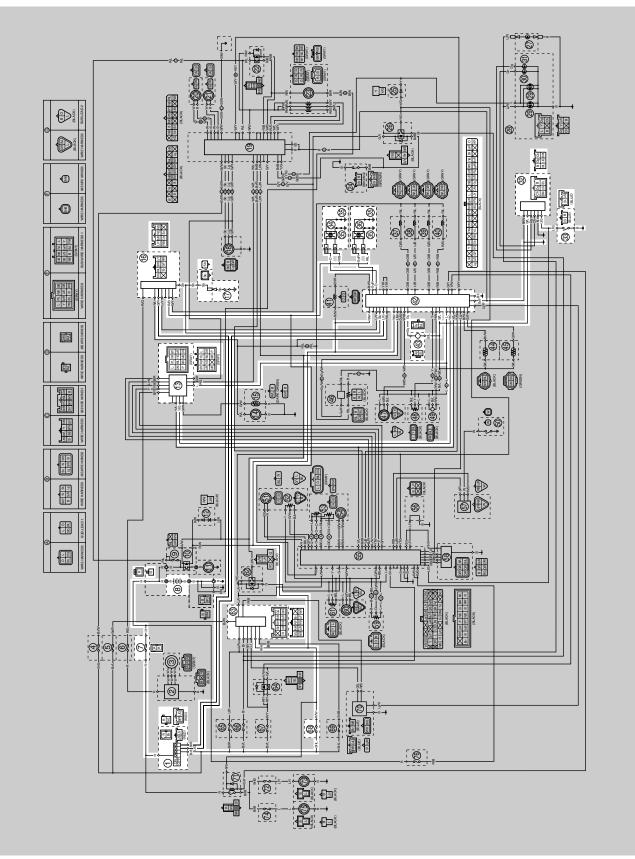
## CIRCUIT DIAGRAM (2/2) (FJR13A)

### Front cowling wire harness



- 13.Coupler 1 (front cowling wire harness–wire harness)
- 16.Coupler 2 (front cowling wire harness–wire harness)
- 30.Coupler 3 (front cowling wire harness–wire harness)
- 50.Coupler 5 (front cowling wire harness–wire harness)
- 67.Engine stop switch
- 76.Relay unit
- 91.Lean angle sensor

## CIRCUIT DIAGRAM (1/2) (FJR13AE)

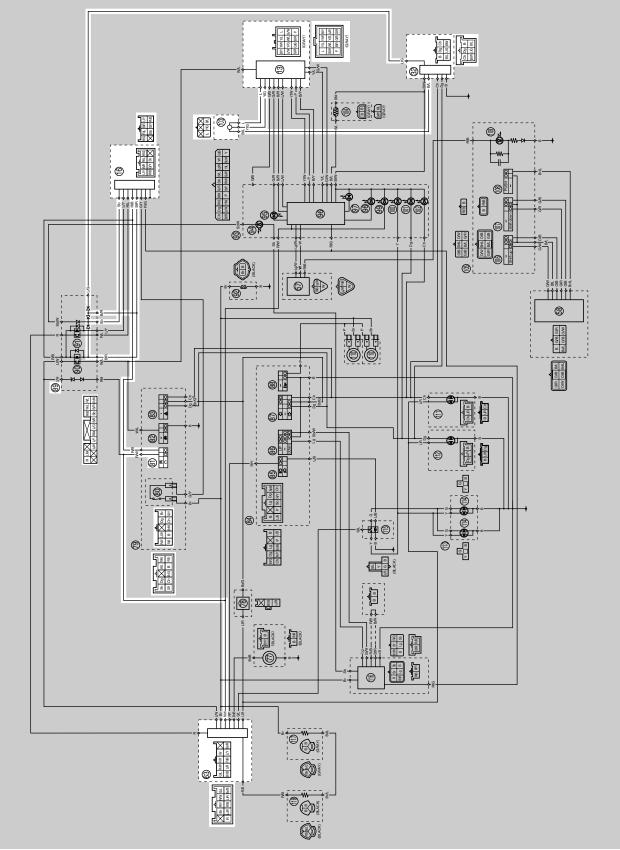


### **IGNITION SYSTEM**

- 1. Main switch
- 7. Main fuse
- 8. Battery
- 13.Coupler 1 (wire harness–front cowling wire harness)
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 17.Neutral switch
- 32.Coupler 3 (wire harness–front cowling wire harness)
- 33.Sidestand switch
- 34.Cylinders-#1/#4 ignition coil
- 35.Spark plug
- 36.Cylinders-#2/#3 ignition coil
- 42.ECU (engine control unit)
- 43.Crankshaft position sensor
- 63.Coupler 5 (wire harness–front cowling wire harness)
- 68.Ignition fuse

## CIRCUIT DIAGRAM (2/2) (FJR13AE)

### Front cowling wire harness

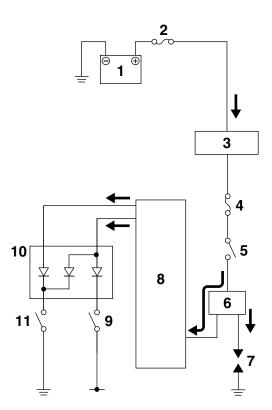


- 13.Coupler 1 (front cowling wire harness–wire harness)
- 16.Coupler 2 (front cowling wire harness–wire harness)
- 32.Coupler 3 (front cowling wire harness–wire harness)
- 63.Coupler 5 (front cowling wire harness–wire harness)
- 81.Engine stop switch
- 89.Relay unit
- 103.Lean angle sensor

## ENGINE STOPPING DUE TO SIDESTAND OPERATION

When the engine is running and the transmission is in gear, the engine will stop if the sidestand is moved down. This is because the electric current from the ignition coils does not flow to the ECU when both the gear position switch (neutral circuit) and sidestand switch are set to "OFF", thereby preventing the spark plugs from producing a spark. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral circuit of the gear position switch is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral circuit of the gear position switch is closed) and the sidestand is down (the sidestand switch circuit is open).



- 1. Battery
- 2. Main fuse
- 3. Main switch
- 4. Ignition fuse
- 5. Engine stop switch
- 6. Ignition coil
- 7. Spark plug
- 8. ECU (engine control unit)
- 9. Sidestand switch
- 10. Relay unit (diode)
- 11. Gear position switch (neutral circuit)

## **IGNITION SYSTEM**

<b>TROUBLESHOOTING</b> The ignition system fails to operate (no spa	ırk or intermi	ttent spark).
NOTE:		
<ul> <li>Before troubleshooting, remove the follow</li> <li>1. Front cowling assembly</li> <li>2. Fuel tank</li> <li>3. T-bar</li> <li>4. Throttle bodies</li> </ul>	ving part(s):	
1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUS- ES" on page 8-217.	$NG \to$	Replace the fuse(s).
ОК↓		
<ol> <li>Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.</li> </ol>	$NG \rightarrow$	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
ОК↓		
<ol> <li>Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-11.</li> </ol>	$NG \to$	Re-gap or replace the spark plug(s).
ОК↓		
<ol> <li>Check the ignition spark gap. Refer to "CHECKING THE IGNI- TION SPARK GAP" on page 8-227.</li> </ol>	$\text{OK} \rightarrow$	Ignition system is OK.
NG↓		
5. Check the spark plug caps. Refer to "CHECKING THE SPARK PLUG CAPS" on page 8-226.	$NG \to$	Replace the spark plug cap(s).
OK↓		
6. Check the ignition coils. Refer to "CHECKING THE IGNI- TION COILS" on page 8-226.	$NG \to$	Replace the ignition coil(s).
OK↓		
<ol> <li>Check the crankshaft position sensor.</li> <li>Refer to "CHECKING THE CRANK-SHAFT POSITION SENSOR" on page 8-227.</li> </ol>	$NG \rightarrow$	Replace the crankshaft position sensor.
		L

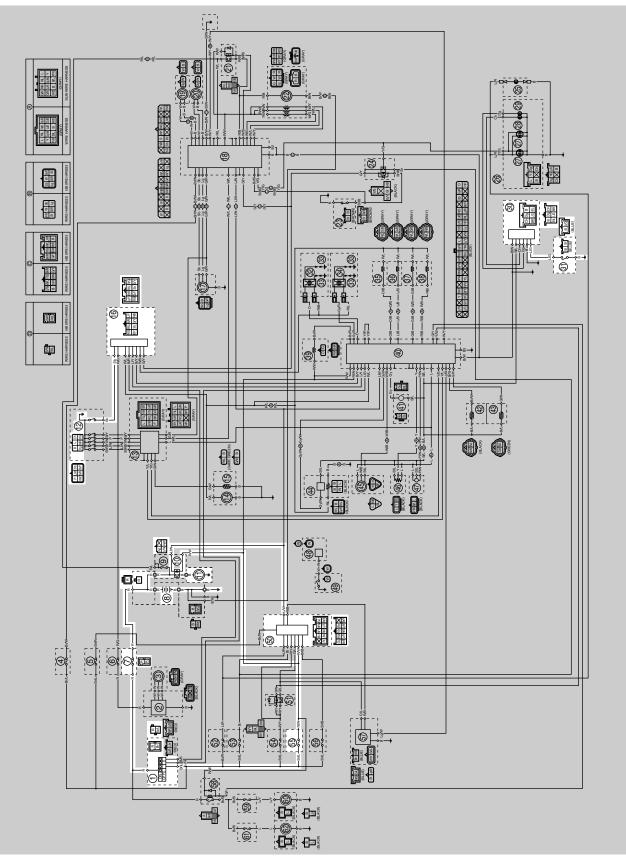
 $\mathsf{OK}\downarrow$ 

## **IGNITION SYSTEM**

8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$\text{NG} \rightarrow$	Replace the main switch.
ΟΚ↓		
9. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$\text{NG} \rightarrow$	Replace the right handlebar switch.
OK↓		
10.Check the gear position switch. (FJR13A) Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \rightarrow$	Replace the gear position switch.
OK↓		
11.Check the neutral switch. (FJR13AE) Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the neutral switch.
OK↓		
12.Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the sidestand switch.
Oκ↓		
13.Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-225.	$NG \to$	Replace the relay unit.
<u> </u>		
14.Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-227.	$NG \to$	Replace the lean angle sensor.
OK↓		
15.Check the entire ignition system wiring. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-1, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-3, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-5, and "CIR- CUIT DIAGRAM (2/2) (FJR13AE)" on page 8-7.	NG →	Properly connect or repair the ignition system wiring.
OK↓		L
Replace the ECU.		

#### EAS27170

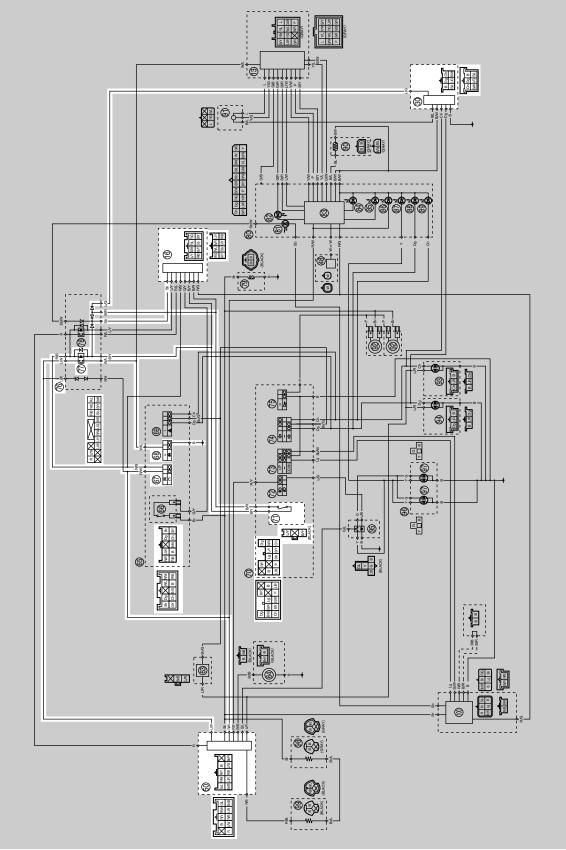
### CIRCUIT DIAGRAM (1/2) (FJR13A)



- 1. Main switch
- 7. Main fuse
- 8. Battery
- 10.Starter relay
- 11.Starter motor
- 12.Gear position switch
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 30.Coupler 3 (wire harness–front cowling wire harness)
- 31.Sidestand switch
- 50.Coupler 5 (wire harness-front cowling wire harness)
- 55.Ignition fuse

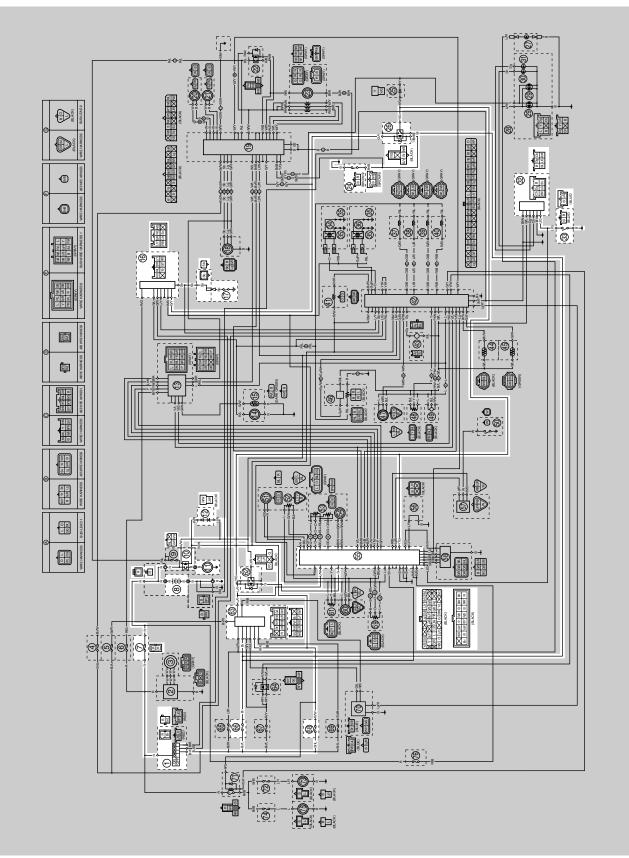
## CIRCUIT DIAGRAM (2/2) (FJR13A)

### Front cowling wire harness



- 16.Coupler 2 (front cowling wire harness–wire harness)
- 30.Coupler 3 (front cowling wire harness–wire harness)
- 50.Coupler 5 (front cowling wire harness–wire harness)
- 67.Engine stop switch
- 68.Start switch
- 71.Clutch switch
- 76.Relay unit
- 77.Starting circuit cut-off relay

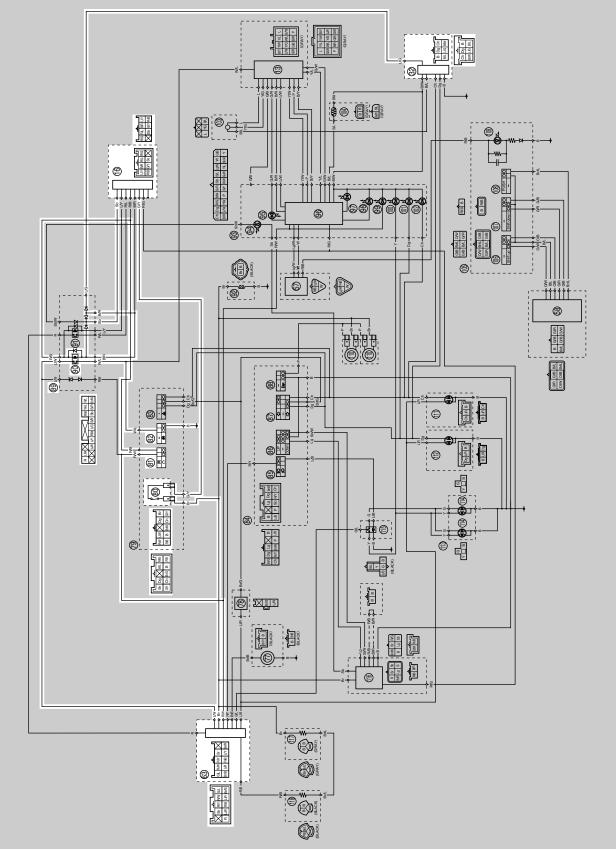
## CIRCUIT DIAGRAM (1/2) (FJR13AE)



- 1. Main switch
- 7. Main fuse
- 8. Battery
- 10.Starter relay
- 11.Starter motor
- 12.Diode 1
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 17.Neutral switch
- 24.Rear brake light switch
- 26.Brake light relay
- 32.Coupler 3 (wire harness-front cowling wire harness)
- 33.Sidestand switch
- 55.MCU (motor control unit)
- 62.YCC-S control relay
- 63.Coupler 5 (wire harness–front cowling wire harness)
- 66.Signaling system fuse
- 68.Ignition fuse

## CIRCUIT DIAGRAM (2/2) (FJR13AE)

### Front cowling wire harness



- 16.Coupler 2 (front cowling wire harness–wire harness)
- 32.Coupler 3 (front cowling wire harness–wire harness)
- 63.Coupler 5 (front cowling wire harness–wire harness)
- 80. Front brake light switch
- 81.Engine stop switch
- 82.Start switch
- 89.Relay unit
- 90.Starting circuit cut-off relay

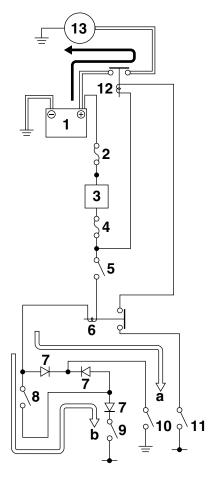
#### EAS27180

### STARTING CIRCUIT CUT-OFF SYSTEM OPERATION (FJR13A)

If the engine stop switch is set to " $\bigcirc$ " and the main switch is turned "ON" (both switch circuits 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 circuit of the gear position switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch circuit is closed) and the sidestand is up (the sidestand switch circuit is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay stays open so current cannot reach the starter motor. When at least one of the above conditions has been met, the starting circuit cut-off relay is closed and the engine can be started by pushing the start switch "(s)".



- a. WHEN THE TRANSMISSION IS IN NEUTRAL
- b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR
- 1. Battery
- 2. Main fuse
- 3. Main switch
- 4. Ignition fuse
- 5. Engine stop switch
- 6. Starting circuit cut-off relay
- 7. Relay unit (diode)

- 8. Clutch switch
- 9. Sidestand switch
- 10. Gear position switch
- 11. Start switch
- 12. Starter relay
- 13. Starter motor

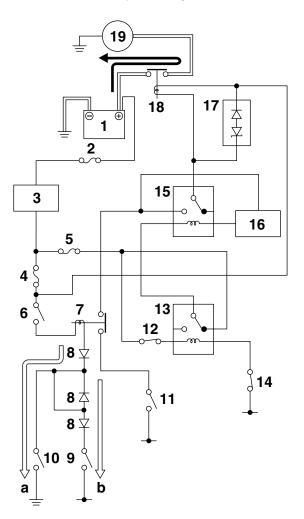
#### ET3P66007 STARTING CIRCUIT CUT-OFF SYSTEM OPERATION (FJR13AE)

If the engine stop switch is set to " $\bigcirc$ " (the switch circuit is closed), the main switch is turned "ON" (the switch circuit is closed), and the brake lever is squeezed (the front brake light switch circuit is open) or the brake pedal is depressed (the rear brake light switch circuit is open), 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 sidestand is up (the sidestand switch circuit is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay stays open so current cannot reach the starter motor. When at least one of the above conditions has been met, the starting circuit cut-off relay is closed and the engine can be started by pushing the start switch "(s)".



- a. WHEN THE TRANSMISSION IS IN NEUTRAL
- b. WHEN THE SIDESTAND IS UP
- 1. Battery
- 2. Main fuse
- 3. Main switch
- 4. Ignition fuse
- 5. Signaling system fuse
- 6. Engine stop switch
- 7. Starting circuit cut-off relay
- 8. Relay unit (diode)

- 9. Sidestand switch
- 10. Neutral switch
- 11. Start switch
- 12. Front brake light switch
- 13. Brake light relay
- 14. Rear brake light switch
- 15. YCC-S control relay
- 16. MCU (motor control unit)
- 17. Diode 1
- 18. Starter relay
- 19. Starter motor

<ul> <li>TROUBLESHOOTING (FJR13A)</li> <li>The starter motor fails to turn.</li> <li>NOTE:</li></ul>	ving part(s):	
<ol> <li>Check the fuses. (Main and ignition) Refer to "CHECKING THE FUS- ES" on page 8-217.</li> </ol>	$NG \to$	Replace the fuse(s).
OK↓		
<ol> <li>Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.</li> </ol>	$NG \to$	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
OK↓		
3. Check the starter motor operation. Refer to "CHECKING THE START- ER MOTOR OPERATION" on page 8-228.	$OK \rightarrow$	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.
NG↓		
4. Check the starter motor. Refer to "CHECKING THE START- ER MOTOR" on page 5-42.	$NG \to$	Repair or replace the starter motor.
ОК↓		
<ol> <li>Check the relay unit (starting circuit cut-off relay).</li> <li>Refer to "CHECKING THE RE- LAYS" on page 8-221.</li> </ol>	$NG \rightarrow$	Replace the relay unit.
OK ↓		·
6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-225.	$NG \to$	Replace the relay unit.
ОК↓		
<ol> <li>Check the starter relay. Refer to "CHECKING THE RE- LAYS" on page 8-221.</li> </ol>	$NG \to$	Replace the starter relay.
OK ↓		

8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the main switch.
ОК↓		
9. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$\text{NG} \rightarrow$	Replace the right handlebar switch.
OK↓		
10.Check the gear position switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the gear position switch.
ОК↓		
11.Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the sidestand switch.
ОК↓		
12.Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$\text{NG} \rightarrow$	Replace the clutch switch.
OK↓		
13.Check the start switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the right handlebar switch.
ОК↓		
14.Check the entire starting system wiring. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-13 and "CIR- CUIT DIAGRAM (2/2) (FJR13A)" on page 8-15.	$NG \rightarrow$	Properly connect or repair the starting sys- tem wiring.
ОК↓		
The starting system circuit is OK.		

TROUBLESHOOTING (FJR13AE) The starter motor fails to turn. NOTE:	ving part(s):	
<ol> <li>Check the fuses. (Main, signaling system, and igni- tion) Refer to "CHECKING THE FUS- ES" on page 8-217.</li> </ol>	$NG \rightarrow$	Replace the fuse(s).
ОК↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.	NG  ightarrow	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
ОК↓		
3. Check the starter motor operation. Refer to "CHECKING THE START- ER MOTOR OPERATION" on page 8-228.	$OK \rightarrow$	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.
NG↓		
4. Check the starter motor. Refer to "CHECKING THE START- ER MOTOR" on page 5-42.	$\text{NG} \rightarrow$	Repair or replace the starter motor.
ОК↓		
<ol> <li>Check the relay unit (starting circuit cut-off relay).</li> <li>Refer to "CHECKING THE RE- LAYS" on page 8-221.</li> </ol>	$NG \to$	Replace the relay unit.
ОК↓		
6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-225.	$\text{NG} \rightarrow$	Replace the relay unit.
OK↓		
7. Check the starter relay. Refer to "CHECKING THE RE- LAYS" on page 8-221.	$NG \to$	Replace the starter relay.
OK↑		

OK↓

8. Check the brake light relay. Refer to "CHECKING THE RE- LAYS" on page 8-221.	$NG \to$	Replace the brake light relay.
OK↓		
9. Check the YCC-S control relay. Refer to "CHECKING THE RE- LAYS" on page 8-221.	$NG \to$	Replace the YCC-S control relay.
OK↓		
10.Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the main switch.
OK↓		·
11.Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$\text{NG} \rightarrow$	Replace the right handlebar switch.
OK↓		
12.Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the neutral switch.
OK↓		
13.Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the sidestand switch.
OK↓		
14.Check the front brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the front brake light switch.
OK↓		
15.Check the rear brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \rightarrow$	Replace the rear brake light switch.
OK↓		
16.Check the start switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the right handlebar switch.
OK↓	•	

17.Check the entire starting system wiring. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-17 and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-19.

 $\mathsf{OK} \downarrow$ 

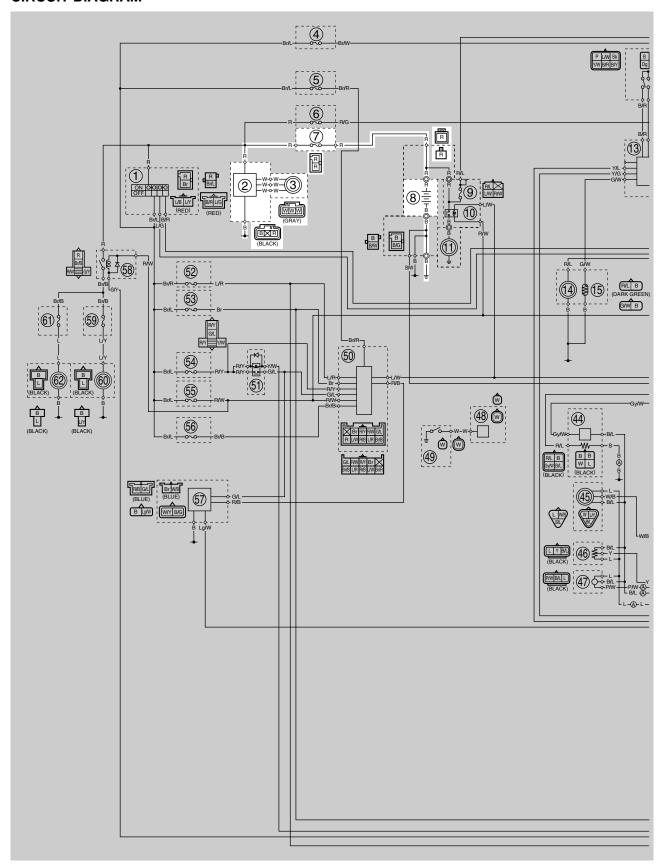
Replace the MCU or diode 1.

 $\text{NG} \rightarrow$ 

Properly connect or repair the starting system wiring.

# CHARGING SYSTEM

#### EAS27210 CIRCUIT DIAGRAM



## **CHARGING SYSTEM**

- Rectifier/regulator
   AC magneto
- 7. Main fuse
- 8. Battery

#### EAS27230 TROUBLESHOOTING

The battery is not being charged.

### NOTE: ____

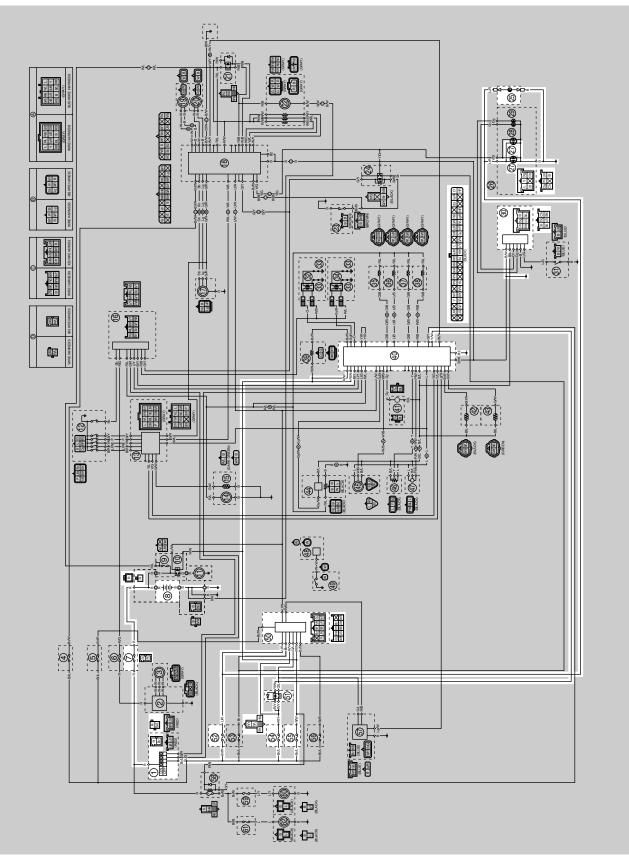
- Before troubleshooting, remove the following part(s):1. Front cowling right inner panel 1

1. Check the fuse. (Main) Refer to "CHECKING THE FUS- ES" on page 8-217.	NG  ightarrow	Replace the fuse.
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.	NG  ightarrow	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
ОК↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-228.	$NG \to$	Replace the stator coil.
OK↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTI- FIER/REGULATOR" on page 8-229.	NG  ightarrow	Replace the rectifier/regulator.
ОК↓		
<ol> <li>Check the entire charging system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.</li> </ol>	$NG \rightarrow$	Properly connect or repair the charging system wiring.
OK↓		·
The charging system circuit is OK.		

# LIGHTING SYSTEM

#### EAS27250



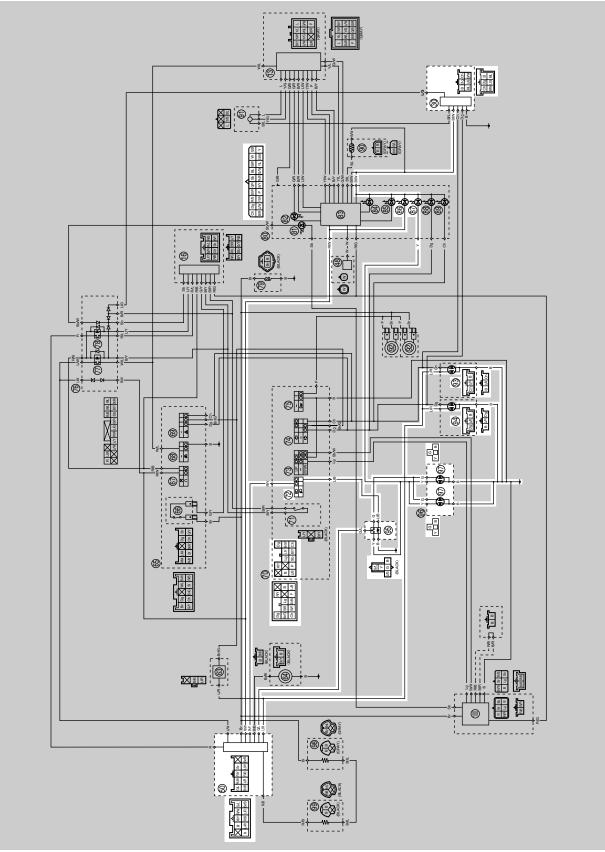


### LIGHTING SYSTEM

- 1. Main switch
- 7. Main fuse
- 8. Battery
- 25.License plate light
- 27.Tail/brake light
- 30.Coupler 3 (wire harness–front cowling wire harness)
- 40.ECU (engine control unit)
- 50.Coupler 5 (wire harness–front cowling wire harness)
- 51.Headlight relay (on/off)
- 52.Hazard lighting fuse
- 54.Headlight fuse
- 55.Ignition fuse

### CIRCUIT DIAGRAM (2/2)

#### Front cowling wire harness



- 30.Coupler 3 (front cowling wire harness–wire harness)
- 50.Coupler 5 (front cowling wire harness-wire harness)
- 72.Dimmer switch
- 86.Meter light
- 87.High beam indicator light
- 93.Front left turn signal light
- 94.Front right turn signal light
- 95.Headlight relay (dimmer)
- 97.Headlight

#### EAS27260 TROUBLESHOOTING

Any of the following fail to light: headlights, high beam indicator light, taillight, license plate light, front turn signal lights or meter light.

NOTE: ____

- Before troubleshooting, remove the following part(s):
- 1. Front cowling assembly
- 2. Fuel tank
- 3. T-bar

$NG \rightarrow$	Replace the bulb(s) and bulb socket(s).
NG  ightarrow	Replace the fuse(s).
$NG \rightarrow$	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
$NG \to$	Replace the main switch.
NG  ightarrow	Replace the left handlebar switch.
$NG \to$	Replace the headlight relay (on/off).
$NG \to$	Replace the headlight relay (dimmer).
	$NG \rightarrow$ $NG \rightarrow$ $NG \rightarrow$ $NG \rightarrow$

OK↓

### LIGHTING SYSTEM

 Check the entire lighting system wiring.
 Refer to "CIRCUIT DIAGRAM (1/2)" on page 8-33 and "CIRCUIT DIA-GRAM (2/2)" on page 8-35.

 $\mathsf{OK}\, \downarrow$ 

Replace the ECU.

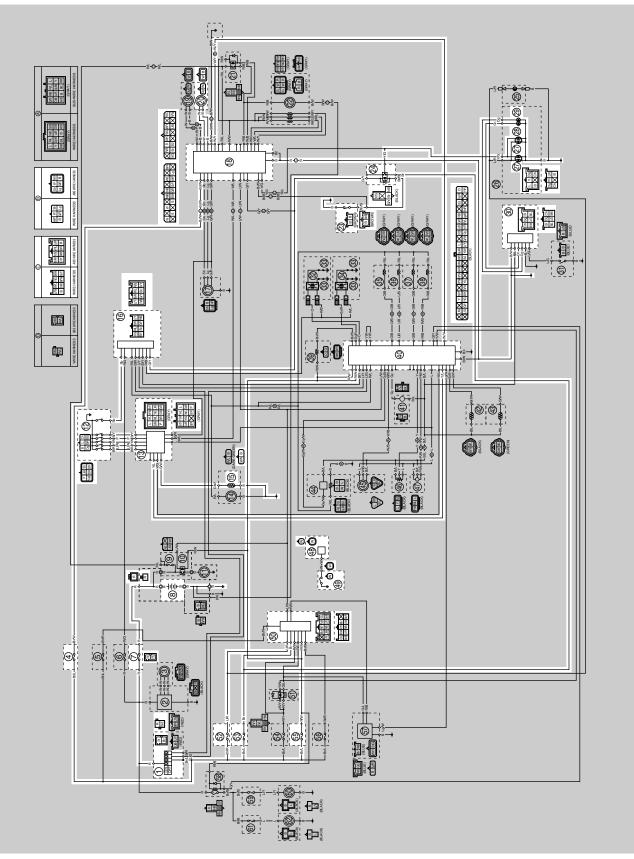
 $\text{NG} \rightarrow$ 

Properly connect or repair the lighting system wiring.

#### EAS27270 SIGNALING SYSTEM

#### EAS27280

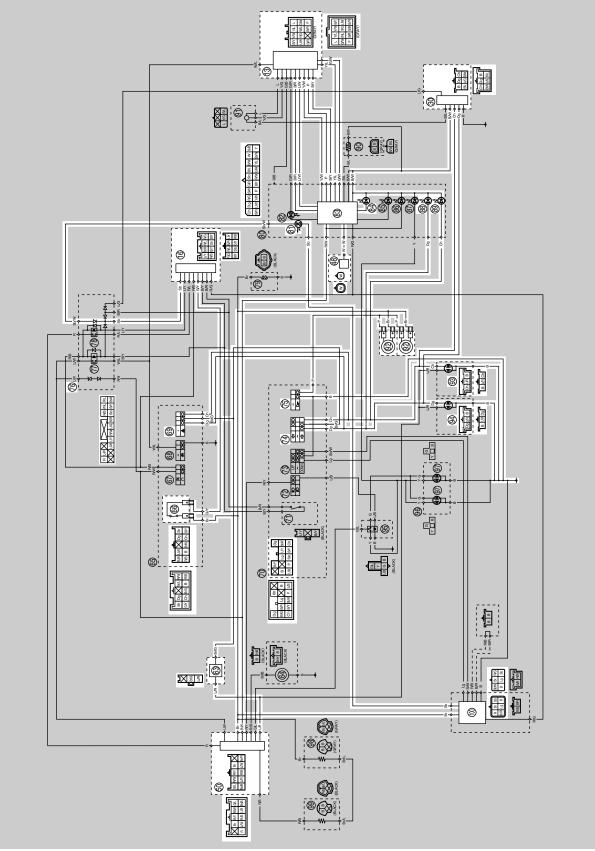
#### CIRCUIT DIAGRAM (1/2) (FJR13A)



- 1. Main switch
- 4. ABS ECU fuse
- 7. Main fuse
- 8. Battery
- 12.Gear position switch
- 13.Coupler 1 (wire harness-front cowling wire harness)
- 15.Fuel sender
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 18.ABS ECU (electronic control unit)
- 20.Rear wheel sensor
- 23.Rear brake light switch
- 24.Brake light relay
- 27.Tail/brake light
- 28.Rear left turn signal light
- 29.Rear right turn signal light
- 30.Coupler 3 (wire harness–front cowling wire harness)
- 40.ECU (engine control unit)
- 48.Coupler 4 (wire harness-front cowling wire harness)
- 49.Oil level switch
- 50.Coupler 5 (wire harness-front cowling wire harness)
- 52.Hazard lighting fuse
- 53.Signaling system fuse
- 55.Ignition fuse

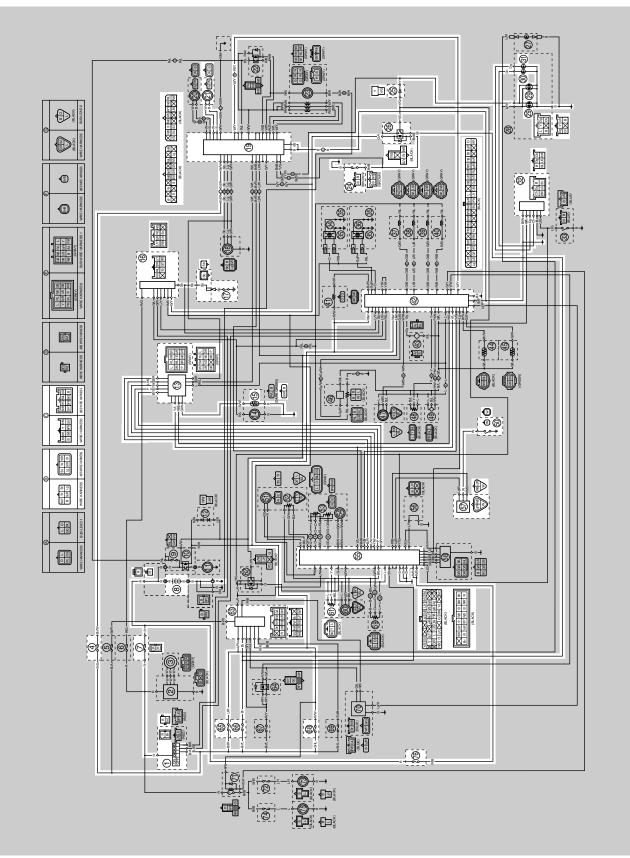
### CIRCUIT DIAGRAM (2/2) (FJR13A)

#### Front cowling wire harness



- 13.Coupler 1 (front cowling wire harness–wire harness)
- 16.Coupler 2 (front cowling wire harness–wire harness)
- 30.Coupler 3 (front cowling wire harness–wire harness)
- 48.Coupler 4 (front cowling wire harness-wire harness)
- 50.Coupler 5 (front cowling wire harness-wire harness)
- 63.Turn signal/hazard relay
- 66. Front brake light switch
- 69.Hazard switch
- 74. Turn signal switch
- 75.Horn switch
- 76.Relay unit
- 81.Neutral indicator light
- 83.Multi-function meter
- 84.Oil level warning light
- 88.Right turn signal indicator light
- 89.Left turn signal indicator light
- 92.Horn
- 93.Front left turn signal light
- 94. Front right turn signal light
- 100.Windshield drive unit

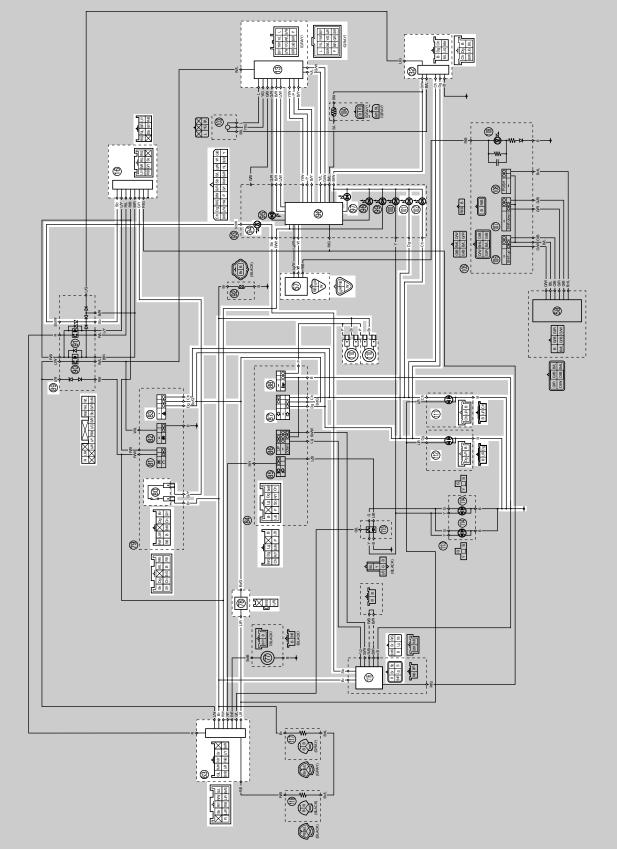
### CIRCUIT DIAGRAM (1/2) (FJR13AE)



- 1. Main switch
- 4. ABS ECU fuse
- 7. Main fuse
- 8. Battery
- 13.Coupler 1 (wire harness–front cowling wire harness)
- 15.Fuel sender
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 17.Neutral switch
- 19.ABS ECU (electronic control unit)
- 21.Rear wheel sensor
- 24.Rear brake light switch
- 25.Diode 2
- 26.Brake light relay
- 29.Tail/brake light
- 30.Rear left turn signal light
- 31.Rear right turn signal light
- 32.Coupler 3 (wire harness-front cowling wire harness)
- 42.ECU (engine control unit)
- 50.Oil level switch
- 55.MCU (motor control unit)
- 57.Coupler 4 (wire harness-front cowling wire harness)
- 61.Gear position sensor
- 63.Coupler 5 (wire harness–front cowling wire harness)
- 65.Hazard lighting fuse
- 66.Signaling system fuse
- 68.Ignition fuse
- 76.YCC-S motor control fuse

### CIRCUIT DIAGRAM (2/2) (FJR13AE)

#### Front cowling wire harness



- 13.Coupler 1 (front cowling wire harness–wire harness)
- 16.Coupler 2 (front cowling wire harness–wire harness)
- 32.Coupler 3 (front cowling wire harness–wire harness)
- 57.Coupler 4 (front cowling wire harness–wire harness)
- 63.Coupler 5 (front cowling wire harness–wire harness)
- 78.Turn signal/hazard relay
- 80. Front brake light switch
- 83.Hazard switch
- 87. Turn signal switch
- 88.Horn switch
- 89.Relay unit
- 94.Neutral indicator light
- 96.Multi-function meter
- 97.Oil level warning light
- 101.Right turn signal indicator light
- 102.Left turn signal indicator light
- 110.Horn
- 111.Front left turn signal light
- 112.Front right turn signal light
- 116.Windshield drive unit

#### EAS27290 TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or indicator light.
- The horn fails to sound.
- The fuel meter fails to come on.
- The speedometer fails to operate.

#### NOTE: ____

- Before troubleshooting, remove the following part(s):
- 1. Front cowling assembly
- 2. Fuel tank
- 3. T-bar
- 4. Throttle bodies

1. Check the fuses. (Main, ignition, signaling system, hazard lighting, backup, ABS ECU, and YCC-S motor control (FJR13AE)) Refer to "CHECKING THE FUS- ES" on page 8-217.	NG →	Replace the fuse(s).
<u> </u>		
<ol> <li>Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.</li> </ol>	NG → <ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>	
<u> </u>		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the main switch.
OK ↓		
<ul> <li>4. Check the entire signaling system wiring.</li> <li>Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-39, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-41, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-43, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-45.</li> </ul>	$NG \rightarrow$	Properly connect or repair the signaling system wiring.
OK↓		
Check the condition of each of the sig- naling system circuits. Refer to "Checking the signaling system".		

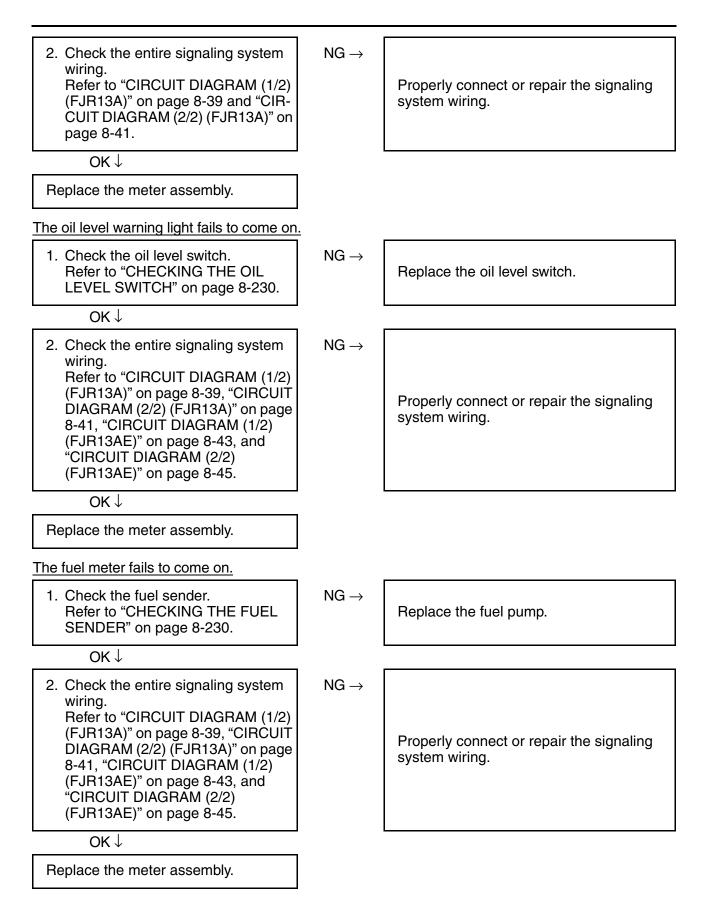
#### Checking the signaling system

The horn fails to sound.		
1. Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$\text{NG} \rightarrow$	Replace the left handlebar switch.
OK ↓		
2. Check the horns. Refer to "CHECKING THE HORNS" on page 8-229.	$NG \to$	Replace the horn(s).
OK↓		
<ol> <li>Check the entire signaling system wiring.</li> <li>Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-39, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-41, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-43, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-45.</li> </ol>	$NG \rightarrow$	Properly connect or repair the signaling system wiring.
ОК↓		
This circuit is OK.		
The tail/brake light fails to come on.		
<ol> <li>Check the tail/brake light bulbs and sockets.</li> <li>Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-216.</li> </ol>	$NG \to$	Replace the tail/brake light bulb, socket or both.
OK↓		
2. Check the front brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$\text{NG} \rightarrow$	Replace the front brake light switch.
OK↓		
3. Check the rear brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$\text{NG} \rightarrow$	Replace the rear brake light switch.
OK ↓		
<ol> <li>Check the brake light relay. Refer to "CHECKING THE RE- LAYS" on page 8-221.</li> </ol>	$\text{NG} \rightarrow$	Replace the brake light relay.
OK↓		

5. Check the diode 2. (FJR13AE) Refer to "CHECKING THE DIODE 2 (FJR13AE only)" on page 8-236.	$NG \rightarrow$	Replace the diode 2.
OK↓		
6. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-39, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-41, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-43, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-45.	NG →	Properly connect or repair the signaling system wiring.
OK↓		
This circuit is OK.		
The turn signal light, turn signal indicator li	ght or both fa	il to blink.
<ol> <li>Check the turn signal light bulbs and sockets. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-216.</li> </ol>	$NG \to$	Replace the turn signal light bulb, socket or both.
Oκ↓		
2. Check the turn signal switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the left handlebar switch.
ОК↓		
3. Check the hazard switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$\text{NG} \rightarrow$	Replace the left handlebar switch.
OK↓		
4. Check the turn signal/hazard relay. Refer to "CHECKING THE TURN SIGNAL/HAZARD RELAY" on page 8-224.	$NG \to$	Replace the turn signal/hazard relay.
OK↓		

5. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-39, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-41, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-43, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-45.	$NG \rightarrow$	Properly connect or repair the signaling system wiring.
ОК↓		
This circuit is OK.		
The neutral indicator light fails to come on	<u>.</u>	
<ol> <li>Check the gear position switch. (FJR13A) Refer to "CHECKING THE SWITCHES" on page 8-211.</li> </ol>	$NG \to$	Replace the gear position switch.
OK↓		
2. Check the neutral switch. (FJR13AE) Refer to "CHECKING THE SWITCHES" on page 8-211.	NG  ightarrow	Replace the neutral switch.
OK↓		
3. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-225.	$\text{NG} \rightarrow$	Replace the relay unit.
OK↓		
<ul> <li>4. Check the entire signaling system wiring.</li> <li>Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-39, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-41, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-43, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-45.</li> </ul>	$NG \rightarrow$	Properly connect or repair the signaling system wiring.
ОК↓		
Replace the windshield drive unit.		
The shift indicator fails to come on. (FJR1:	3A)	
1. Check the gear position switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the gear position switch.
OK		

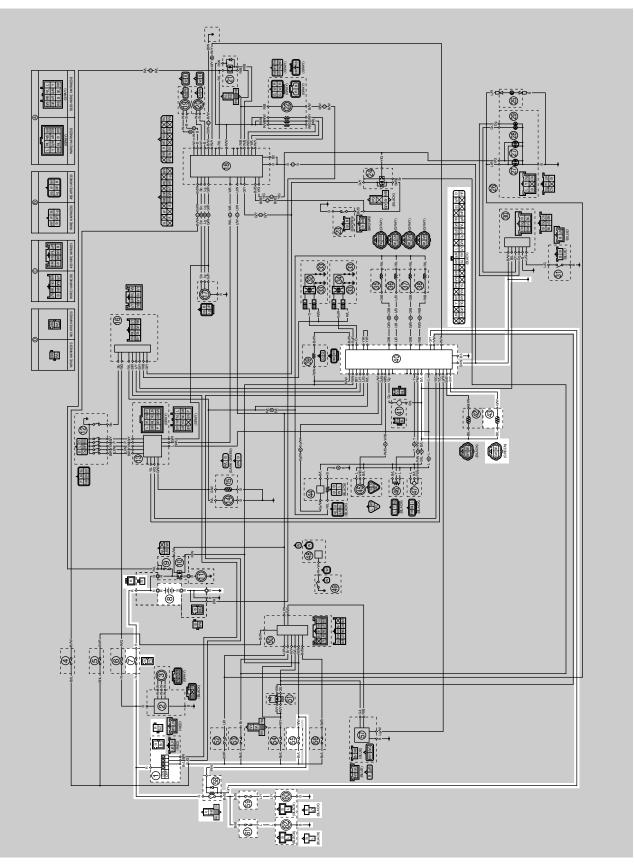
 $\mathsf{OK}\downarrow$ 



The speedometer fails to operate.		
1. Check the rear wheel sensor. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26.	$NG \rightarrow$	Replace the rear wheel sensor.
ОК↓		
<ol> <li>Check the entire speed sensor wir- ing. Refer to NOTE.</li> </ol>	$NG \rightarrow$	Properly connect or repair the speed sen- sor wiring.
ОК↓		
Replace the ABS ECU, ECU or meter assembly.		
NOTE:		
<ul> <li>Repair or replace if there is an open or sh</li> <li>Between rear wheel sensor and ABS EC (white–white) (black–black)</li> <li>Between ABS ECU coupler and ECU co (white/yellow–white/yellow)</li> <li>Between ECU coupler and meter assem (yellow/blue–yellow/blue)</li> </ul>	CU coupler. oupler.	

## COOLING SYSTEM

### CIRCUIT DIAGRAM



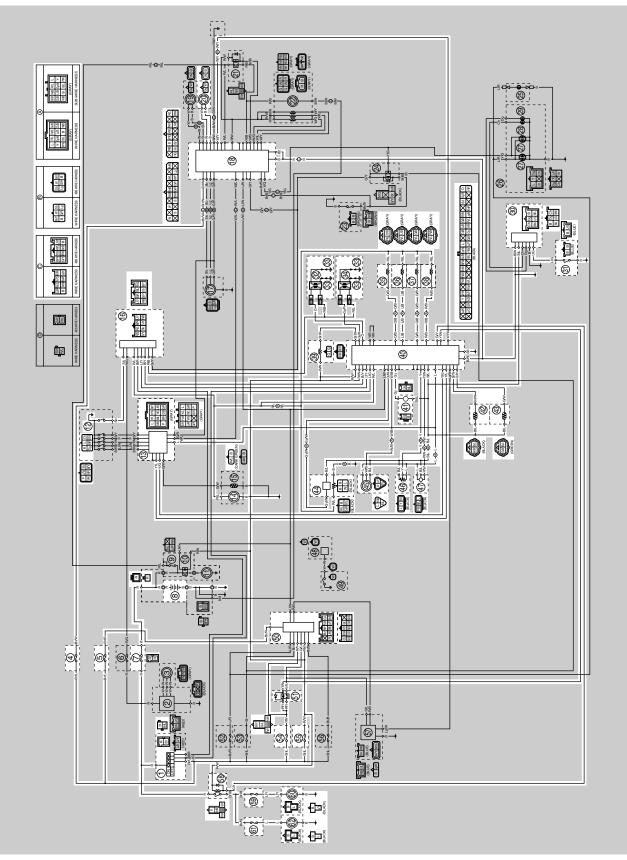
### **COOLING SYSTEM**

- 1. Main switch
- 7. Main fuse
- 8. Battery
- 40.ECU (engine control unit)
- 43.Coolant temperature sensor
- 55.Ignition fuse
- 58.Radiator fan motor relay
- 59.Left radiator fan motor fuse
- 60.Left radiator fan motor
- 61.Right radiator fan motor fuse
- 62.Right radiator fan motor

ing part(s):	
$NG \rightarrow$	Replace the fuse(s).
$NG \rightarrow$	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
$NG \to$	Replace the main switch.
$NG \rightarrow$	Replace the radiator fan motor(s).
$NG \to$	Replace the radiator fan motor relay.
$NG \rightarrow$	Replace the coolant temperature sensor.
$NG \rightarrow$	Properly connect or repair the cooling system wiring.
	$NG \rightarrow$ $NG \rightarrow$ $NG \rightarrow$ $NG \rightarrow$ $NG \rightarrow$

#### EAS27340

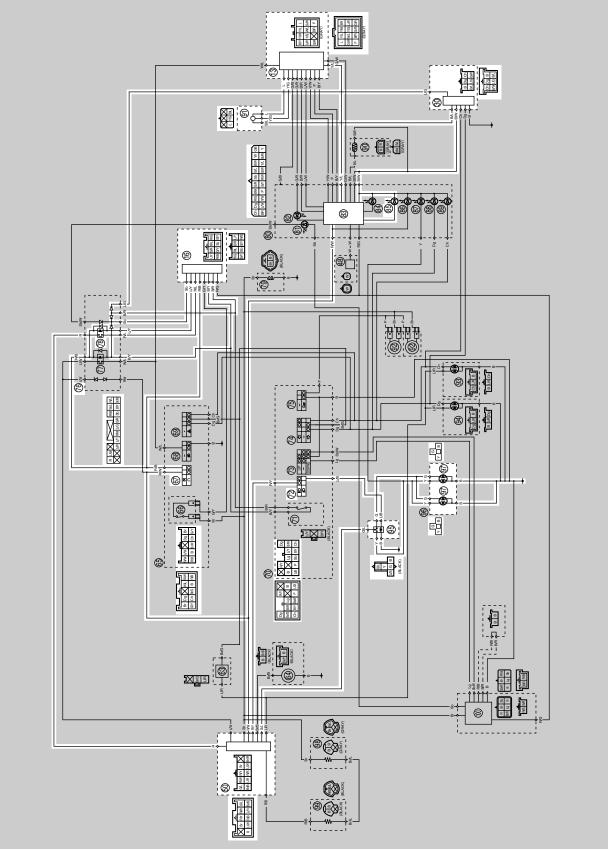
#### CIRCUIT DIAGRAM (1/2) (FJR13A)



- 1. Main switch
- 4. ABS ECU fuse
- 5. Fuel injection system fuse
- 7. Main fuse
- 8. Battery
- 12.Gear position switch
- 13.Coupler 1 (wire harness–front cowling wire harness)
- 14.Fuel pump
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 18.ABS ECU (electronic control unit)
- 20.Rear wheel sensor
- 30.Coupler 3 (wire harness–front cowling wire harness)
- 31.Sidestand switch
- 32.Cylinders-#1/#4 ignition coil
- 33.Spark plug
- 34.Cylinders-#2/#3 ignition coil
- 35.Injector #4
- 36.Injector #3
- 37.Injector #2
- 38.Injector #1
- 39. Air induction system solenoid
- 40.ECU (engine control unit)
- 41.Crankshaft position sensor
- 42.Intake air temperature sensor
- 43.Coolant temperature sensor
- 44.O₂ sensor
- 45.Cylinder identification sensor
- 46.Throttle position sensor
- 47.Intake air pressure sensor
- 50.Coupler 5 (wire harness-front cowling wire harness)
- 51.Headlight relay (on/off)
- 54.Headlight fuse
- 55.Ignition fuse
- 58.Radiator fan motor relay
- 59.Left radiator fan motor fuse
- 60.Left radiator fan motor
- 61.Right radiator fan motor fuse
- 62.Right radiator fan motor

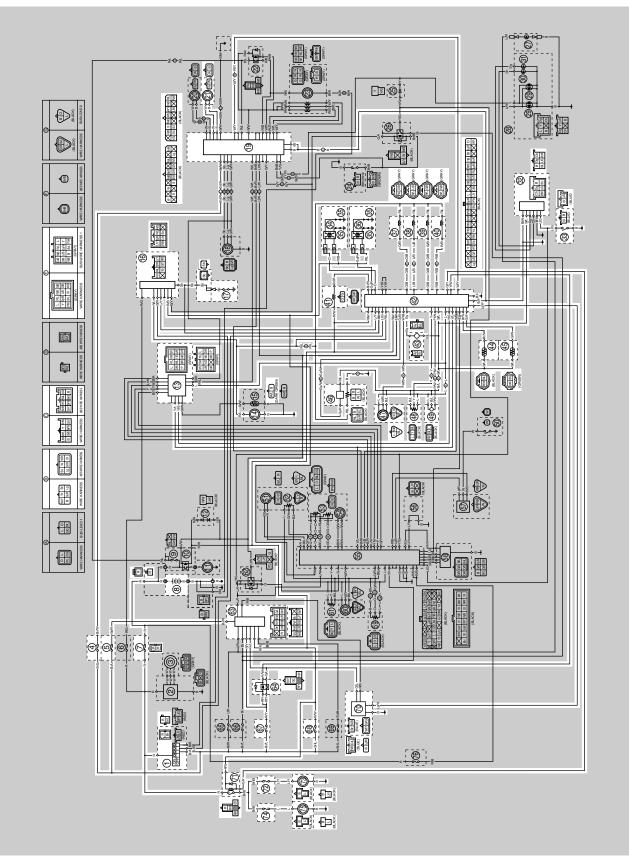
### CIRCUIT DIAGRAM (2/2) (FJR13A)

#### Front cowling wire harness



- 13.Coupler 1 (front cowling wire harness–wire harness)
- 16.Coupler 2 (front cowling wire harness–wire harness)
- 30.Coupler 3 (front cowling wire harness–wire harness)
- 50.Coupler 5 (front cowling wire harness-wire harness)
- 67.Engine stop switch
- 72.Dimmer switch
- 76.Relay unit
- 78. Fuel pump relay
- 83.Multi-function meter
- 85.Engine trouble warning light
- 91.Lean angle sensor
- 95.Headlight relay (dimmer)
- 97.Headlight

### CIRCUIT DIAGRAM (1/2) (FJR13AE)

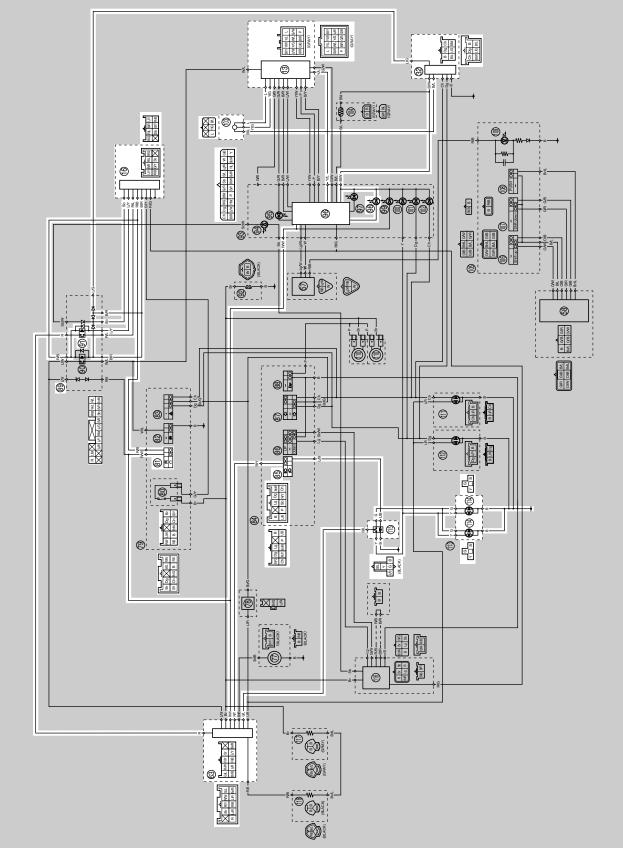


#### 1. Main switch

- 4. ABS ECU fuse
- 5. Fuel injection system fuse
- 7. Main fuse
- 8. Battery
- 13.Coupler 1 (wire harness-front cowling wire harness)
- 14.Fuel pump
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 17.Neutral switch
- 19.ABS ECU (electronic control unit)
- 21.Rear wheel sensor
- 32.Coupler 3 (wire harness-front cowling wire harness)
- 33.Sidestand switch
- 34.Cylinders-#1/#4 ignition coil
- 35.Spark plug
- 36.Cylinders-#2/#3 ignition coil
- 37.Injector #4
- 38.Injector #3
- 39.Injector #2
- 40.Injector #1
- 41.Air induction system solenoid
- 42.ECU (engine control unit)
- 43.Crankshaft position sensor
- 44.Intake air temperature sensor
- 45.Coolant temperature sensor
- 46.O₂ sensor
- 47.Cylinder identification sensor
- 48. Throttle position sensor
- 49.Intake air pressure sensor
- 63.Coupler 5 (wire harness-front cowling wire harness)
- 64.Headlight (on/off)/grip warmer relay
- 67.Headlight fuse
- 68.Ignition fuse
- 70.Grip warmer control unit
- 71.Radiator fan motor relay
- 72.Left radiator fan motor fuse
- 73.Left radiator fan motor
- 74.Right radiator fan motor fuse
- 75.Right radiator fan motor

### CIRCUIT DIAGRAM (2/2) (FJR13AE)

#### Front cowling wire harness



- 13.Coupler 1 (front cowling wire harness–wire harness)
- 16.Coupler 2 (front cowling wire harness–wire harness)
- 32.Coupler 3 (front cowling wire harness–wire harness)
- 63.Coupler 5 (front cowling wire harness–wire harness)
- 81.Engine stop switch
- 85.Dimmer switch
- 89.Relay unit
- 91. Fuel pump relay
- 96.Multi-function meter
- 98.Engine trouble warning light
- 103.Lean angle sensor
- 114.Headlight
- 115.Headlight relay (dimmer)

#### EAS27350 ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, the ECU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the odometer/tripmeter/fuel reserve tripmeter LCD. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

Engine trouble warning	light indication and fue	I injection system operation	

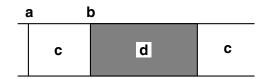
Warning light indica- tion	ECU operation	Fuel injection opera- tion	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on Malfunction detected		Operated with substi- tute characteristics in accordance with the description of the mal- function	Can or cannot be oper- ated depending on the fault code

* The warning light flashes when any one of the conditions listed below is present and the start switch is pushed:

11:	Cylinder identification sensor	33:	Cylinders-#1/#4 ignition coil (faulty ignition)
12:	Crankshaft position sensor	34:	Cylinders-#2/#3 ignition coil (faulty ignition)
19:	Black/red ECU lead (broken or disconnected)	41:	Lean angle sensor (open or short-circuit)
30:	Lean angle sensor (latch up detected)	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.

#### **Self-Diagnostic Function table**

Fault code No.	Item	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.	Unable	Unable
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)	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	Able	Able
15	Throttle position sen- sor (open or short circuit)	Throttle position sensor: open or short circuit detected.	Able	Able
16	Throttle position sen- sor (stuck)	Stuck throttle position sensor is detected.	Able	Able
19	Black/red ECU lead (broken or discon- nected)	A break or disconnection of the black/red lead of the ECU is detected.	Unable	Unable
21	Coolant temperature sensor	Coolant temperature sensor: open or short circuit detected.	Able	Able

Fault code No.	Item	Symptom	Able / un- able to start	Able / un- able to drive
22	Intake air tempera- ture sensor (open or short circuit)	Intake air temperature sensor: open or short circuit detected.	Able	Able
24	O ₂ sensor (inactive)	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
31	O ₂ sensor (compensation stuck to upper limit)	The amount of air-fuel ratio feed- back compensation is maintained continuously in the vicinity of the upper limit (lean air-fuel ratio).	Able	Able
32	O ₂ sensor (compensation stuck to lower limit)	The amount of air-fuel ratio feed- back compensation is maintained continuously in the vicinity of the lower limit (rich air-fuel ratio).	Able	Able
33	Cylinders-#1/#4 igni- tion coil (faulty ignition)	Malfunction detected in the prima- ry wire of the cylinders-#1/#4 igni- tion coil.	Able (depending on the number of faulty cylin- ders)	Able (depending on the number of faulty cylin- ders)
34	Cylinders-#2/#3 igni- tion coil (faulty ignition)	Malfunction detected in the prima- ry wire of the cylinders-#2/#3 igni- tion coil.	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
	Rear wheel sensor	No normal signals are received from the rear wheel sensor.		
42	Gear position switch (neutral circuit) (FJR13A)	Open or short circuit is detected in the neutral circuit of the gear posi- tion switch.	Able	Able
	Neutral switch (FJR13AE)	Open or short circuit is detected in the neutral switch.		
43	Fuel system voltage (monitoring voltage)	The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).	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 to the fuel injection system is not normal.	Able	Able

Fault code No.	Item	Symptom	Able / un- able to start	Able / un- able to drive
50	ECU internal malfunc- tion	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	Unable	Unable

#### Communication error with the meter

Fault code No.	Item	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
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".

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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 8-77. 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 (throttle angle)
- 30: Cylinders-#1/#4 ignition coil
- 31: Cylinders-#2/#3 ignition coil
- 36: Injector #1
- 37: Injector #2
- 38: Injector #3
- 39: Injector #4
- 48: Air induction system solenoid

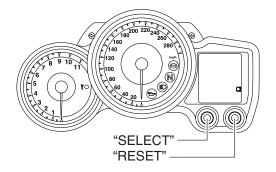
If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts. If no malfunction is detected in the sensors and actuators, check and repair inner parts of the engine.

#### EAS27410

#### DIAGNOSTIC MODE

Setting the diagnostic mode

- 1. Turn the main switch to "OFF".
- 2. Disconnect the wire harness coupler from the fuel pump.
- 3. Simultaneously press and hold the "SELECT" and "RESET" buttons, turn the main switch to "ON", and continue to press the buttons for 8 seconds or more.

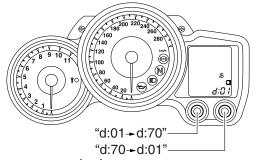


#### NOTE: _

- All displays on the meter disappear except the odometer/tripmeter/fuel reserve tripmeter displays.
- "dIAG" appears on the odometer/tripmeter/fuel reserve tripmeter LCD.
- 4. Press the "SELECT" button to select the CO adjustment mode "Co" or 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 "d:01" appears on the clock LCD.
- 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 trip LCD.
  - Actuator operation
  - Set the engine stop switch to " $\bigcirc$ " to operate the actuator.

#### NOTE: _

If the engine stop switch is set to " $\bigcirc$ ", set it to " $\bigotimes$ ", and then set it to " $\bigcirc$ " again.

8. Turn the main switch to "OFF" to cancel the diagnostic mode.

#### Fault code table

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
11	No normal signals are re- ceived from the cylinder identification sensor.	<ul> <li>Open or short circuit in sub-wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Defective cylinder identification sensor.</li> <li>Malfunction in ECU.</li> <li>Improperly installed cylinder identification 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 crankshaft position sensor.</li> </ul>	_
13	Intake air pressure sensor: open or short circuit detect- ed.	<ul> <li>Open or short circuit in sub-wire harness.</li> <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: open or short circuit detect- ed.	<ul> <li>Open or short circuit in sub-wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Defective throttle position sensor.</li> <li>Malfunction in ECU.</li> <li>Improperly installed throttle position sensor.</li> </ul>	01
16	Stuck throttle position sen- sor is detected.	<ul> <li>Stuck throttle position sensor</li> <li>Malfunction in ECU.</li> </ul>	01

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
19	A break or disconnection of the black/red lead of the ECU is detected.	<ul> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Malfunction in ECU.</li> <li>Defective relay unit (diode).</li> </ul>	20
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
22	Intake air temperature sen- sor: open or short circuit detected.	<ul> <li>Open or short circuit in wire harness.</li> <li>Defective intake temperature sensor.</li> <li>Malfunction in ECU.</li> <li>Improperly installed intake air temperature sensor.</li> </ul>	05
24	No normal signal is re- ceived from the O ₂ sensor.	<ul> <li>Open or short circuit in sub-wire harness.</li> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Defective O₂ sensor.</li> <li>Malfunction in ECU.</li> <li>Improperly installed O₂ 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
31	The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the upper lim- it (lean air-fuel ratio).	<ul> <li>Open or short circuit in sub-wire harness.</li> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Fuel pressure too low.</li> <li>Clogged injectors.</li> <li>Defective O₂ sensor (unable to output a rich signal).</li> <li>Malfunction in ECU.</li> <li>Malfunction in other areas of the fuel system.</li> </ul>	01
32	The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the lower limit (rich air-fuel ratio).	<ul> <li>Open or short circuit in sub-wire harness.</li> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Fuel pressure too high.</li> <li>Faulty injectors (excessive injection volume).</li> <li>Defective O₂ sensor (unable to output a lean signal).</li> <li>Malfunction in ECU.</li> <li>Malfunction in other areas of the fuel system.</li> </ul>	01

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
33	Malfunction detected in the primary wire of the cylin- ders-#1/#4 ignition coil.	<ul> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Malfunction in cylinders-#1/#4 ignition coil.</li> <li>Malfunction in ECU.</li> </ul>	30
34	Malfunction detected in the primary wire of the cylin- ders-#2/#3 ignition coil.	<ul> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Malfunction in cylinders-#2/#3 ignition coil.</li> <li>Malfunction in ECU.</li> </ul>	31
41	Lean angle sensor: open or short circuit detected.	<ul> <li>Open or short circuit in front cowling wire harness.</li> <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 rear wheel sensor. Open or short circuit is de- tected in the neutral circuit of the gear position switch. (FJR13A) Open or short circuit is de- tected in the neutral switch. (FJR13AE)	<ul> <li>Open or short circuit in ABS wire harness.</li> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Defective rear wheel sensor.</li> <li>Malfunction in rear wheel sensor detected.</li> <li>Defective gear position switch. (FJR13A)</li> <li>Defective neutral switch. (FJR13AE)</li> <li>Malfunction in the engine side of the gear position switch. (FJR13A)</li> <li>Malfunction in the engine side of the neutral switch. (FJR13AE)</li> <li>Malfunction in the engine side of the neutral switch. (FJR13AE)</li> <li>Malfunction in the engine side of the neutral switch. (FJR13AE)</li> <li>Malfunction in ABS ECU.</li> </ul>	07 21
43	The ECU is unable to moni- tor the battery voltage (an open or short circuit in the line to the ECU).	<ul> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Malfunction in ECU.</li> </ul>	09
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 memory).</li> </ul>	60
46	Power supply to the fuel in- jection system is not nor- mal.	Malfunction in the charging system. Refer to "CHARGING SYSTEM" on page 8-29.	_
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	<ul> <li>Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.)</li> </ul>	_

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
Er-1	No signals are received from the ECU.	<ul> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Malfunction in meter assembly.</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>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Malfunction in meter assembly.</li> <li>Malfunction in ECU.</li> </ul>	_
Er-3	Data from the ECU cannot be received correctly.	<ul> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Malfunction in meter assembly.</li> <li>Malfunction in ECU.</li> </ul>	
Er-4	Non-registered data has been received from the meter.	<ul> <li>Open or short circuit in front cowling wire harness.</li> <li>Open or short circuit in wire harness.</li> <li>Malfunction in meter assembly.</li> <li>Malfunction in ECU.</li> </ul>	_

#### Sensor operation table

Diag- nostic code No.	Item	Meter display	Checking method
01	Throttle angle		
	<ul> <li>Fully closed position</li> </ul>	15–17	Check with throttle fully closed.
	<ul> <li>Fully opened position</li> </ul>	97–100	Check with throttle fully open.
03	Pressure difference (atmospheric pressure and intake air pressure)	Displays the intake air pres- sure.	Set the engine stop switch to " $\bigcirc$ ", and then push the start switch " $\circledast$ ". (If the dis- play value changes, the performance is OK.)
05	Intake air temperature	Displays the intake air tem- perature.	Compare the actually mea- sured intake air tempera- ture with the meter display value. (*1)
06	Coolant temperature	Displays the coolant temper- ature.	Compare the actually mea- sured coolant temperature with the meter display val- ue.

Diag- nostic code No.	Item	Meter display	Checking method
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 (battery voltage)	Approximately 12.0	Set the engine stop switch to "O", and then compare with the actually measured battery voltage. (If the bat- tery voltage is lower, per- form recharging.)
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 geal.)
21	Gear position switch (FJR13A)		Shift the transmission.
	Neutral switch (FJR13AE)		
	Neutral	ON	
	• In gear	OFF	
60	EEPROM fault code dis- play		—
	No history	00	
	• History exists	<ul> <li>01–04 (Cylinder fault code)</li> <li>(If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.)</li> </ul>	

Diag- nostic code No.	ltem	Meter display	Checking method
61	Malfunction history code display		—
	<ul> <li>No history</li> </ul>	00	
	• History exists	<ul> <li>Fault codes 11-50</li> <li>(If more than one code number is detected, the display alternates every two seconds to show all the de- tected code numbers.</li> <li>When all code numbers are shown, the display repeats the same process.)</li> </ul>	
62	Malfunction history code erasure		
	No history	0	_
	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 " $\bigcirc$ ".
70	Control number	0–255	—

*1 If it is not possible to check the intake temperature, use the ambient temperature as reference (use the compared values for reference).

#### Actuator operation table

Diag- nostic code No.	Item	Actuation	Checking method
30	Cylinders-#1/#4 ignition coil	Actuates the cylinders-#1/#4 ignition coil five times at one- second intervals. Illuminates the engine trou- ble warning light.	Check the spark five times. • Connect an ignition checker.
31	Cylinders-#2/#3 ignition coil	Actuates the cylinders-#2/#3 ignition coil five times at one- second intervals. Illuminates the engine trou- ble warning light.	Check the spark five times. • Connect an ignition checker.
36	Injector #1	Actuates the injector #1 five times at one-second inter- vals. Illuminates the engine trou- ble warning light.	Check the operating sound of the injector #1 five times.

Diag- nostic code No.	ltem	Actuation	Checking method
37	Injector #2	Actuates the injector #2 five times at one-second inter- vals. Illuminates the engine trou- ble warning light.	Check the operating sound of the injector #2 five times.
38	Injector #3	Actuates the injector #3 five times at one-second inter- vals. Illuminates the engine trou- ble warning light.	Check the operating sound of the injector #3 five times.
39	Injector #4	Actuates the injector #4 five times at one-second inter- vals. Illuminates the engine trou- ble warning light.	Check the operating sound of the injector #4 five times.
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 pump relay	Actuates the fuel pump relay five times at one-second in- tervals. 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 pump relay five times.
51	Radiator fan motor relay	Actuates the radiator fan mo- tor relay for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trou- ble warning light and rotates the radiator fan motors.	Check the operating sound of the radiator fan motor re- lay five times.
52	Headlight relay (on/off)	Actuates the headlight relay (on/off) for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trou- ble warning light and head- light.	Check the operating sound of the headlight relay (on/off) five times.

Diag- nostic code No.	Item	Actuation	Checking method
57	Grip warmer	Illuminates the engine trou- ble warning light.	Disconnect the grip warmer control unit coupler from the control unit, if equipped, and then con- nect a pocket tester to the terminals (light green/white–black) of the coupler (wire harness side) and check for continuity.

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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 8-69.

Fault	code No.	11	Symptom	No norm	al signals are received from the c ensor.	cylinder identifi-
Diagr	nostic code	No.	—	—		
Orde	r Item/comp cause	onen	ts and prot	able	Check or maintenance job	Reinstatement method
1	Installed c cation sen		on of cylinde	r identifi-	Check for looseness or pinching.	Starting the en- gine and oper-
2	Connections • Cylinder identification sensor cou- pler • Wire harness ECU coupler • Sub-wire harness coupler				<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	— ating it at idle.
3	Open or short circuit in wire harness and/or sub-wire harness.			harness	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between cylinder identification sensor coupler and ECU coupler. (blue-blue) (white/black-white/black) (black/blue-black/blue)</li> </ul>	
4	Defective sor.	cylinde	er identificat	ion sen-	Replace if defective. Refer to "CHECKING THE CYLINDER IDENTIFICATION SENSOR" on page 8-232.	

Fault	code No.	12	Symptom	No normation sens	al signals are received from the c or.	rankshaft posi-
Diagn	ostic code	No.	—	—		
Order	Item/comp cause	onen	ts and prot	bable	Check or maintenance job	Reinstatement method
1	Installed control tion senso		on of cranks	haft posi-	Check for looseness or pinching.	Cranking the engine.
2		nections ankshaft position sensor coupler re harness ECU coupler			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	
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 the crankshaft position sensor coupler and ECU coupler. (gray–gray) (black/blue–black/blue)</li> </ul>	
4	Defective of	cranks	shaft position	n sensor.	Replace if defective. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-227.	

Fault	code No.	13	Symptom	Intake air	Intake air pressure sensor: open or short circuit detected.				
Diagn	Diagnostic code No. 03 Intake a				pressure sensor				
Order Item/components and probable cause				able	Check or maintenance job	Reinstatement method			
1	Connections • Intake air pressure sensor coupler • Wire harness ECU coupler • Sub-wire harness coupler				<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON".			
2	Open or short circuit in wire harness and/or sub-wire harness.				<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	esensor	<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 8-233.</li> </ul>				

Fault				r pressure sensor: hose system malfunction or detached hose).		
Diagn	ostic code	No.	03	Intake air	r pressure sensor	
Order	der Item/components and probable cause			able	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>	Starting the en- gine and oper- ating it at idle.
2	Intake air pressure sensor malfunction at intermediate electrical potential.				<ul> <li>Check and repair the connection.</li> <li>Replace it if there is a malfunction.</li> </ul>	
3	Connections • Intake air pressure sensor coupler • Wire harness ECU coupler • Sub-wire harness coupler				<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	

Fault o	code No.	15	Symptom	Throttle	position sensor: open or short circuit detected.			
Diagn	ostic code	No.	01	Throttle	position sensor			
Order	Item/comp cause	onen	ts and prob	able	Check or mainte	enance job	Reinstatement method	
1	Installed co sensor.	onditic	on of throttle	position	Check for looser	ness or pinching.	Turning the main switch to	
2	Wire harr	oositio ness E	n sensor co CU coupler ess coupler		<ul> <li>Check the coup that may be pu</li> <li>Check the lock the coupler.</li> <li>If there is a mal and connect th curely.</li> </ul>	lled out. ing condition of function, repair it	- "ON".	
3	Open or sh and/or sub		rcuit in wire harness.	harness	<ul> <li>Repair or repla open or short of</li> <li>Between throttle sor coupler and (black/blue-bla (yellow-yellow) (blue-blue)</li> </ul>			
4			sensor lead ut voltage c		<ul> <li>Check for oper place the thrott sor. (black/blue-yel</li> </ul>			
					Open circuit item	Output voltage		
					Ground wire open circuit	5 V		
					Output wire open circuit	0 V		
					Power supply wire open cir- cuit	0 V		
5	Defective t	hrottle	position se	nsor.	<ul> <li>Execute the dia (Code No.01)</li> <li>Replace if defe Refer to "CHEO THROTTLE PO SOR" on page</li> </ul>	ctive. CKING THE DSITION SEN-		

Fault	code No.	16	Symptom	Stuck thr	ottle position se	nsor is detected.	
Diagn	ostic code	No.	01	Throttle p	position sensor		
Order	Item/comp cause	onen	ts and prob	able	Check or mainte	enance job	Reinstatement method
1	Installed co sensor.	onditio	on of throttle	position	Check for looser	ness or pinching.	Starting the en- gine and oper-
2	• Wire harr	oositio ness E	n sensor co ECU coupler ess coupler		<ul> <li>Check the coup that may be pu</li> <li>Check the lock the coupler.</li> <li>If there is a mal and connect th curely.</li> </ul>	ating it at idle, and then by racing it.	
3			sensor leac out voltage c		<ul> <li>Check for oper place the thrott sor. (black/blue-yel</li> </ul>		
					Open circuit item	Output voltage	-
					Ground wire open circuit	5 V	
					Output wire open circuit	0 V	
					Power supply wire open cir- cuit	0 V	
4	Defective t	hrottle	e position se	nsor.	<ul> <li>Execute the dia (Code No.01)</li> <li>Replace if defe Refer to "CHEO THROTTLE PO SOR" on page</li> </ul>		

Fault	code No.	19	Symptom	or disconnection of the black/red	lead of the ECU	
Diagn	ostic code	No.	20	Sidestand	d switch	
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method
1		ness E	ECU coupler vire harness		<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 and/or front cowling wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between ECU and black/red lead.</li> </ul>	
3	Defective sidestand switch				<ul> <li>Replace if defective.</li> <li>Refer to "CHECKING THE SWITCHES" on page 8-211.</li> </ul>	
4	Defective r	elay u	init (diode)		Replace if defective. Refer to "CHECKING THE RE- LAYS" on page 8-221.	

Fault	code No.	21	Symptom	Coolant t ed.	emperature sensor: open or sho	rt circuit detect-
Diagn	ostic code	No.	06	Coolant t	emperature sensor	
Order Item/components and probable cause					Check or maintenance job	Reinstatement method
1	Installed co ture senso		on of coolant	t tempera-	Check for looseness or pinching.	Turning the main switch to
2		empe	rature senso ECU coupler		<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	"ON".
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 coolant temperature sensor coupler and ECU coupler. (black/blue–black/blue) (green/white–green/white)</li> </ul>	
4	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 8-231.</li> </ul>	

Fault	code No.	22	Symptom	Intake air tected.	Intake air temperature sensor: open or short circuit de- tected.				
Diagn	ostic code	No.	05	Intake air	r temperature sensor				
Order Item/components and probable cause				able	Check or maintenance job	Reinstatement method			
1	Installed c perature s		on of intake	air tem-	Check for looseness or pinching.	Turning the main switch to			
2	pler	r temp	erature sens		<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	"ON".			
3	Open or sl	hort ci	rcuit in wire	harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between intake air temperature sensor coupler and ECU coupler. (black/blue–black/blue) (brown/white–brown/white)</li> </ul>				
4	Defective i sor.	intake	air tempera	ture sen-	<ul> <li>Execute the diagnostic mode. (Code No.05)</li> <li>Replace if defective. Refer to "CHECKING THE IN- TAKE AIR TEMPERATURE SENSOR" on page 8-233.</li> </ul>				

Fault	code No.	24	Symptom	No norma	al signal is received from the $O_2$ s	sensor.
Diagn	ostic code	No.		—		
Order	Item/comp cause	onen	ts and prob	bable	Check or maintenance job	Reinstatement method
1	Installed co	onditic	on of O ₂ sen	ISOr	Check for looseness or pinching.	Starting the en-
2	Sub-wire	or coup it coup ness E harne			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	gine, warming it up until the coolant temper- ature is 60 °C or more, and then running it between 2000– 3000 r/min un-
3		arness	rcuit in wire s, and/or froi		<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between O₂ sensor coupler and ECU coupler. (black/blue–black/blue) (gray/white–gray/white)</li> <li>Between O₂ sensor coupler and relay unit coupler. (red/blue–red/blue)</li> <li>Between O₂ sensor coupler and sub-wire harness coupler. (black-black)</li> </ul>	til the engine trouble warn- ing light turns off.
4	Check fuel	press	sure.		Refer to "CHECKING THE FUEL PRESSURE" on page 7-8.	
5	Defective (	D ₂ ser	nsor		Replace if defective.	1

Fault				o detected. nal signal is received from the lean angle sensor.		
Diagn	ostic code	No.	08	Lean ang	le sensor	
Order	Item/components and probable cause				Check or maintenance job	Reinstatement method
1	The vehicle has overturned.				Raise the vehicle upright.	Turning the
2	Installed cosor	onditio	on of lean ar	ngle sen-	Check the installed direction and condition of the sensor.	main switch to "ON" (however, the engine can-
3	Connections • Lean angle sensor coupler • Wire harness ECU coupler				<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	not be restarted unless the main switch is first turned "OFF").
4	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 8-227.</li> </ul>	

Fault o	code No.	31	Symptom	maintaine	mount of air-fuel ratio feedback compensation is ained continuously in the vicinity of the upper limit air-fuel ratio).			
Diagn	ostic code	No.	01	Throttle p	oosition sensor			
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method		
1	<ul> <li>Sub-wire</li> </ul>	or coup it coup ness E harne			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Starting the en- gine, warming it up until the coolant temper- ature is 60 °C or more, and then running it		
2	Open or short circuit in wire harness, sub-wire harness, and/or front cowling wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between O₂ sensor coupler and ECU coupler. (black/blue–black/blue) (gray/white–gray/white)</li> <li>Between O₂ sensor coupler and relay unit coupler. (red/blue–red/blue)</li> <li>Between O₂ sensor coupler and sub-wire harness coupler. (black–black)</li> </ul>	between 2000– 3000 r/min un- til the engine trouble warn- ing light turns off.		
3	Defective (	O₂ ser	isor		Replace if defective. (Unable to output a rich signal)			
4	Clogged in	ijector			<ul> <li>Replace if defective.</li> <li>Refer to "CHECKING THE IN- JECTORS" on page 7-8.</li> </ul>			

Fault	code No.	31	Symptom	maintaine	The amount of air-fuel ratio feedback compensa maintained continuously in the vicinity of the up (lean air-fuel ratio).			
Diagn	ostic code	No.	01	Throttle p	oosition sensor			
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method		
5	The fuel pressure is too low.				<ul> <li>Compare the fuel pressures at idle and with throttle open.</li> <li>About the same → Normal</li> <li>Too low → Refer to the following table.</li> </ul>			
					<ul> <li>Check the fuel pump.</li> <li>Replace if defective. Refer to "CHECKING THE FUEL PUMP BODY" on page 7-3.</li> </ul>			
					<ul> <li>Check the delivery hose for pinching or kinking.</li> <li>Repair or replace if there is a malfunction.</li> </ul>			
					<ul> <li>Check the pressure regulator.</li> <li>Replace if defective. Refer to "CHECKING THE FUEL PRESSURE" on page 7-8.</li> </ul>			
					<ul> <li>Check the throttle position sensor.</li> <li>Execute the diagnostic mode. (Code No.01)</li> <li>Replace if defective.</li> </ul>			
					<ul> <li>Check the fuel system (disconnection, etc.).</li> <li>Repair or replace if there is a malfunction.</li> </ul>			
					<ul> <li>Check the intake system (improper sealing, etc.).</li> <li>Repair or replace if there is a malfunction.</li> </ul>			

Fault					The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the lower limit (rich air-fuel ratio).				
Diagn	ostic code	No.	01	Throttle p	oosition sensor				
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method			
1	Sub-wire	or coup it coup ness E harne			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Starting the en- gine, warming it up until the coolant temper- ature is 60 °C or more, and then running it			
2		arnes	rcuit in wire s and/or fror		<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between O₂ sensor coupler and ECU coupler. (black/blue–black/blue) (gray/white–gray/white)</li> <li>Between O₂ sensor coupler and relay unit coupler. (red/blue–red/blue)</li> <li>Between O₂ sensor coupler and sub-wire harness coupler. (black–black)</li> </ul>				
3	Defective	O ₂ ser	nsor		Replace if defective. (Unable to output a rich signal)	]			
4	Excessive injector.	volum	ne of fuel inje	ected by	<ul> <li>Check the injector.</li> <li>Check the fuel pressure. Refer to "CHECKING THE FUEL PRESSURE" on page 7-8.</li> </ul>				

Fault o			The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the lower limit (rich air-fuel ratio).			
Diagn	ostic code	No.	01	Throttle p	position sensor	
Order	Item/components and probable cause				Check or maintenance job	Reinstatement method
5	The fuel pressure is too high.				• Compare the fuel pressures at idle and with throttle open. About the same $\rightarrow$ Normal Too high $\rightarrow$ Refer to the following table.	
					<ul> <li>Checking the pressure regulator.</li> <li>Replace if defective. Refer to "CHECKING THE FUEL PRESSURE" on page 7-8.</li> </ul>	
					<ul> <li>Checking the throttle position sensor.</li> <li>Execute the diagnostic mode. (Code No.01)</li> <li>Replace if defective.</li> </ul>	
					<ul> <li>Checking the fuel system (clog- ging, etc.).</li> <li>Repair or replace if there is a malfunction.</li> </ul>	

Fault	code No.	33	Symptom		ion detected in the primary wire on the primary wire on the second second second second second second second se	of the cylinders-
Diagn	Diagnostic code No. 30				s-#1/#4 ignition coil	
Order	Item/components and probable cause				Check or maintenance job	Reinstatement method
1	tor (prima • Wire har	s-#1/# ary co ness l	4 ignition co il side) ECU coupler wire harness		<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Starting the en- gine and oper- ating it at idle.
2	Open or short circuit in wire harness and/or front cowling wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between cylinders-#1/#4 ignition coil connector and ECU coupler. (orange–orange)</li> <li>Between cylinders-#1/#4 ignition coil connector and right handlebar switch coupler. (red/black–red/black)</li> </ul>	
3	Defective	cylind	ers-#1/#4 igi	nition 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 8-226.</li> </ul>	

Fault	code No.	34	Symptom		ion detected in the primary wire on the primary wire on the second second second second second second second se	of the cylinders-
Diagn	ostic code	No.	31	Cylinders	s-#2/#3 ignition coil	
Order	Item/comp cause	onen	its and prob	bable	Check or maintenance job	Reinstatement method
1	tor (prima • Wire har	s-#2/# ary co ness l	3 ignition co il side) ECU coupler wire harness		<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Starting the en- gine and oper- ating it at idle.
2	Open or short circuit in wire harness and/or front cowling wire harness.				<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between cylinders-#2/#3 ignition coil connector and ECU coupler. (gray/red–gray/red)</li> <li>Between cylinders-#2/#3 ignition coil connector and right handlebar switch coupler. (red/blue–red/black)</li> </ul>	
3	Defective	cylind	ers-#2/#3 igi	nition 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 8-226.</li> </ul>	

Fault	code No.	41	Symptom	Lean ang	Lean angle sensor: open or short circuit detected.			
Diagn	ostic code	No.	08	Lean ang	le sensor			
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method		
1	Connections • Lean angle sensor coupler • Wire harness ECU coupler • Front cowling wire harness coupler				<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON".		
2			rcuit in wire ling wire har		<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between lean angle sensor coupler and ECU coupler. (black/blue–black/blue) (yellow/green–yellow/green) (blue–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 8-227.</li> </ul>			

Fault	Fault code No. 42 Symptom		<ul> <li>A. No normal signals are received from the rear wheel sensor.</li> <li>B. Open or short circuit is detected in the neutral circuit of the gear position switch. (FJR13A) Open or short circuit is detected in the neutral switch. (FJR13AE)</li> </ul>				
Diagn	Diagnostic code No. A 07					el sensor	
			В	21		ition switch (neutral circuit) (FJR witch (FJR13AE)	13A)
Order	Item/comp cause	onen	ts and	l prob	able	Check or maintenance job	Reinstatement method
A-1	Connection • Rear whe • Wire harr • ABS ECU • ABS wire	eel ser ness E J coup	ECU co oler	oupler		<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Starting the en- gine, and input- ting the vehicle speed signals by operating the vehicle at a 20 to 30 km/h.
A-2	Open or short circuit in wire harness and/or ABS wire harness.					<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between rear wheel sensor coupler and ABS ECU coupler. (white–white) (black–black)</li> <li>Between ABS ECU coupler and ECU coupler. (white/yellow–white/yellow)</li> </ul>	
A-3	Sensor rot speed has			ing ve	hicle	<ul> <li>Replace the rear wheel. Refer to "REAR WHEEL" on page 4-24.</li> </ul>	
A-4	Defective r	ear w	heel s	ensor		<ul> <li>Execute the diagnostic mode. (Code No.07)</li> <li>Replace if defective. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26.</li> </ul>	

Fault o	Fault code No. 42 Symptom		<ul> <li>A. No normal signals are received from the rear wheel sensor.</li> <li>B. Open or short circuit is detected in the neutral circuit of the gear position switch. (FJR13A) Open or short circuit is detected in the neutral switch. (FJR13AE)</li> </ul>							
Diagn	gnostic code No. A 07				Rear whe	el sensor				
			В	21		Gear position switch (neutral circuit) (FJR13A) Neutral switch (FJR13AE)				
Order	Item/comp cause	onen	ts and	l prob	able	Check or maintenance job	Reinstatement method			
B-1	Connections • Gear position switch coupler (FJR13A) • Neutral switch coupler (FJR13AE) • Wire harness ECU coupler • Front cowling wire harness coupler					<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Starting the en- gine, and input- ting the vehicle speed signals by operating the vehicle at a 20 to 30 km/h.			
B-2	Open or short circuit in wire harness and/or front cowling wire harness.					<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between gear position switch coupler and relay unit coupler. (sky blue–sky blue) (FJR13A)</li> <li>Between relay unit coupler and ECU coupler. (black/yellow–black/yellow) (FJR13A)</li> <li>Between neutral switch coupler and relay unit coupler. (sky blue–sky blue) (FJR13AE)</li> <li>Between relay unit coupler. (sky blue–sky blue) (FJR13AE)</li> <li>Between relay unit coupler and ECU coupler. (black/red–black/red) (FJR13AE)</li> <li>Between neutral switch coupler and ECU coupler. (black/red–black/red) (FJR13AE)</li> <li>Between neutral switch coupler and ECU coupler. (sky blue–sky blue) (FJR13AE)</li> </ul>				
B-3	Faulty shift ea)	drum	(neut	ral de	tection ar-	<ul> <li>Replace if defective. Refer to "TRANSMISSION" on page 5-116.</li> </ul>				
B-4	Defective g circuit) (FJ Defective r	R13A)	)			<ul> <li>Execute the diagnostic mode. (Code No.21)</li> <li>Replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-211.</li> </ul>				

Fault			The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).			
Diagn	ostic code	No.	09	Fuel syst	em voltage	
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method
1		it coup e harn	oler ess ECU co vire harness		<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Starting the en- gine and oper- ating it at idle.
2			rcuit in the v wire harnes		<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 main switch coupler. (red-brown/blue)</li> <li>Between relay unit coupler and engine stop switch coupler. (red/black-red/black)</li> </ul>	
3	Malfunction pump relay		oen 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>	

Fault	ault code No. 44 Symptom			An error is detected while reading or writing on EEPROM (CO adjustment value).					
Diagn	Diagnostic code No. 60				EEPROM fault cylinder No.				
Order	rder Item/components and probable cause				Check or maintenance job	Reinstatement method			
1	Cause Malfunction in ECU.				<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".</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	code No.	46	Symptom	Power su	upply to the fuel injection system	is not normal.		
Diagn	ostic code	No.	—	—				
Order	Item/comp cause	onen	ts and prob	able	Check or maintenance job	Reinstatement method		
1	Connectio • Wire har	-	ECU coupler		<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Starting the en- gine and oper- ating it at idle.		
2	Faulty batt	ery.			• Replace or charge the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.			
3	Malfunctio	n in re	ctifier/regula	ator	Replace if defective. Refer to "CHARGING SYS- TEM" on page 8-29.	•		
4	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 battery and main switch coupler. (red-red)</li> <li>Between main switch coupler and ignition fuse. (brown/blue-brown/blue)</li> <li>Between ignition fuse and ECU coupler. (red/white-red/white)</li> </ul>			

the I					CU memory. (When this malfunction the fault code number might not	
Diagn	ostic code	No.	—	—		
Order	Item/components and probable cause				Check or maintenance job	Reinstatement method
1	Malfunction in ECU.				Replace the ECU. <b>NOTE:</b> Do not perform this procedure with the main switch turned to "ON".	Turning the main switch to "ON".

Fault	code No.	Er-1	Symptom	No signa	Is are received from the ECU.	
Diagn	ostic code	No.	—	—		
Order	Item/comp cause	onen	ts and prot	bable	Check or maintenance job	Reinstatement method
1	Connections • Meter assembly coupler • Wire harness ECU coupler • Front cowling wire harness coupler				<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON".
2			rcuit in wire ling wire ha		<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.	1
4	Malfunctio	n in E	CU		Replace the ECU.	1

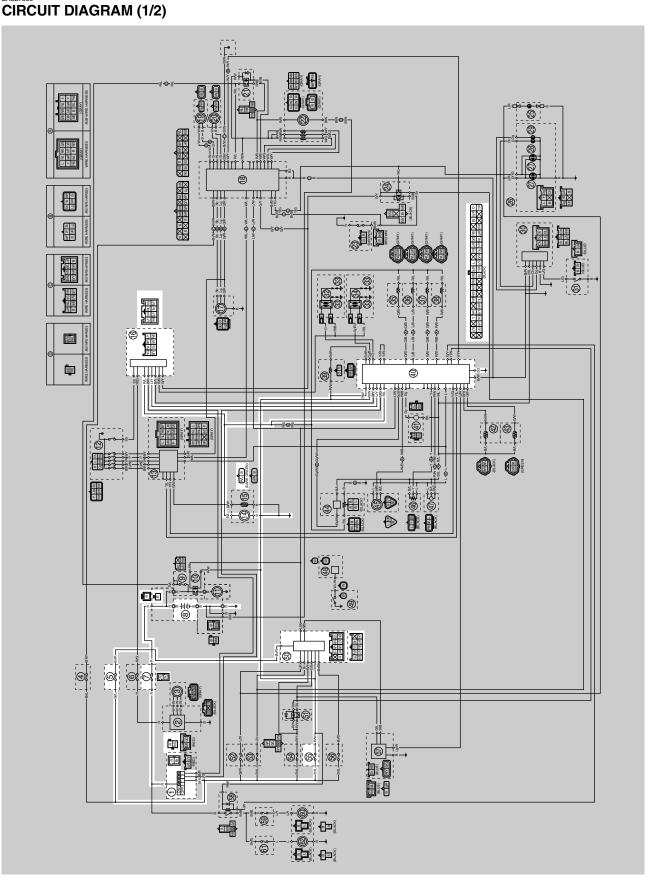
Fault o			Symptom	No signa duration.	No signals are received from the ECU within the specified duration.				
Diagn	ostic code	No.	—	—					
Order	Item/comp cause	onen	ts and prot	able	Check or maintenance job	Reinstatement method			
1	Connections • Meter assembly coupler • Wire harness ECU coupler • Front cowling wire harness coupler				<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON".			
2			rcuit in wire ling wire hai		<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 from the ECU cannot be received correctly.					
Diagnostic code No. — — —			—				
Order Item/components and probable cause					Check or maintenance job	Reinstatement method	
1	Connections • Meter assembly coupler • Wire harness ECU coupler • Front cowling wire harness coupler				<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON".	
2	Open or short circuit in wire harness and/or front cowling 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 in meter assembly			bly	Replace the meter assembly.	1	
4	Malfunction in ECU				Replace the ECU.		

Fault code No. Er-4 Symptom		n Non-regi	Non-registered data has been received from the meter.					
Diagnostic code No. —			—	—				
Order Item/components and probable cause					Check or maintenance job	Reinstatement method		
1	Connections • Meter assembly coupler • Wire harness ECU coupler • Front cowling wire harness coupler				<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "ON".		
2	Open or short circuit in wire harness and/or front cowling 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	Malfunction in meter assembly		nbly	Replace the meter assembly.	1		
4	Malfunctio	n in E	CU		Replace the ECU.	1		

# FUEL PUMP SYSTEM

#### 

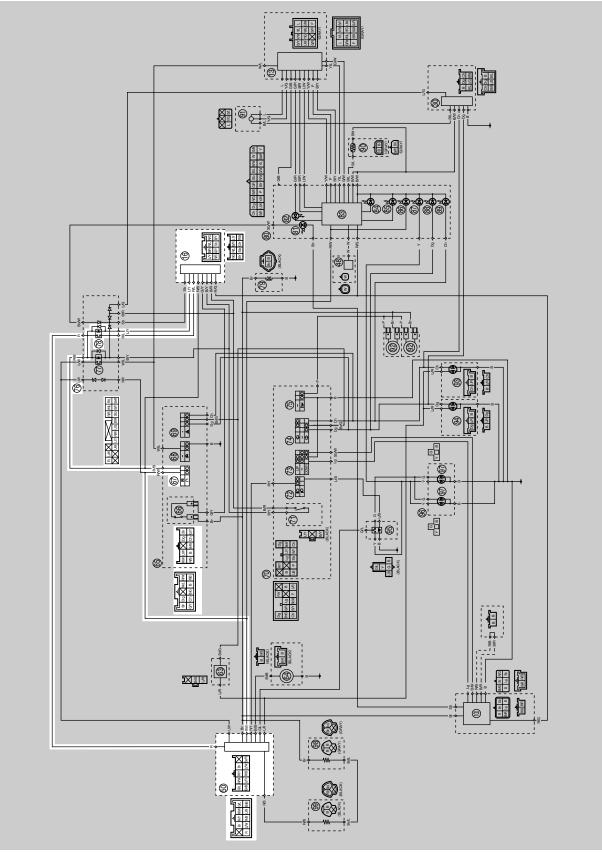


#### **FUEL PUMP SYSTEM**

- 1. Main switch
- 5. Fuel injection system fuse
- 7. Main fuse
- 8. Battery
- 14.Fuel pump
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 40.ECU (engine control unit)
- 50.Coupler 5 (wire harness–front cowling wire harness)
- 55.Ignition fuse

# CIRCUIT DIAGRAM (2/2)

#### Front cowling wire harness

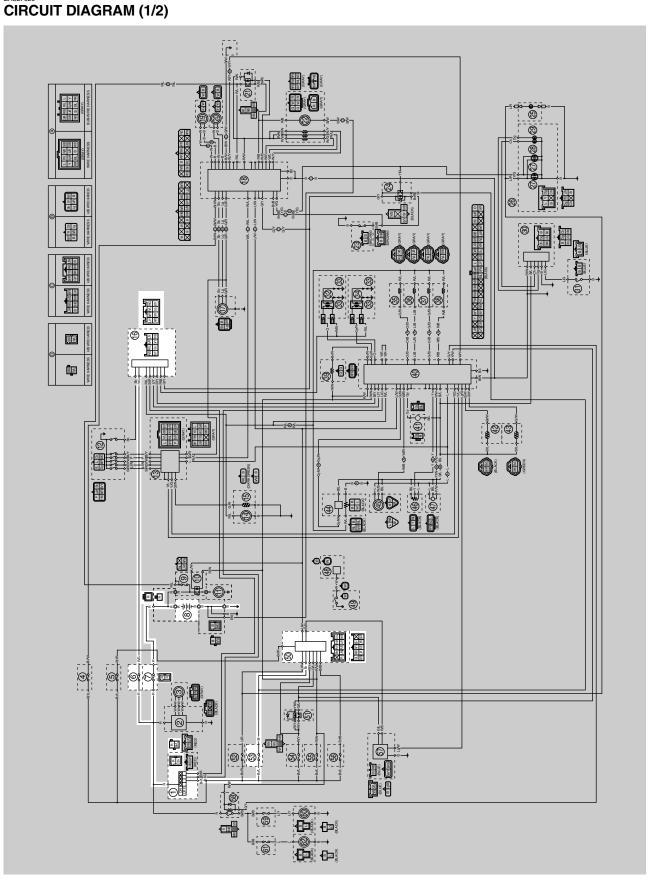


#### **FUEL PUMP SYSTEM**

- 16.Coupler 2 (front cowling wire harness–wire harness)
- 50.Coupler 5 (front cowling wire harness–wire harness)
- 67.Engine stop switch
- 76.Relay unit
- 78. Fuel pump relay

NOTE: Before troubleshooting, remove the follow 1. Front cowling assembly 2. Fuel tank 3. T-bar	ing part(s):	
<ol> <li>Check the fuses. (Main, ignition, and fuel injection system) Refer to "CHECKING THE FUS- ES" on page 8-217.</li> </ol>	$NG \rightarrow$	Replace the fuse(s).
OK↓		
<ol> <li>Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.</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 8-211.	$\text{NG} \rightarrow$	Replace the main switch.
ОК↓		
4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the right handlebar switch.
ОК↓		
<ol> <li>Check the relay unit (fuel pump re- lay).</li> <li>Refer to "CHECKING THE RE- LAYS" on page 8-221.</li> </ol>	$NG \to$	Replace the relay unit.
OK↓		
6. Check the fuel pump. Refer to "CHECKING THE FUEL PUMP BODY" on page 7-3.	$NG \to$	Replace the fuel pump assembly.
OK↓		L
<ol> <li>Check the entire fuel pump system wiring. Refer to "CIRCUIT DIAGRAM (1/2)" on page 8-101 and "CIRCUIT DIA- GRAM (2/2)" on page 8-103.</li> </ol>	$NG \rightarrow$	Properly connect or repair the fuel pump system wiring.
OK↓		
Replace the ECU.		

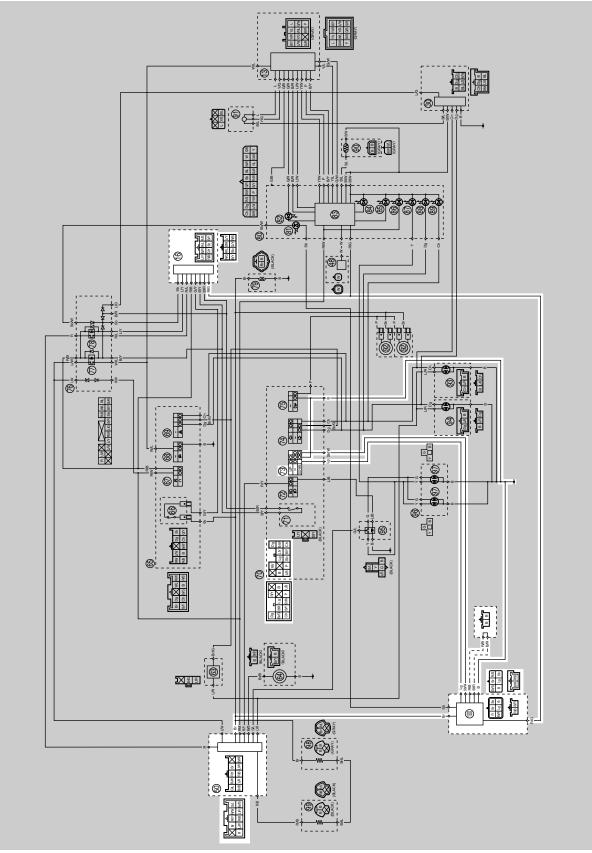
#### EAS27620



- 1. Main switch
- 6. Backup fuse (odometer, clock, and windshield drive system)
- 7. Main fuse
- 8. Battery
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 50.Coupler 5 (wire harness-front cowling wire harness)
- 53. Signaling system fuse

# CIRCUIT DIAGRAM (2/2)

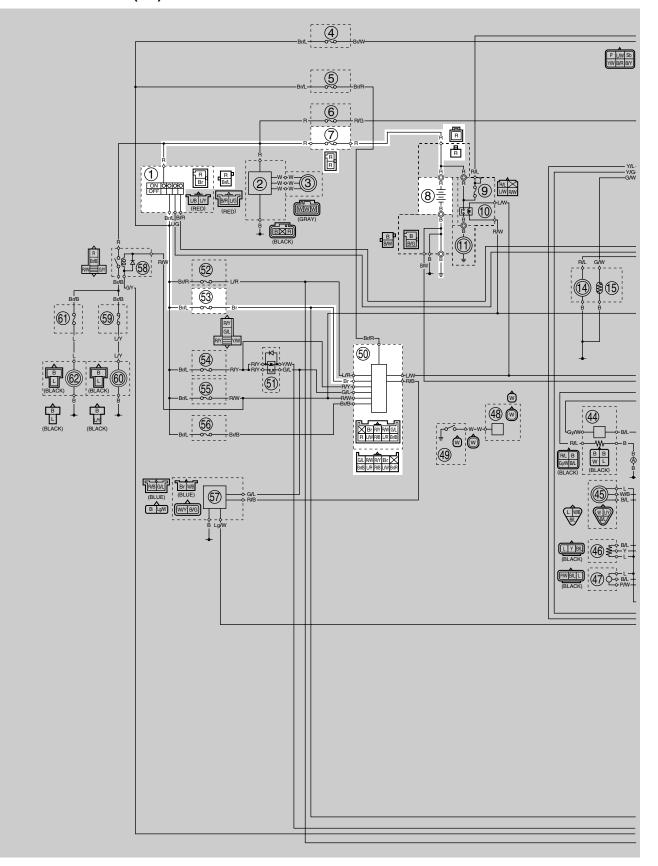
#### Front cowling wire harness



- 16.Coupler 2 (front cowling wire harness–wire harness)
- 50.Coupler 5 (front cowling wire harness-wire harness)
- 73.Windshield position switch
- 100.Windshield drive unit

TROUBLESHOOTING The windshield fails to operate. NOTE: Before troubleshooting, remove the follow I. Front cowling assembly 2. Fuel tank 3. T-bar	ing part(s):	
<ol> <li>Check the fuses. (Main, signaling system, and back- up) Refer to "CHECKING THE FUS- ES" on page 8-217.</li> </ol>	$NG \rightarrow$	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.	NG  ightarrow	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
ОК↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$\text{NG} \rightarrow$	Replace the main switch.
ОК↓		
<ol> <li>Check the windshield position switch.</li> <li>Refer to "CHECKING THE SWITCHES" on page 8-211.</li> </ol>	$NG \to$	Replace the left handlebar switch.
ОК↓		
<ol> <li>Check the entire windshield drive system wiring. Refer to "CIRCUIT DIAGRAM (1/2)" on page 8-107 and "CIRCUIT DIA- GRAM (2/2)" on page 8-109.</li> </ol>	$NG \rightarrow$	Properly connect or repair the windshield drive system wiring.
ОК↓		
Replace the windshield drive unit.		

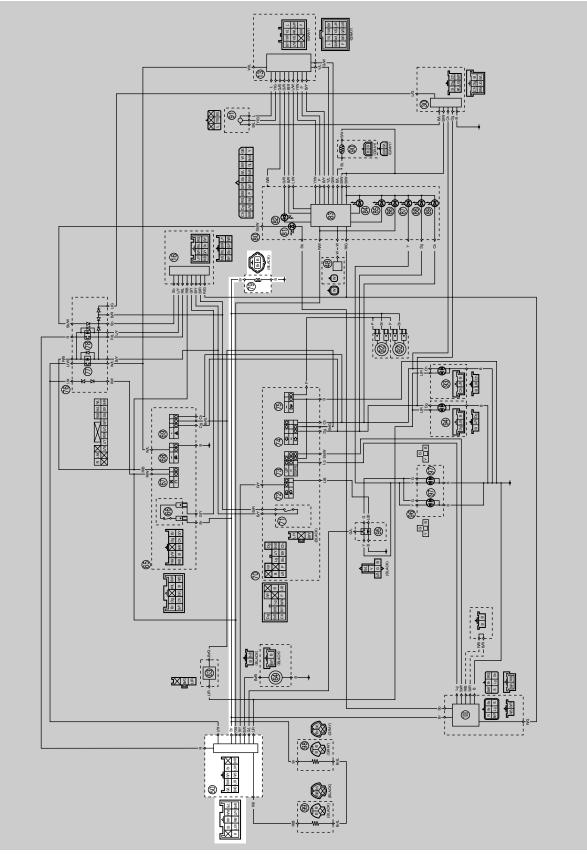
# CIRCUIT DIAGRAM (1/2)



- 1. Main switch
- 7. Main fuse
- 8. Battery
- 50.Coupler 5 (wire harness–front cowling wire harness)
- 53.Signaling system fuse

# CIRCUIT DIAGRAM (2/2)

#### Front cowling wire harness

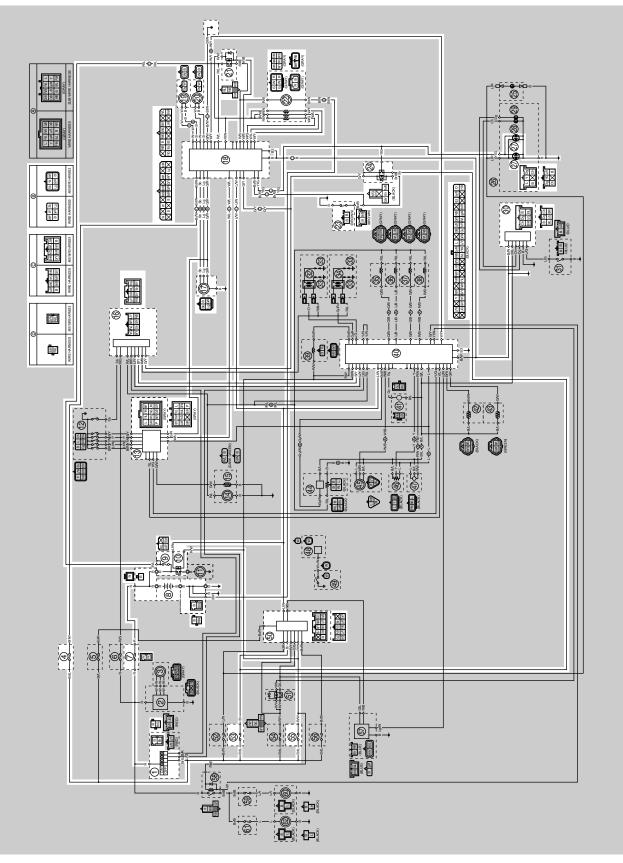


50.Coupler 5 (front cowling wire harness–wire harness)79.Accessory box solenoid

TROUBLESHOOTING The accessory box fails to operate.		
<ul> <li>Before troubleshooting, remove the follow</li> <li>1. Front cowling assembly</li> </ul>	ving part(s):	
<ol> <li>Check the fuses. (Main and signaling system) Refer to "CHECKING THE FUS- ES" on page 8-217.</li> </ol>	$\text{NG} \rightarrow$	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.	$NG \to$	<ul> <li>Clean the battery terminals.</li> <li>Recharge or replace the battery.</li> </ul>
ОК↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	$NG \to$	Replace the main switch.
ОК↓		
4. Check the accessory box solenoid. Refer to "CHECKING THE ACCES- SORY BOX SOLENOID" on page 8-234.	$NG \to$	Replace the accessory box solenoid.
OK ↓		
<ol> <li>Check the entire accessory box system wiring. Refer to "CIRCUIT DIAGRAM (1/2)" on page 8-107 and "CIRCUIT DIA- GRAM (2/2)" on page 8-109.</li> </ol>	NG  ightarrow	Properly connect or repair the accessory box system wiring.
OK↓		
This accessory box system circuit is OK.		

#### EAS27730

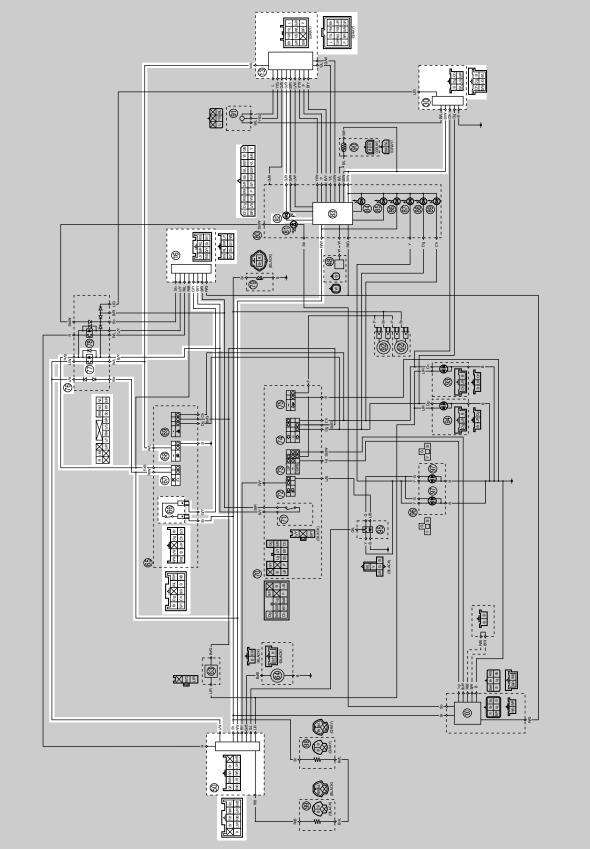
## CIRCUIT DIAGRAM (1/2) (FJR13A)



- 1. Main switch
- 4. ABS ECU fuse
- 7. Main fuse
- 8. Battery
- 9. ABS motor fuse
- 10.Starter relay
- 13.Coupler 1 (wire harness–front cowling wire harness)
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 17.ABS test coupler
- 18.ABS ECU (electronic control unit)
- 19.Front wheel sensor
- 20.Rear wheel sensor
- 21.ABS motor relay
- 22.Hydraulic unit
- 23.Rear brake light switch
- 24.Brake light relay
- 27.Tail/brake light
- 30.Coupler 3 (wire harness–front cowling wire harness)
- 40.ECU (engine control unit)
- 50.Coupler 5 (wire harness-front cowling wire harness)
- 53. Signaling system fuse
- 55.Ignition fuse

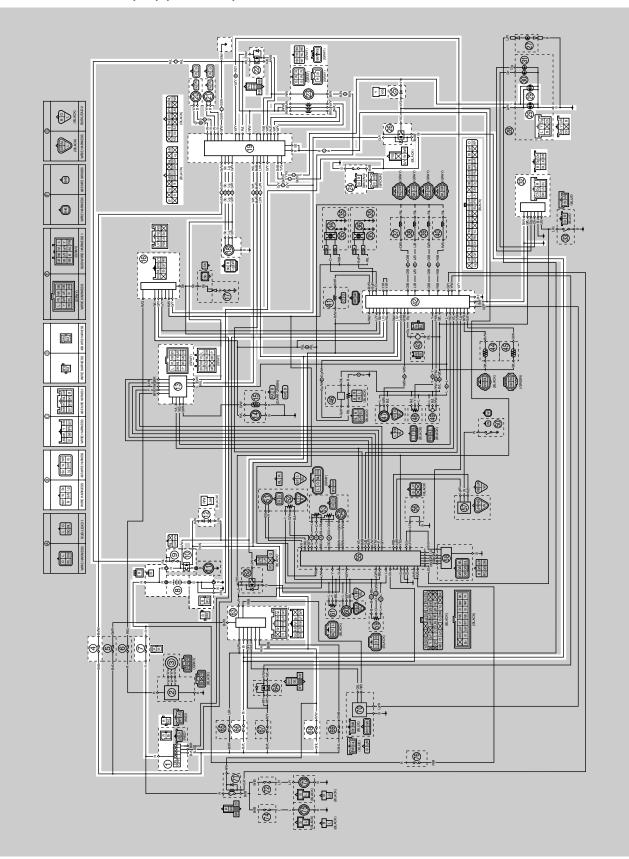
# CIRCUIT DIAGRAM (2/2) (FJR13A)

### Front cowling wire harness



- 13.Coupler 1 (front cowling wire harness–wire harness)
- 16.Coupler 2 (front cowling wire harness–wire harness)
- 30.Coupler 3 (front cowling wire harness–wire harness)
- 50.Coupler 5 (front cowling wire harness-wire harness)
- 66. Front brake light switch
- 67.Engine stop switch
- 68.Start switch
- 76.Relay unit
- 77.Starting circuit cut-off relay
- 82.ABS warning light
- 83.Multi-function meter

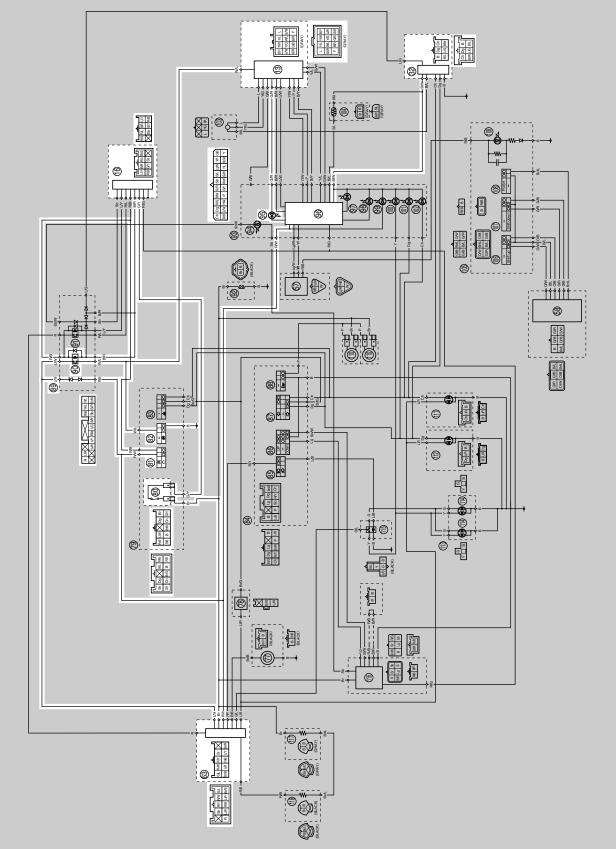
CIRCUIT DIAGRAM (1/2) (FJR13AE)



- 1. Main switch
- 4. ABS ECU fuse
- 7. Main fuse
- 8. Battery
- 9. ABS motor fuse
- 10.Starter relay
- 12.Diode 1
- 13.Coupler 1 (wire harness–front cowling wire harness)
- 16.Coupler 2 (wire harness-front cowling wire harness)
- 18.ABS test coupler
- 19.ABS ECU (electronic control unit)
- 20.Front wheel sensor
- 21.Rear wheel sensor
- 22.ABS motor relay
- 23.Hydraulic unit
- 24.Rear brake light switch
- 25.Diode 2
- 26.Brake light relay
- 29.Tail/brake light
- 32.Coupler 3 (wire harness–front cowling wire harness)
- 42.ECU (engine control unit)
- 63.Coupler 5 (wire harness-front cowling wire harness)
- 66.Signaling system fuse
- 68.Ignition fuse

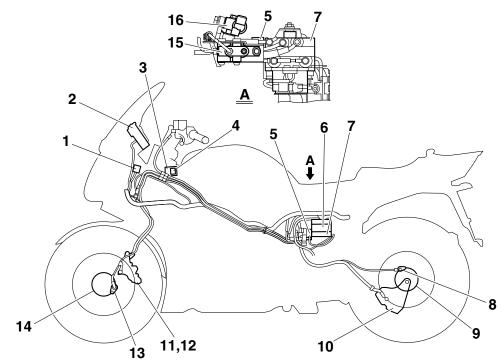
# CIRCUIT DIAGRAM (2/2) (FJR13AE)

### Front cowling wire harness



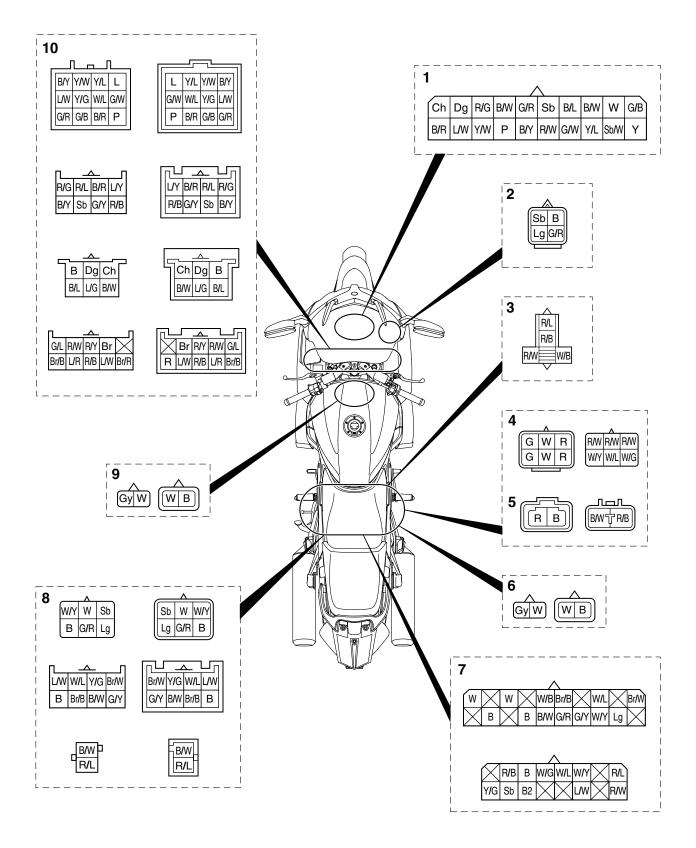
- 13.Coupler 1 (front cowling wire harness–wire harness)
- 16.Coupler 2 (front cowling wire harness–wire harness)
- 32.Coupler 3 (front cowling wire harness–wire harness)
- 63.Coupler 5 (front cowling wire harness–wire harness)
- 80. Front brake light switch
- 81.Engine stop switch
- 82.Start switch
- 89.Relay unit
- 90.Starting circuit cut-off relay
- 95.ABS warning light
- 96.Multi-function meter

# ABS COMPONENTS CHART

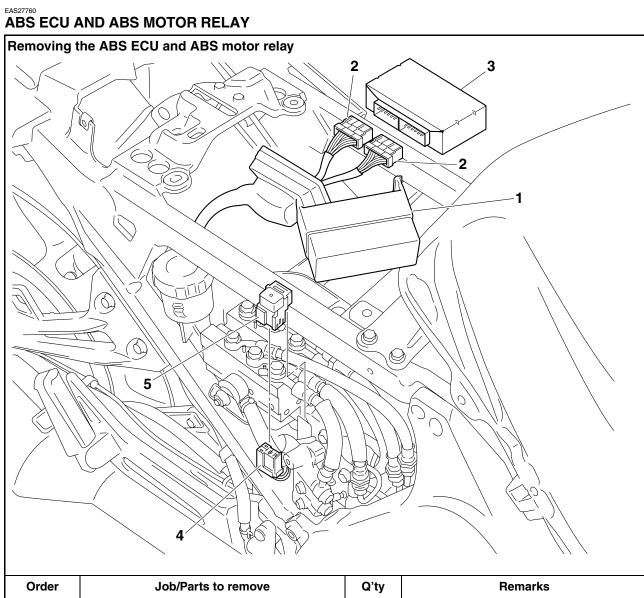


- 1. ABS test coupler
- 2. ABS warning light
- 3. ABS ECU fuse
- 4. ABS motor fuse
- 5. ABS motor relay
- 6. ABS ECU (electronic control unit)
- 7. Hydraulic unit (HU)
- 8. Rear wheel sensor
- 9. Rear wheel sensor rotor
- 10. Rear brake caliper
- 11. Left front brake caliper
- 12. Right front brake caliper (partially operated together with the rear brake)
- 13. Front wheel sensor
- 14. Front wheel sensor rotor
- 15. Proportioning valve
- 16. Metering valve

# ABS COUPLER LOCATION CHART



- 1. Meter assembly coupler
- 2. ABS test coupler
- 3. ABS motor relay coupler
- 4. Hydraulic unit solenoid coupler
- 5. ABS motor coupler
- 6. Rear wheel sensor coupler
- 7. ABS ECU coupler
- 8. Wire harness-ABS wire harness coupler
- 9. Front wheel sensor coupler
- 10. Wire harness-front cowling wire harness coupler



Order	Job/Parts to remove	Q'ty	Remarks
	Rear side cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Storage compartment		Refer to "GENERAL CHASSIS" on page 4-1.
1	ABS ECU cover	1	
2	ABS ECU coupler	2	Disconnect.
3	ABS ECU	1	
4	ABS motor relay coupler	1	Disconnect.
5	ABS motor relay	1	
			For installation, reverse the removal proce- dure.

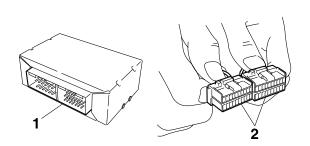
## MAINTENANCE OF THE ABS ECU

### Checking the ABS ECU

- 1. Check:
- Terminals "1" of the ABS ECU Cracks/damages  $\rightarrow$  Replace the ABS ECU.
- Terminals "2" of the ABS ECU couplers Connection defective, contaminated, comeoff → Correct or clean.

#### NOTE:

If the ABS ECU couplers are clogged with mud or dirt, clean with compressed air.



## EAS27780

## MAINTENANCE OF THE ABS MOTOR RELAY

## Checking the ABS motor relay

- 1. Check:
- ABS motor relay Refer to "CHECKING THE ABS MOTOR RE-LAY" on page 8-223.

#### EAS22770

### MAINTENANCE OF THE HYDRAULIC UNIT

Checking the hydraulic unit (solenoid valve resistance and ABS motor continuity)

### CAUTION:

When checking the hydraulic unit solenoid valves and ABS motor, do not remove the brake hoses.

- 1. Check:
- Solenoid valve resistance Out of specification → Replace the hydraulic unit.



Solenoid valve resistance 2.96–3.20 Ω at 20 °C (68 °F)

### NOTE: _____

Measure the resistance of the front brake, rear brake, and unified brake system solenoid valves.

#### *****

a. Connect the pocket tester ( $\Omega \times 1$ ) to the solenoid valve terminals as shown.

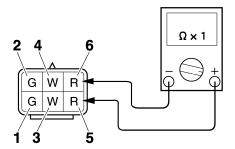
#### Pocket tester 90890-03112 Analog pocket tester YU-03112-C

Rear brake solenoid valve

- Positive tester probe → terminal "1"
- Negative tester probe → terminal "2"
- Front brake solenoid valve
- Positive tester probe → terminal "3"
- Negative tester probe → terminal "4"

Unified brake system solenoid valve

- Positive tester probe → terminal "5"
- Negative tester probe →
- terminal "6"



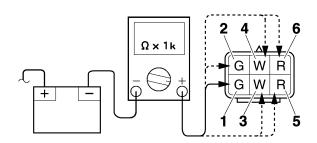
b. Measure the solenoid valve resistance.

#### *****

- 2. Check:
- Solenoid valve insulation Continuity → Replace the hydraulic unit.
- .....
- a. Connect the pocket tester  $(\Omega \times 1k)$  to the solenoid terminal and negative battery terminal.

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

- Positive tester probe  $\rightarrow$
- terminals "1", "2", "3", "4", "5", and "6"
- Negative tester probe  $\rightarrow$
- negative battery terminal



b. Check the solenoid valve insulation.

### *****

3. Check:

EAS27790

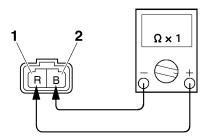
- ABS motor continuity
- No continuity  $\rightarrow$  Replace the hydraulic unit.
- a. Connect the pocket tester ( $\Omega \times 1$ ) to the ABS
- motor coupler as shown.

ABS TROUBLESHOOTING OUTLINE

# A CONTRACTOR

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

- Positive tester probe  $\rightarrow$
- terminal "1"
- Negative tester probe  $\rightarrow$ 
  - terminal "2"



b. Check the ABS motor for continuity.

*****

This section describes the troubleshooting for the ABS in detail. Read this service manual carefully and make sure you fully understand the information provided before repairing any malfunctions or performing service.

The ABS ECU (electronic control unit) has a self-diagnosis function. When failures occur in the system, the ABS warning light on the meter assembly indicates a malfunction.

The following troubleshooting describes the problem identification and service method according to the indications by the multi-function display. For troubleshooting items other than the following items, follow the normal service method.

#### EW3P61011 WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer. (Refer to "[D-3] FINAL CHECK" on page 8-157.)

## ABS operation when the ABS warning light comes on

- The ABS warning light remains on → ABS operates as a normal brake system.
   A malfunction was detected using the ABS self-diagnosis function.
- 2. The ABS warning light comes on, and then goes off when starting the engine  $\rightarrow$  ABS operation is normal.
  - The ABS warning light comes on for 2 seconds, and then goes off every time the main switch is turned to "ON".
  - The ABS warning light comes on while the start switch is being pushed.
- 3. The ABS warning light flashes  $\rightarrow$  ABS operation is normal.
  - The front or rear brake light switch is defective or improperly adjusted.
  - The rear wheel is racing.
  - The vehicle is continuously ridden on extremely uneven roads.

## Self-diagnosis and servicing

The ABS ECU has a self-diagnosis function. By utilizing this function, quick problem identification and service are possible. Previous malfunctions can be checked since the ABS ECU also stores the malfunction history.

In case malfunctions are detected:

The light cannot be used to recall the malfunction codes from the memory of the ABS ECU if the ABS warning light is already on. Connect the test coupler adapter to the ABS test coupler, and then connect a pocket tester to the light green terminal of the adapter and the positive battery terminal to determine the malfunction codes by the movement of the pocket tester needle.

In case any malfunctions are not detected:

The multi-function display indicates all the malfunction codes recorded in the ABS ECU.

You can also recall the malfunction codes by using a pocket tester. Note all of the indicated malfunction codes if more than two malfunction codes are stored in the memory.

Deleting the malfunction code(s):

When the service is finished, check the normal operation of the vehicle, and then delete the malfunction code(s). (Refer to "[D-3] FINAL CHECK" on page 8-157.) By deleting the malfunction codes stored in the ABS ECU memory, it is possible to pursue the cause correctly if another malfunction occurs.

## Self-diagnosis using the ABS ECU

The ABS ECU performs a static check of the entire system when the main switch is turned to "ON". It also checks for malfunctions while the vehicle is ridden. Since all malfunctions are recorded after they are detected, it is possible to check the recorded malfunction data by using a pocket tester or by utilizing the multi-function display when the ABS ECU has entered the self-diagnosis mode.

# Special precautions for handling and servicing a vehicle equipped with ABS

#### **CAUTION:**

# Care should be taken not to damage components by subjecting them to shocks or pulling on them with too much force since the ABS components are precisely adjusted.

- The ABS ECU, hydraulic unit, wheel sensors, and ABS motor relay are united assemblies and cannot be disassembled.
- The malfunction history is stored in the memory of the ABS ECU. Delete the malfunction codes when the service is finished. (This is because the past malfunction codes will be displayed again if another malfunction occurs.)

EAS27800 BASIC INSTRUCTIONS FOR TROUBLESHOOTING EW3P61004 WARNING

Perform the troubleshooting [A] → [B] → [C] → [D] in order. Be sure to follow the order since
a wrong diagnosis could result if the steps are followed in a different order or omitted.

### • Use sufficiently charged regular batteries only.

[A] Malfunction check using the ABS warning light

[B] Detailed check of the malfunction

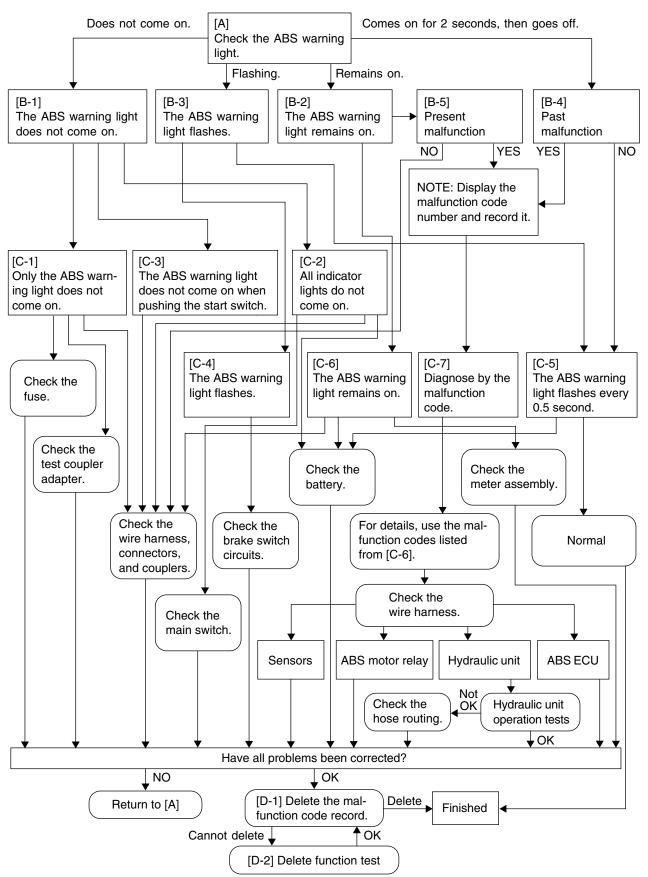
The results of the self-diagnosis by the ABS ECU can be displayed using the multi-function display or a pocket tester.

[C] Supposing the malfunction cause and position

Find the malfunction cause by reasoning the place and situation where it occurred.

[D] Servicing the ABS

Execute the final check after disassembly and assembly.



#### EAS27810 BASIC PROCESS FOR TROUBLESHOOTING

#### NOTE:

Do not delete the malfunction codes during the troubleshooting procedures. Be sure to delete the codes when the service is finished.

# WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer. (Refer to "[D-3] FINAL CHECK" on page 8-157.)

#### EAS27830

## [A] CHECKING THE ABS WARNING LIGHT

Turn the main switch to "ON". (Do not start the engine.)

- 1. The ABS warning light does not come on. [B-1]
- 2. The ABS warning light remains on. [B-2]
- 3. The ABS warning light flashes. [B-3]
- 4. The ABS warning light comes on for 2 seconds, then goes off. [B-4]

ET3P61061

## [B-1] THE ABS WARNING LIGHT DOES NOT COME ON

- 1. Only the ABS warning light fails to come on when the main switch is turned to "ON". [C-1]
- 2. The ABS warning light and all other indicator lights fail to come on. [C-2]
- 3. The ABS warning light fails to come on while the start switch is being pushed. [C-3]

#### ET3P61062

### [B-2] THE ABS WARNING LIGHT REMAINS ON

- 1. A present malfunction is detected. [B-5]
- 2. The ABS warning light remains on. [C-6]

#### ET3P61063

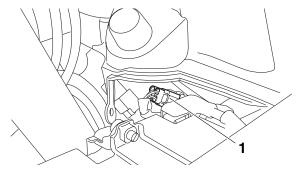
### [B-3] THE ABS WARNING LIGHT FLASHES

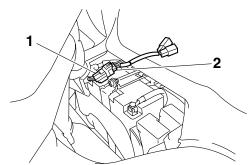
- 1. The ABS warning light flashes. [C-4]
- 2. The ABS warning light flashes every 0.5 second. [C-5]

EAS27860

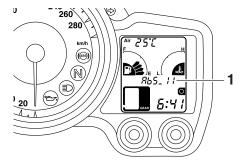
### [B-4] MALFUNCTION CHECK BY THE ABS SELF-DIAGNOSIS (PAST MALFUNCTION)

Remove front cowling right inner panel 1 to access the ABS test coupler "1". Remove the protective cap from the ABS test coupler, and then connect the test coupler adapter "2" to the coupler. The T/C terminal (sky blue) is now grounded.





1. The malfunction code "1" is displayed on the multi-function display (example: malfunction code 11).



2. The ABS warning light flashes every 0.5 second for more than 6 seconds. The ABS warning light flashes every 0.5 second if a malfunction code for a past malfunction is not stored in the memory of the ABS ECU. The ABS warning light flashes quicker if a malfunction code is displayed on the multi-function display. If no malfunction code is displayed, make sure that the customer understands the possible conditions that may cause the ABS warning light to come on or flash even if the system is normal.

#### NOTE:

- The ABS malfunction codes will not be displayed if a fault code for the fuel injection system is displayed on the multi-function display. To display the ABS malfunction codes, delete the fuel injection system fault codes, and then start the check again.
- The test coupler adapter must be connected to the ABS test coupler to display the malfunction codes. If the adapter is not connected, the ABS warning light will come on or flash, but no malfunction codes will be displayed.

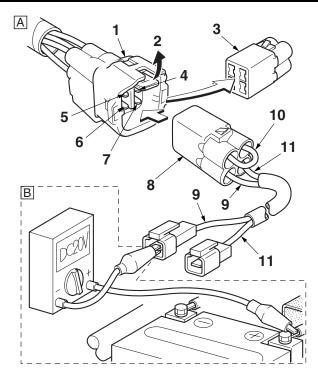
#### EAS27870

#### [B-5] MALFUNCTION CHECK BY THE ABS SELF-DIAGNOSIS (PRESENT MALFUNCTION)

Remove front cowling right inner panel 1 to access the ABS test coupler. Connect the test coupler adapter to the ABS test coupler in order to ground the T/C terminal (sky blue). (Figure A) Because malfunction codes for present malfunctions are not displayed on the multi-function display, check the malfunction codes as follows.

Set the range of the pocket tester to DC 20 V. Connect the negative tester probe to the T/F terminal (light green) and the positive tester probe to the positive battery terminal. (Figure B)

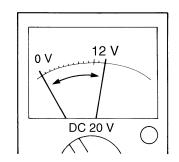
Determine the malfunction code according to the movement of the pocket tester needle. (Figure C)



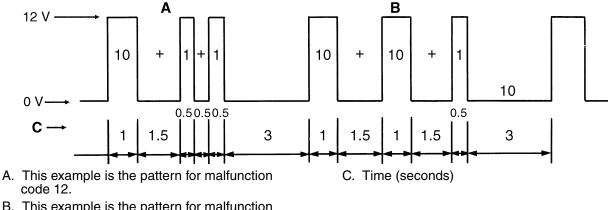
- 1. ABS test coupler
- 2. Lock plate
- 3. Protective cap
- 4. Ground terminal (black)
- 5. T/C terminal (sky blue)
- 6. T/F terminal (light green)

С

- 7. ABS warning light terminal (green/red)
- 8. Test coupler adapter
- 9. Light green lead
- 10. Black lead
- 11. White/red lead



As an example, a "10 digits/1 digit pattern" of the tester reading is shown below.



B. This example is the pattern for malfunction code 21.

#### EAS27840

# [C-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON WHEN THE MAIN SWITCH IS TURNED TO "ON"

Disconnect the ABS ECU couplers and meter assembly coupler, and then connect the test coupler adapter to the ABS test coupler.

- 1. Check for continuity between the white/red terminal of the test coupler adapter and the ground.
- If there is continuity, ABS wire harness, front cowling wire harness or the wire harness is defective. Properly repair or replace the defective harness.
- 2. Disconnect the ABS ECU couplers and check that the ABS warning light comes on when the main switch is turned to "ON".
- If the ABS warning light comes on, the ABS ECU is defective. Replace the ABS ECU.
- If the ABS warning light does not come on, the meter assembly circuit (including the ABS warning light [LED]) is defective. Replace the meter assembly.

#### ET3P61064

## [C-2] THE ABS WARNING LIGHT AND ALL OTHER INDICATOR LIGHTS FAIL TO COME ON

- 1. Main switch
- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES" on page 8-211.
- If there is no continuity, replace the main switch.
- 2. Battery
- Check the condition of the battery.

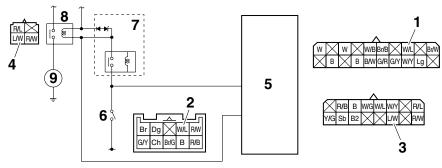
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.

- If the battery is defective, clean the battery terminals and recharge it, or replace the battery.
- 3. Main fuse
- Check the main fuse for continuity. Refer to "CHECKING THE FUSES" on page 8-217.
- If the main fuse is blown, replace the fuse.
- 4. Wiring
- Check the entire multi-function meter wiring. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.
- If the wiring is defective, properly connect or repair the multi-function meter wiring.
- If the wiring is good, check the condition of each multi-function meter circuit.

#### ET3P61065

# [C-3] THE ABS WARNING LIGHT FAIL TO COME ON WHILE THE START SWITCH IS BEING PUSHED

- 1. Wire harness, ABS wire harness, and front cowling wire harness
- Check the white/blue lead for continuity between "1" and "2" of the start switch monitor circuit.
- If there is no continuity, the wire harness, ABS wire harness, or front cowling wire harness is defective. Properly repair or replace the defective harness.
- 2. Wire harness and ABS wire harness
- Check the blue/white lead for continuity between "3" and "4" of the starter motor monitor circuit.
- If there is no continuity, the wire harness or ABS wire harness is defective. Properly repair or replace the defective harness.



- 5. ABS ECU
- 6. Start switch

- 8. Starter relay
   9. Starter motor
- 7. Relay unit (starting circuit cut-off relay)

#### ET3P61066

## [C-4] THE ABS WARNING LIGHT FLASHES

With the engine off, check the front and rear brake light switches.

Check that the rear brake light switch is adjusted properly, and then check if the brake light comes on when the front or rear brake is applied.

- 1. The brake light does not come on for only one brake.
- The corresponding brake light switch connector or coupler is disconnected. Refer to "CIRCUIT DI-AGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.

### • The corresponding brake light switch is defective.

- 2. The brake light does not come on for either brake.
- The wire harness and front cowling wire harness may be disconnected or the fuse may be blown. Check the fuse and make sure that the wire harness (brown or brown/black lead) is connected to the power source end of the brake light switch. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.
- 3. The brake light comes on.
- The ABS wire harness, front cowling wire harness, and the wire harness couplers may be disconnected. Refer to "ABS COUPLER LOCATION CHART" on page 8-129.

#### ET3P61067

## [C-5] THE ABS WARNING LIGHT FLASHES EVERY 0.5 SECOND

The ABS warning light flashes every 0.5 second if a malfunction code for a past malfunction is not stored in the memory of the ABS ECU. The ABS warning light flashes quicker if a malfunction code is displayed on the multi-function display. If no malfunction code is displayed, make sure that the customer understands the possible conditions that may cause the ABS warning light to come on or flash even if the system is normal.

1. ABS warning light flashes

The following are probable causes to explain why the ABS warning light flashed while riding, and then stopped flashing, or stopped flashing when the main switch was turned to "OFF", then back to "ON".

- The rear wheel was rotated with the vehicle on the centerstand. The system is normal.
- The rear wheel raced. The system is normal.
- The vehicle was ridden on the rear wheel with the front wheel elevated. The system is normal.

- The vehicle was continuously ridden on extremely uneven roads. The system is normal.
- The front or rear brake light switch is defective or improperly adjusted. Replace or adjust.

#### ET3P61068

## [C-6] THE ABS WARNING LIGHT REMAINS ON

- 1. The battery voltage is low.
- Check the condition of the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.
- If the battery voltage is low, clean the battery terminals and recharge it, or replace the battery.
- 2. A present malfunction is detected.
- Connect the test coupler adapter to the ABS test coupler and utilize the ABS self-diagnosis function to check the present malfunctions.
- Perform the troubleshooting according to the detected malfunction codes. Refer to "[C-7] DIAGNOSIS BY THE MALFUNCTION CODE" on page 8-142.
- 3. ABS is stopped by the ABS ECU

The ABS ECU may stop the ABS operation if it is exposed to extremely strong electromagnetic waves or static electricity.

When the ABS ECU is no longer exposed to the electromagnetic waves or static electricity, and the ABS warning light is not flashing, the ABS will operate again. Explain to the customer that the ABS will operate normally.

- 4. ABS ECU fuse
- Check the ABS ECU fuse for continuity. Refer to "CHECKING THE FUSES" on page 8-217.
- If the ABS ECU fuse is blown, replace the fuse.
- 5. ABS ECU couplers, ABS wire harness, front cowling wire harness, and wire harness
- Check the ABS ECU couplers and wire harness couplers for continuity.
- Check the ABS wire harness, front cowling wire harness, and wire harness for continuity. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.
- If the anti-lock brake system wiring is defective, properly connect or replace the ABS ECU couplers, ABS wire harness, front cowling wire harness and wire harness.
- 6. Check the connection of the ABS wire harness to the ABS ECU.
- Check that the ABS wire harness is securely connected to the ABS ECU. (Refer to "ABS COUPLER LOCATION CHART" on page 8-129.)
- 7. The ABS ECU, ABS wire harness, front cowling wire harness or wire harness couplers are disconnected.
- Connect the couplers if they are disconnected.
- 8. There is a break or disconnection in the wire harness, ABS wire harness, front cowling wire harness between the ABS ECU and the meter assembly (ABS warning light).
- Check for continuity between the green/red terminal of the ABS ECU coupler and the green/red terminal of the meter assembly coupler.
- If there is no continuity, ABS wire harness, front cowling wire harness or the wire harness is defective. Properly repair or replace the defective harness.
- 9. The meter assembly circuit is defective.
- Disconnect the ABS ECU couplers, and then connect the test coupler adapter to the ABS test coupler.
- Ground the white/red lead of the test coupler adapter.
- Turn the main switch to "ON", and then check that the ABS warning light goes off.
- If the ABS warning light does not go off, the meter assembly is defective. Replace the meter assembly.
- If the ABS warning light goes off, the ABS ECU is defective. Replace the ABS ECU.

## 8-141

#### EAS27880

#### [C-7] DIAGNOSIS BY THE MALFUNCTION CODE

Connect the test coupler adapter to the ABS test coupler, and then connect a pocket tester to the light green terminal of the adapter and the positive battery terminal to determine the malfunction code by the movement of the pocket tester needle.

Information for the malfunction codes from the ABS ECU, for both past and present malfunctions, is contained in the following table. Refer to the following table for troubleshooting.

NOTE: _

Record all of the malfunction codes displayed and inspect the check points.

Malfunc- tion code	Problem	Check point	Reference
11*	Front wheel sensor signal is not re- ceived properly.	<ul> <li>Installation of the front wheel sensor</li> <li>Front wheel sensor lead and coupler</li> <li>Wire harness and ABS wire harness (front wheel sensor circuit)</li> <li>Front wheel sensor rotor</li> </ul>	Malfunction code 11 (See page 8-145.)
12	Rear wheel sensor signal is not re- ceived properly.	<ul> <li>Installation of the rear wheel sensor</li> <li>Rear wheel sensor lead and coupler</li> <li>ABS wire harness (rear wheel sensor circuit)</li> <li>Rear wheel sensor rotor</li> </ul>	Malfunction code 12 (See page 8-146.)
13/26, 14/27	Incorrect signal from the front (13/26) or rear (14/27) wheel sensor is detected. 13 12 V $_{0 V}$ $_{0 V}$	<ul> <li>Installation of the wheel sensors</li> <li>Wheel sensor housings</li> <li>Wheel sensor rotors</li> </ul>	Malfunction codes 13, 14, 26 and 27 (See page 8-147.)

Malfunc- tion code	Problem	Check point	Reference
15/16	No continuity in the front or rear wheel sensor circuits. 15 ^{12 V} _{0 V} 16 ^{12 V} _{0 V}	<ul> <li>Continuity of the sensor circuits</li> <li>Wire harness and ABS wire harness (ABS circuit)</li> <li>Connection of the wheel sensor couplers</li> </ul>	Malfunction codes 15 and 16 (See page 8-147.)
21	Hydraulic unit solenoid circuit is broken or short-circuited.	<ul> <li>ABS wire harness (ABS circuit)</li> <li>Hydraulic unit solenoid coupler</li> <li>Hydraulic unit solenoids</li> </ul>	Malfunction code 21 (See page 8-148.)
23	Front or rear brake light switch is defec- tive.	<ul> <li>Improper adjustment of the rear brake light switch</li> <li>Brake light switches</li> <li>Brake light relay</li> <li>Wire harness, ABS wire harness, and front cowling wire harness (ABS circuit)</li> </ul>	Malfunction code 23 (See page 8-149.)
24	Brake light is defective.	<ul> <li>Brake light relay</li> <li>Brake light bulbs</li> <li>Wire harness and ABS wire harness (brake light circuit)</li> </ul>	Malfunction code 24 (See page 8-149.)
25	No signal is received from the front wheel sensor when the vehicle starts moving.	<ul> <li>Rear wheel was rotated when the vehicle was on the centerstand</li> <li>Slippage of the rear wheel</li> <li>The vehicle wheelies</li> <li>Installation of the front wheel sensor</li> <li>Wire harness and ABS wire harness (front wheel sensor circuit)</li> </ul>	Malfunction code 25 (See page 8-150.)
41	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is normal). 41	<ul> <li>Brake dragging</li> <li>Hydraulic unit operation tests</li> <li>Front wheel brake lines</li> </ul>	Malfunction code 41 (See page 8-150.)

Malfunc- tion code	Problem	Check point	Reference
42	Rear wheel will not recover from the locking tendency even though the sig- nal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is normal). 42	<ul> <li>Brake dragging</li> <li>Hydraulic unit operation tests</li> <li>Rear wheel brake lines</li> </ul>	Malfunction code 42 (See page 8-152.)
31	Disconnection is detected in the bat- tery and ABS ECU circuit.	<ul> <li>ABS motor fuse</li> <li>Wire harness and ABS wire harness (battery and ABS ECU circuit)</li> <li>ABS ECU couplers</li> </ul>	Malfunction code 31 (See page 8-153.)
32	ABS ECU circuit is broken or short-cir- cuited.	<ul> <li>Wire harness and ABS wire harness (ABS circuit)</li> <li>ABS ECU</li> </ul>	Malfunction code 32 (See page 8-153.)
33	ABS motor is defective (ABS motor stops and will not rotate).	<ul> <li>ABS motor fuse</li> <li>Wire harness and ABS wire harness (ABS circuit)</li> <li>ABS motor coupler</li> <li>ABS motor relay</li> <li>ABS motor circuit</li> </ul>	Malfunction code 33 (See page 8-153.)
34	ABS motor is defective (ABS motor keeps rotating and will not stop).	<ul> <li>ABS motor relay</li> <li>Wire harness and ABS wire harness (ABS circuit)</li> <li>ABS motor circuit</li> </ul>	Malfunction code 34 (See page 8-154.)
35	Disconnection is detected in the ABS ECU and hydraulic unit solenoid circuit.	<ul> <li>ABS wire harness (ABS ECU and hydraulic unit sole- noid circuit)</li> <li>Hydraulic unit solenoid cou- pler</li> </ul>	Malfunction code 35 (See page 8-154.)
51	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is low).	<ul> <li>Brake dragging</li> <li>Hydraulic unit operation tests</li> <li>Front wheel brake line</li> <li>Battery voltage</li> </ul>	Malfunction code 51 (See page 8-155.)

Malfunc- tion code	Problem	Check point	Reference
52	Rear wheel will not recover from the locking tendency even though the sig- nal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is low).	<ul> <li>Brake dragging</li> <li>Hydraulic unit operation tests</li> <li>Rear wheel brake line</li> <li>Battery voltage</li> </ul>	Malfunction code 52 (See page 8-155.)
Present malfunc- tion (pocket tester al- ways indi- cates 12 V)	ABS ECU may be malfunctioning.	<ul> <li>Wire harness and ABS wire harness (ABS test coupler circuit)</li> <li>Wire harness, ABS wire harness, front cowling wire harness (ABS warning light circuit)</li> <li>ABS ECU (replace)</li> </ul>	Maintenance of the ABS ECU (See page 8-132.)

* Malfunction code 11 is indicated if the rear wheel rotates for longer than about 20 seconds with the front wheel stopped (e.g., when the vehicle is on the centerstand).

#### NOTE:

Malfunction codes 15 (front wheel) and 16 (rear wheel) are indicated if a defective connection is detected in the front or rear wheel sensor when the vehicle is not being ridden.

#### Malfunction code 11 (Front wheel sensor signal is not received properly.)

Turn the main switch to "OFF", then back to "ON" after removing the test coupler adapter.

- 1. The ABS warning light remains on.
  - $\rightarrow$  Defective connection is detected in the front wheel sensor circuit.
- Front wheel sensor coupler is disconnected.
   Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20 and "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22.
- Front wheel sensor or lead is broken. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20 and "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22.
- Front wheel sensor circuit is disconnected. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.
- ABS ECU coupler terminal is disconnected. Refer to "MAINTENANCE OF THE ABS ECU" on page 8-132.
- 2. The ABS warning light comes on for 2.0 seconds, then goes off.
  - a. With the front wheel stopped, the rear wheel was rotated for longer than about 20 seconds. This is not a malfunction.
  - b. No signal is generated at the front wheel sensor.
    - Front wheel sensor is not installed properly. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20 and "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22.
    - Front wheel sensor rotor is defective. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20 and "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22.

- c. Front wheel sensor circuit is short-circuited.
  - Front wheel sensor or lead is short-circuited. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20 and "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22.
  - ABS wire harness and wire harness are short-circuited. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.
- d. Front wheel sensor output drops.
  - Sensor signal output may drop due to failure of the bearings, wheel axle, wheel, or sensor housing of the front wheel. Check these components, without removing them, for looseness, distortion, and bends.

#### Malfunction code 12 (Rear wheel sensor signal is not received properly.)

Turn the main switch to "OFF", then back to "ON".

- 1. The ABS warning light remains on.
  - $\rightarrow$  Defective connection is detected in the rear wheel sensor circuit.
- Rear wheel sensor coupler is disconnected.
   Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26 and "INSTALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
- Rear wheel sensor or lead is broken.
   Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26 and "INSTALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
- Rear wheel sensor circuit is disconnected. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.
- ABS ECU coupler terminal is disconnected. Refer to "MAINTENANCE OF THE ABS ECU" on page 8-132.
- 2. The ABS warning light comes on for 2.0 seconds, then goes off.
  - a. With the rear wheel stopped, the front wheel was rotated at a speed faster than about 11 km/h. This is not a malfunction.
  - b. No signal is generated at the rear wheel sensor.
    - Rear wheel sensor is not installed properly. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26 and "INSTALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
    - Rear wheel sensor rotor is defective.
       Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26 and "INSTALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
  - c. Rear wheel sensor circuit is short-circuited.
    - Rear wheel sensor or lead is short-circuited. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26 and "INSTALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
    - ABS wire harness is short-circuited. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.
  - d. Rear wheel sensor output drops.
    - Sensor signal output may drop due to failure of the bearings, wheel axle, wheel, or sensor housing of the rear wheel. Check these components, without removing them, for looseness, distortion, and bends.

#### NOTE: _

If the vehicle is continuously ridden on extremely uneven roads, the ABS warning light may flash and malfunction code 11 or 12 may be recorded depending on the condition.

# Malfunction codes 13/26 (front wheel) and 14/27 (rear wheel) (Incorrect signal from the front (13/26) or rear (14/27) wheel sensor is detected.)

1. The wheel sensors or sensor rotors are not properly installed.

- a. Installation of the front or rear wheel sensor
  - Check that the wheel sensor is properly installed in the housing. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20, "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22, "MAINTE-NANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26, and "IN-STALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
  - Check if there is looseness between the housing and wheel. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20, "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22, "MAINTE-NANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26, and "IN-STALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
- b. Installation of the front or rear wheel sensor rotor
  - Check that the sensor rotor is correctly pressed in the wheel. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20, "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22, "MAINTE-NANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26, and "IN-STALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
  - Check the rotor and inside the rotor housing for foreign materials. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20, "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22, "MAINTE-NANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26, and "IN-STALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
- 2. Teeth surfaces of the sensor rotors are defective.
- Check if there are flaws on the surfaces of the sensor rotor teeth. Also, check for any foreign materials.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20, "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22, "MAINTE-NANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26, and "INSTALL-ING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.

- 3. Sensor output has dropped.
- Sensor signal output may drop due to failure of the bearings, wheel axle, wheel, or sensor housing of the front or rear wheel. Check these components, without removing them, for looseness, distortion, and bends.

# Malfunction codes 15 (front wheel) and 16 (rear wheel) (No continuity in the front or rear wheel sensor circuit.)

Broken front or rear wheel sensor circuit is detected.

- Front or rear wheel sensor coupler is disconnected.
   Befer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AN
- Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20, "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22, "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26, and "INSTALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.

• Front or rear wheel sensor or lead is broken.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20, "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22, "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-26, and "INSTALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.

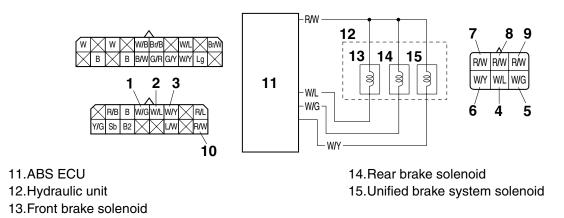
- Front or rear wheel sensor circuit is broken. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.
- ABS wire harness is disconnected from the ABS ECU coupler terminal. Refer to "MAINTENANCE OF THE ABS ECU" on page 8-132.

#### NOTE:

- Check that both the front and rear wheel sensor couplers are connected securely.
- If the vehicle is ridden after malfunction code 15 (front wheel) or 16 (rear wheel) is displayed, the malfunction code will be overwritten from 15 to 11 (front wheel) or from 16 to 12 (rear wheel).

#### Malfunction code 21 (Hydraulic unit solenoid circuit is broken or short-circuited.)

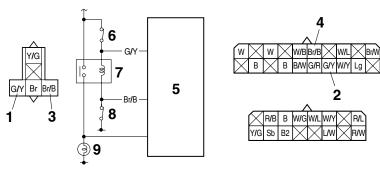
- 1. Hydraulic unit solenoid coupler
- Check if a hydraulic unit solenoid coupler terminal is disconnected. Refer to "ABS COUPLER LOCATION CHART" on page 8-129.
- 2. Hydraulic unit solenoids
- Check the solenoids (front brake, rear brake, and unified brake system) for continuity. Refer to "MAINTENANCE OF THE HYDRAULIC UNIT" on page 8-132.
- Check the insulation between each solenoid terminal and the negative battery terminal. Refer to "MAINTENANCE OF THE HYDRAULIC UNIT" on page 8-132.
- 3. ABS wire harness
- Check the white/green lead for continuity between "1" and "5" of the hydraulic unit solenoid circuit.
- Check the white/blue lead for continuity between "2" and "4" of the hydraulic unit solenoid circuit.
- Check the white/yellow lead for continuity between "3" and "6" of the hydraulic unit solenoid circuit.
- Check the red/white leads for continuity between "7" and "10", between "8" and "10", and between "9" and "10" of the hydraulic unit solenoid circuit.



• Check the insulation of the hydraulic unit solenoid circuits and the negative battery terminal.

#### Malfunction code 23 (Front or rear brake light switch is defective.)

- 1. Wire harness, ABS wire harness, and front cowling wire harness
- Check the entire anti-lock brake system wiring. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.
- 2. Brake light relay
- Check the brake light relay. Refer to "CHECKING THE RELAYS" on page 8-221.
- 3. Brake light switches (front and rear)
- Check the brake light switches (front and rear). Refer to "CHECKING THE SWITCHES" on page 8-211.
- 4. Rear brake light switch
- Check that the rear brake light switch is adjusted properly. Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-30.
- 5. Wire harness, ABS wire harness, and front cowling wire harness
  - Check the front and rear brake light switch monitor circuits.
  - Check the green/yellow lead for continuity between "1" and "2" of the front brake light switch monitor circuit.
  - Check the brown/black lead for continuity between "3" and "4" of the rear brake light switch monitor circuit.



- 5. ABS ECU
- 6. Front brake light switch
- 7. Brake light relay

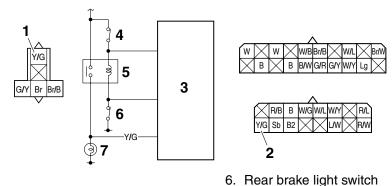
- 8. Rear brake light switch
- 9. Tail/brake light

#### Malfunction code 24 (Brake light is defective.)

- 1. Wire harness and ABS wire harness
- Check the entire anti-lock brake system wiring. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.
- 2. Brake light relay
- Check the brake light relay.

Refer to "CHECKING THE RELAYS" on page 8-221.

- 3. Wire harness and ABS wire harness
- Check the brake light monitor circuit.
- Check the yellow/green lead for continuity between "1" and "2" of the brake light monitor circuit.



- 3. ABS ECU
- 4. Front brake light switch
- 5. Brake light relay

7. Tail/brake light

# Malfunction code 25 (No signal is received from the front wheel sensor when the vehicle starts moving.)

- 1. If any of the following conditions have occurred, malfunction codes (past malfunctions) will be stored in the memory of the ABS ECU, but the ABS has not malfunctioned. Delete the malfunction codes.
- The rear wheel was rotated with the vehicle on the centerstand.
- The rear wheel raced.
- The vehicle was ridden on the rear wheel with the front wheel elevated.
- 2. The front wheel sensor is not properly installed.
- Check that the front wheel sensor is properly installed in the housing. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20 and "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22.
- Check if there is looseness between the housing and the wheel. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20 and "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22.
- 3. Front wheel sensor circuit is short-circuited.
- Front wheel sensor or lead is short-circuited. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20 and "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22.
- ABS wire harness and wire harness are short-circuited. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.

# Malfunction code 41 (Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is normal).)

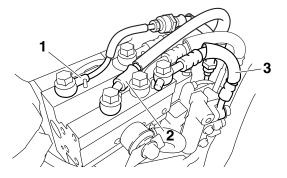
- 1. Rotation of wheel
- Check that there is no brake disc drag on the front wheel and make sure that it rotates smoothly.
- Check the front wheel axle for loose bearings and bends, and the brake discs for distortion.
- 2. Brake master cylinder and brake caliper
- Check that the brake fluid pressure is correctly transmitted to the brake calipers when the brake lever is operated and that the pressure decreases when the lever is released.
- 3. Brake fluid
- Visually check the brake fluid in the brake master cylinder reservoir and the brake fluid reservoir for water, foreign materials, solidification, and contamination.
- Check for air in the brake hose lines.
- 4. Brake hose lines
- Check the brake hose lines for kinks and deterioration.

#### 8-150

## WARNING

# Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake hose lines.

• Check that the connections of the brake hose lines from the brake master cylinder to the hydraulic unit and from the hydraulic unit to the front brake calipers and the metering valve are correct.



## WARNING

The front brakes will not function properly if the connections are incorrect.

- Brake hose "1" inlet: from the front brake master cylinder to the hydraulic unit
- Brake hose "2" outlet: from the hydraulic unit to the front brake calipers
- Brake hose "3" outlet: from the hydraulic unit to the metering valve

#### NOTE: _

- If the brake hose inlet and outlet connections are incorrect on the hydraulic unit, the brake lever will be pulled to its full-stroke position without responding, and then it will be pushed back slowly without pulsating when the final check on page "[D-3] FINAL CHECK" on page 8-157 is performed.
- If the front and rear brake hose connections are reversed on the hydraulic unit, the pulsating action in the brake lever and brake pedal will be performed in the reverse order when the final check on page "[D-3] FINAL CHECK" on page 8-157 is performed.
- If the brake hoses (to the proportioning valve and the metering valve) are switched during assembly, the brakes will continue to operate as normal. However, the reduction of the hydraulic pressure for the rear brake and part of the right front brake will be reversed during the ABS operation when the final check on page "[D-3] FINAL CHECK" on page 8-157 is performed.
- 5. Hydraulic unit solenoid coupler terminals
- Check if the front brake, rear brake, and unified brake system solenoid coupler terminals (hydraulic unit and ABS wire harness) are connected correctly.

	Terminal color	
	Solenoid	ABS wire harness
Front brake	white, white	red/white, white/blue
Rear brake	green, green	red/white, white/green
Unified brake system	red, red	red/white, white/yellow

#### 6. Hydraulic unit

If the malfunction is not corrected after checking items (1) to (5), replace the hydraulic unit. Be sure to connect the brake hoses and couplers correctly and securely. Check the hydraulic unit operation. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-60.

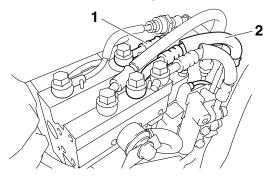
# Malfunction code 42 (Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is normal).)

- 1. Rotation of wheel
- Check that there is no brake disc drag on the rear wheel and make sure that it rotates smoothly.
- Check for brake disc distortion.
- 2. Brake master cylinder and brake caliper
- Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake pedal is operated and that the pressure decreases when the pedal is released.
- 3. Brake fluid
- Visually check the brake fluid in the brake fluid reservoir for water, foreign materials, solidification, and contamination.
- Check for air in the brake hose lines.
- 4. Brake hose lines
- Check the brake hose lines for kinks and deterioration (particularly between the hydraulic unit and the rear brake caliper).

## WARNING

# Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake hose lines.

• Check that the connections of the brake hose lines from the brake master cylinder to the hydraulic unit and from the hydraulic unit to the proportioning valve are correct.



## EW3P61007

The rear brake will not function properly if the connections are reversed.

- Brake hose "1" inlet: from the rear brake master cylinder to the hydraulic unit
- Brake hose "2" outlet: from the hydraulic unit to the proportioning valve

#### NOTE:

- If the rear brake hose inlet and outlet connections are reversed on the hydraulic unit, the brake pedal will be pressed down to its full-stroke position without responding, and then it will be pushed back slowly without pulsating when the final check on page "[D-3] FINAL CHECK" on page 8-157 is performed.
- If the front and rear brake hose connections are reversed on the hydraulic unit, the pulsating action in the brake lever and brake pedal will be performed in the reverse order when the final check on page "[D-3] FINAL CHECK" on page 8-157 is performed.
- If the brake hoses (to the proportioning valve and the metering valve) are switched during assembly, the brakes will continue to operate as normal. However, the reduction of the hydraulic pressure for the rear brake and part of the right front brake will be reversed during the ABS operation when the final check on page "[D-3] FINAL CHECK" on page 8-157 is performed.

#### 5. Hydraulic unit solenoid coupler terminals

• Check if the front brake, rear brake, and unified brake system solenoid coupler terminals (hydraulic unit and ABS wire harness) are connected correctly.

	Terminal color	
	Solenoid	ABS wire harness
Front brake	white, white	red/white, white/blue
Rear brake	green, green	red/white, white/green
Unified brake system	red, red	red/white, white/yellow

6. Hydraulic unit

If the malfunction is not corrected after checking items (1) to (5), replace the hydraulic unit. Be sure to connect the brake hoses and couplers correctly and securely. Check the hydraulic unit operation. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-60.

#### Malfunction code 31 (Disconnection is detected in the battery and ABS ECU circuit.)

- 1. ABS motor fuse
- Check if the ABS motor fuse in the starter relay is blown.
- 2. Coupler between the battery and the ABS ECU
- Check if the coupler is connected properly.
- 3. Wire harness and ABS wire harness
- Turn the main switch to "OFF" and disconnect the ABS ECU coupler and battery leads.
- Check for continuity between the positive battery terminal and the red/blue terminal of the ABS ECU coupler.

Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.

- 4. ABS ECU
- If the malfunction is not corrected after checking items (1) to (3), replace the ABS ECU.

#### Malfunction code 32 (ABS ECU circuit is broken or short-circuited.)

- 1. ABS ECU circuit (positive battery terminal to red/white terminal of the ABS ECU coupler)
- Turn the main switch to "OFF" and disconnect the ABS ECU coupler and battery leads.
- Check for continuity between the positive battery terminal and the red/white terminal of the ABS ECU coupler.

Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.

If there is continuity, repair or replace the defective harness.

- 2. ABS ECU circuit (brown/white terminal to red/white terminal of the ABS ECU coupler)
- Turn the main switch to "OFF" and disconnect the ABS ECU coupler.
- Check for continuity between the brown/white and the red/white terminals of the ABS ECU coupler. Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-125.

If there is continuity, repair or replace the defective harness.

- 3. ABS ECU
- If the malfunction is not corrected after checking items (1) to (2), replace the ABS ECU.

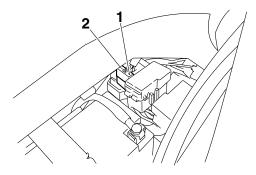
#### Malfunction code 33 (ABS motor is defective (ABS motor stops and will not rotate).)

- 1. ABS motor fuse
- Check if the ABS motor fuse in the starter relay is blown.
- 2. ABS motor relay
- Check if the ABS motor relay operates correctly.
   Refer to "MAINTENANCE OF THE ABS MOTOR RELAY" on page 8-132.

#### 8-153

#### 3. Wire harness and ABS wire harness

- Remove the ABS motor relay and ABS motor fuse, and then check for continuity between the red/blue terminal of ABS wire harness and the starter relay ABS motor fuse terminal "1" (ABS wire harness side) shown in the illustration.
   Refer to "CIRCUIT DIAGRAM (1/2) (FJR13A)" on page 8-119, "CIRCUIT DIAGRAM (2/2) (FJR13A)" on page 8-121, "CIRCUIT DIAGRAM (1/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)" on page 8-123, and "CIRCUIT DIAGRAM (2/2) (FJR13AE)"
- Check for continuity between the positive battery terminal and the ABS motor fuse terminal "2" (battery side) shown in the illustration.
- Disconnect the ABS ECU and ABS motor relay from ABS wire harness, and then check for continuity between the white/black terminals, between the red/white terminals, between the red/black terminals, and between the red/blue terminals.

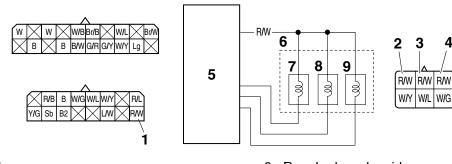


#### Malfunction code 34 (ABS motor is defective (ABS motor keeps rotating and will not stop).)

- 1. ABS motor
- Check if the ABS motor coupler located under the hydraulic unit is connected properly.
- Check the ABS motor for continuity. Refer to "MAINTENANCE OF THE HYDRAULIC UNIT" on page 8-132.
- 2. ABS wire harness
- Disconnect the ABS motor coupler, and then check for continuity between the black/white terminal of the ABS motor coupler of ABS wire harness and the negative battery terminal.
- Disconnect the ABS ECU couplers, and then check for continuity between the red/black terminal of the ABS ECU coupler and the red/black terminal of the ABS motor coupler. Refer to "MAINTENANCE OF THE ABS ECU" on page 8-132.
- Remove the ABS motor relay and check for continuity between the red/white terminal of the ABS motor coupler of the ABS wire harness and positive battery terminal.
- 3. ABS motor relay
- Check if the ABS motor relay operates correctly. Refer to "MAINTENANCE OF THE ABS MOTOR RELAY" on page 8-132.

# Malfunction code 35 (Disconnection is detected in the ABS ECU and hydraulic unit solenoid circuit.)

- 1. Coupler between the battery and the hydraulic unit (solenoid)
- Check if the coupler is connected properly.
- 2. ABS wire harness
- Check the red/white leads for continuity between "1" and "2", between "1" and "3", and between "1" and "4" of the hydraulic unit solenoid circuit.



- 5. ABS ECU
- 6. Hydraulic unit
- 7. Front brake solenoid

8. Rear brake solenoid

9. Unified brake system solenoid

- 3. ABS ECU
- If the malfunction is not corrected after checking items (1) to (2), replace the ABS ECU.

Malfunction code 51 (Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is low).)

- 1. Refer to malfunction codes 26 and 41.
- Battery voltage Measure the battery output voltage.

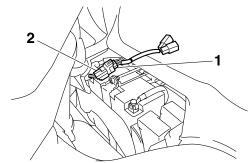
Malfunction code 52 (Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is low).)

- 1. Refer to malfunction codes 27 and 42.
- Battery voltage Measure the battery output voltage.

#### EAS22830

# [D-1] DELETING THE MALFUNCTION CODES

 Connect the test coupler adapter "1" to the ABS test coupler "2". Refer to "[B-5] MAL-FUNCTION CHECK BY THE ABS SELF-DI-AGNOSIS (PRESENT MALFUNCTION)" on page 8-137.

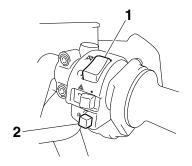


 Turn the main switch to "ON". Previously recorded malfunction codes will be displayed in the multi-function display. 3. Set the engine stop switch "1" to " $\bigotimes$ ".

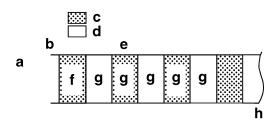
#### CAUTION:

If the start switch is pushed without setting the engine stop switch to " $\bigotimes$ ", the starter motor gears or other parts may be damaged.

4. Push the start switch "2" at least 10 times in 4 seconds to delete the malfunction codes.



- 5. The multi-function display switches to the odometer/tripmeter/fuel reserve tripmeter display and the ABS warning light flashes in 0.5 second-intervals while the malfunction codes are being deleted.
- 6. Turn the main switch to "OFF".
- Turn the main switch to "ON" again. Check that the ABS warning light comes on for 2 seconds, goes off for 0.5 second, and then starts flashing.



- a. ABS warning light
- b. Main switch "ON"
- c. Comes on
- d. Goes off
- e. Flashes
- f. 2.0 seconds
- g. 0.5 second
- h. Repeats
- 8. Turn the main switch to "OFF".
- Disconnect the test coupler adapter from the ABS test coupler, and then install the protective cap onto the ABS test coupler. Deleting the malfunction codes is now finished.

#### NOTE:

Do not forget to install the protective cap onto the ABS test coupler.

#### EC3P61015 CAUTION:

Since the malfunction codes remain in the memory of the ABS ECU until they are deleted, always delete the malfunction codes after the service has been completed.

#### ET3P61020 [D-2] DELETE FUNCTION TEST

- 1. Place the vehicle on the centerstand.
- 2. Turn the main switch to "OFF".
- 3. Connect the test coupler adapter to the ABS test coupler.
- 4. Turn the main switch to "ON".
- 5. Check:
- ABS ECU voltage Lower than 12.8 V → Charge or replace the
  - battery.



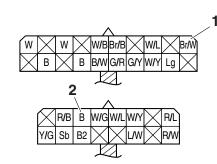
#### Battery voltage Higher than 12.8 V

- *****
- a. Connect the pocket tester (DC 20 V) to the ABS ECU couplers.

# C.C.

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

- Positive tester probe  $\rightarrow$
- brown/white "1"
- Negative tester probe → black "2"



b. Measure the ABS ECU voltage.

#### *****

- 6. Check:
- ABS-ECU-to-start-switch-lead continuity No continuity → Replace or repair the wire harness, ABS wire harness and front cowling wire harness.



#### Continuity is all right.

- ****
- a. Connect the pocket tester ( $\Omega \times 1$ ) to the ABS ECU coupler and right handlebar switch coupler.

******

Pocket tester 90890-03112 Analog pocket tester

YU-03112-C

ABS ECU couplers.

• Positive tester probe  $\rightarrow$ 

• Negative tester probe  $\rightarrow$ 

white/blue "1"

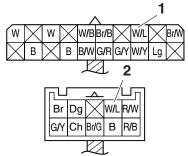
black "2"

a. Connect the pocket tester (DC 12 V) to the



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

- Positive tester probe → white/blue "1" (ABS ECU)
- Negative tester probe  $\rightarrow$
- white/blue "2" (right handlebar switch)



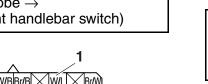
b. Check for continuity between the ABS ECU and the start switch lead.

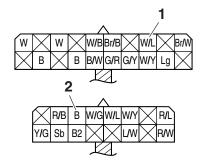
#### *****

- 7. Check:
  - ABS ECU voltage

Out of specification  $\rightarrow$  Replace the right handlebar switch.

Start switch "ON": less than 1 V 0 Start switch "OFF": more than 12 V





- b. Push the start switch.
- c. Measure the ABS ECU voltage.

#### ****

8. If the above-mentioned checks are within specification, replace the ABS ECU.

#### ET3P61022

#### [D-3] FINAL CHECK

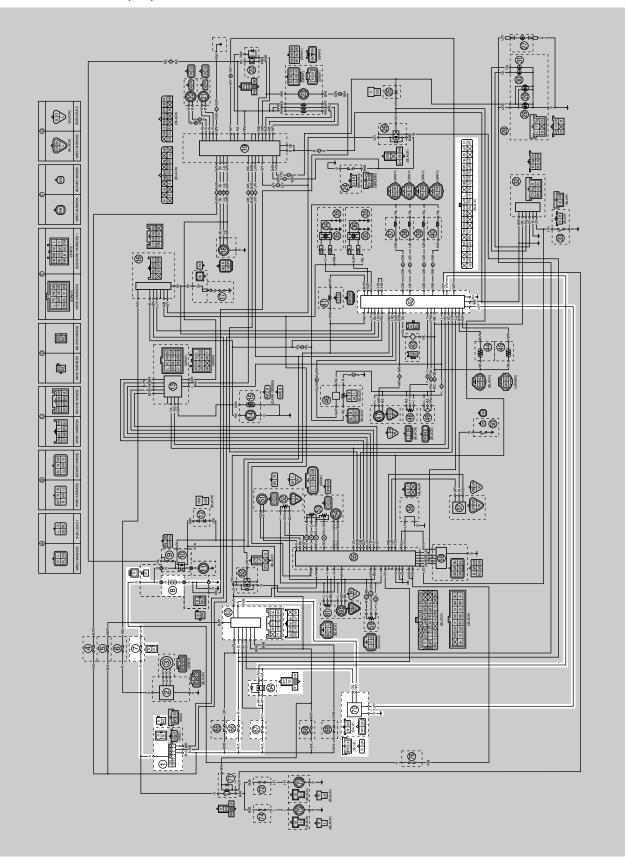
#### Checking procedures

- 1. Check the brake fluid level in the brake master cylinder reservoir and brake fluid reservoir. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-29.
- 2. Check the wheel sensor housings and wheel sensors for proper installation. Refer to "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-22 and "IN-STALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-27.
- 3. Perform hydraulic unit operation test 1 or 2. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-60.
- 4. Delete the malfunction codes. Refer to "[D-1] DELETING THE MALFUNCTION CODES" on page 8-155.
- 5. Perform a trial run. Refer to "TRIAL RUN" on page 4-63.

### **GRIP WARMER SYSTEM (FJR13AE only)**

## GRIP WARMER SYSTEM (FJR13AE only)

## CIRCUIT DIAGRAM (1/2)

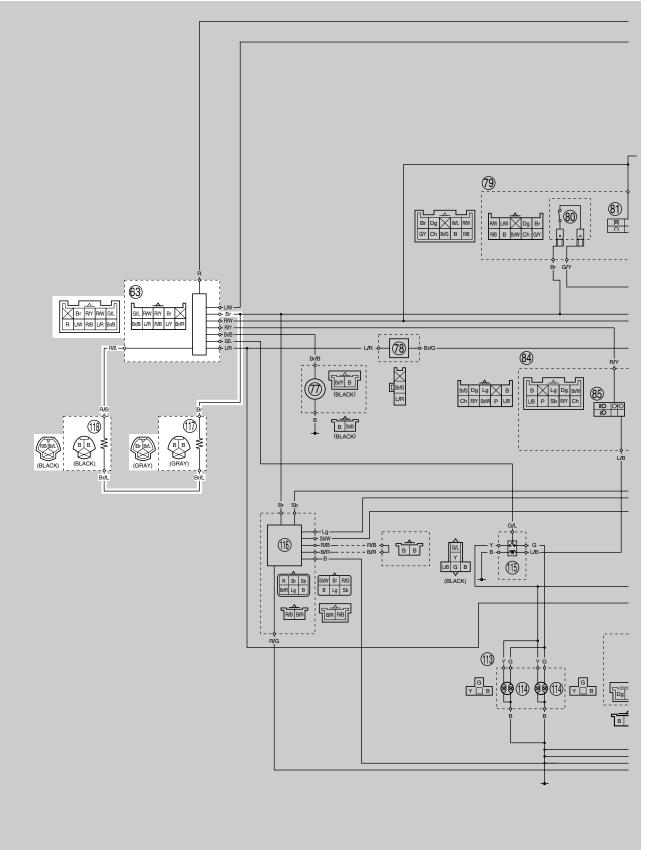


- 1. Main switch
- 7. Main fuse
- 8. Battery
- 42.ECU (engine control unit)
- 63.Coupler 5 (wire harness–front cowling wire harness)
- 64.Headlight (on/off)/grip warmer relay
- 66.Signaling system fuse
- 67.Headlight fuse
- 70.Grip warmer control unit

## **GRIP WARMER SYSTEM (FJR13AE only)**

## CIRCUIT DIAGRAM (2/2)

Front cowling wire harness



63.Coupler 5 (front cowling wire harness–wire harness)117.Right grip warmer118.Left grip warmer

#### ET3P66019 TROUBLESHOOTING

- The grip warmers do not become warm at all.
- The grip warmers are abnormally hot while the engine is idling.
- The grip warmers do not become very warm while the vehicle is traveling.

#### NOTE:

- Before troubleshooting, remove the following part(s):
- 1. Front cowling assembly

The grip warmers do not become warm at all.

The grip warmers do not become warm at	an.	
<ol> <li>Check the fuses. (Main, signaling system, and head- light) Refer to "CHECKING THE FUS- ES" on page 8-217.</li> </ol>	$NG \to$	Replace the fuse(s).
OK↓		
2. Check that the engine is started.	$\text{NG} \rightarrow$	Start the engine.
OK↓		
3. Check that the headlight is on.	$\text{NG} \rightarrow$	Replace the headlight (on/off)/grip warmer relay.
OK↓		
<ol> <li>Check the grip warmers. Refer to "CHECKING THE GRIP WARMERS (FJR13AE only)" on page 8-235.</li> </ol>	$NG \to$	Replace the grip warmer(s).
ОК↓		
<ol> <li>Check the entire grip warmer system wiring. Refer to "CIRCUIT DIAGRAM (1/2)" on page 8-159 and "CIRCUIT DIA- GRAM (2/2)" on page 8-161.</li> </ol>	$NG \to$	Properly connect or repair the grip warmer system wiring.
ОК↓		·
Replace the grip warmer control unit.		
The grip warmers are apportally bot while	e the engine is	sidling

The grip warmers are abnormally hot while the engine is idling.

1. Check that the grip warmer adjust- $NG \rightarrow$ ing knob is set to the "LO" position.

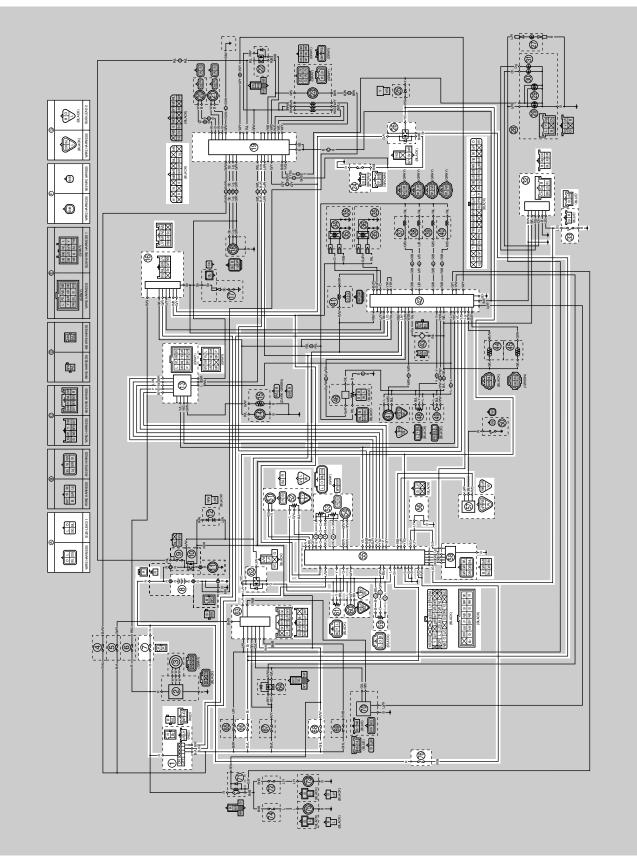
Adjust the grip warmer temperature using the grip warmer adjusting knob.

OK↓

## GRIP WARMER SYSTEM (FJR13AE only)

	_	
2. Disconnect the grip warmer control unit coupler (white/yellow and black/green) and check that the temperature does not drop while the engine is running.	$NG \rightarrow$	Replace the ECU.
ОК↓		
Replace the grip warmer control unit.	]	
The grip warmers do not become very wa	rm while the v	vehicle is traveling.
1. Disconnect the ECU coupler and grip warmer control unit coupler (black and light green/white) and check for continuity between the light green/white terminal of the ECU coupler and the light green/white terminal of the grip warmer control unit coupler.	NG →	The wiring system from ECU coupler to the grip warmer control unit coupler (black and light green/white) is faulty and must be repaired.
OK ↓	1	
2. Check that the grip warmer adjust- ing knob is set to the "HI" position.	$NG \rightarrow$	Adjust the grip warmer temperature using the grip warmer adjusting knob.
OK↓	1	
<ol> <li>Execute the diagnostic mode (Diagnostic code No. 57).</li> <li>Refer to "Actuator operation table (Diagnostic code No.57)".</li> </ol>	NG →	Replace the ECU.
OK↓	_	
Replace the grip warmer control unit.		

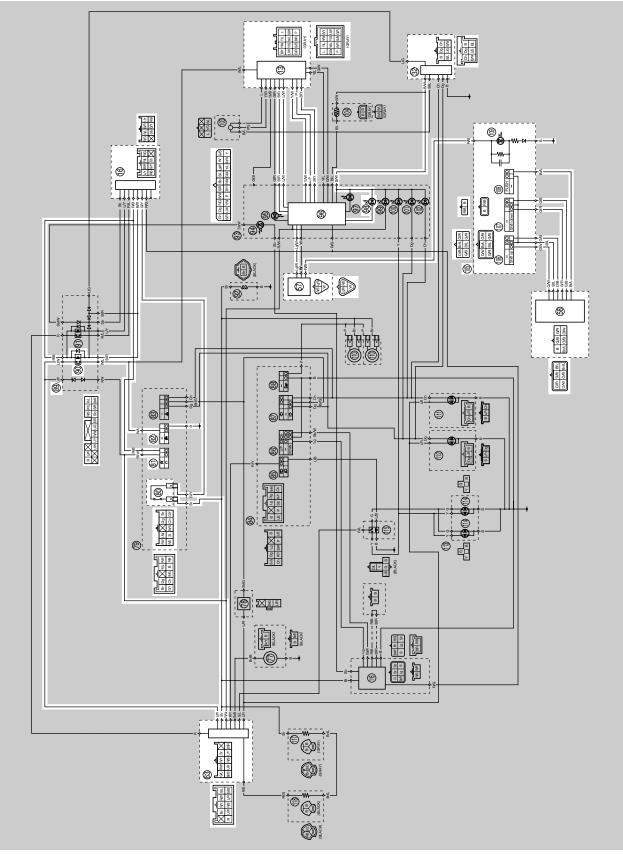
# CIRCUIT DIAGRAM (1/2)



- 1. Main switch
- 7. Main fuse
- 8. Battery
- 13.Coupler 1 (wire harness–front cowling wire harness)
- 16.Coupler 2 (wire harness–front cowling wire harness)
- 19.ABS ECU (electronic control unit)
- 24.Rear brake light switch
- 26.Brake light relay
- 32.Coupler 3 (wire harness–front cowling wire harness)
- 33.Sidestand switch
- 42.ECU (engine control unit)
- 51.Shift actuator motor
- 52.Shift actuator sensor
- 53.Clutch actuator sensor
- 54.Clutch actuator motor
- 55.MCU (motor control unit)
- 56.YCC-S test coupler
- 57.Coupler 4 (wire harness-front cowling wire harness)
- 58.Coupler 6 (wire harness-front cowling wire harness)
- 59.Foot shift switch
- 60.YCC-S speed sensor
- 61.Gear position sensor
- 62.YCC-S control relay
- 63.Coupler 5 (wire harness-front cowling wire harness)
- 66.Signaling system fuse
- 68.Ignition fuse
- 76.YCC-S motor control fuse

## CIRCUIT DIAGRAM (2/2)

#### Front cowling wire harness



- 13.Coupler 1 (front cowling wire harness–wire harness)
- 16.Coupler 2 (front cowling wire harness–wire harness)
- 32.Coupler 3 (front cowling wire harness–wire harness)
- 57.Coupler 4 (front cowling wire harness-wire harness)
- 58.Coupler 6 (front cowling wire harness-wire harness)
- 63.Coupler 5 (front cowling wire harness–wire harness)
- 80. Front brake light switch
- 81.Engine stop switch
- 82.Start switch
- 89.Relay unit
- 90.Starting circuit cut-off relay
- 96.Multi-function meter
- 98.Engine trouble warning light
- 105.Hand shift switch
- 106.Hand shift lever switch (shift up)
- 107.Hand shift lever switch (shift down)
- 108.Hand shift select button
- 109.Hand shift select indicator light

ET3P66059

#### TROUBLESHOOTING

- The hand shift select indicator light fails to come on.
- The transmission gear display on the multi-function meter fails to indicate the selected gear.

NOTE:

- Before troubleshooting, remove the following part(s):
- 1. Front cowling assembly

<ol> <li>Check the fuses. (Main, ignition and signaling system) Refer to "CHECKING THE FUS- ES" on page 8-217.</li> </ol>	$NG \rightarrow$	Replace the fuse(s).
OK↓	_	
<ol> <li>Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.</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 8-211.	NG  ightarrow	Replace the main switch.
OK↓	<u>.</u>	
<ol> <li>Check the entire YCC-S system wiring. Refer to "CIRCUIT DIAGRAM (1/2)" on page 8-165 and "CIRCUIT DIA- GRAM (2/2)" on page 8-167.</li> </ol>	$NG \rightarrow$	Properly connect or repair the YCC-S sys- tem wiring.
OK↓		
Check the condition of each of the YCC-S system circuits. Refer to "Checking the YCC-S system".		

#### Checking the YCC-S system

The hand shift select indicator light fails to come on.

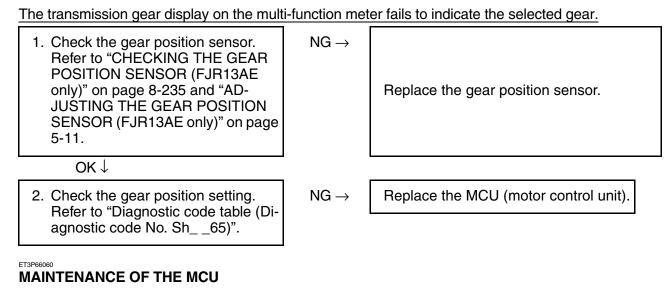
1. Check the hand shift select button. Refer to "CHECKING THE SWITCHES" on page 8-211.

OK↓

Replace the MCU (motor control unit).

Replace the hand shift switch.

 $NG \rightarrow$ 



#### Checking the MCU

#### 1. Check:

- Terminals "1" of the MCU Cracks/damages  $\rightarrow$  Replace the MCU.
- Terminals "2" of the MCU couplers Connection defective, contaminated, comeoff → Correct or clean.

#### NOTE:

If the MCU couplers are clogged with mud or dirt, clean with compressed air.

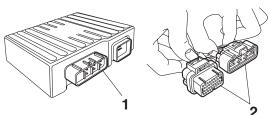
#### ET3P66061

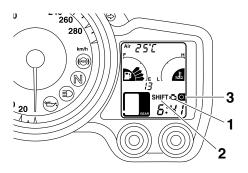
#### MCU (motor control unit) SELF-DIAGNOSTIC FUNCTION

The MCU (motor control unit) is equipped with a self-diagnostic function in order to ensure that the YCC-S system is operating normally. If this function detects a malfunction in the YCC-S system, it immediately operates the system under substitute characteristics and lights the YCC-S indicator and 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 MCU (motor control unit). 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 MCU (motor control unit) until it is deleted.

#### NOTE:

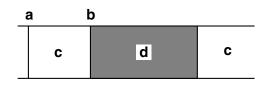
If the engine trouble indicator "1", YCC-S indicator "2", and engine trouble warning light "3" all come on, malfunctions have been detected in both the fuel injection system and the YCC-S system. If this occurs, the fault codes for the fuel injection system take priority over those for the YCC-S system, so only the fuel injection system fault codes will appear in the multi-function display. The fault codes for the YCC-S system will be displayed in the multi-function display after all of the fault codes for the fuel injection system have been deleted using the reinstatement method.





#### Checking the YCC-S indicator and warning light

The YCC-S indicator and warning light come on for 1.4 seconds after the main switch has been turned to "ON" and they come on while the start switch is being pushed. If the YCC-S indicator and warning light does not come on under these conditions, the warning light (LED) may be defective.



d. YCC-S indicator and warning light on for 1.4

- a. Main switch "OFF"
- b. Main switch "ON"
- c. YCC-S indicator and warning light off

#### ET3P66062

#### SELF-DIAGNOSTIC FUNCTION TABLE

If the MCU (motor control unit) detects an abnormal signal from a sensor while the vehicle is being driven, the MCU (motor control unit) lights the YCC-S indicator and warning light and provides the YCC-S system with alternate operating instructions that are appropriate for the type of malfunction.

seconds

When an abnormal signal is received from a sensor, the MCU (motor control unit) processes the specified values that are programmed for each sensor in order to provide the YCC-S system with alternate operating instructions that enable the system to continue operating or stop operating, depending on the conditions.

Fault code No.	Symptom	Malfunction detecting condition	Able/un- able to start	Able/un- able to change the shift
Sh11	Too low or too high voltage is supplied to the YCC-S system.	Voltage is below 8 V or above 16 V.	Unable	Unable
Sh12	Malfunction of power cut-off function in MCU (motor control unit)	Faulty power source relay cut-off function is detected during the YCC-S system check when main switch is turned to "ON".	Unable	Unable

#### Self-Diagnostic Function table

Fault code No.	Symptom	Malfunction detecting condition	Able/un- able to start	Able/un- able to change the shift
Sh13*	Overcurrent to clutch actuator motor	Detected current in shift actuator motor is too high.	Unable	Unable
Sh14*	Overcurrent to clutch actuator motor	Detected current in clutch actuator motor is too high.	Unable	Unable
Sh15*	Abnormal current is detected in clutch or shift actuator motor drive circuit.	Detected current in clutch actuator motor or shift actuator motor is dif- ferent from MCU (motor control unit) signals.	Unable	Unable
Sh16*	Malfunction of clutch or shift actuator mo- tor drive circuit in MCU (motor control unit)	Drive circuit in MCU (motor control unit) is not working properly.	Unable	Unable
Sh17*	Detected clutch actu- ator position is incor- rect.	Detected clutch actuator position is different from MCU (motor con- trol unit) signals.	Unable	Unable
Sh18*	Detected shift actua- tor position is incor- rect.	Detected shift actuator position is different from MCU (motor control unit) signals.	Unable	Unable
Sh19*	Output signal of shift actuator sensor is ab- normal.	Output signal of shift actuator sensor is below 0.5 V or above 4.5 V.	Unable	Unable
Sh21	Output signal of gear position sensor is ab- normal.	Output signal of gear position sen- sor is below 0.3 V or above 4.7 V.	Unable	Unable
Sh22	Output signal of foot shift switch is abnor- mal.	Output signal of foot shift switch is below 0.9 V or above 4.1 V.	Able	Able
Sh23	No input signal from sidestand switch.	No signal is received from side- stand switch while vehicle is driv- en.	Able	Able
Sh25	Error has occurred in actuator drive circuit in MCU (motor control unit) when main switch is turned to "ON".	Drive circuit error is detected dur- ing YCC-S system check when main switch is turned to "ON".	Unable	Unable
Sh26*	Abnormal clutch movement is detect- ed during check when main switch is turned to "ON".	Detected clutch motor current when main switch is turned to "ON" is too high.	Unable	Unable
Sh27*	Diagnostic mode is activated at engine start-up.	Diagnostic mode signal is received when vehicle is started (YCC-S test coupler is connected).	Able	Able

Fault code No.	Symptom	Malfunction detecting condition	Able/un- able to start	Able/un- able to change the shift
Sh31	Engine speed signal is abnormal.	Engine speed signal from ECU does not match multi-function meter engine speed.	Unable	Unable
Sh32*	YCC-S speed sensor signal is abnormal.	YCC-S speed sensor signal does not match multi-function meter vehicle speed.	Unable	Unable
Sh34	TPS (throttle position sensor) signal is ab- normal.	TPS (throttle position sensor) sig- nal voltage is too low or too high	Unable	Able
Sh35	Start switch signal is abnormal.	Signal is received from start switch while vehicle is driven.	Able	Able
Sh36	Output signal of clutch actuator sensor is ab- normal.	Signals received from clutch actu- ator sensor 1 and clutch actuator sensor 2 are different or signal voltage is too low or too high.	Unable	Unable
Sh37*	Power supply to clutch or shift actuator motor is abnormal.	Battery voltage is good, but motor terminal voltage is too low.	Unable	Unable
Sh38	Malfunction of hand shift lever switch (shift up or shift down)	Both the on and off circuits of the hand shift lever switch (shift up or shift down) are closed at the same time.	Able	Able
Sh39	Ignition timing retard output signal is abnor- mal.	Detected ignition retard signal from MCU (motor control unit) to ECU is abnormal.	Able	Able
Sh41	Coolant temperature sensor signal is ab- normal.	Coolant temperature sensor signal is too high or too low	Able	Able
Sh42	Communication be- tween ECU and multi- function meter is ab- normal.	Error detected in communication signal between ECU and multi- function meter.	Unable	Able
Sh43	Communication be- tween MCU (motor control unit) and ABS ECU is abnormal.	ABS ECU continuously sends signals to activate ABS.	Able	Able
Sh44*	Clutch actuator sen- sor signal is abnor- mal.	Clutch is completely engaged, but signal sent from clutch actuator sensor indicates clutch is disen- gaged.	Unable	Unable
Sh45*	Shift operation and gear position do not match.	Gear position has not changed af- ter shifting by shift actuator (mis- shift occurs repeatedly).	Unable	Unable
Sh46*	Engine speed and gear position sensor signal do not match while vehicle is driven.	Gear position calculated by MCU (motor control unit) is different from foot shift switch signal.	Unable	Unable

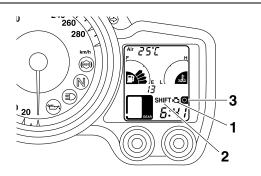
Fault code No.	Symptom	Malfunction detecting condition	Able/un- able to start	Able/un- able to change the shift
Sh47	Braking signal is not detected while brak- ing.	No braking signal is received by MCU (motor control unit) when vehicle is braking.	Able	Able
Sh48*	Improper engine idling speed adjustment.	Engine speed at engine start-up exceeds the set limit.	Unable	Unable
Sh49*	Engine idling speed is too high when vehicle is started.	Engine speed when vehicle is starting off exceeds the set limit.	Able	Able
Sh51	Shift actuator sensor signal is abnormal.	Shift rod is not in neutral position when shift actuator is not operat- ing.	Unable	Unable
Sh52*	Main switch signal is abnormal.	Main switch "OFF" signal is re- ceived even though engine is run- ning.	Able	Able

*If the main switch is turned to "OFF", the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to "ON". Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh__61. The fault code numbers can be confirmed in the malfunction history. Refer to "Diagnostic code table (Diagnostic code No. Sh__61)".

# 

#### NOTE:

If the engine trouble indicator "1", YCC-S indicator "2", and engine trouble warning light "3" all come on, malfunctions have been detected in both the fuel injection system and the YCC-S system. If this occurs, the fault codes for the fuel injection system take priority over those for the YCC-S system, so only the fuel injection system fault codes will appear in the multi-function display. The fault codes for the YCC-S system will be displayed in the multi-function display after all of the fault codes for the fuel injection system have been deleted using the reinstatement method.



# The YCC-S indicator and warning light come on.

- 1. Check:
- Fault code number

#### ****

- a. Check the fault code number displayed on the meter and diagnostic code Sh_ _61.
   Refer to "Diagnostic code table (Diagnostic code No. Sh_ _61)".
- b. Identify the faulty system with the fault code. Refer to "Self-Diagnostic Function table".

#### *****

 Check and repair the probable cause of the malfunction.
 Refer to "TROUBLESHOOTING DETAILS"

Refer to "TROUBLESHOOTING DETAILS" on page 8-179.

- Perform the reinstatement action for the YCC-system.
   Refer to "Reinstatement method" in the appropriate 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 "Diagnostic code table (Diagnostic code No. Sh_ _62)".

#### NOTE:

Turning the main switch to "OFF" will not erase the malfunction history.

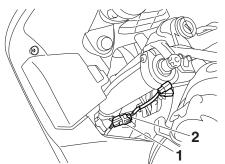
ET3P66064

#### DIAGNOSTIC MODE

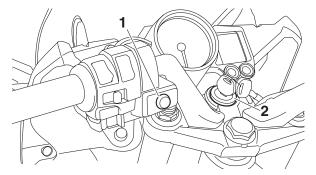
Setting the diagnostic mode

- 1. Turn the main switch to "OFF".
- 2. Remove the front cowling left inner panel 1 to access the YCC-S test coupler "1".
- 3. Remove the protective cap from the YCC-S test coupler.
- 4. Connect the test coupler adapter "2" to the YCC-S test coupler.

Test coupler adapter 90890-03149



5. Push and hold the hand shift select button "1", turn the main switch "2" to "ON", and continue to push the button for 8 seconds or more.



#### NOTE:

• All displays on the meter disappear except the odometer/tripmeter/fuel reserve tripmeter displays.

- "Sh__61" appears on the odometer/tripmeter/fuel reserve tripmeter LCD.
- 6. Select the diagnostic code number corresponding to the fault code number by pushing the hand shift select button and operating the brake lever (or brake pedal) simultaneously.
- 7. Turn the main switch to "OFF" to cancel the diagnostic mode.

Diagnostic code table							
Diagnos- tic code No.	ltem	Data displayed on meter (reference value)	Checking method				
Sh61	Malfunction history code display						
	<ul> <li>No history</li> </ul>	Sh61	—				
	• History exists	Fault code numbers Sh11-Sh52 • (First displays Sh _61 for 6 seconds, and then displays each fault code number that is stored in the mal- function history. If more than one code number is detected, the dis- play alternates ev- ery two seconds to show all the de- tected code num- bers. When all of the code numbers have been shown, the display re- peats the same process.)	If fault codes are stored in the malfunction history, the hand shift select indicator light will come on.				
Sh62	Malfunction history code erasure						
	<ul> <li>No history</li> </ul>	Sh62	—				
	• History exists	<ul> <li>01-09</li> <li>First displays Sh62 for 6 seconds, and then displays the total number of malfunctions, including the current malfunction, that have oc-curred since the history was last erased.</li> <li>If there are nine or more of fault codes stored in the malfunction history, "09" is displayed.</li> </ul>	<ul> <li>If fault codes are stored in the malfunction history, the hand shift select indicator light will come on.</li> <li>To erase the history, set the engine stop switch from "⑤" to "∩".</li> <li>After the history is erased, the hand shift select indicator light will go off.</li> </ul>				

Diagnos- tic code No.	ltem	Data displayed on meter (reference value)	Checking method			
Sh63	Clutch actuation op- eration <b>NOTE:</b> The checking meth- od for the diagnostic code (Sh63) can- not be performed when any of the fol- lowing fault codes are detected. Sh11, Sh12, Sh13, Sh15, Sh16, Sh17, Sh25, Sh26, Sh36, Sh37, and Sh44	Sh63	<ul> <li>The clutch actuator can be operated in this mode.</li> <li>1. The hand shift select indicator light comes on when the clutch is engaged.</li> <li>2. Set the engine stop switch to "○" and push the hand shift select button simultaneously. The clutch will disengage and the hand shift select indicator light will go off.</li> <li>3. Set the engine stop switch to "○" and push the hand shift select button simultaneously. The clutch will engage and the hand shift select button simultaneously. The clutch will engage and the hand shift select button simultaneously. The clutch will engage and the hand shift select button simultaneously. The clutch will engage and the hand shift select indicator light will come on.</li> <li>4. If the clutch actuator sensor is malfunctioning, the hand shift select indicator light will flash.</li> </ul>			
Sh64	Shift actuator opera- tion NOTE: The checking meth- od for the diagnostic code (Sh64) can- not be performed when any of the fol- lowing fault codes are detected. Sh11, Sh12, Sh14, Sh15, Sh16, Sh18, Sh19, Sh25, Sh37, and Sh51	Sh64	<ul> <li>The shift actuator can be operated in this mode.</li> <li>Make sure that the transmission is in neutral.</li> <li>Set the engine stop switch to "∩" and operate the hand shift lever switch (shift up) simultaneously. The MCU (motor control unit) operates the shift actuator once. The shift actuator is operated once each time two switches are operated.</li> <li>The MCU (motor control unit) detects the signal from the shift actuator sensor. If the signal received after upshifting is correct, the hand shift select indicator light will come on. If the signal received after upshifting in incorrect, the hand shift select indicator light will flash.</li> <li>Set the engine stop switch to "∩" and operate the hand shift lever switch (shift down) simultaneously. The MCU (motor control unit) operates the shift actuator once. The shift actuator is operated once each time two switches are operated.</li> <li>The MCU (motor control unit) detects the signal from the shift actuator once. The shift actuator is operated once each time two switches are operated.</li> <li>The MCU (motor control unit) detects the signal from the shift actuator sensor. If the signal received after downshifting is correct, the hand shift select indicator light will come on. If the signal received after downshifting is correct, the hand shift select indicator light will come on. If the signal received after downshifting is incorrect, the hand shift select indicator light will come on. If the signal received after downshifting is incorrect, the hand shift select indicator light will flash.</li> </ul>			

Diagnos- tic code No.	ltem	Data displayed on meter (reference value)	Checking method
Sh65	Gear position setting	Sh65	<ul> <li>The gear position can be set in this mode.</li> <li>Make sure that the transmission is in neutral.</li> <li>Push the start switch.</li> <li>If the gear position sensor output signal is correct for the neutral position, the hand shift select indicator light will come on for 0.5 second.</li> <li>Shift the transmission into 1st gear using the hand shift lever switch (shift up), and then rotate the rear wheel at least 1/2 turn by hand to ensure that the dog completely engages the 1st gear.</li> <li>Push the start switch.</li> <li>If the gear position sensor output signal is correct for the 1st gear position, the hand shift select indicator light will come on for 0.5 second.</li> <li>Repeat steps 3 and 4 for each gear up to the 5th gear and make sure that the hand shift select indicator light comes on for 0.5 second each time the start switch is pushed.</li> <li>Shift the transmission into 4th gear using the hand shift lever switch (shift down), and then rotate the rear wheel at least 1/2 turn by hand to ensure that the dog completely engages the 4th gear.</li> <li>Push the start switch.</li> <li>If the gear position sensor output signal is correct for the 4th gear position, the hand shift select indicator light comes on for 0.5 second each time the start switch is pushed.</li> <li>Shift the transmission into 4th gear using the hand shift lever switch (shift down), and then rotate the rear wheel at least 1/2 turn by hand to ensure that the dog completely engages the 4th gear.</li> <li>Push the start switch.</li> <li>If the gear position sensor output signal is correct for the 4th gear position, the hand shift select indicator light will come on for 0.5 second.</li> <li>Repeat steps 6 and 7 for each gear down to the 1st gear and make sure that the hand shift select indicator light will comes on for 0.5 second each time the start switch is pushed.</li> <li>Shift the transmission into neutral.</li> <li>After the above procedure is completed, all of the gear position data is temporarily stored and ready to be w</li></ul>

Diagnos- tic code No.	Item	Data displayed on meter (reference value)	Checking method
Sh66	Adjust the clutch en- gagement position	Sh66	<ul> <li>This mode adjust the clutch engagement point manually.</li> <li>The clutch engagement point while the vehicle is starting off can be adjusted manually to 21 engine speed settings in this mode. The initial setting of the clutch engagement point varies according to the vehicle.</li> <li>Hand shift lever switch operation (shift up)</li> <li>To increase the clutch engagement point by approximately 100–150 r/min, operate the hand shift lever switch (shift up) four times. After the switch is operated, the hand shift select indicator light will come on for 0.6 second.</li> <li>Hand shift lever switch operation (shift down)</li> <li>To decrease the clutch engagement point by approximately 100–150 r/min, operate the hand shift lever switch is operated, the hand shift select indicator light will come on for 0.3 second.</li> <li>Hand shift lever switch (shift down) four times. After the switch is operated, the hand shift select indicator light will come on for 0.3 second.</li> <li>To write the changed setting on EE-PROM, push the hand shift select indicator light will come on for 0.3 second.</li> </ul>

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### TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Select diagnostic code No. Sh__61, and then confirm the fault code numbers in the malfunction history. 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. Then select diagnostic code No. Sh__62 in the diagnostic mode to erase the malfunction history.

Fault code No.:

Code number displayed on the meter when the engine failed to work normally. Refer to "Self-Diagnostic Function table".

Fault				Too low or too high voltage is supplied to the YCC-S system.		
Order	Item/comp cause	oonents and	l probable	Check or maintenance job	Reinstatement method	
1	Connections • Wire harness MCU (motor control unit) coupler			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.	
2	Faulty batt	ery		• Replace or charge the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-218.		
3	Malfunctio	n in rectifier	/regulator	Replace if detective. Refer to "CHARGING SYS- TEM" on page 8-29.		
4	Open or short circuit in wire harness.			<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between battery and main switch coupler. (red-red)</li> <li>Between main switch coupler and signaling system fuse. (brown/blue-brown/blue)</li> <li>Between signaling system fuse and MCU (motor control unit) coupler. (brown-brown)</li> </ul>		

Fault code No. S		Sh12	Symptom	Malfunction of power cut-off function in the MCU (motor control unit).	
	Item/components and probable cause			Check or maintenance job	Reinstatement method
1	Malfunction in MCU (motor control unit).			Replace the MCU (motor control unit).	Repairing the cause of the malfunction.

Fault	code No.	Sh13	Symptom	Over current to clutch actuator	notor.
Order	Item/comp cause	oonents ai	nd probable	Check or maintenance job	Reinstatement method
1	Connection • Wire harr unit) coup • Clutch ac	ness MCU pler	(motor control tor coupler	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "OFF". See NOTE.
2	Open or short circuit in wire harness.			<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between clutch actuator motor coupler and MCU (motor control unit) coupler. (black/white-black/white) (red/white-red/white)</li> <li>Between battery and YCC-S fuse terminal. (red-red)</li> <li>Between YCC-S fuse and MCU (motor control unit). (red/black-red/black)</li> </ul>	
3	YCC-S fus	e		Replace if defective.	
4	Stuck cluto	ch actuator	motor.	Replace the clutch actuator.	1

### NOTE: ____

Fault	code No.	Sh14	Symptom	Over current to shift actuator me	otor.
Order	Item/comp cause	oonents and	d probable	Check or maintenance job	Reinstatement method
1	unit) cou	ness MCU (	motor control coupler	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "OFF". See NOTE.
2	Open or short circuit in wire harness.			<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between shift actuator motor coupler and MCU (motor control unit) coupler. (black/blue–black/blue) (red–red)</li> <li>Between battery and YCC-S fuse terminal. (red–red)</li> <li>Between YCC-S fuse and MCU (motor control unit). (red/black–red/black)</li> </ul>	
3	YCC-S fus	e		Replace if defective.	
4	Stuck shift	actuator m	otor.	Replace the shift actuator.	1

### NOTE: ____

Fault	code No.	Sh15	Symptom	Abnormal current is detected in clutch or shift actuator motor drive circuit.		
Order	Item/comp cause	oonents and	d probable	Check or maintenance job	Reinstatement method	
1	unit) cou • Clutch ac	ness MCU (		<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "OFF". See NOTE.	
2	Open or short circuit in wire harness.			<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between clutch actuator motor coupler and MCU (motor control unit) coupler. (black/white–black/white) (red/white–red/white)</li> <li>Between shift actuator motor coupler and MCU (motor control unit) coupler. (black/blue–black/blue) (red–red)</li> <li>Between battery and YCC-S fuse terminal. (red–red)</li> <li>Between YCC-S fuse and MCU (motor control unit). (red/black–red/black)</li> </ul>		
3	YCC-S fuse			Replace if defective.		
4	Defective of tor drive ci		ft actuator mo-	Replace the clutch actuator or shift actuator.		
5	switch afte	e operation er repairing t ng the cause	he malfunction	• Execute the diagnostic mode. (Code No. Sh63 and Sh_ _64)		

### NOTE: _

		Malfunction of clutch or shift actuator motor drive circuit in the MCU (motor control unit).			
Order	Item/comp cause	oonents and	l probable	Check or maintenance job	Reinstatement method
1	Connections <ul> <li>Wire harness MCU (motor control unit) coupler</li> <li>Clutch actuator motor coupler</li> <li>Shift actuator motor coupler</li> </ul>			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "OFF". See NOTE.
2	Open or sl	hort circuit ir	n wire harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between clutch actuator motor coupler and MCU (motor control unit) coupler. (black/white–black/white) (red/white–red/white)</li> <li>Between shift actuator motor coupler and MCU (motor control unit) coupler. (black/blue–black/blue) (red–red)</li> </ul>	
3	Malfunctio unit).	n in MCU (n	notor control	Replace the MCU (motor control unit).	

### NOTE: _

Fault code No.   Sh17   Symptom				Detected clutch actuator position is incorrect.		
Order	Item/comp cause	oonents and	d probable	Check or maintenance job	Reinstatement method	
1	unit) cou	ness MCU (	motor control r coupler	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "OFF". See NOTE.	
2	Open or sł	nort circuit i	n wire harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between clutch actuator motor coupler and MCU (motor control unit) coupler. (black/white-black/white) (red/white-red/white)</li> </ul>		
3	Stuck cluto actuator ge		notor or clutch	Replace the clutch actuator.		
4	switch afte		of the main he malfunction e.	• Execute the diagnostic mode. (Code No. Sh63)		

### NOTE: __

Fault code No. Sh18 Symptom				Detected shift actuator position	is incorrect.
Order	Item/comp cause	oonents an	d probable	Check or maintenance job	Reinstatement method
1	unit) cou	ness MCU	(motor control coupler	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "OFF". See NOTE.
2	Open or sł	nort circuit i	n wire harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between shift actuator motor coupler and MCU (motor control unit) coupler. (black/blue-black/blue) (red-red)</li> </ul>	
3	Stuck shift tuator gear		otor or shift ac-	Replace the shift actuator.	
4	switch afte		of the main the malfunction e.	• Execute the diagnostic mode. (Code No. Sh64)	

### NOTE: __

Fault	Fault code No. Sh_ 19 Symptom		Output signal of shift actuator sensor is abnor- mal.		
Order	Item/comj cause	ponents and	d probable	Check or maintenance job	Reinstatement method
1	Connections • Wire harness MCU (motor control unit) coupler • Shift actuator sensor coupler			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "OFF". See NOTE.
2	Open or short circuit in wire harness.			<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between shift actuator sensor coupler and MCU (motor control unit) coupler. (green/yellow–green/yellow) (blue–blue) (black/blue–black/blue)</li> </ul>	
3	Defective	shift actuato	r sensor.	Replace the shift actuator.	1

#### NOTE: _

Fault	code No.	Sh21	Symptom	Output signal of gear position sensor is abnor- mal.		
Order	Item/comp cause	oonents and	l probable	Check or maintenance job	Reinstatement method	
1	unit) cou	ness MCU (	motor control	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.	
2	Open or sl	hort circuit ir	n wire harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between gear position sensor coupler and MCU (motor control unit) coupler. (yellow-yellow) (blue-blue) (black/blue-black/blue)</li> </ul>		
3	Defective gear position sensor.			Adjust or replace if defective. Refer to "ADJUSTING THE GEAR POSITION SENSOR (FJR13AE only)" on page 5-11 and "CHECKING THE GEAR POSITION SENSOR (FJR13AE only)" on page 8-235.		
4	Gear posit	tion setting		• Execute the diagnostic mode. (Code No. Sh65)		

Fault	Fault code No. Sh22 Symptom			Output signal of foot shift switch	h is abnormal.
Order	Item/comp cause	oonents and	d probable	Check or maintenance job	Reinstatement method
1	unit) cou	ness MCU (	motor control	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.
2	Open or sł and/or sub		n wire harness	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between foot shift switch coupler and MCU (motor control unit) coupler. (orange/red–orange/black) (blue–blue) (black/blue–black/blue)</li> </ul>	
3	Defective foot shift switch.			Adjust or replace if defective. Refer to "ADJUSTING THE FOOT SHIFT SWITCH" on page 5-70 and "CHECKING THE FOOT SHIFT SWITCH (FJR13AE only)" on page 8-235.	

Fault	Fault code No.   Sh_ 23   Symptom			No input signal from sidestand s	switch.
Order	Order Item/components and probable cause			Check or maintenance job	Reinstatement method
1	Connections • Wire harness MCU (motor control unit) coupler			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.
2	Open circuit in wire harness.			<ul> <li>Repair or replace if there is an open circuit.</li> <li>Between sidestand switch coupler and MCU (motor control unit) coupler. (blue/green-blue/green)</li> </ul>	
3	Defective s	sidestand sv	vitch.	Check and replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-211.	

Fault code No. Sh_ 25		Sh25	Symptom	Error has occurred in the actuator drive circuin MCU (motor control unit) when main switch turned to "ON".	
Order	r Item/components and probable cause		d probable	Check or maintenance job	Reinstatement method
1	Malfunction in MCU (motor control unit).			Replace the MCU (motor control unit).	Replacing the MCU (motor control unit).

Fault code No. Sh26 Symptom		Abnormal clutch movement is detected during check when main switch is turned to "ON".			
Order	Order Item/components and probable cause		nd probable	Check or maintenance job	Reinstatement method
1	Clutch fluid			<ul> <li>Check for clutch fluid leakage.</li> <li>Check the clutch fluid level. Refer to "CHECKING THE CLUTCH FLUID LEVEL (FJR13AE)" on page 3-17.</li> </ul>	Turning the main switch to "OFF". See NOTE.
2	Air in hydraulic clutch system			<ul> <li>Check the clutch stroke.</li> <li>Bleed the hydraulic clutch. Refer to "BLEEDING THE HY- DRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.</li> </ul>	

### NOTE:

Fault code No. Sh27 Symptom		Diagnosis mode is activated at e	Diagnosis mode is activated at engine start-up.		
Order	r Item/components and probable cause			Check or maintenance job	Reinstatement method
1	YCC-S test coupler			Check that the test coupler adapter is not connected. Refer to "DIAGNOSTIC MODE" on page 8-175.	Turning the main switch to "OFF". See NOTE.
2	Short circuit in wire harness.			<ul> <li>Repair or replace if there is a short circuit.</li> <li>Between YCC-S test coupler and MCU (motor control unit) coupler. (blue/yellow–blue/yellow)</li> </ul>	

### NOTE: ____

Fault code No. Sh31 Symptom			Symptom	Engine speed signal is abnorma	Engine speed signal is abnormal.		
Order	Item/components and probable cause			Check or maintenance job	Reinstatement method		
1	<ul> <li>Connections</li> <li>Wire harness MCU (motor control unit) coupler</li> <li>Wire harness ECU coupler</li> </ul>		,	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Repairing the cause of the malfunction.		
2	Open or sl	hort circu	it in wire harnes	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between ECU coupler and MCU (motor control unit) coupler. (yellow/black-yellow/black)</li> </ul>			

Fault	code No.	Sh32	Symptom	YCC-S speed sensor signal is abnormal.		
Order	Item/comp cause	oonents and	d probable	Check or maintenance job	Reinstatement method	
1	unit) cou	ness MCU (	motor control r coupler	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "OFF". See NOTE.	
2	Open or sł	nort circuit ir	n wire harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between YCC-S speed sensor coupler and MCU (motor control unit) coupler. (white/yellow-white/yellow) (blue-blue) (black/blue-black/blue)</li> </ul>		
3	Defective `	YCC-S spee	ed sensor.	• Replace if detective. Refer to "CHECKING THE YCC-S SPEED SENSOR (FJR13AE only)" on page 8-234.		

#### NOTE: ____

Fault code No. Sh34 Symptom		TPS (throttle position sensor) signal is abnor- mal.			
Order	Item/comp cause	oonents and	d probable	Check or maintenance job	Reinstatement method
1	Connections • Wire harness MCU (motor control unit) coupler • Wire harness ECU coupler			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.
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 MCU (motor control unit) coupler. (yellow/blue–yellow/blue)</li> </ul>	

Fault	code No.	Sh35	Symptom	Start switch signal is abnormal.	
Order	Item/comp cause	oonents an	d probable	Check or maintenance job	Reinstatement method
1	unit) cour • Relay uni	ness MCU pler it coupler	(motor control	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.
2			n wire harness rire harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between right handlebar switch coupler and relay unit coupler. (white/blue–white/blue)</li> <li>Between relay unit coupler and MCU (motor control unit) coupler. (blue/white–blue/white)</li> </ul>	
3	Defective r	relay unit.		Check and replace relay unit. Refer to "CHECKING THE RE- LAYS" on page 8-221.	
4	Defective s	start switch		Check and replace right handle- bar switch. Refer to "CHECKING THE SWITCHES" on page 8-211.	

Fault code No. Sh36 Symptom		Output signal of clutch actuator sensor is ab- normal.			
Order	Item/comp cause	onents and	d probable	Check or maintenance job	Reinstatement method
1	<ul> <li>Connections</li> <li>Wire harness MCU (motor control unit) coupler</li> <li>Clutch actuator sensor coupler</li> </ul>			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness and/or sub-lead 1.			<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between clutch actuator sensor coupler and MCU (motor control unit) coupler. (orange–orange) (orange/green–orange/green) (blue–blue) (black/blue–black/blue)</li> </ul>	
3	Defective of	clutch actua	tor sensor.	Replace clutch actuator.	

Fault code No. Sh37 Symptom			Symptom	Power supply to clutch or shift actuator motor is abnormal.		
Order	ltem/comp cause	oonents and	l probable	Check or maintenance job	Reinstatement method	
1	<ul> <li>Connections</li> <li>Wire harness MCU (motor control unit) coupler</li> <li>Clutch actuator motor coupler</li> <li>Shift actuator motor coupler</li> </ul>			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "OFF". See NOTE.	
2	Open or sl	nort circuit ir	n wire harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between clutch actuator motor coupler and MCU (motor control unit) coupler. (black/white-black/white) (red/white-red/white)</li> <li>Between shift actuator motor coupler and MCU (motor control unit) coupler. (black/blue-black/blue) (red-red)</li> </ul>		
3	Defective of tor.	clutch or shi	ft actuator mo-	Replace the clutch actuator or shift actuator.		

### NOTE: _

Fault	Fault code No. Sh38 Symptom			Malfunction of hand shift lever switch (shift up or shift down).		
Order	Item/comp cause	oonents and	d probable	Check or maintenance job	Reinstatement method	
1	unit) cou	ness MCU (	motor control upler	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.	
2	Open or s	hort circuit i	n wire harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between hand shift switch coupler and MCU (motor control unit) coupler. (orange/white–orange/white) (orange/black–orange/black) (green/red–green/red) (green/black–green/black)</li> </ul>		
3	Defective up or shift		ver switch (shift	Replace hand shift switch. Refer to "CHECKING THE SWITCHES" on page 8-211.		

Fault	Fault code No. Sh39 Symptom			Ignition timing retard output sig	nal is abnormal.
Order	Item/comp cause	ponents an	d probable	Check or maintenance job	Reinstatement method
1	Connections <ul> <li>Wire harness MCU (motor control unit) coupler</li> <li>Wire harness ECU coupler</li> </ul>		,	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.
2	Open or sl	hort circuit i	n wire harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between ECU coupler and MCU (motor control unit) coupler. (light green–light green)</li> </ul>	

Fault	Fault code No. Sh41 Symptom			Symptom	Coolant temperature sensor signal is abnormal.		
Order	Item/comp cause	onent	s and	d probable	Check or maintenance job	Reinstatement method	
1	Connections • Wire harness MCU (motor control unit) coupler • Wire harness ECU coupler				<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.	
2	Open or short circuit in wire harness.			n wire harness.	<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between ECU coupler and MCU (motor control unit) coupler. (yellow/blue–yellow/blue)</li> </ul>		

Fault	Fault code No. Sh42 Symptom		Communication between ECU and multi-func- tion meter is abnormal.		
Order	Item/comp cause	ponents and	d probable	Check or maintenance job	Reinstatement method
1	<ul> <li>Connections</li> <li>Wire harness MCU (motor control unit) coupler</li> <li>YCC-S speed sensor coupler</li> </ul>			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness.			<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between YCC-S speed sensor coupler and MCU (motor control unit) coupler. (yellow/blue–yellow/blue)</li> </ul>	

Fault	Fault code No. Sh_ 43 Symptom		Communication between MCU (motor control unit) and ABS ECU is abnormal.		
Order	ltem/comp cause	oonents an	d probable	Check or maintenance job	Reinstatement method
1	Connections • Wire harness MCU (motor control unit) coupler • ABS ECU coupler			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness.			<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between ABS ECU coupler and MCU (motor control unit) coupler. (brown/black-brown/black)</li> </ul>	

Fault code No. Sh_ 44 Symptom		Clutch actuator sensor signal is abnormal.			
Order	Item/comp cause	onents and	d probable	,	Reinstatement method
1	Defective of	clutch actua	tor sensor.	Replace clutch actuator.	Turning the
2	Confirm the operation of the main switch after repairing the malfunction or correcting the cause.			• Execute the diagnostic mode. (Code No. Sh63)	main switch to "OFF". See NOTE.

### NOTE:

Fault	Fault code No. Sh45 Symptom			Shift operation and gear position do not match.		
Order	Item/comp cause	oonents an	d probable	Check or maintenance job	Reinstatement method	
1	Shift rod			<ul> <li>Check the shift rod pin hole location.</li> <li>Check the shift rod groove location.</li> <li>Adjust or replace if defective. Refer to "CHECKING THE SHIFT ROD" on page 5-69 and "INSTALLING THE SHIFT ACTUATOR" on page 5-71.</li> </ul>	Turning the main switch to "OFF". See NOTE.	
2	Defective shift actuator.			Replace shift actuator.		
3	switch afte		of the main the malfunction e.	• Execute the diagnostic mode. (Code No. Sh64)		

#### NOTE: _

If the main switch is turned to "OFF", the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to "ON". Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh__61. The fault code numbers can be confirmed in the malfunction history.

Fault	Fault code No. Sh_		Symptom	Engine speed and gear positio do not match while vehicle is d	
Order	r Item/components and probable cause		d probable	Check or maintenance job	Reinstatement method
1	Gear position setting.			• Execute the diagnostic mode. (Code No. Sh65)	Turning the main switch to "OFF". See NOTE.

### NOTE: _

Fault o	code No.	Sh47	Symptom	Braking signal is not detected while braking.		
Order	Item/comp cause	onents and	l probable	Check or maintenance job	Reinstatement method	
1	unit) cou	ness MCU (	motor control bler	<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Repairing the cause of the malfunction.	
2	Open or short circuit in wire harness.			<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between battery and main switch coupler. (red-red)</li> <li>Between main switch coupler and signaling system fuse. (brown/blue-brown/blue)</li> <li>Between signaling system fuse and brake light relay coupler. (brown-brown)</li> <li>Between brake light relay coupler and MCU (motor control unit) coupler. (yellow/green-yellow/green)</li> </ul>		
3	Defective k	orake light re	elay.	Replace if defective. Refer to "CHECKING THE RE- LAYS" on page 8-221.		

Fault	Fault code No. Sh48 Symptom			Improper engine idling speed adjustment.		
	der Item/components and probable cause			Check or maintenance job	Reinstatement method	
1	Engine idling speed			<ul> <li>Check and adjust the engine idling speed.</li> <li>Refer to "ADJUSTING THE EN- GINE IDLING SPEED" on page 3-10.</li> </ul>	Turning the main switch to "OFF". See NOTE.	
2	Defective fast idle unit.			• Replace the throttle bodies. Refer to "THROTTLE BODIES" on page 7-5.		

### NOTE: _

Fault	Fault code No. Sh49 Symptom		Symptom	Engine idling speed is too high when vehicle is started.		
Order	ltem/components and probable cause			Check or maintenance job	Reinstatement method	
1	Clutch operation.			Check the clutch stroke. Refer to "BLEEDING THE HY- DRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.	Turning the main switch to "OFF". See NOTE.	
2	Clutch slippage.			Check the friction plate thick- ness and replace the friction plates if necessary. Refer to "CHECKING THE FRICTION PLATES" on page 5-56.		

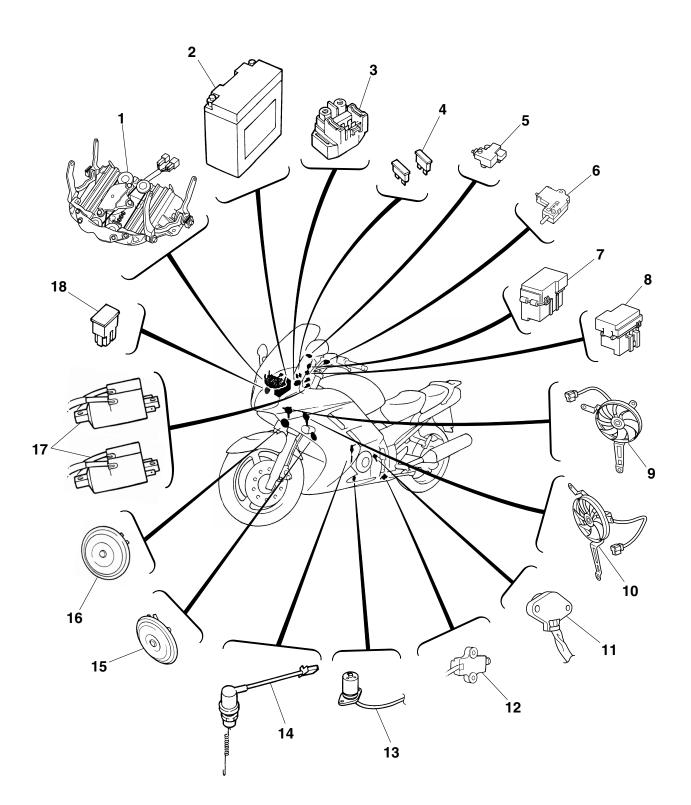
#### NOTE: _

Fault code No.     Sh51     Symptom			Symptom	Shift actuator sensor signal is abnormal.		
Order	Order Item/components and probable cause			Check or maintenance job	Reinstatement method	
1	Shift rod			<ul> <li>Check the shift rod pin hole location.</li> <li>Check the shift rod groove location.</li> <li>Adjust or replace the shift rod. Refer to "CHECKING THE SHIFT ROD" on page 5-69 and "INSTALLING THE SHIFT AC- TUATOR" on page 5-71.</li> </ul>	Repairing the cause of the malfunction.	
2	Defective shift actuator sensor.			Replace the shift actuator.		
3	switch afte	ne operation er repairing t ng the caus	he malfunction	• Execute the diagnostic mode. (Code No. Sh64)		

Fault	Fault code No. Sh52 Symptom			Main switch signal is abnormal.	
Order	Item/comp cause	oonents and	d probable	Check or maintenance job	Reinstatement method
1	Connections • Wire harness MCU (motor control unit) coupler			<ul> <li>Check the coupler for any pins that may be pulled out.</li> <li>Check the locking condition of the coupler.</li> <li>If there is a malfunction, repair it and connect the coupler se- curely.</li> </ul>	Turning the main switch to "OFF". See NOTE.
2	Open or short circuit in wire harness.			<ul> <li>Repair or replace if there is an open or short circuit.</li> <li>Between battery and main switch coupler. (red-red)</li> <li>Between main switch coupler and signaling system fuse. (brown/blue-brown/blue)</li> <li>Between signaling system fuse and MCU (motor control unit) coupler. (brown-brown)</li> </ul>	

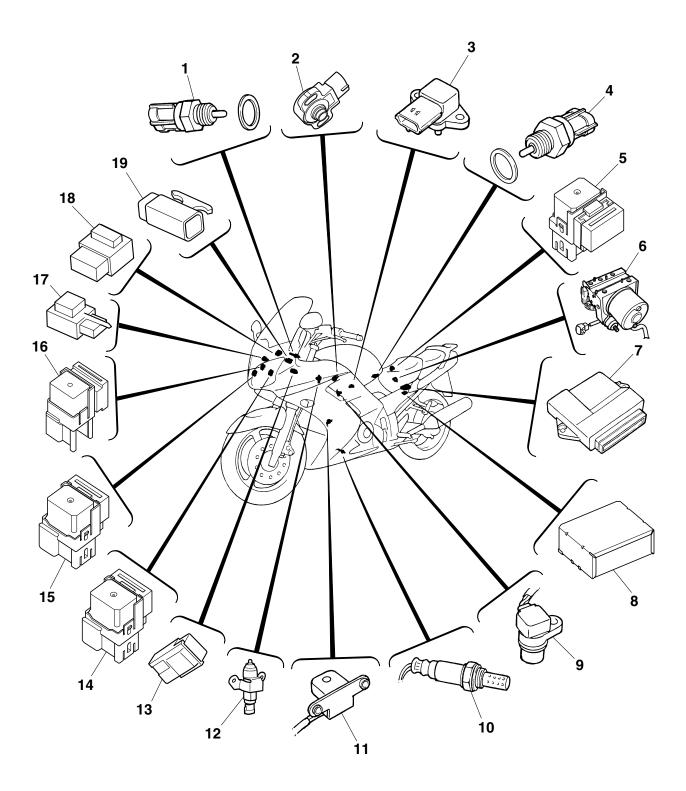
#### NOTE: _

FJR13A



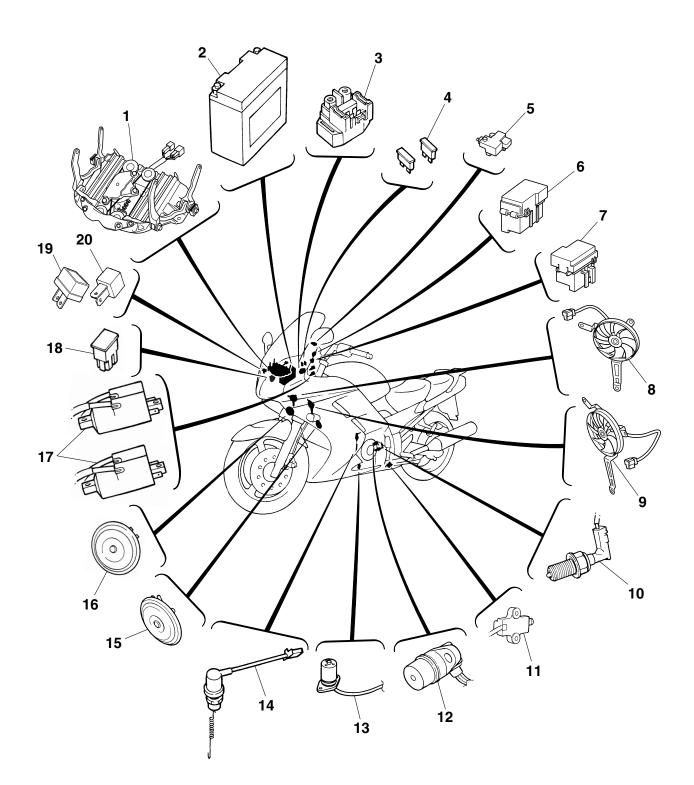
- 1. Windshield drive unit
- 2. Battery
- 3. Starter relay
- 4. ABS motor fuse
- 5. Front brake light switch
- 6. Clutch switch
- 7. Fuse box 2
- 8. Fuse box 1
- 9. Right radiator fan motor
- 10. Left radiator fan motor
- 11. Gear position switch
- 12. Sidestand switch
- 13. Oil level switch
- 14. Rear brake light switch
- 15. Left horn (low)
- 16. Right horn (high)
- 17. Ignition coil
- 18. Main fuse

### FJR13A



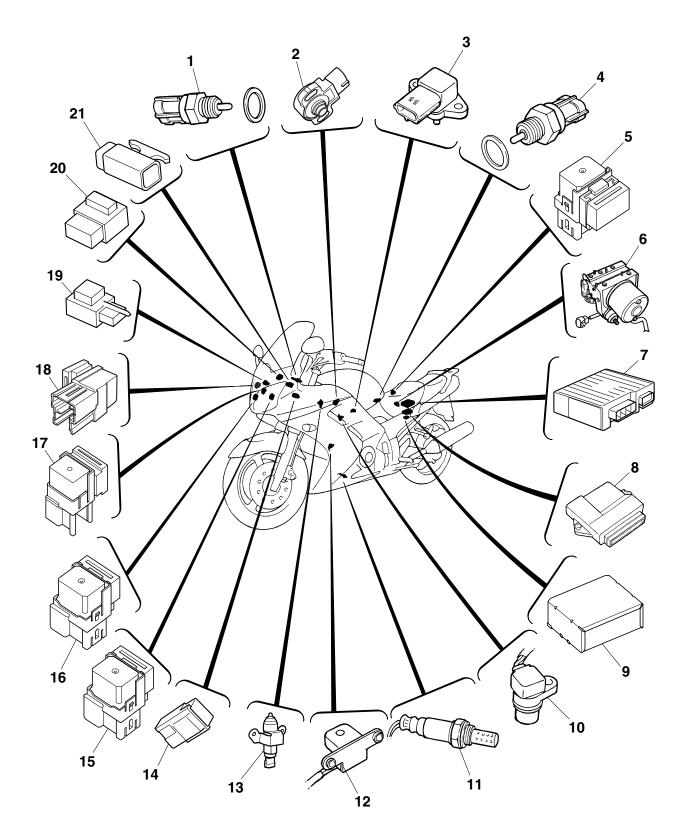
- 1. Coolant temperature sensor
- 2. Throttle position sensor
- 3. Intake air pressure sensor
- 4. Intake air temperature sensor
- 5. ABS motor relay
- 6. Hydraulic unit
- 7. ECU (engine control unit)
- 8. ABS (ECU)
- 9. Cylinder identification sensor
- 10.02 sensor
- 11. Crankshaft position sensor
- 12. Accessory box solenoid
- 13. Headlight relay (dimmer)
- 14. Radiator fan motor relay
- 15. Headlight relay (on/off)
- 16. Brake light relay
- 17. Turn signal/hazard relay
- 18. Relay unit
- 19. Lean angle sensor

### FJR13AE



- 1. Windshield drive unit
- 2. Battery
- 3. Starter relay
- 4. ABS motor fuse
- 5. Front brake light switch
- 6. Fuse box 2
- 7. Fuse box 1
- 8. Right radiator fan motor
- 9. Left radiator fan motor
- 10. Neutral switch
- 11. Sidestand switch
- 12. YCC-S speed sensor
- 13. Oil level switch
- 14. Rear brake light switch
- 15. Left horn (low)
- 16. Right horn (high)
- 17. Ignition coil
- 18. Main fuse
- 19. Diode 1
- 20. Diode 2

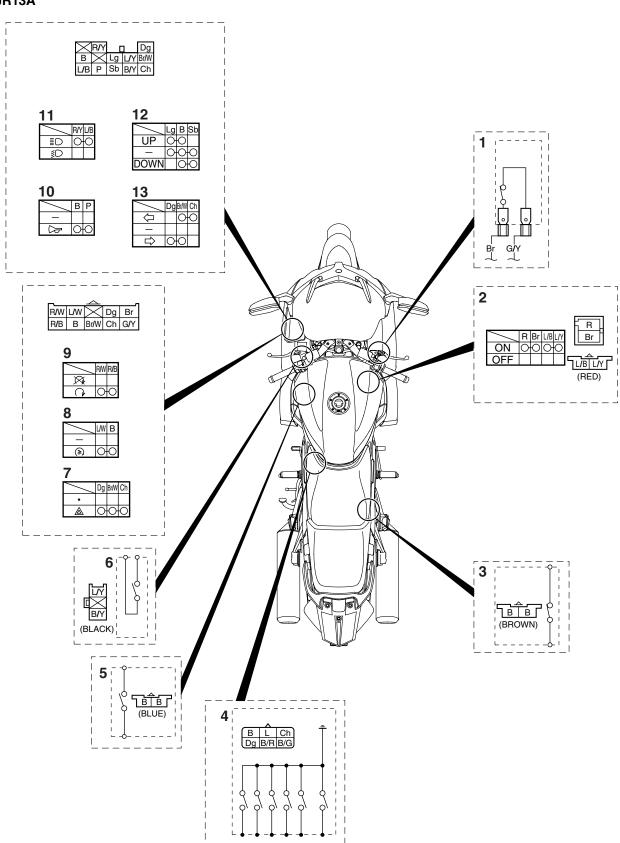
FJR13AE



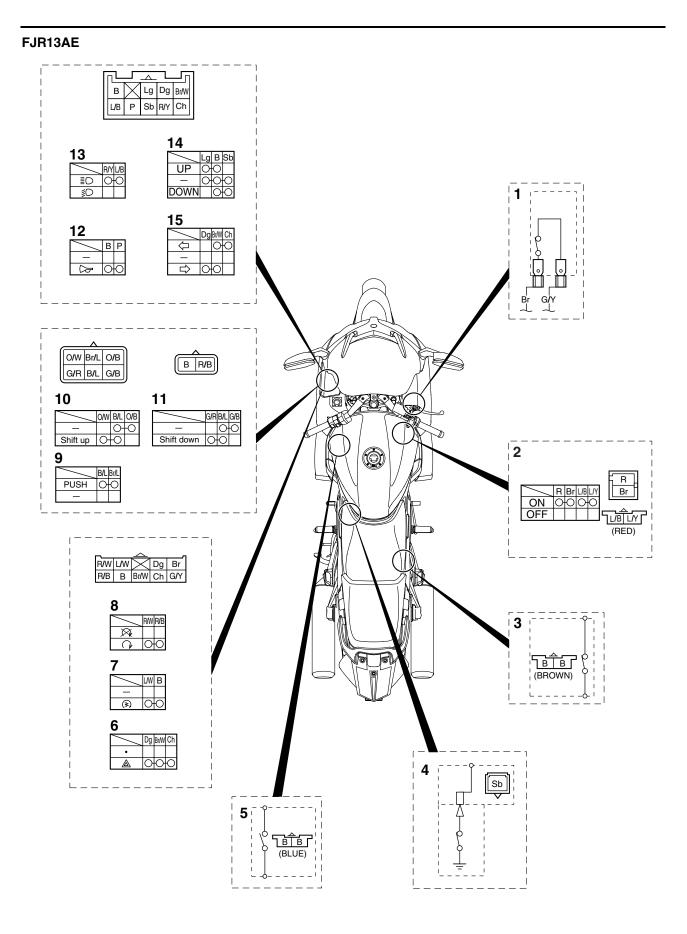
- 1. Coolant temperature sensor
- 2. Throttle position sensor
- 3. Intake air pressure sensor
- 4. Intake air temperature sensor
- 5. ABS motor relay
- 6. Hydraulic unit
- 7. MCU (motor control unit)
- 8. ECU (engine control unit)
- 9. ABS (ECU)
- 10. Cylinder identification sensor
- 11.O₂ sensor
- 12. Crankshaft position sensor
- 13. Accessory box solenoid
- 14. Headlight relay (dimmer)
- 15. Radiator fan motor relay
- 16. Headlight (on/off)/grip warmer relay
- 17. Brake light relay
- 18. YCC-S control relay
- 19. Turn signal/hazard relay
- 20. Relay unit
- 21. Lean angle sensor

## CHECKING THE SWITCHES

FJR13A



- 1. Front brake light switch
- 2. Main switch
- 3. Rear brake light switch
- 4. Gear position switch
- 5. Sidestand switch
- 6. Clutch switch
- 7. Hazard switch
- 8. Start switch
- 9. Engine stop switch
- 10. Horn switch
- 11. Dimmer switch
- 12. Windshield position switch
- 13. Turn signal switch

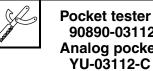


- 1. Front brake light switch
- 2. Main switch
- 3. Rear brake light switch
- 4. Neutral switch
- 5. Sidestand switch
- 6. Hazard switch
- 7. Start switch
- 8. Engine stop switch
- 9. Hand shift select button
- 10. Hand shift lever switch (shift up)
- 11. Hand shift lever switch (shift down)
- 12. Horn switch
- 13. Dimmer switch
- 14. Windshield position switch
- 15. Turn signal 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. ECA14370

## **CAUTION:**

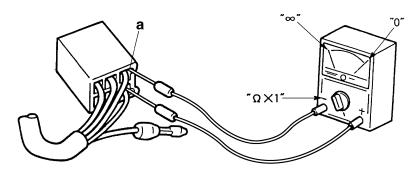
Never insert the tester probes into the coupler terminal slots "a". Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



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.

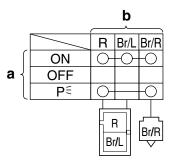


The switches and their terminal connections are illustrated as in the following example of the main switch.

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 indicated by

" O ... 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 "PE".



## 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.

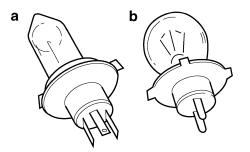
Improperly connected  $\rightarrow$  Properly connect.

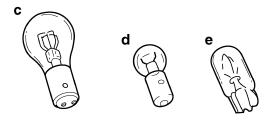
No continuity  $\rightarrow$  Repair or replace the bulb, bulb socket or both.

## Types of bulbs

The bulbs used on this vehicle are shown in the 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 EW3P61001

## WARNING

Since headlight bulbs get extremely hot, keep flammable products and your hands away from them until they have cooled down.

# EC3P61002

- Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.
- Avoid touching the glass part of a headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.
- 2. Check:
  - Bulb (for continuity) (with the pocket tester) No continuity → Replace.

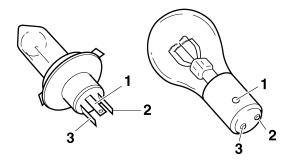
Pocket tester 90890-03112 Analog pocket tester YU-03112-C

## 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:
- Front cowling right inner panel 1 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:

- D. neplace.
- Blown fuse

- a. Turn the main switch to "OFF".
- b. Install a new fuse of the correct amperage rating.
- c. Set on the switches to verify if the electrical circuit is operational.
- d. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	50 A	1
ABS motor	30 A	1
YCC-S motor control (FJR13AE)	30 A	1
Headlight	25 A	1
Fuel injection system	15 A	1
Signaling system	15 A	1
Left radiator fan motor	15 A	1
Right radiator fan motor	15 A	1
Ignition	10 A	1
Hazard lighting	10 A	1
ABS ECU	10 A	1
Backup (odometer, clock, and windshield drive system)	10 A	1
Auxiliary DC jack	3 A	1
Spare	30 A	1
Spare	25 A	1
Spare	15 A	1
Spare	10 A	1
Spare	3 A	1

# WARNING

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

## *****

- 4. Install:
- Front cowling right inner panel 1 Refer to "GENERAL CHASSIS" on page 4-1.

## EAS28030

# CHECKING AND CHARGING THE BATTERY

## 

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.

# EC3P61004

• 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 appropriate charging method. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.

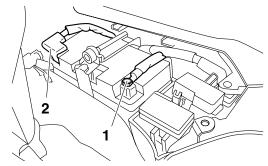
## NOTE:

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:
- Front cowling right inner panel 1 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".



- 3. Remove:
- Battery
- 4. Check:
  - Battery charge

## ******

- Connect a pocket tester to the battery terminals.
- Positive tester probe  $\rightarrow$ 
  - positive battery terminal
- Negative tester probe → negative battery terminal

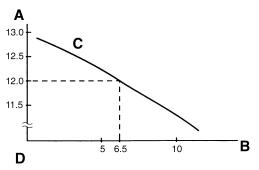
## NOTE: _

- 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.

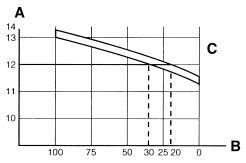
## Example Open-circuit voltage = 12.0 V

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

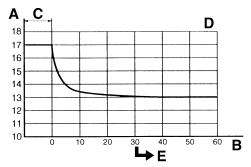
(refer to the appropriate charging method)

## 

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.

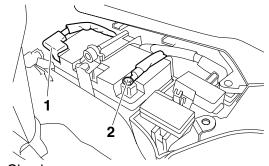
12.8 V or more --- Charging is complete. 12.7 V or less --- Recharging is required. Under 12.0 V --- Replace the battery.

## *****

- 6. Install:
- Battery
- 7. Connect:
- Battery leads (to the battery terminals)

## CAUTION:

First, connect the positive battery lead "1", and then the negative battery lead "2".



- 8. Check:
  - Battery terminals
     Dirt → Clean with a wire brush.
     Loose connection → Connect properly.
- 9. Lubricate:
  - Battery terminals

## Recommended lubricant Dielectric grease

10.Install:

• Front cowling right inner panel 1 Refer to "GENERAL CHASSIS" on page 4-1.

### EAS28040

## CHECKING THE RELAYS

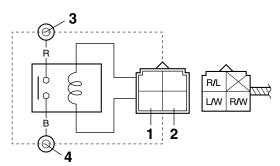
Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.



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

- 1. Disconnect the relay from the wire harness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the relay terminals as shown. Check the relay operation. Out of specification → Replace.

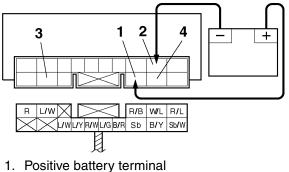
## **Starter relay**



- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe

## Result Continuity (between "3" and "4")

## Relay unit (starting circuit cut-off relay)

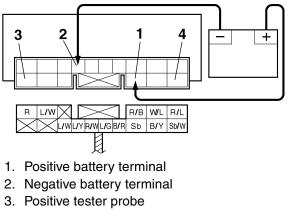


- 2. Negative battery terminal
- 2. Negative battery termi
- 3. Positive tester probe
- 4. Negative tester probe



(between "3" and "4")

## Relay unit (fuel pump relay)

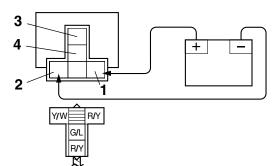


4. Negative tester probe



Result Continuity

## Headlight relay (on/off)



- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe

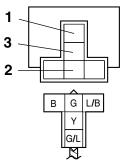


Result Continuity

(between "3" and "4")

## Headlight relay (dimmer)

First step:



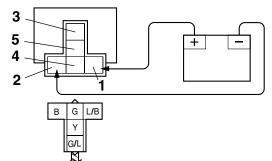
- 1. Positive tester probe
- 2. Negative tester probe
- 3. Negative tester probe

# 0 Result

Continuity (between "1" and "2") No continuity

(between "1" and "3")

## Second step:



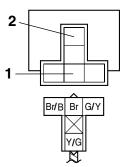
- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe
- 5. Negative tester probe



Result No continuity (between "3" and "4") Continuity (between "3" and "5")

## Brake light relay

First step:



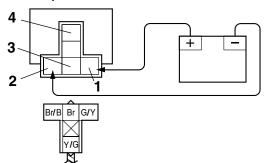
- 1. Positive tester probe
- 2. Negative tester probe



Result Continuity

(between "1" and "2")

### Second step:



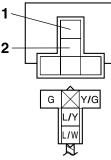
- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe



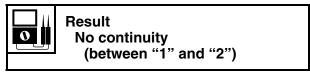
Result No continuity (between "3" and "4")

## YCC-S control relay (FJR13AE)

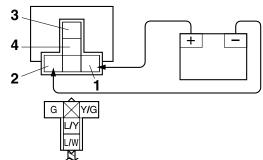
## First step:



- 1. Positive tester probe
- 2. Negative tester probe



## Second step:



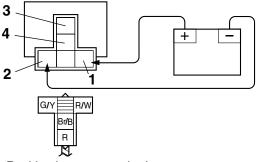
- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe



## Result Continuity

(between "3" and "4")

## Radiator fan motor relay



- 1. Positive battery terminal
- 2. Negative battery terminal
- 3. Positive tester probe
- 4. Negative tester probe



## Result Continuity

(between "3" and "4")

ET3P61059

## CHECKING THE ABS MOTOR RELAY

- 1. Remove:
- ABS motor relay
- 2. Check:
- ABS motor relay resistance Out of specification → Replace.



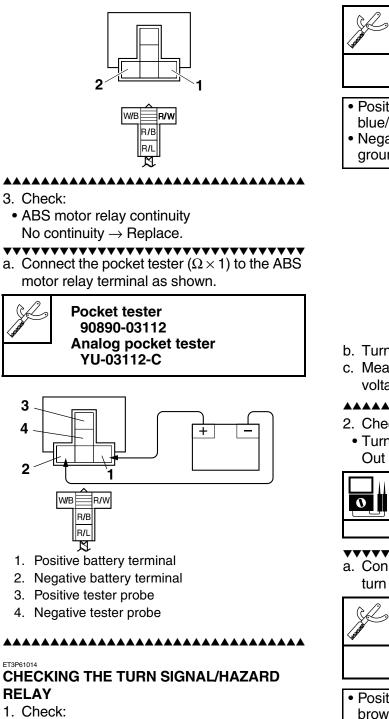
ABS motor relay resistance 50–150  $\Omega$ 

a. Connect the pocket tester ( $\Omega \times 1$ ) to the ABS motor relay terminal as shown.



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

- Positive tester probe  $\rightarrow$
- red/white "1"
- Negative tester probe  $\rightarrow$
- white/black "2"



 Turn signal/hazard relay input voltage Out of specification  $\rightarrow$  The wiring circuit from the main switch to the turn signal/hazard relay coupler is faulty and must be repaired.

0

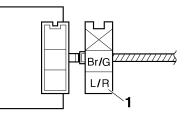
Turn signal/hazard relay input voltage DC 12 V

a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.



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

- Positive tester probe →
- blue/red "1"
- Negative tester probe  $\rightarrow$
- 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

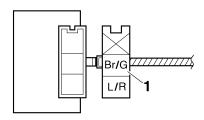
## *************************

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/green "1"
- Negative tester probe  $\rightarrow$ ground



- b. Turn the main switch to "ON".
- c. Measure the turn signal/hazard relay output voltage.

# EAS28050

## CHECKING THE RELAY UNIT (DIODE)

- 1. Check:
- Relay unit (diode) Out of specification  $\rightarrow$  Replace.



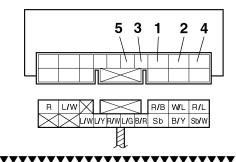
Pocket tester 90890-03112 Analog pocket tester YU-03112-C

## NOTE: _

The pocket tester and the analog pocket tester readings are shown in the following table.

# 0

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  $\rightarrow$ black/red "3" No continuity Positive tester probe  $\rightarrow$ black/red "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/green "5" Negative tester probe  $\rightarrow$ black/red "3" No continuity Positive tester probe  $\rightarrow$ black/red "3" Negative tester probe  $\rightarrow$ blue/green "5"



- a. Disconnect the relay unit coupler from the wire harness.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the relay unit terminal as shown.

- c. Check the relay unit (diode) for continuity.
- d. Check the relay unit (diode) for no continuity.

.....

### EAS28070

## CHECKING THE SPARK PLUG CAPS

The following procedure applies to all of the spark plug caps.

- 1. Check:
- Spark plug cap resistance Out of specification → Replace.

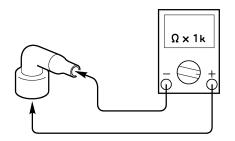


## •••••

- a. Remove the spark plug cap from the spark plug lead.
- b. Connect the pocket tester ( $\Omega \times 1k$ ) to the spark plug cap as shown.



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



c. Measure the spark plug cap resistance.

## ****

## EAS28100

## **CHECKING THE IGNITION COILS**

The following procedure applies to both of the ignition coils.

1. Check:

0

 Primary coil resistance Out of specification → Replace.

> Primary coil resistance 1.53–2.07 Ω at 20 °C (68 °F)

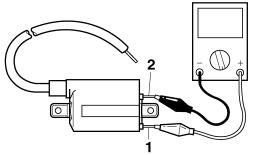
## 

- a. Disconnect the ignition coil connectors from the ignition coil terminals.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil as shown.



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

- $\bullet$  Positive tester probe  $\rightarrow$
- red/black or red/blue "1"
- Negative tester probe  $\rightarrow$
- orange or gray/red "2"



c. Measure the primary coil resistance.

## *****

- 2. Check:
- Secondary coil resistance Out of specification  $\rightarrow$  Replace.

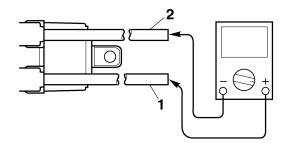


Secondary coil resistance 12–18 k $\Omega$  at 20 °C (68 °F)

- ****
- a. Disconnect the spark plug cap from the ignition coil.
- b. Connect the pocket tester  $(\Omega \times 1k)$  to the ignition coil as shown.

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

- Positive tester probe  $\rightarrow$
- Spark plug lead "1"
- Negative tester probe  $\rightarrow$
- Spark plug lead "2"



c. Measure the secondary coil resistance.

## *****

# CHECKING THE IGNITION SPARK GAP

- 1. Check:
- Ignition spark gap Out of specification → Perform the ignition system troubleshooting, starting with step 5. Refer to "TROUBLESHOOTING" on page 8-10.



## Minimum ignition spark gap 6.0 mm (0.24 in)

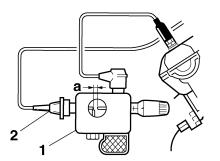
## NOTE:

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

## ****

- a. Disconnect the spark plug cap from the spark plug.
- b. Connect the ignition checker "1" as shown.

Ignition checker
 90890-06754
 Opama pet-4000 spark checker
 YM-34487



- 2. Spark plug cap
- c. Turn the main switch to "ON" and engine stop switch to " $\bigcirc$ ".
- d. Measure the ignition spark gap "a".
- e. 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 → Replace the crankshaft position sensor.



Crankshaft position sensor resistance

421–569 Ω at 20 °C (68 °F)

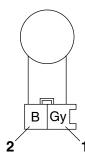
## *****

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 → black "2"



b. Measure the crankshaft position sensor resistance.

*****

# CHECKING THE LEAN ANGLE SENSOR

- 1. Remove:
- Lean angle sensor
- 2. Check:
  - Lean angle sensor output voltage Out of specification  $\rightarrow$  Replace.



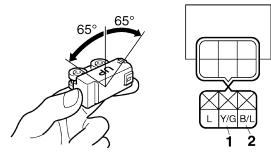
Lean angle sensor output voltage Less than 65°: 0.4–1.4 V More than 65°: 3.7–4.4 V

## *****

- a. Connect the lean angle sensor coupler to the wire harness.
- b. Connect the pocket tester (DC 20 V) to the lean angle sensor coupler as shown.



- 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.

*****

## FT0D01010

## CHECKING THE STARTER MOTOR OPERATION

- 1. Check:
- Starter motor operation Does not operate → Perform the electric starting system troubleshooting, starting with step 4.

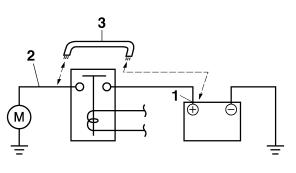
Refer to "TROUBLESHOOTING (FJR13A)" on page 8-23 and "TROUBLESHOOTING (FJR13AE)" on page 8-25.

## *****

a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

## 

- A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.



b. Check the starter motor operation.

## *****

## EAS28150

## CHECKING THE STATOR COIL

- 1. Disconnect:
- Stator coil coupler (from the wire harness)
- 2. Check:
- Stator coil resistance Out of specification → Replace the stator coil.



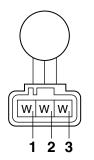
Stator coil resistance 0.13–0.19 Ω at 20 °C (68 °F)

## ****

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  $\rightarrow$
- white "1"
- Negative tester probe → white "2"
- Positive tester probe → white "1"
- Negative tester probe → white "3"
- Positive tester probe  $\rightarrow$
- white "2"
- Negative tester probe → white "3"



b. Measure the stator coil resistance.

## *****

## EAS28170

## CHECKING THE RECTIFIER/REGULATOR 1. Check:

Charging voltage

Out of specification  $\rightarrow$  Replace the rectifier/regulator.



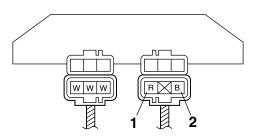
## *****

- a. Set the engine tachometer to the spark plug lead of cylinder-#1.
- 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.

*****

### EAS28180 CHECKING THE HORNS

The following procedure applies to both of the horns.

- 1. Check:
- Horn resistance

Out of specification  $\rightarrow$  Replace.



Coil resistance 1.01–1.11 Ω at 20 °C (68 °F)

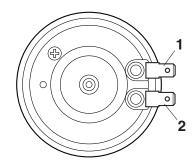
## ****

- a. Disconnect the horn connectors 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

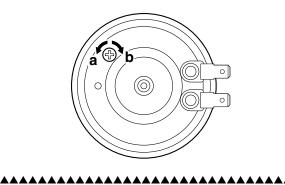
- Positive tester probe  $\rightarrow$
- horn terminal "1"
- $\bullet$  Negative tester probe  $\rightarrow$
- horn terminal "2"



- 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.



FAS28190

## CHECKING THE OIL LEVEL SWITCH

- 1. Drain:
- Engine oil
- 2. Remove:
- · Oil level switch (from the oil pan)
- 3. Check:

0

• Oil level switch continuity Out of specification  $\rightarrow$  Replace.

> Oil level switch resistance Minimum level position No continuity Maximum level position Continuity

a. Connect the pocket tester ( $\Omega \times 1$ ) to the oil level switch terminal as shown.

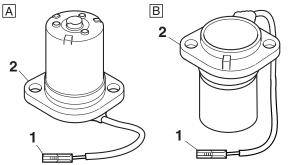
Pocket tester 90890-03112 Analog pocket tester YU-03112-C

Minimum level position "A"

- Positive tester probe  $\rightarrow$ white "1"
- Negative tester probe  $\rightarrow$ body ground "2"

Maximum level position "B"

- Positive tester probe  $\rightarrow$
- white "1"
- Negative tester probe  $\rightarrow$ body ground "2"



b. Measure the oil level switch resistance.

## *****

## EAS28220

## CHECKING THE FUEL SENDER

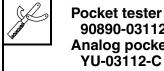
- 1. Disconnect:
- Fuel pump coupler
- Fuel sender coupler (from the wire harness)
- 2. Remove:
- Fuel tank
- 3. Remove:
- Fuel pump (from the fuel tank)
- 4. Check:
  - Fuel sender resistance Out of specification  $\rightarrow$  Replace the fuel pump assembly.



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

## ******

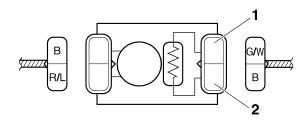
a. Connect the pocket tester ( $\Omega \times 10$ ) to the fuel sender terminals as shown.



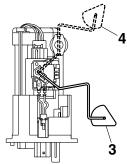
Analog pocket tester YU-03112-C

90890-03112

- Positive tester probe  $\rightarrow$
- green/white "1"
- Negative tester probe  $\rightarrow$ black "2"



b. Move the fuel sender float to minimum "3" and maximum "4" level position.



c. Measure the fuel sender resistance.

******* 

### EAS28250

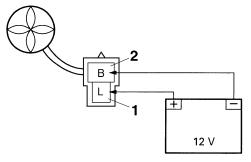
## CHECKING THE RADIATOR FAN MOTORS

The following procedure applies to both of the radiator fan motors.

- 1. Check:
- Radiator fan motor Faulty/rough movement  $\rightarrow$  Replace.

## *******************************

- a. Disconnect the radiator fan motor coupler from the wire harness.
- b. Connect the battery (DC 12 V) as shown.
- Positive battery terminal → blue "1"
- Negative battery terminal → black "2"



c. Measure the radiator fan motor movement.

## .....

# CHECKING THE COOLANT TEMPERATURE SENSOR

- 1. Remove:
- Coolant temperature sensor

## **WARNING**

- Handle the coolant temperature sensor with special care.
- Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.

## 2. Check:

 Coolant temperature sensor resistance Out of specification → Replace.



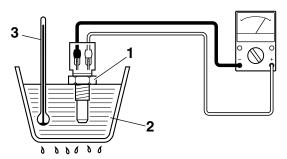
Coolant temperature sensor resistance 290–354  $\Omega$  at 80 °C (176 °F)

## ****

a. Connect the pocket tester ( $\Omega \times 100$ ) to the coolant temperature sensor terminals as shown.

Poc 90 Ana YU

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 that the coolant temperature sensor terminals do not get wet.

- c. Place a thermometer "3" in the coolant.
- d. Slowly heat the coolant, and then let it cool down to the specified temperature.
- e. Measure the coolant temperature sensor resistance.

## ****

- 3. Install:
- Coolant temperature sensor



## Coolant temperature sensor 18 Nm (1.8 m·kg, 13 ft·lb)

### EAS28300

# CHECKING THE THROTTLE POSITION SENSOR

- 1. Remove:
- Throttle position sensor (from the throttle body)
- 2. Check:
- Throttle position sensor maximum resistance Out of specification → Replace the throttle position sensor.



# Resistance 4.0–6.0 k $\Omega$

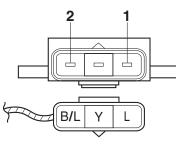
****

a. Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor terminals as shown.



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

- Tester positive lead → blue "1"
- Tester negative lead  $\rightarrow$  black/blue "2"



b. Measure the throttle position sensor maximum resistance.

## *****

- 3. Install:
- Throttle position sensor

## NOTE:

When installing the throttle position sensor, adjust its angle properly. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-8.

# CHECKING THE AIR INDUCTION SYSTEM SOLENOID

- 1. Check:
- Air induction system solenoid resistance Out of specification → Replace.



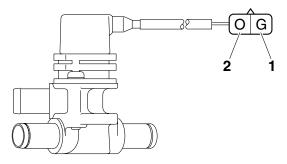
Solenoid resistance 19–25 Ω at 20 °C (68 °F)

## ****

- a. Disconnect the air induction system solenoid coupler from the wire harness.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the air induction system solenoid terminals as shown.

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

- Positive tester probe  $\rightarrow$
- green "1"
- Negative tester probe → orange "2"



c. Measure the air induction system solenoid resistance.

## *****

## CHECKING THE CYLINDER IDENTIFICATION SENSOR

- 1. Remove:
- Timing plate cover
- 2. Check:
  - Cylinder identification sensor output voltage Out of specification → Replace.

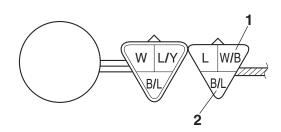


Cylinder identification sensor output voltage (ON) More than 4.8 V Cylinder identification sensor output voltage (OFF) Less than 0.6 V

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 → 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.

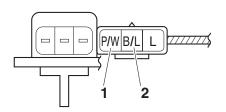


Intake air pressure sensor output voltage 3.75–4.25 V

- a. Connect the pocket tester (DC 20 V) to the in-
- take 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 INTAKE AIR TEMPERATURE SENSOR

- 1. Remove:
- Intake air temperature sensor (from the air filter case)

## 

- Handle the intake air temperature sensor with special care.
- Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.
- 2. Check:
- Intake air temperature sensor resistance Out of specification → Replace.



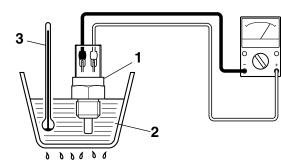
Intake air temperature sensor resistance 290–390  $\Omega$  at 80 °C (176 °F)

## ******

a. Connect the pocket tester ( $\Omega \times 100$ ) to the intake air temperature sensor terminals as shown.



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



b. Immerse the intake air temperature sensor "1" in a container filled with water "2".

## NOTE:

Make sure that the intake air temperature sensor terminals do not get wet.

- c. Place a thermometer "3" in the water.
- d. Slowly heat the water, then let it cool down to the specified temperature.
- e. Measure the intake air temperature sensor resistance.

## 

## CHECKING THE ACCESSORY BOX SOLENOID

- 1. Check:
- Accessory box solenoid resistance Out of specification → Replace.



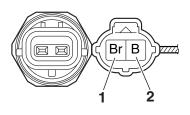
## *********

- a. Disconnect the accessory box solenoid coupler from the wire harness.
- b. Connect the pocket tester ( $\Omega \times 10$ ) to the accessory box solenoid terminals as shown.



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

- Positive tester probe  $\rightarrow$
- brown "1"
- Negative tester probe → black "2"



c. Measure the accessory box solenoid resistance.

*****

## ET3P66020

## CHECKING THE YCC-S SPEED SENSOR (FJR13AE only)

- 1. Check:
- YCC-S speed sensor output voltage Out of specification → Replace.



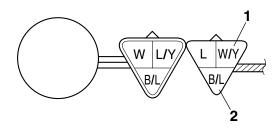
Output voltage reading cycle 0.6 V to 4.8 V to 0.6 V to 4.8 V

a. Connect the pocket tester (DC 20 V) to the YCC-S 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.

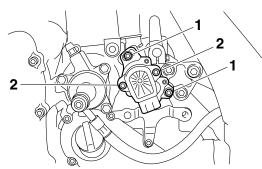
*****

## CHECKING THE GEAR POSITION SENSOR (FJR13AE only)

- 1. Remove:
- Gear position sensor

## NOTE: ____

Remove only the screws "1" when removing the gear position sensor. Do not remove the screws "2".



- 2. Check:
- Gear position sensor maximum resistance Out of specification → Replace the gear position sensor.

# Resistance FJR13AE 4.0–6.0 kΩ

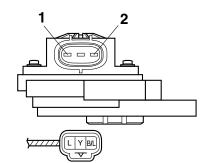
## *****

a. Connect the pocket tester ( $\Omega \times 1k$ ) to the gear position sensor terminals as shown.



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

- Positive tester probe → blue "1"
- Negative tester probe → black/blue "2"



b. Measure the gear position sensor maximum resistance.

*****

- 3. Install:
- Gear position sensor Refer to "INSTALLING THE GEAR POSI-TION SENSOR (FJR13AE only)" on page 5-11.

## CHECKING THE FOOT SHIFT SWITCH (FJR13AE only)

- 1. Remove:
- Foot shift switch
- 2. Check:
- Foot shift switch maximum resistance Out of specification → Replace the foot shift switch.



Resistance FJR13AE 4.0–6.0 kΩ

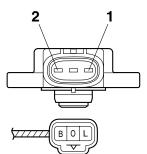
## •••••••••••••••••••••••

a. Connect the pocket tester  $(\Omega \times 1k)$  to the foot shift switch terminals as shown.



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

- Positive tester probe  $\rightarrow$
- blue "1"
- Negative tester probe → black "2"



b. Measure the foot shift switch maximum resistance.

## *****

- 3. Install:
- Foot shift switch Refer to "INSTALLING THE FOOT SHIFT SWITCH" on page 5-69.

# CHECKING THE GRIP WARMERS (FJR13AE only)

The following procedure applies to both of the grip warmers.

## 1. Check:

• Grip warmer resistance

Out of specification  $\rightarrow$  Replace the grip warmer.

# 0

Grip warmer resistance FJR13AE 1.21–1.48 Ω at 20 °C (68 °F)

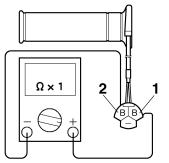
## ******

- a. Disconnect the grip warmer coupler from the front cowling wire harness.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the grip warmer coupler as shown.



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

- Positive tester probe → black "1"
- Negative tester probe → black "2"

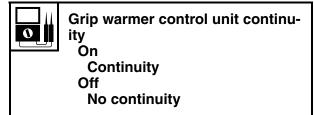


c. Measure the grip warmer resistance.

## *****

## CHECKING THE GRIP WARMER CONTROL UNIT (FJR13AE only)

- 1. Check:
- Grip warmer control unit continuity Out of specification → Replace.



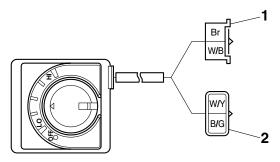
## *****

- a. Disconnect the grip warmer control unit couplers from the front cowling wire harness.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the grip warmer control unit coupler as shown.



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

- Positive tester probe → brown "1"
- Negative tester probe  $\rightarrow$
- black/green "2"



c. Measure the grip warmer control unit resistance.

*****

## CHECKING THE DIODE 2 (FJR13AE only)

- 1. Check:
- Diode 2

Out of specification  $\rightarrow$  Replace.



## NOTE:

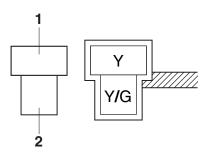
The pocket tester and the analog pocket tester readings are shown in the following table.

# Continuity

"1"

Positive tester probe  $\rightarrow$  yellow "1"

Negative tester probe  $\rightarrow$  yellow/green "2" No continuity Positive tester probe  $\rightarrow$  yellow/green "2" Negative tester probe  $\rightarrow$  yellow



## ****

- a. Remove the diode 2 from the wire harness.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the diode 2 terminals as shown.
- c. Check the diode 2 for continuity.
- d. Check the diode 2 for no continuity.

_____

# TROUBLESHOOTING

TROUBLESHOOTING	
GENERAL INFORMATION	
STARTING FAILURES	
INCORRECT ENGINE IDLING SPEED	
POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE	
FAULTY GEAR SHIFTING	
SHIFT PEDAL DOES NOT MOVE	
JUMPS OUT OF GEAR	
FAULTY CLUTCH	
OVERHEATING	
OVERCOOLING	
POOR BRAKING PERFORMANCE	
FAULTY FRONT FORK LEGS	
UNSTABLE HANDLING	
FAULTY LIGHTING OR SIGNALING SYSTEM	

# 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 overflow hose
- Clogged rollover valve (for California only)
- Clogged rollover valve hoses (for California only)
- 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
- Faulty spark plug cap
- 4. Ignition coil(s)
- Cracked or broken ignition coil body
- Broken or shorted primary or secondary coils
- Faulty spark plug lead
- 5. Ignition system
- Faulty ECU
- Faulty crankshaft position sensor
- Faulty cylinder identification sensor
- Broken generator rotor woodruff key
- 6. Switches and wiring
- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty gear position switch (neutral circuit) (FJR13A)
- Faulty neutral switch (FJR13AE)
- Faulty start switch
- Faulty sidestand switch
- Faulty clutch switch (FJR13A)
- Faulty front, rear, or both brake light switches (FJR13AE)
- 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
- Improperly adjusted engine idling speed (throttle stop screw)
- Improper throttle cable free play
- Flooded throttle body
- Faulty air induction system

## Electrical system

- 1. Battery
- Discharged battery
- Faulty battery
- 2. Spark plug(s)
- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap
- 3. Ignition coil(s)
- Broken or shorted primary or secondary coils
- Faulty spark plug lead
- Cracked or broken ignition coil
- 4. Ignition system
- Faulty ECU
- Faulty crankshaft position sensor
- Faulty cylinder identification sensor
- Broken generator rotor woodruff key

## EAS28510

## POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURES" on page 9-1.

## Engine

- 1. Air filter
- Clogged air filter element

## Fuel system

- 1. Fuel pump
- Faulty fuel pump

## 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

## 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 assembled clutch master cylinder
- Improperly assembled clutch release cylinder
- Incorrect clutch fluid level
- Damaged clutch hose
- Loose or fatigued clutch spring plate
- Loose union bolt
- Worn friction plate
- Worn clutch plate
- Damaged clutch release cylinder
- 2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity (low)
  - Deteriorated oil

## **Clutch drags**

- 1. Clutch
- Air in hydraulic clutch system
- Warped pressure plate
- · Bent clutch plate
- Swollen friction plate

- Bent clutch push rod
- Damaged clutch boss
- Burnt primary driven gear bushing
- Damaged clutch release cylinder
- Match marks not aligned
- 2. Engine oil
- Incorrect oil level
- Incorrect oil viscosity (high)
- Deteriorated oil

### eAS28600 OVERHEATING

## Engine

- 1. Clogged coolant passages
- Cylinder head and piston(s)
- Heavy carbon buildup
- 2. Engine oil
- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

## **Cooling system**

- 1. Coolant
- Low coolant level
- 2. Radiator
- Damaged or leaking radiator
- Faulty radiator cap
- Bent or damaged radiator fin
- 3. Water pump
- Damaged or faulty water pump
- 4. Thermostat
- Thermostat stays closed
- 5. Oil cooler
- Clogged or damaged oil cooler
- 6. Hose(s) and pipe(s)
- Damaged hose
- Improperly connected hose
- Damaged pipe
- Improperly connected pipe

## Fuel system

- 1. Throttle body(-ies)
- Damaged or loose throttle body joint
- 2. Air filter
- Clogged air filter element

## Chassis

- 1. Brake(s)
- Dragging brake

## Electrical system

- 1. Spark plug(s)
- Incorrect spark plug gap

- Incorrect spark plug heat range
- 2. Ignition system
- Faulty ECU

EAS28610

## OVERCOOLING

## **Cooling system**

- 1. Thermostat
- Thermostat stays open

## EAS28620

## POOR BRAKING PERFORMANCE

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit
- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

## EAS2866

## FAULTY FRONT FORK LEGS

## Leaking oil

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- · Damaged oil seal lip
- Incorrect oil level (high)
- · Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Cracked or damaged cap bolt O-ring

## Malfunction

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

### EAS28680 UNSTABLE HANDLING

## Handlebars

- Bent or improperly installed right handlebar
- Bent or improperly installed left handlebar
- 1. Steering head components
- Improperly installed upper bracket

- Improperly installed lower bracket (improperly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race
- 2. Front fork leg(s)
- 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 bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

## Tail/brake light bulb burnt out

- Wrong tail/brake light bulb
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

## Turn signal does not come on

- Faulty turn signal switch
- Faulty turn signal/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**

51. Headlight relay (on/off)

	51. Headlight relay (on/off)
	52. Hazard lighting fuse
FJR13AV(C) 2006	53. Signaling system fuse
1. Main switch	54. Headlight fuse
2. Rectifier/regulator	55. Ignition fuse
3. AC magneto	56. Auxiliary DC jack fuse
4. ABS ECU fuse	57. Grip warmer control unit (OP-
5. Fuel injection system fuse	TION)
6. Backup fuse (odometer, clock,	58. Radiator fan motor relay
and windshield drive system)	59. Left radiator fan motor fuse 60. Left radiator fan motor
7. Main fuse	
8. Battery	61. Right radiator fan motor fuse 62. Right radiator fan motor
9. ABS motor fuse	
10. Starter relay	63. Turn signal/hazard relay 64. Auxiliary DC jack
11. Starter motor	65. Right handlebar switch
12. Gear position switch	66. Front brake light switch
13. Coupler 1 (wire harness–front cowling wire harness)	67. Engine stop switch
14. Fuel pump	68. Start switch
15. Fuel sender	69. Hazard switch
16. Coupler 2 (wire harness-front	70. Left handlebar switch
cowling wire harness)	71. Clutch switch
17. ABS test coupler	72. Dimmer switch
18. ABS ECU (electronic control	73. Windshield position switch
unit)	74. Turn signal switch
19. Front wheel sensor	75. Horn switch
20. Rear wheel sensor	76. Relay unit
21. ABS motor relay	77. Starting circuit cut-off relay
22. Hydraulic unit	78. Fuel pump relay
23. Rear brake light switch	79. Accessory box solenoid
24. Brake light relay	80. Meter assembly
25. License plate light	81. Neutral indicator light
26. Taillight assembly	82. ABS warning light
27. Tail/brake light	83. Multi-function meter
28. Rear left turn signal light	84. Oil level warning light
29. Rear right turn signal light	85. Engine trouble warning light
30. Coupler 3 (wire harness-front	86. Meter light
cowling wire harness)	87. High beam indicator light
31. Sidestand switch	88. Right turn signal indicator light
32. Cylinders-#1/#4 ignition coil	89. Left turn signal indicator light 90. Thermistor
33. Spark plug 34. Cylinders-#2/#3 ignition coil	91. Lean angle sensor
35. Injector #4	92. Horn
36. Injector #3	93. Front left turn signal light
37. Injector #2	94. Front right turn signal light
38. Injector #1	95. Headlight relay (dimmer)
39. Air induction system solenoid	96. Headlight assembly
40. ECU (engine control unit)	97. Headlight
41. Crankshaft position sensor	98. Right grip warmer (OPTION)
42. Intake air temperature sensor	99. Left grip warmer (OPTION)
43. Coolant temperature sensor	100.Windshield drive unit
44. O ₂ sensor	
45. Cylinder identification sensor	
46. Throttle position sensor	
47. Intake air pressure sensor	
48. Coupler 4 (wire harness-front	
cowling wire harness)	
49. Oil level switch	
50 Coupler 5 (wire barness_front	

50. Coupler 5 (wire harness-front cowling wire harness)

	EAS28750	CODE
	В	Black
	Br	Brown
	Ch	Chocolate
	Dg	Dark green
	G	Green
-	Gy	Gray
	L	Blue
	Lg	Light green
	õ	Orange
	P	Pink
	R	Red
	Sb	Sky blue
	W	White
	Y	Yellow
	B/G	Black/Green
	B/L	Black/Blue
	B/R	Black/Red
	B/W	Black/White
	B/Y	Black/Yellow
	Br/B	Brown/Black
	Br/G	Brown/Green
	Br/L	Brown/Blue
	Br/R	Brown/Red
	Br/W	Brown/White
	Br/Y	Brown/Yellow
	G/B	Green/Black
	G/L	Green/Blue
	G/R	Green/Red
	G/W	Green/White
	G/Y	Green/Yellow
	Gy/R	Gray/Red
	Gy/W	Gray/White
	L/B	Blue/Black
	L/G	Blue/Green
	L/R	Blue/Red
	L/W	Blue/White
	L/Y	Blue/Yellow
	Lg/W O/B	Light green/white
	D/B P/W	Orange/Black Pink/White
nt	R/B	Red/Black
	R/G	Red/Green
	R/L	Red/Blue
	R/W	Red/White
	R/Y	Red/Yellow
	Sb/W	Sky blue/White
	W/B	White/Black
	W/G	White/Green
	W/L	White/Blue
	W/Y	White/Yellow
	Y/G	Yellow/Green
	Y/L	Yellow/Blue
	Y/R	Yellow/Red
	Y/W	Yellow/White

## ET3P66050 WIRING DIAGRAM

## FJR13AEV(C) 2006

- 1. Main switch
- 2. Rectifier/regulator
- 3. AC magneto
- 4. ABS ECU fuse
- 5. Fuel injection system fuse 6. Backup fuse (odometer, clock,
- and windshield drive system) 7. Main fuse
- 8. Batterv
- 9. ABS motor fuse
- 10. Starter relay
- 11. Starter motor
- 12. Diode 1
- 13. Coupler 1 (wire harness-front cowling wire harness)
- 14. Fuel pump
- 15. Fuel sender
- 16. Coupler 2 (wire harness-front cowling wire harness)
- 17. Neutral switch
- 18. ABS test coupler
- 19. ABS ECU (electronic control unit)
- 20. Front wheel sensor
- 21. Rear wheel sensor
- 22. ABS motor relay
- 23. Hydraulic unit
- 24. Rear brake light switch
- 25. Diode 2
- 26. Brake light relay
- 27. License plate light
- 28. Taillight assembly
- 29. Tail/brake light
- 30. Rear left turn signal light
- 31. Rear right turn signal light 32. Coupler 3 (wire harness-front
- cowling wire harness)
- 33. Sidestand switch
- 34. Cylinders-#1/#4 ignition coil
- 35. Spark plug
- 36. Cylinders-#2/#3 ignition coil
- 37. Injector #4
- 38. Injector #3
- 39. Injector #2
- 40. Injector #1
- 41. Air induction system solenoid
- 42. ECU (engine control unit)
- 43. Crankshaft position sensor
- 44. Intake air temperature sensor
- 45. Coolant temperature sensor 46.O₂ sensor
- 47. Cylinder identification sensor
- 48. Throttle position sensor
- 49. Intake air pressure sensor
- 50. Oil level switch
- 51. Shift actuator motor
- 52. Shift actuator sensor

53. Clutch actuator sensor 54. Clutch actuator motor 55. MCU (motor control unit) 56. YCC-S test coupler 57. Coupler 4 (wire harness-front cowling wire harness) 58. Coupler 6 (wire harness-front cowling wire harness) 59. Foot shift switch 60. YCC-S speed sensor 61. Gear position sensor 62. YCC-S control relay 63. Coupler 5 (wire harness-front cowling wire harness) 64. Headlight (on/off)/grip warmer relav 65. Hazard lighting fuse 66. Signaling system fuse 67. Headlight fuse 68. Ignition fuse 69. Auxiliary DC jack fuse 70. Grip warmer control unit 71. Radiator fan motor relay 72. Left radiator fan motor fuse 73. Left radiator fan motor 74. Right radiator fan motor fuse 75. Right radiator fan motor 76. YCC-S motor control fuse 77. Auxiliary DC jack 78. Turn signal/hazard relay 79. Right handlebar switch 80. Front brake light switch 81. Engine stop switch 82. Start switch 83. Hazard switch 84. Left handlebar switch 85. Dimmer switch 86. Windshield position switch 87. Turn signal switch 88. Horn switch 89. Relay unit 90. Starting circuit cut-off relay 91. Fuel pump relay 92. Accessory box solenoid 93. Meter assembly 94. Neutral indicator light 95. ABS warning light 96. Multi-function meter 97. Oil level warning light 98. Engine trouble warning light 99. Meter light

100.High beam indicator light

103.Lean angle sensor

105.Hand shift switch

104.Thermistor

up)

101.Right turn signal indicator light

102.Left turn signal indicator light

106.Hand shift lever switch (shift

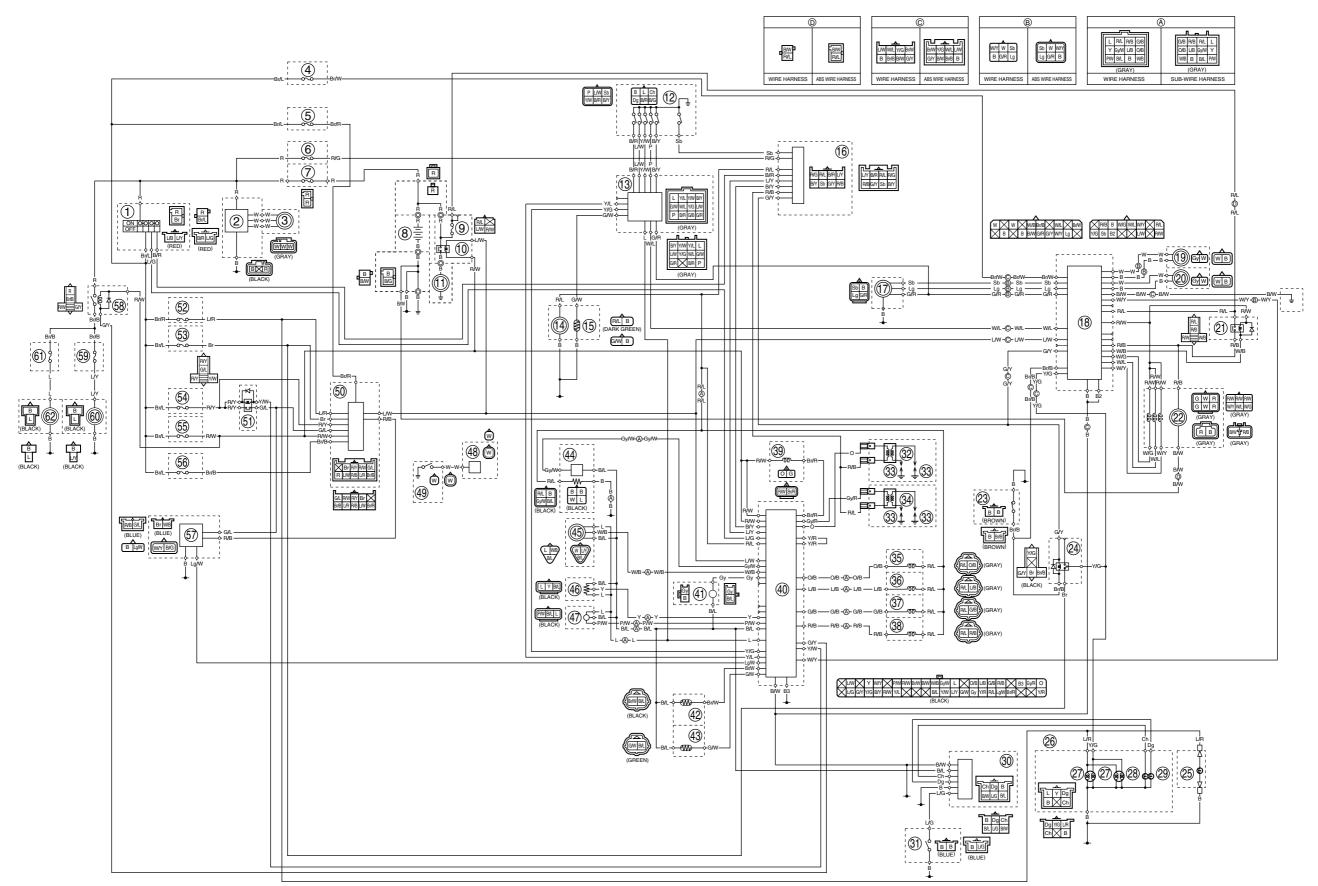
- 107.Hand shift lever switch (shift down)
- 108.Hand shift select button
- 109.Hand shift select indicator light
- 110.Horn
- 111.Front left turn signal light
- 112.Front right turn signal light
- 113.Headlight assembly
- 114.Headlight
- 115.Headlight relay (dimmer)
- 116.Windshield drive unit
- 117.Right grip warmer
- 118.Left grip warmer

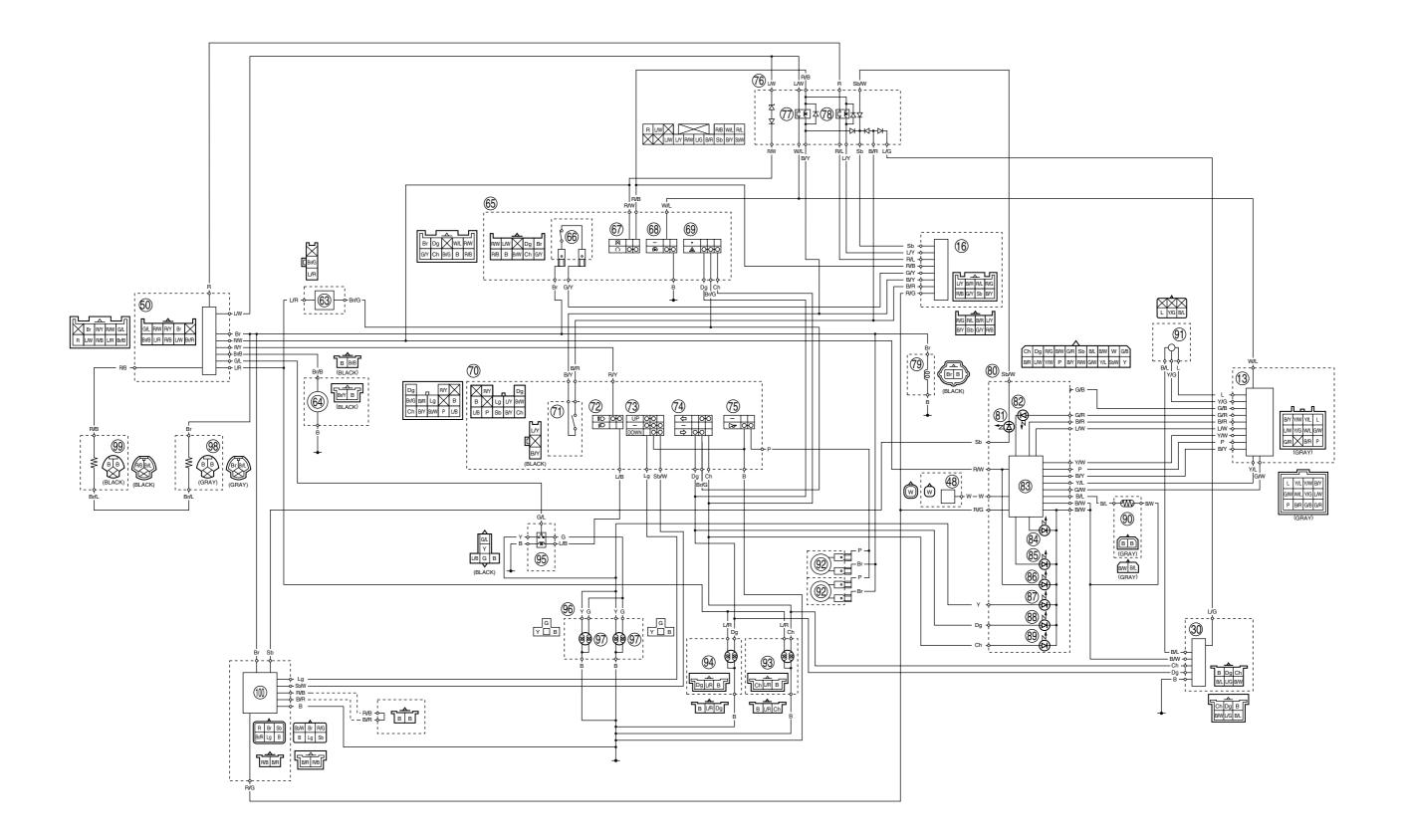
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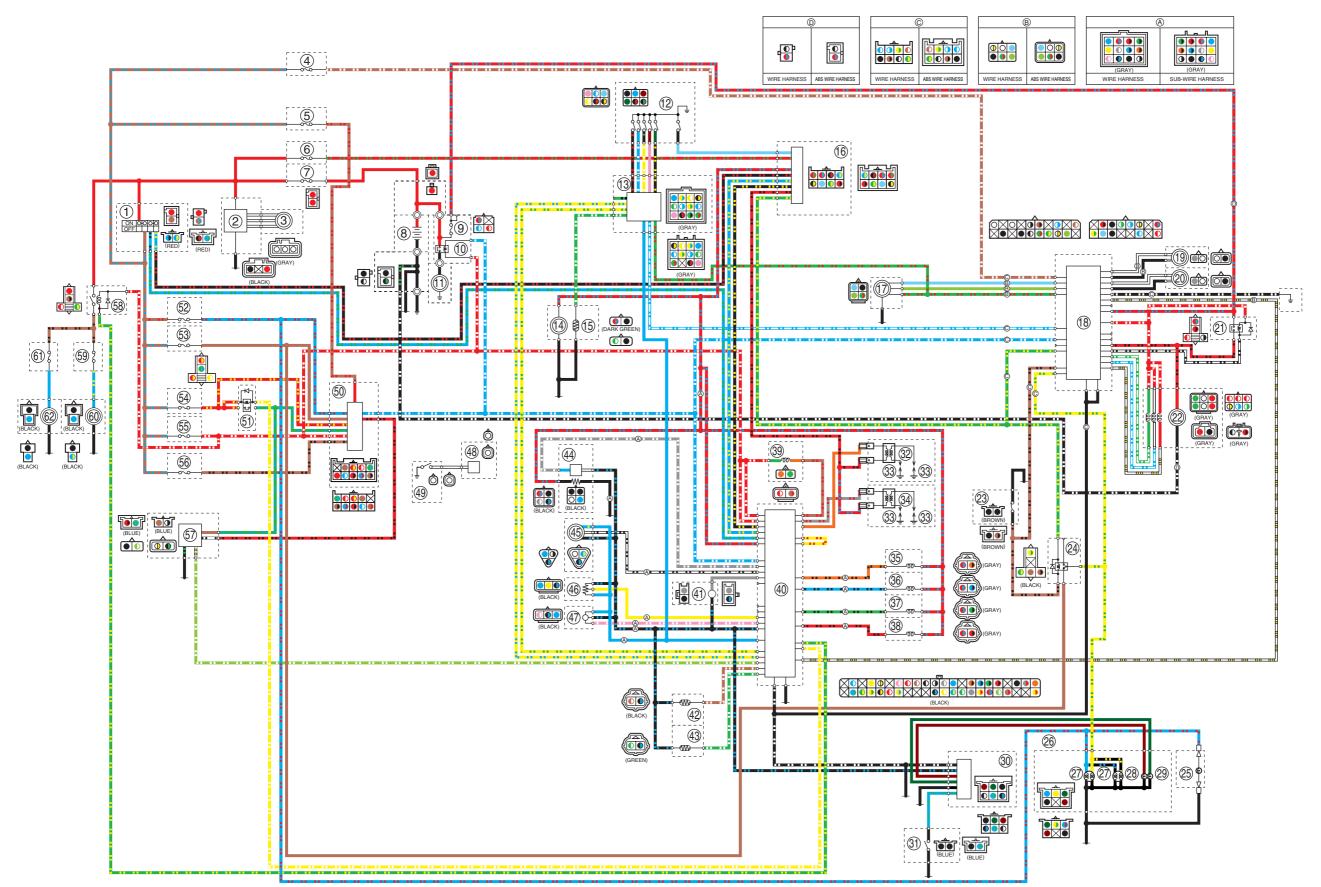
В	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
Ĺ	Blue
Lg	Light green
Õ	Orange
Р	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/B	Brown/Black
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
Br/Y	Brown/Yellow
G/B	Green/Black
G/L G/R	Green/Blue Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/R	Gray/Red
Gy/W	Gray/White
L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
Lg/W	Light green/White
О́/В	Orange/Black
O/G	Orange/Green
O/R	Orange/Red
O/W	Orange/White
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow

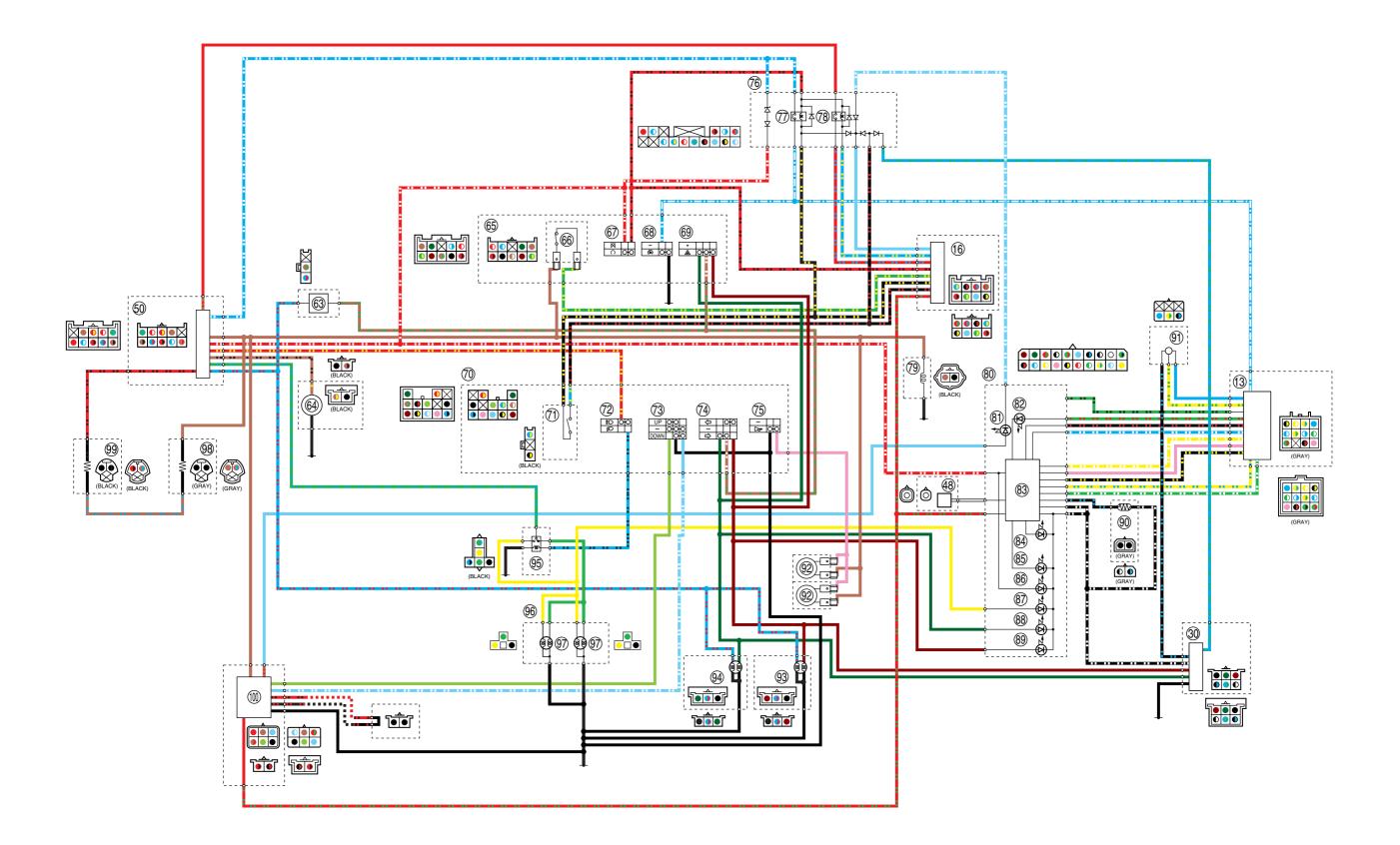
Sb/W	Sky blue/White
W/B	White/Black
W/G	White/Green
W/L	White/Blue
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue
Y/R	Yellow/Red
Y/W	Yellow/White



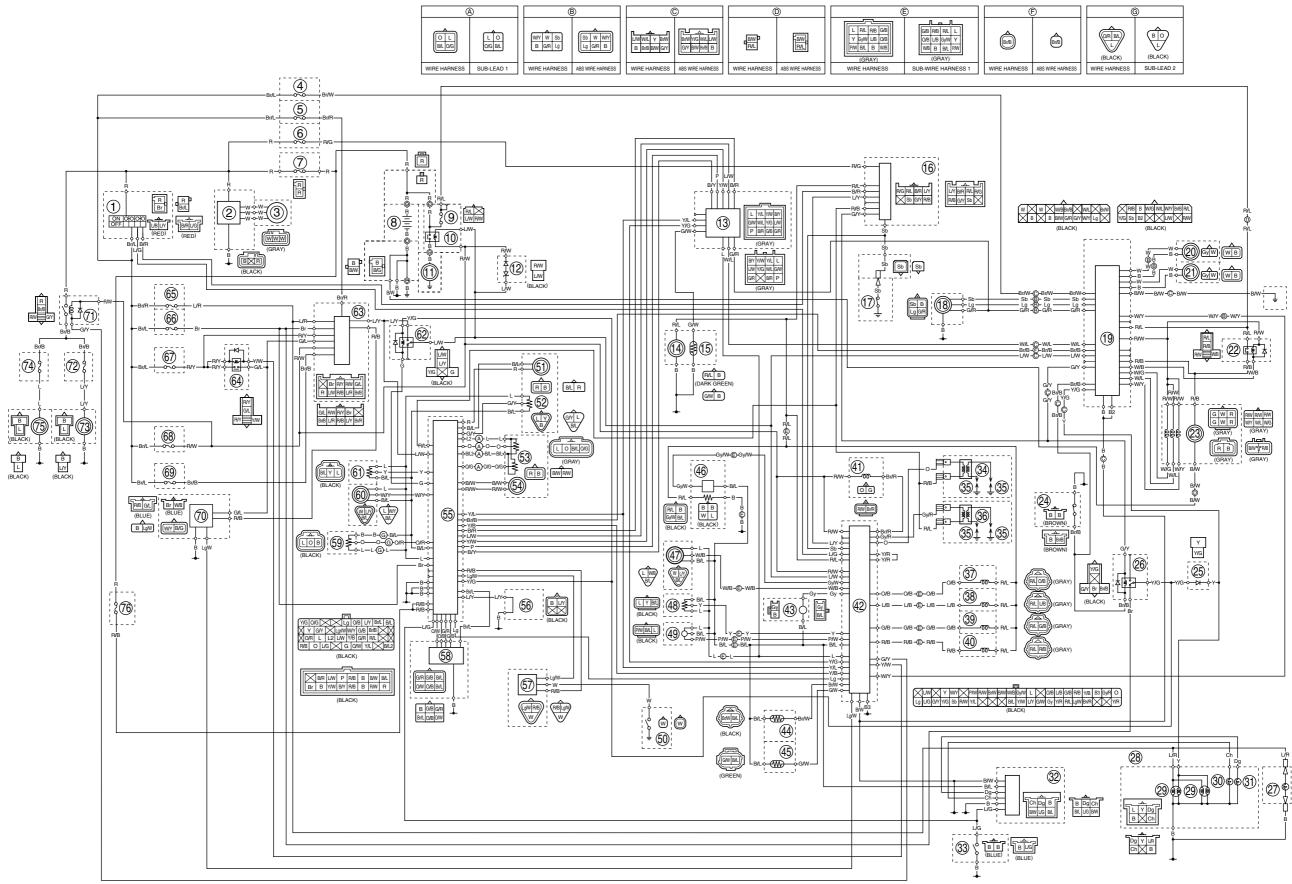




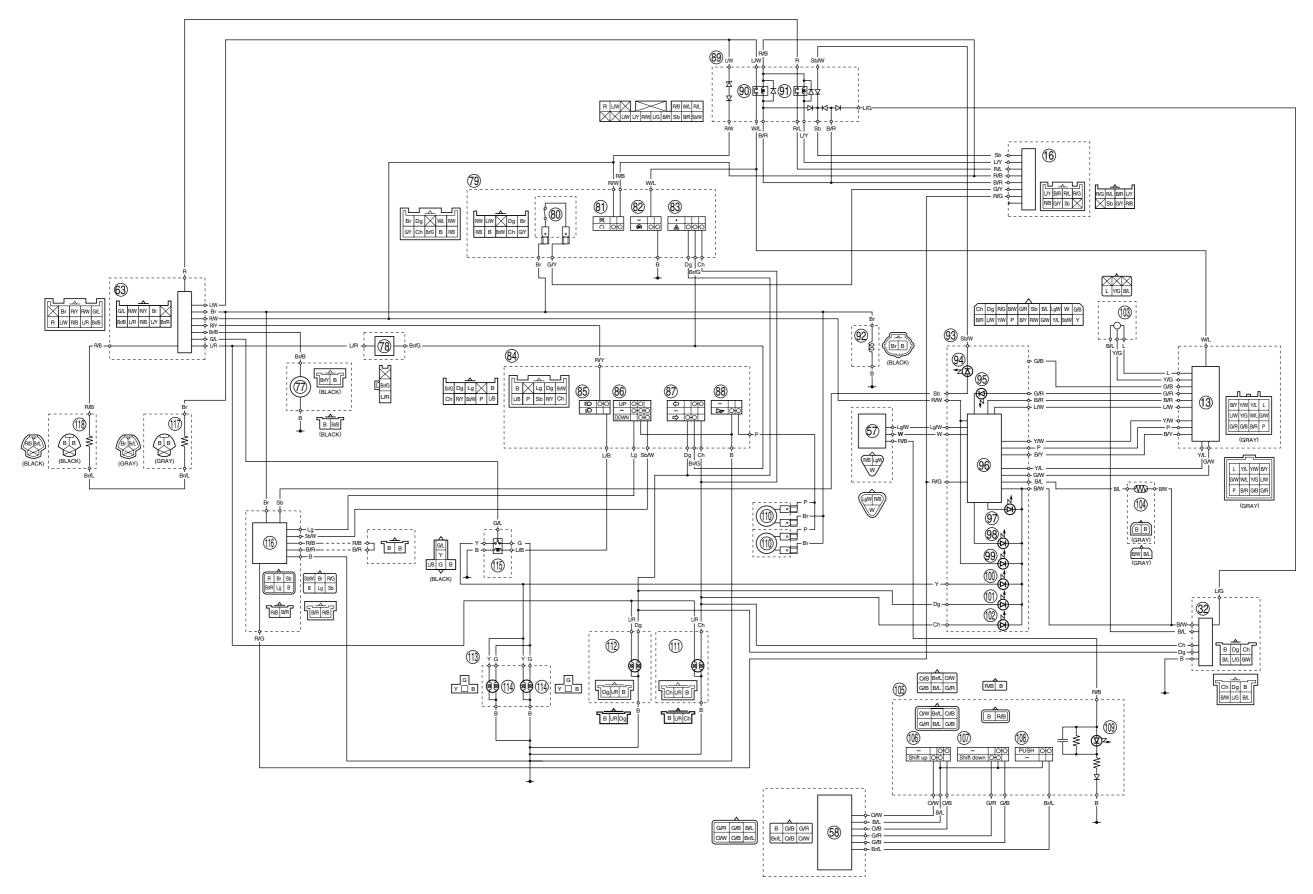




## FJR13AEV(C) 2006 WIRING DIAGRAM (1/2)



## FJR13AEV(C) 2006 WIRING DIAGRAM (2/2)



## FJR13AEV(C) 2006 WIRING DIAGRAM (1/2)

