

XP500 XP500A

5VU5-AE1

SERVICE MANUAL

XP500/XP500A 2005
SERVICE MANUAL
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First edition, September 2004
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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.

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Designs and specifications are subject to change without notice.

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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 scooter operator, a bystander or a person checking or repairing the scooter.



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

NOTE:

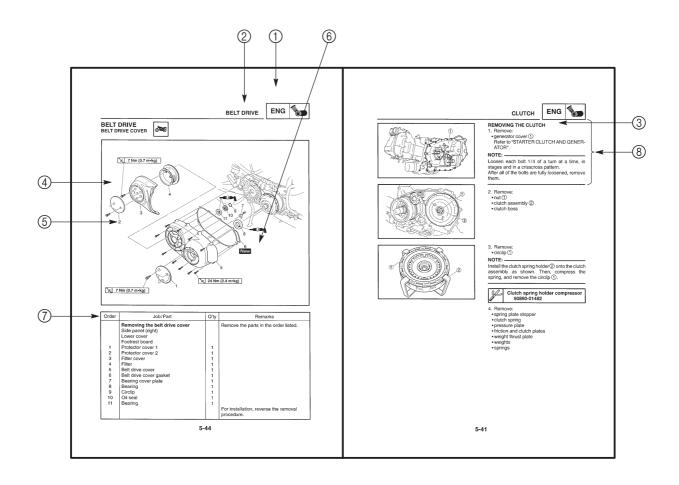
A NOTE provides key information to make procedures easier or clearer.

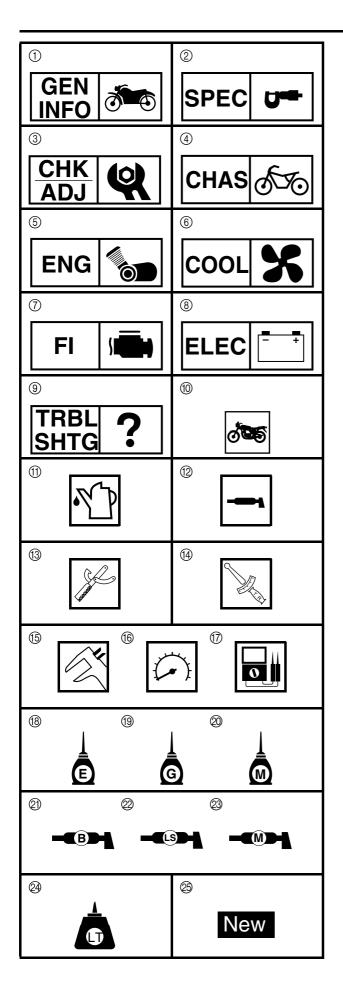
HOW TO USE THIS MANUAL

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.

- ① The manual is divided into chapters. An abbreviation and symbol in the upper right corner of each page indicate the current chapter.

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





SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols 1 to 9 indicate the subject of each chapter.

- 1) General information
- ② Specifications
- 3 Periodic checks and adjustments
- (4) Chassis
- (5) Engine
- 6 Cooling system
- (7) Fuel injection system
- ® Electrical system
- Troubleshooting

Symbols 10 to 17 indicate the following.

- (1) Serviceable with engine mounted
- ① Filling fluid
- (12) Lubricant
- (3) Special tool
- (4) Tightening torque
- (5) Wear limit, clearance
- ® Engine speed
- (7) Electrical data

Symbols [®] to [®] in the exploded diagrams indicate the types of lubricants and lubrication points.

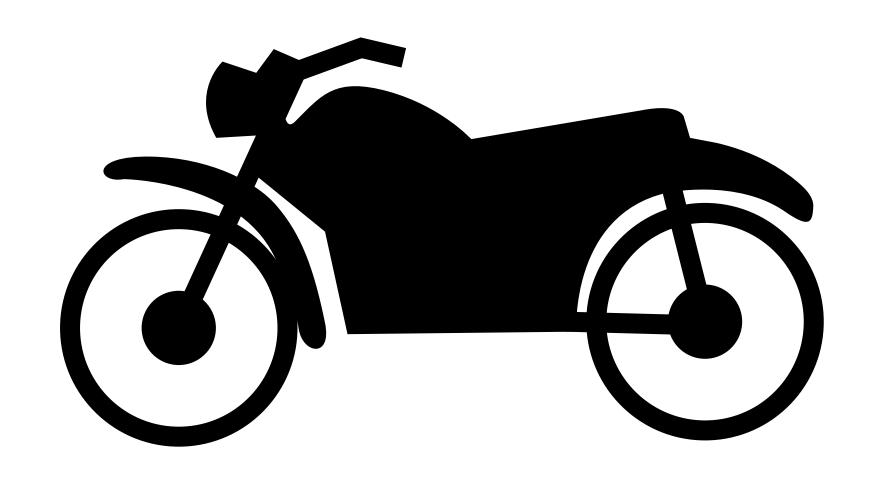
- ® Engine oil
- (19) Gear oil
- Molybdenum-disulfide oil
- ② Wheel-bearing grease
- ② Lithium-soap- based grease
- 23 Molybdenum-disulfide grease

Symbols 24 to 25 in the exploded diagrams indicate the following.

- ② Apply locking agent (LOCTITE®)
- 25 Replace the part

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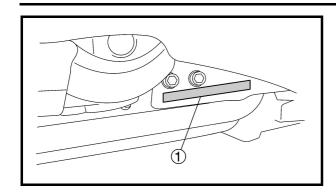
CHAPTER 1 GENERAL INFORMATION

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SCOOTER IDENTIFICATION



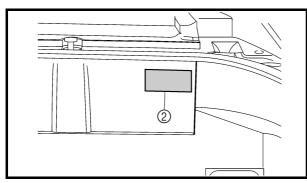


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GENERAL INFORMATION SCOOTER IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number (1) is stamped into the right side of the frame.



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MODEL LABEL

The model label ② is affixed to the storage box. This information will be needed to order spare parts.

FEATURES

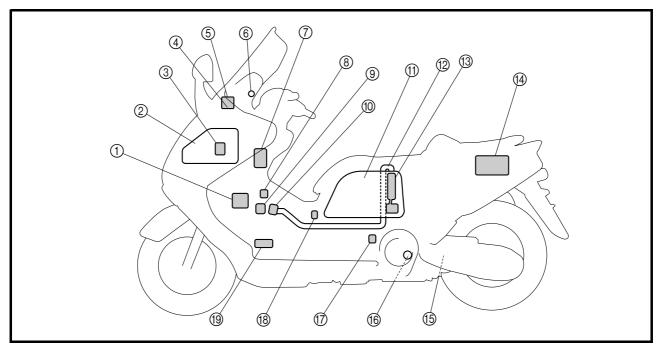
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OUTLINE OF FI SYSTEM

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

As the requirements for engines 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 a 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.

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



- ① Ignition coil
- ② Air filter case
- ③ Intake air temperature sensor
- (4) Fuel injection system relay
- (5) Lean angle cut-off switch
- (6) Engine trouble warning light
- 7 ECU (engine)

- (8) Intake air pressure sensor
- (9) Throttle position sensor
- 10 Fuel injector
- (1) Fuel tank
- 12) Fuel delivery hose
- Fuel pump
- (14) Battery
- (5) Catalyst

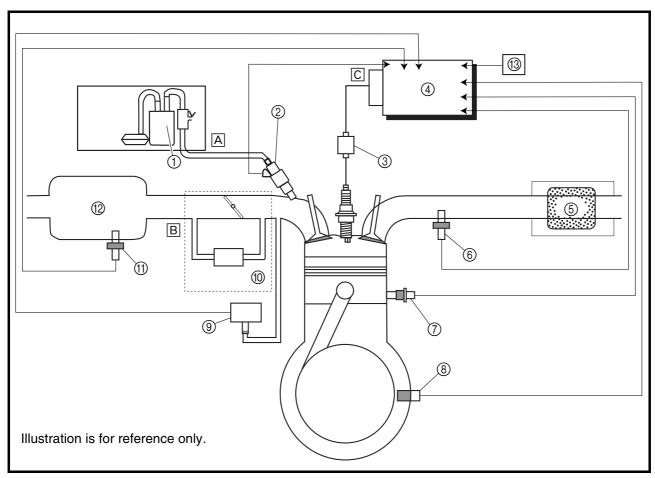
- 16 O₂ sensor
- (7) Crankshaft position sensor
- (8) Coolant temperature sensor
- Spark plug



FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator (in the fuel pump) maintains the fuel pressure that is applied to the fuel injector at 240 ~ 260 kPa (2.40 ~ 2.60 kg/cm², 34.1 ~ 37.0 psi) higher than the intake manifold pressure. Accordingly, when the energizing signal from the ECU (engine) 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 (engine). Signals that are input from the throttle position sensor, crankshaft position sensor, intake air pressure sensor, intake air temperature sensor, coolant temperature sensor, and O_2 sensor enable the ECU (engine) 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 Fuel injector
- (3) Ignition coil
- 4 ECU (engine)
- ⑤ Catalyst
- 6 O2 sensor
- (7) Coolant temperature sensor
- (8) Crankshaft position sensor
- Intake air pressure sensor
- 10 Throttle body
- (1) Intake air temperature sensor
- (2) Air filter case
- Throttle position sensor
- A Fuel system
- B Air system
- C Control system



OUTLINE OF ANTI-LOCK BRAKE SYSTEM (XP500A)

Yamaha ABS features

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

The operation of the Yamaha ABS brakes is the same as conventional vehicle, with a right hand brake lever for operating the front wheel brake and a left hand brake lever for operating the rear wheel brake.

When wheel lockup is detected during emergency braking, hydraulic control is performed by the hydraulic system independently.

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

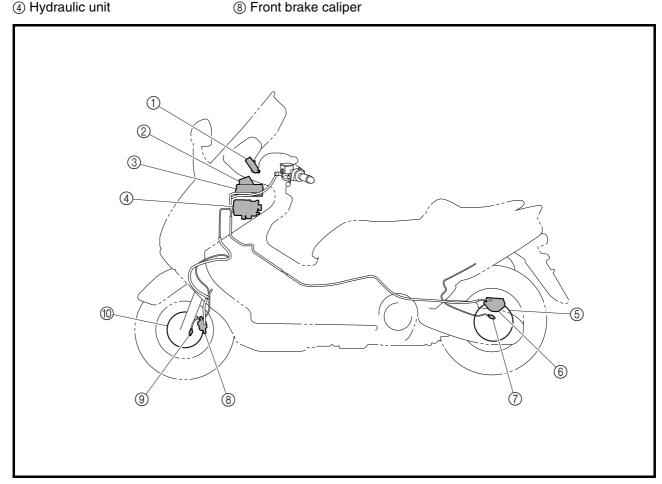
When this occurs, the ABS warning light on the meter assembly comes on.

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

ABS layout

- 1 ABS warning light
- 2 Fail-safe relay
- ③ Electronic control unit (ECU)
- 4 Hydraulic unit

- (5) Rear disc rotor
- (6) Rear brake caliper
- (7) Rear wheel sensor
- (9) Front wheel sensor
- (10) Front disc rotor



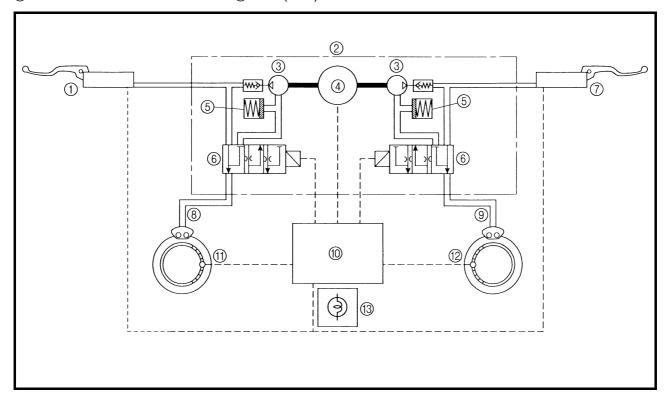


ABS block diagram

- ① Rear brake master cylinder
- ② Hydraulic unit
- ③ Hydraulic pump
- 4 ABS motor
- (5) Buffer chamber

- 6 Hydraulic control valve7 Front brake master cylinder
- ® Rear brake caliper
- 9 Front brake caliper
- ® ECU (ABS)

- ① Rear wheel sensor
- 12 Front wheel sensor
- (3) ABS warning light





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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.

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

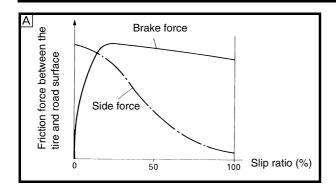
0%:

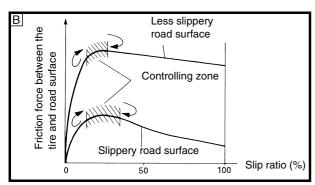
There is no slip between the wheel and the road surface. The chassis speed is equal to the wheel speed.

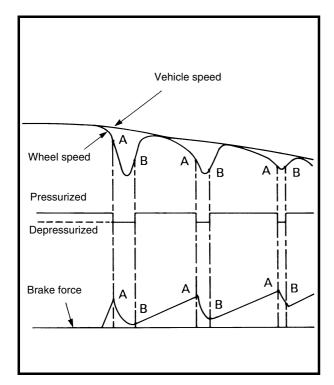
100%:

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









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Brake force and vehicle stability

When the brake pressure is increased, wheel speed is reduced. Slip 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.

Therefore, 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 tire capabilities even on slippery road surfaces or less slippery road surfaces. See figure B.

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Wheel slip and hydraulic control

The ECU (ABS) calculates the wheel speed of each wheel according to the rotation signal received from the front and rear wheel sensors. In addition, the ECU (ABS) 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 has a tendency to lock, the wheel speed is suddenly reduced. When the wheel slip and the wheel speed reduction rate exceed the preset values, the ECU (ABS) 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 figure), the ECU (ABS) reduces the brake fluid pressure in the brake caliper and increases the pressure of the brake fluid in the brake caliper when the tendency to lock has diminished (point B in the figure).

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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.

NOTE: .

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

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

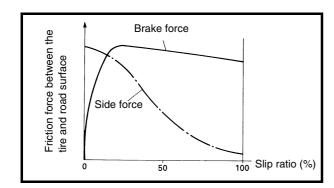
WARNING

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

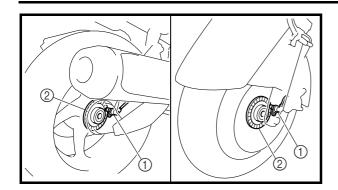
The ABS functions to prevent the tendency of the wheel to lock by controlling the brake hydraulic pressure. But, if there is a tendency of the wheel to lock on a slippery road surface, due to engine braking, the ABS may not be able to prevent the wheel from locking.

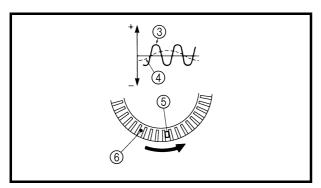
WARNING

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









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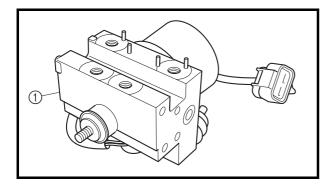
ABS component functions

· Wheel sensors and sensor rotors

Wheel sensors ① detect the wheel rotation speed and transmit the wheel rotation signal to the ECU (ABS).

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 installed inside the front and rear wheel hubs and rotate with the wheels. Each sensor rotor has 40 serrations that face the sensor housing. 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 rotation speed is detected based on the frequency of this alternating voltage.

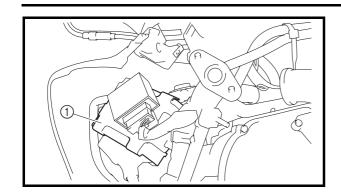
- 3 At high speed
- (4) At low speed
- (5) Wheel sensor
- (6) Sensor rotor



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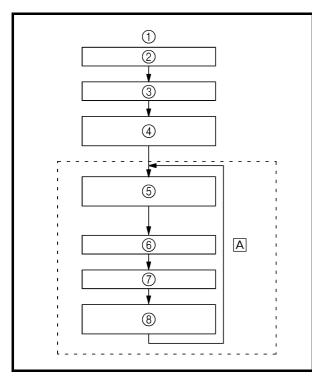
Hydraulic unit

The hydraulic unit ① is composed of a hydraulic control valve (solenoid valve, flow control valve), a buffer chamber, and a hydraulic pump for each brake and an ABS motor. The hydraulic unit adjusts the front and rear wheel brake fluid pressure to control the wheel rotation speed according to signals transmitted from the ECU (ABS).



Electronic control unit (ECU)

The ECU (ABS) ① controls the ABS and is located on the right side of the vehicle near the top of the front fork. To protect the ECU (ABS) from water damage, it is protected by a cover.



ABS control operation

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

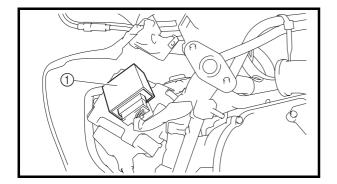
- Hydraulic control
- Self-diagnosis

These operations are performed once every 8/1,000 of a second. When a failure is detected in the ABS, a malfunction code is stored in the memory of the ECU (ABS) for easy problem identification and troubleshooting.

NOTE: _

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

- Software operation flow
- ② Set the main switch to "ON".
- ③ Initialize
- 4 Self-diagnosis (when static)
- ⑤ Self-diagnosis (when riding)
- (6) Receive signals
- (7) Control operation
- ® Depressurize/pressurize
- A 8/1,000 of a second



Fail-safe relay

The fail-safe relay controls the power supply of the hydraulic unit and is located upper the ECU (ABS).

1 Fail-safe relay



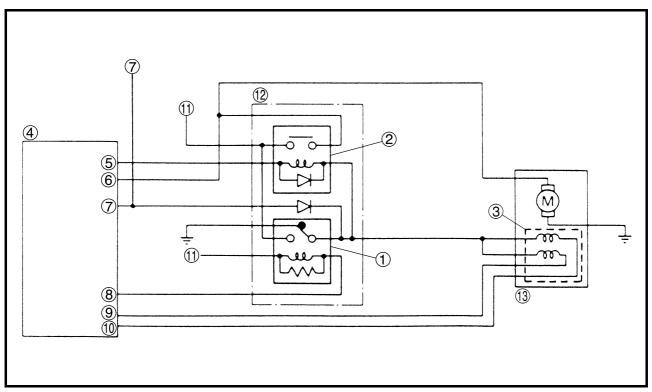
Composition and operation

The fail-safe relay is composed of the solenoid relay ① and ABS motor relay ②. The solenoid relay is activated (continuous) by signals transmitted from the ECU (ABS). As a result, the solenoid valve ③ can be operated.

If a malfunction occurs in the circuit, the solenoid relay is deactivated and it becomes impossible for the solenoid valve to reduce the hydraulic pressure of the brake fluid and normal braking is resumed.

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

If the solenoid relay is turned off, the motor relay is also deactivated and the motor stops operating if there is a malfunction.



- (1) Solenoid relay
- ② ABS motor relay
- 3 Solenoid valve
- (4) ECU (ABS)
- (5) Pump motor relay coil
- 6 Pump motor monitor
- (7) ABS warning light
- (9) Rear solenoid
- (1) Front solenoid

- (1) Power
- Pail-safe relay
- (3) Hydraulic unit



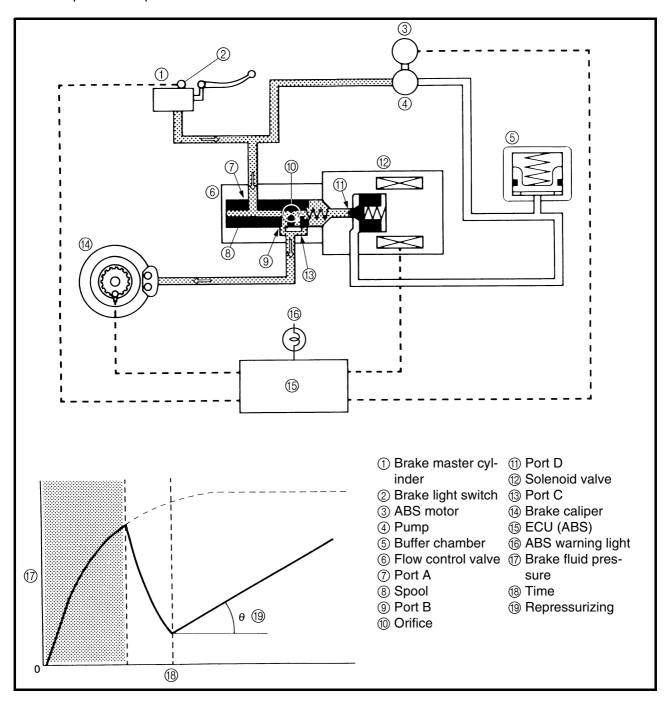
ABS operation

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

Normal braking (ABS not activated)

When the ABS is not activated port D ① of the solenoid valve is closed because a control signal has not been transmitted from the ECU (ABS) and port A ② and port B ② 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 pump close the lines and brake fluid is not sent. As a result, the brake master cylinder directly pressurizes the brake caliper during normal braking. When the brake lever is released, the brake fluid in the brake caliper returns to the brake master cylinder via port A and port B.



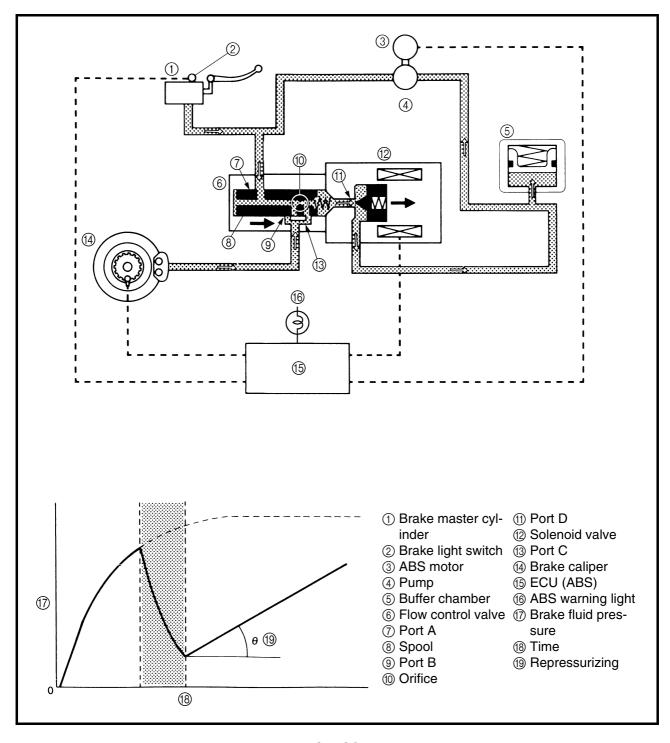


Emergency braking (ABS activated)

1) Depressurized state

When the front wheel is about to lockup, port D 1 of the solenoid valve is opened by the "depressurization" signal transmitted from the ECU (ABS). When this occurs, the spool of the flow control valve compresses the return spring to close port B 9. Brake fluid that has entered through port A 7 is restricted by the orifice 1 and the brake fluid is sent to the brake caliper via port C 3 and port D 1, and the buffer chamber. As a result, the hydraulic pressure in the brake caliper is reduced.

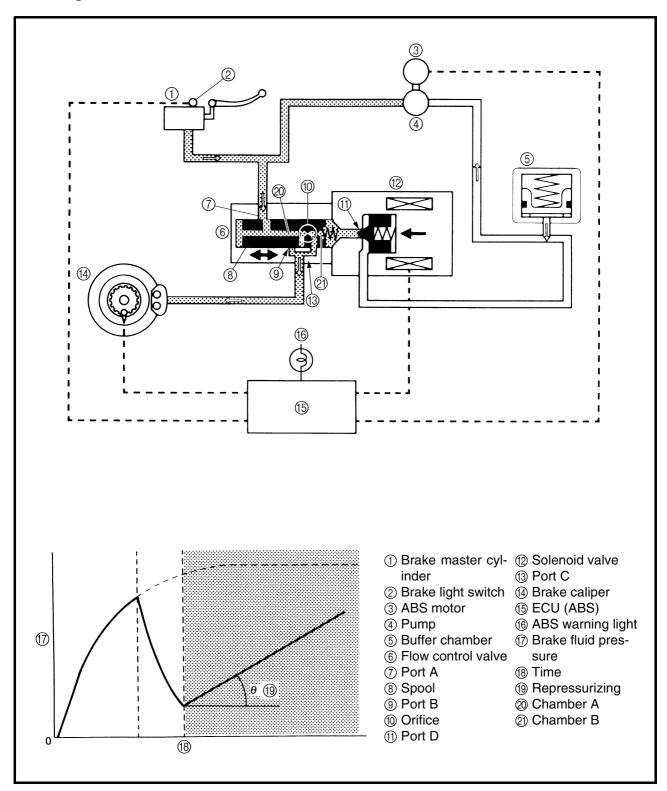
The brake fluid stored in the buffer chamber is pumped back to the brake master cylinder by the fluid pressure pump linked to the pump motor.





2) Pressurized state

Port D ① is closed by the "pressurization" signal transmitted from the ECU (ABS). Before this occurs, the spool of the flow control valve has compressed the return spring to close port B ②. Brake fluid that has entered through port A ⑦ is further restricted by the orifice ⑩ and the brake fluid is sent to the brake calipers via port A ⑦ and port C ③. At this time, the brake is pressurized at a constant speed regardless of the brake fluid pressure level since restriction of port A ⑦ changes so that a constant pressure difference is maintained between chamber A ② and chamber B ② of the flow control valve.





INSTRUMENT FUNCTION Multi-function display

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:

- a fuel meter ①
- a coolant temperature meter (2)
- an odometer (which shows the total distance traveled), two tripmeters (which show the distance traveled since they were last set to zero), a fuel reserve tripmeter (which shows the distance traveled since the bottom segment of the fuel meter and fuel level warning symbol started flashing), a self-diagnosis device (engine and ABS) (3)
- a clock (4)
- an oil change indicator (5)
- a V-belt replacement indicator (6)
- a fuel level warning symbol 7
- a coolant temperature symbol (8)

NOTE:

- Be sure to turn the key to "ON" before using the "SELECT" (9) and "RESET" (10) buttons.
- When the key is turned to "ON", all of the display segments of the multi-function display will appear one after the other and then disappear, in order to test the electrical circuit.

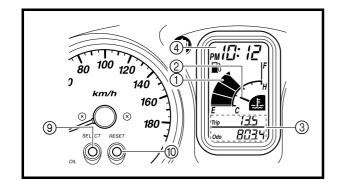
CAUTION:

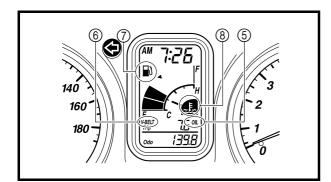
If bars ① appear where the odometer and tripmeters are normally displayed, the multi-function display is malfunctioning. Replace the entire multi-function display.

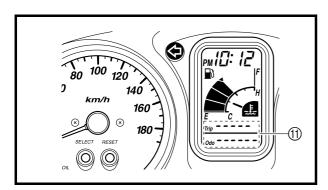
Odometer and tripmeter modes

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

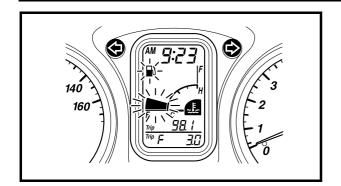
 $\mathsf{ODO} \to \mathsf{TRIP} \ \mathsf{F} \to \mathsf{TRIP} \ (\mathsf{top}) \to \mathsf{TRIP} \ (\mathsf{bottom}) \to \mathsf{ODO}$











When approximately 2.8 L (0.62 Imp gal, 0.74 US gal) of fuel remains in the fuel tank, the bottom segment of the fuel meter and fuel level warning symbol will start flashing, and the display will automatically change to the fuel reserve tripmeter mode "TRIP F" and start counting the distance traveled from that point. In that case, pushing the "SELECT" button switches the display between the various tripmeter and odometer modes in the following order:

TRIP F \rightarrow TRIP (top) \rightarrow TRIP (bottom) \rightarrow ODO \rightarrow TRIP F

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

Fuel meter

With the key in the "ON" position, 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 fuel level reaches the bottom segment near "E", the fuel level warning symbol and the bottom segment will flash. Refuel as soon as possible.

CAUTION:

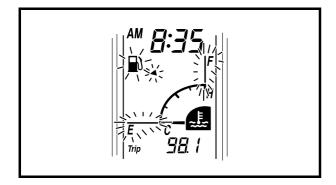
If the fuel level is not displayed and the fuel level warning symbol, triangular mark, "E" line and "F" line flash in the fuel meter, the fuel level monitoring system is malfunctioning. Check the fuel sender and the electrical circuit.

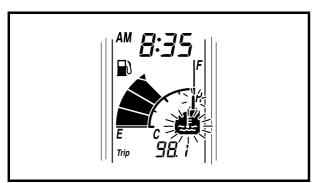
Coolant temperature meter

With the key in the "ON" position, the coolant temperature meter indicates the temperature of the coolant. The coolant temperature varies with changes in the weather and engine load. If the top segment and coolant temperature symbol flash, stop the vehicle and let the engine cool.

CAUTION:

Do not operate the engine if it is overheated.







Oil change indicator "OIL"

This indicator flashes at the initial 1,000 km (600 mi), then at 5,000 km (3,000 mi) and every 5,000 km (3,000 mi) thereafter to indicate that the engine oil should be changed.

After changing the engine oil, reset the oil change indicator. Refer to "To reset the oil change indicator light".

If the engine oil is changed before the oil change indicator comes on (i.e. before the periodic oil change interval has been reached), the indicator must be reset after the oil change for the next periodic oil change to be indicated at the correct time.

The electrical circuit of the indicator can be checked according to the following procedure.

- 1. Set the engine stop switch to "\(\cap\)" and turn the key to "ON".
- 2. Check that the indicator comes on for a few seconds and then goes off.
- 3. If the indicator does not come on, check the electrical circuit. Refer to "SIGNALING SYSTEM" in chapter 8.

NOTE:

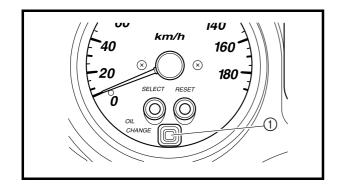
The oil change indicator may flash when the engine is revved with the scooter on the centerstand, but this does not indicate a malfunction.

To reset the oil change indicator light

- 1. Turn the key to "ON".
- 2. Hold the "OIL CHANGE" button ① pushed for two to eight seconds.
- 3. Release the "OIL CHANGE" button ①, and the oil change indicator light will go off.

NOTE:

If the engine oil is changed before the oil change indicator light comes on (i.e. before the periodic oil change interval has been reached), the indicator light must be reset after the oil change for the next periodic oil change to be indicated at the correct time. To reset the oil change indicator light before the periodic oil change interval has been reached, follow the above procedure, but note that the indicator light will come on for 1.4 seconds after releasing the "OIL CHANGE" button, otherwise repeat the procedure.





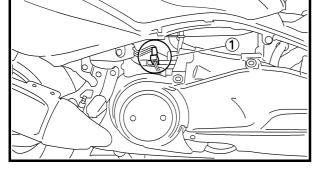
V-belt replacement indicator "V-BELT"

This indicator flashes every 20,000 km (12,000 mi) when the V-belt needs to be replaced. The electrical circuit of the indicator can be checked according to the following procedure.

- 1. Turn the key to "ON" and make sure that the engine stop switch is set to "\(\cap \)".
- 2. If the indicator does not come on, check the electrical circuit. Refer to "SIGNALING SYSTEM" in chapter 8.



- 1. Turn the key to "ON" and make sure that the engine stop switch is set to "ON".
- 2. Disconnect the V-belt replacement reset coupler ① for two to ten seconds.
- And then, connect the V-belt replacement reset coupler, the V-belt replacement indicator will come on for 1.4 seconds.
 And the V-belt replacement indicator will go



NOTE:

If the V-belt is replaced before the V-belt replacement indicator comes on (i.e. before the V-belt replacement interval has been reached), the indicator must be reset after the V-belt replacement for the next periodic V-belt replacement to be indicated at the correct time.

Self-diagnosis device

Refer to "ANTI-LOCK BRAKE SYSTEM (XP500A)" in chapter 4 "FUEL INJECTION SYSTEM" in chapter 7 and "IMMOBILIZER SYSTEM" in chapter 8.

Clock mode

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.

IMPORTANT INFORMATION

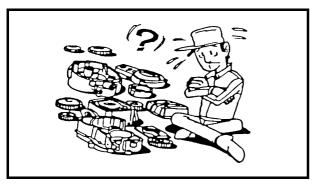




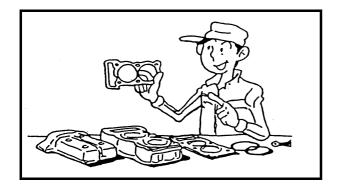
EAS00020

IMPORTANT INFORMATION PREPARATION FOR REMOVAL AND DISASSEMBLY

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



- 2. Use only the proper tools and cleaning equipment.
 - Refer to the "SPECIAL TOOLS".
- 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.



EAS00021

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.

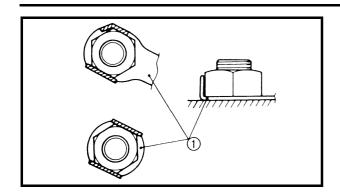
EAS00022

GASKETS, OIL SEALS AND O-RINGS

- 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.

IMPORTANT INFORMATION

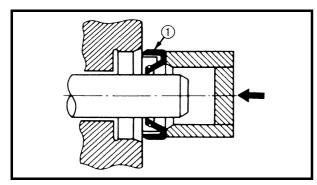




EAS00023

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.



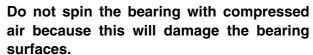
EAS00024

BEARINGS AND OIL SEALS

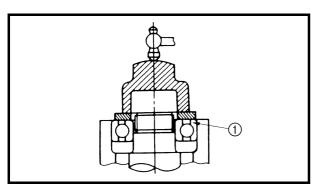
Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

① Oil seal





① Bearing

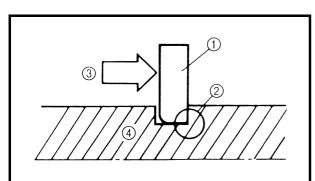


EAS00025

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.

(4) Shaft



CHECKING THE CONNECTIONS

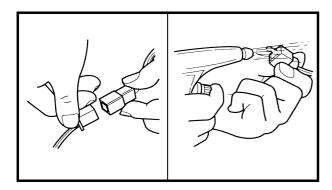


EAS00026

CHECKING THE CONNECTIONS

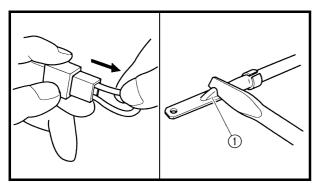
Check the leads, couplers, and connectors for stains, rust, moisture, etc.

- 1. Disconnect:
- lead
- coupler
- · connector



- 2. Check:
 - lead
 - coupler
- connector
 Moisture → Dry with an air blower.

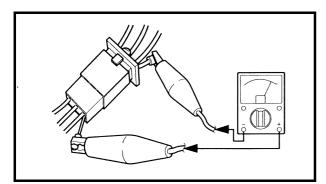
 Rust/stains → Connect and disconnect several times.



- 3. Check:
- all connections
 Loose connection → Connect properly.

NOTE:

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



- 4. Connect:
- lead
- coupler
- connector

NOTE:

Make sure all connections are tight.

5. Check:

continuity (with the pocket tester)



Pocket tester 90890-03112, 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.



EAS00027

SPECIAL TOOLS

The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.

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

NOTE: .

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

Tool No.	Tool name/Function	Illustration
90890-01235 YU-01235	Rotor holding tool This tool is used to hold the clutch assembly.	
90890-01268 YU-01268	Ring nut wrench This tool is used to loosen or tighten the steering ring nuts.	R22
90890-01304 YU-01304	Piston pin puller set This tool is used to remove the piston pins.	
Radiator cap tester 90890-01325 YU-24460-01 Radiator cap tester adapter 90890-01352 YU-33984	Radiator cap tester Radiator cap tester adapter These tools are used to check the cooling system.	
T-handle 90890-01326 YM-01326 Damper rod holder 90890-01294 YM-01300	T-handle Damper rod holder These tools are used to hold the damper rod when removing or installing the damper rod.	
90890-01348 YM-01348	Locknut wrench This tool is used to remove or install the secondary sheave spring seat nut.	46



Tool No.	Tool name/Function	Illustration
90890-01362 YU-33270-B	Flywheel puller This tool is used to remove the A.C. magneto rotor.	
Fork seal driver weight 90890-01367 YM-A5142-4 Fork seal driver attachment 90890-01381 YM-A5142-2	Fork seal driver weight Fork seal driver attachment (41 mm) These tools are used to install the oil seal, dust seal, and the outer tube bushing of a front fork leg.	
90890-01403 YU-33975	Steering nut wrench This tool is used to loosen or tighten the steering ring nuts.	
90890-01469	Oil filter wrench This tool is needed to loosen or tighten the oil filter cartridge.	
90890-01481	Sheave holder This tool is used to hold the sheave assembly when removing or installing the primary and secondary sheave.	
90890-01482	Clutch spring compressor This tool is used to remove or install the nut.	
90890-01701 YS-01880-A	Sheave holder This tool is used to hold the A.C. magneto rotor.	
90890-03008 YU-03008	Micrometers (50 ~ 75 mm) This tool is used to measure the piston skirt diameter.	



Tool No.	Tool name/Function	Illustration
90890-03079 YM-34483	Thickness gauge This tool is used to measure the valve clearance.	
Compression gauge 90890-03081 YU-33223 Extension 90890-04082	Compression gauge Extension These tools are used to measure engine compression.	
Vacuum gauge 90890-03094 YU-44456	Vacuum gauge This gauge is used to synchronize the throttle bodies.	
90890-03112 YU-03112-C	Pocket tester This tool is used to check the electrical system.	
90890-03141 YM-33277-B	Timing light This tool is used to check the ignition timing.	
90890-03149	Test coupler adaptor This tool is used to check the ABS diagnosis.	
Pressure gauge 90890-03153 Oil pressure adapter B 90890-03124	Pressure gauge Oil pressure adapter B These tools are used to measure fuel pressure and oil pressure.	
90890-03158	Carburetor angle driver This tool is used to turn the air screw when syncronizing the throttle bodies.	



Tool No.	Tool name/Function	Illustration
90890-03174	Digital circuit tester This tool is used to check electrical system.	
90890-03181	Fuel pressure adapter This tool is used to measure fuel pressure.	
Valve spring compressor 90890-04019 YM-04019 Valve spring compressor attachment 90890-04114 YM-04114	Valve spring compressor Valve spring compressor attachment These tools are used to remove or install the valve assemblies.	
Middle driven shaft bearing driver 90890-04058 YM-04058 Mechanical seal installer 90890-04078 YM-33221-A	Middle driven shaft bearing driver Mechanical seal installer These tools are used to install the water pump seal.	
90890-04085	Damper rod holder (14 mm) This tool is used to loosen or tighten the front wheel axle.	□3/8"
90890-04086 YM-91042	Clutch holding tool This tool is needed to hold the clutch boss when removing or installing the clutch boss nut.	M8×P1.25
90890-04101	Valve lapper This tool is needed to remove and install the valve lifters.	
90890-04111 YM-04111	Valve guide remover (4 mm) This tool is used to remove or install the valve guides.	

SPECIAL TOOLS



Tool No.	Tool name/Function	Illustration
90890-04112 YM-04112	Valve guide installer (4 mm) This tool is used to install the valve guides.	
90890-04113 YM-04113	Valve guide reamer (4 mm) This tool is used to rebore the new valve guides.	
Sheave spring com- pressor 90890-04134 YM-04134 Sheave fixed block 90890-04135 YM-04135	Sheave spring compressor Sheave fixed block This tool is used to hold the compression spring when removing or installing the secondary sheave nut.	
90890-04139	Plane bearing installer This tool is used to install the crankshaft journal bearings.	
90890-06754 YM-34487	Ignition checker This tool is used to check the ignition system components.	
Bond 90890-85505 Sealant ACC-11001-05-01	Yamaha bond No. 1215 Sealant (Quick Gasket®) This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces).	

SPEC

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SPEC U

GENERAL SPECIFICATIONS



SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Standard	Limit
Model code	XP500: 5VU6	
	XP500A: 5VU5	
Dimensions		
Overall length	2,235 mm (88.0 in)	
Overall width	775 mm (30.5 in)	
Overall height	1,410 mm (55.5 in)	
Seat height	795 mm (31.3 in)	
Wheelbase	1,575 mm (62.0 in)	
Minimum ground clearance	130 mm (5.12 in)	
Minimum turning radius	2,800 mm (110.2 in)	
Weight		
Wet (with oil and a full fuel tank)	225 kg (496 lb) (XP500)	
	230 kg (507 lb) (XP500A)	
Maximum load (total of cargo, rider,	190 kg (419 lb) (XP500)	
passenger, and accessories)	185 kg (408 lb) (XP500A)	



ltem	Standard	Limit
Engine		
Engine type	Liquid-cooled 4-stroke, DOHC	
Displacement	499 cm ³ (30.45 cu.in)	
Cylinder arrangement	Forward inclined parallel 2-cylinder	
Bore × stroke	$66 \times 73 \text{ mm } (2.60 \times 2.87 \text{ in})$	
Compression ratio	11.0:1	
Engine idling speed	1,100 ~ 1,300 r/min	
Vacuum pressure at engine idling speed	33 kPa (248 mmHg, 9.7 inHg)	
Standard compression pressure (at sea level)	1,400 kPa (14.0 kg/cm², 199.1 psi) at 360 r/min	
Coolant temperature	85 ~ 100 °C (185 ~ 212 °F)	
Oil temperature	70 °C (158 °F)	
Fuel	(
Recommended fuel	Regular unleaded gasoline only	
Fuel tank capacity	gacomic cin,	
Total (including reserve)	14 L (3.08 Imp gal, 3.70 US gal)	
Engine oil	(13 / 3 /	
Lubrication system	Dry sump	
Recommended oil		
Temp20° -10° 0° 10° 20° 30° 40° 50°C SAE 10W/30 SAE 10W/40	SAE10W30 or SAE10W40 API service SE, SF, SG type or higher	
Quantity		
Total amount	3.6 L (3.17 Imp qt, 3.81 US qt)	
Without oil filter cartridge replace-	2.8 L (2.46 Imp qt, 2.96 US qt)	
ment		
With oil filter cartridge replacement	2.9 L (2.55 Imp qt, 3.07 US qt)	
Oil pressure (hot)	150 kPa (1.50 kg/cm², 21.8 psi) at	
	1,200 r/min	
Relief valve opening pressure	450 ~ 550 kPa	
	(4.5 ~ 5.5 kg/cm ² , 65.3 ~ 79.8 psi)	
Chain drive oil		
Type	SAE 80 API GL-4 Hypoid gear oil	
Quantity	0.70 L (0.62 Imp qt, 0.74 US qt)	



Item	Standard	Limit
Oil filter		
Oil filter type	Cartridge (paper)	
Bypass valve opening pressure	80 ~ 120 kPa	
	(0.8 ~ 1.2 kg/cm ² , 11.6 ~ 17.4 psi)	
Oil pump		
Oil pump type	Trochoid	
Inner-rotor-to-outer-rotor-tip clear- ance	0.04 ~ 0.12 mm (0.0016 ~ 0.0047 in)	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.045 ~ 0.085 mm (0.0018 ~ 0.0033 in)	0.15 mm (0.0059 in)
Oil-pump-housing-to-inner-and- outer-rotor clearance	0.11 ~ 0.23 mm (0.0043 ~ 0.0091 in)	0.30 mm
Pressure check location	MAIN GALLERY	(0.0118 in)
Cooling system	MAIN GALLENT	
Radiator capacity (including all routes)	1.5 L (1.32 lmp qt, 1.59 US qt)	
Coolant reservoir capacity (up to the	0.35 L (0.31 Imp qt, 0.37 US qt)	
maximum level mark)	107.0 107.0 kDo	
Radiator cap opening pressure	107.9 ~ 137.3 kPa (1.08 ~ 1.37 kg/cm ² , 15.6 ~ 19.9 psi)	
Radiator core	(1.00 % 1.07 kg/6/11 , 10.0 % 10.0 psi)	
Width	330 mm (12.99 in)	
Height	138 mm (5.43 in)	
Depth	24 mm (0.94 in)	
Thermostat	,	
Model/manufacturer	4JH/NIPPON THERMOSTAT	
Valve opening temperature	69 ~ 73 °C (156.2 ~ 163.4 °F)	
Valve full open temperature	85 °C (185 °F)	
Valve lift-full open	8.0 mm (0.31 in)	
Water pump	,	
Water pump type	Single-suction centrifugal pump	
Reduction ratio	23/19 (1.210)	
Starting system type	Electric starter	
Spark plugs		
Model/manufacturer \times quantity	CR7E/NGK × 2	
Spark plug gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in)	
Cylinder head		
Volume	14.97 ~ 15.57 cm ³ (0.91 ~ 0.95 cu.in)	
Max warpage ∗		0.03 mm
*		(0.0012 in)
		I



Item	Standard	Limit
Camshafts Drive system Camshaft cap inside diameter Camshaft journal diameter Camshaft-journal-to-camshaft cap clearance Intake camshaft lobe dimensions	Standard Chain drive (left) 23.000 ~ 23.021 mm (0.9055 ~ 0.9063 in) 22.967 ~ 22.980 mm (0.9042 ~ 0.9047 in) 0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)	 0.08 mm (0.0031 in)
A A		00.450
Measurement A	33.252 ~ 33.352 mm (1.3091 ~ 1.3131 in)	33.152 mm (1.3052 in)
Measurement B	24.956 ~ 25.056 mm (0.9825 ~ 0.9865 in)	24.856 mm (0.9786 in)
Exhaust camshaft lobe dimensions A		
B →		
Measurement A	33.252 ~ 33.352 mm (1.3091 ~ 1.3131 in)	33.152 mm (1.3052 in)
Measurement B	24.956 ~ 25.056 mm (0.9825 ~ 0.9865 in)	24.856 mm (0.9786 in)
Camshaft runout limit		0.03 mm
**************************************		(0.0012 in)
Timing chain	000 0400 07/400	
Model/number of links	SCR-0409 SV/132	
Tensioning system	Automatic	



Valves, valve seats, valve guides Valve clearance (cold) Intake Exhaust Ualve dimensions B Head Diameter Face Width Valve head diameter A Intake Exhaust Valve face width B Valve face width B O.15 ~ 0.20 mm (0.0059 ~ 0.0079 in) 0.25 ~ 0.30 mm (0.0098 ~ 0.0118 in) Valve face width Seat Width Margin Thick 24.9 ~ 25.1 mm (0.9803 ~ 0.9882 in) 21.9 ~ 22.1 mm (0.8622 ~ 0.8701 in)	
Valve clearance (cold) Intake Exhaust Valve dimensions B Head Diameter Valve head diameter A Intake Exhaust Valve clearance (cold) 0.15 ~ 0.20 mm (0.0059 ~ 0.0079 in) 0.25 ~ 0.30 mm (0.0098 ~ 0.0118 in) Valve dimensions Face Width Seat Width Margin Thick 24.9 ~ 25.1 mm (0.9803 ~ 0.9882 in) Exhaust 21.9 ~ 22.1 mm (0.8622 ~ 0.8701 in)	
Exhaust Valve dimensions B Head Diameter Valve head diameter A Intake Exhaust O.25 ~ 0.30 mm (0.0098 ~ 0.0118 in) B Seat Width Margin Thick 24.9 ~ 25.1 mm (0.9803 ~ 0.9882 in) 21.9 ~ 22.1 mm (0.8622 ~ 0.8701 in)	
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Intake 24.9 ~ 25.1 mm (0.9803 ~ 0.9882 in) 21.9 ~ 22.1 mm (0.8622 ~ 0.8701 in)	l ness
Exhaust 21.9 ~ 22.1 mm (0.8622 ~ 0.8701 in)	
Intake 1.14 ~ 1.98 mm (0.0449 ~ 0.0780 in)	
Exhaust 1.14 ~ 1.98 mm (0.0449 ~ 0.0780 in)	
Valve seat width C	
Intake 0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in) 1.6 r	nm
(0.00	3 in)
Exhaust 0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in) 1.6 r	nm
(0.00	3 in)
Valve margin thickness D	
Intake 0.6 ~ 0.8 mm (0.0236 ~ 0.0315 in) 0.5 r	nm
(0.0)	197 in)
Exhaust 0.6 ~ 0.8 mm (0.0236 ~ 0.0315 in) 0.5 r	
	197 in)
Valve stem diameter	
· · · · · · · · · · · · · · · · · · ·	5 mm
l '	553 in)
1 ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	0 mm
I ' '	547 in)
Valve guide inside diameter	0 mm
1 ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	0 mm 594 in)
·	0 mm
, , , , , , , , , , , , , , , , , , ,	594 in)
Valve-stem-to-valve-guide clearance	
1	0 mm
1	032 in)
	,
(0.00	0 mm



Item	Standard	Limit
Valve stem runout		0.04 mm
пП		(0.0016 in)
777777777777777777777777777777777777777		
Valve seat width		
Intake	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm
	,	(0.06 in)
Exhaust	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm
		(0.06 in)
Valve springs		
Free length		
Intake	35.59 mm (1.40 in)	33.81 mm
Enthanes	05 50 (4. 40 in)	(1.33 in)
Exhaust	35.59 mm (1.40 in)	33.81 mm
Installed length (valve closed)		(1.33 in)
Installed length (valve closed) Intake	30.39 mm (1.20 in)	
Exhaust	30.39 mm (1.20 in)	
Spring rate (K1)	00.03 11111 (1.20 111)	
Intake	18.84 N/mm (1.92 kg/mm, 107.60 lb/in)	
Exhaust	18.84 N/mm (1.92 kg/mm, 107.60 lb/in)	
Spring rate (K2)		
Intake	24.52 N/mm (2.50 kg/mm, 140.01 lb/in)	
Exhaust	24.52 N/mm (2.50 kg/mm, 140.01 lb/in)	
Compressed spring force (installed)	,	
Intake	91.2 ~ 104.9 N at 30.4 mm	
	(9.3 ~ 10.7 kg at 30.4 mm,	
	20.5 ~ 23.6 lb at 1.20 in)	
Exhaust	91.2 ~ 104.9 N at 30.4 mm	
	(9.3 ~ 10.7 kg at 30.4 mm,	
Coring tilt de	20.5 ~ 23.6 lb at 1.20 in)	
Spring tilt *		
*		
Intake (inner)		2.5°/1.6 mm
make (miler)		(2.5°/0.06 in)
Exhaust		2.5°/1.6 mm
		(2.5°/0.06 in)



Winding direction (top view) Intake Exhaust Clockwise Cl	Item	Standard	Limit
Exhaust Clockwise	Winding direction (top view)		
Valve lifter 24.476 ~ 24.500 mm (0.9636 ~ 0.9646 in) 24.451 mm (0.9626 in) 66.10 mm (2.6024 in) 66.10 mm (2.6024 in) 66.10 mm (2.6024 in) 66.10 mm (2.6024 in) 0.055 mm (0.0020 in) 0.15 mm (0.0020 in) 0.15 mm (0.0026 in) 0.05 mm (0.0026 in) <td>Intake</td> <td>Clockwise</td> <td></td>	Intake	Clockwise	
Valve lifter outside diameter Intake 24.476 ~ 24.500 mm (0.9636 ~ 0.9646 in) 24.451 mm (0.9626 in) Exhaust 24.476 ~ 24.500 mm (0.9636 ~ 0.9646 in) 24.451 mm (0.9626 in) Cylinders Bore 66.00 ~ 66.01 mm (2.5984 ~ 2.5988 in) 66.10 mm (2.6024 in) Maximum taper 0.05 mm (0.0020 in) Maximum out-of-round 0.05 mm (0.0020 in) Pistons Piston-to-cylinder clearance 0.020 ~ 0.045 mm (0.0008 ~ 0.0018 in) 0.15 mm (0.0029 in) Diameter "D" 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) Height "H" Piston pin bore (in the piston) Diameter 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) 15.043 mm (0.5922 in) Offset Offset direction Piston pin Outside diameter 0.50 mm (0.0197 in) Intake side 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	Exhaust	Clockwise	
Valve lifter outside diameter Intake 24.476 ~ 24.500 mm (0.9636 ~ 0.9646 in) 24.451 mm (0.9626 in) Exhaust 24.476 ~ 24.500 mm (0.9636 ~ 0.9646 in) 24.451 mm (0.9626 in) Cylinders Bore 66.00 ~ 66.01 mm (2.5984 ~ 2.5988 in) 66.10 mm (2.6024 in) Maximum taper 0.05 mm (0.0020 in) Maximum out-of-round 0.05 mm (0.0020 in) Pistons Piston-to-cylinder clearance 0.020 ~ 0.045 mm (0.0008 ~ 0.0018 in) 0.15 mm (0.0029 in) Diameter "D" 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) Height "H" Piston pin bore (in the piston) Diameter 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) 15.043 mm (0.5922 in) Offset Offset direction Piston pin Outside diameter 0.50 mm (0.0197 in) Intake side Piston-pin-to-piston-pin-bore clear- Piston-pin-to-piston-pin-bore clear- 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) O.072 mm 0.002 ~ 0.022 mm 0.072 mm			
Intake	Valve lifter		
Exhaust 24.476 ~ 24.500 mm (0.9636 ~ 0.9646 in) (0.9626 in) 24.451 mm (0.9626 in) 25.5984 ~ 2.5988 in) 66.10 mm (2.6024 in) 0.05 mm (0.0020 in) 25.5988 mm (0.0020 in)	Valve lifter outside diameter		
Exhaust 24.476 ~ 24.500 mm (0.9636 ~ 0.9646 in) 24.451 mm (0.9626 in) Cylinders Bore 66.00 ~ 66.01 mm (2.5984 ~ 2.5988 in) 66.10 mm (2.6024 in) Maximum taper 0.05 mm (0.0020 in) Maximum out-of-round 0.05 mm (0.0020 in) Pistons Piston-to-cylinder clearance 0.020 ~ 0.045 mm (0.0008 ~ 0.0018 in) 0.15 mm (0.0020 in) Diameter "D" 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) Piston pin bore (in the piston) Diameter 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) Offset 0.50 mm (0.0197 in) 15.043 mm (0.5922 in) Offset direction Piston pin Outside diameter 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	Intake	24.476 ~ 24.500 mm (0.9636 ~ 0.9646 in)	24.451 mm
Cylinders 66.00 ~ 66.01 mm (2.5984 ~ 2.5988 in) 66.10 mm (2.6024 in)			(0.9626 in)
Cylinders Bore 66.00 ~ 66.01 mm (2.5984 ~ 2.5988 in) 66.10 mm (2.6024 in) 0.05 mm (0.0020 in) 0.15 mm (0.0059 in) 0.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) 0.5902 in) 0.50 mm (0.0197 in) 0.5902 in) 0.50 mm (0.0197 in) 0.5902 in) 0.50 mm (0.0197 in) 0.002 mm (0.5902 ~ 0.5906 in) 0.002 mm (0.5894 in) 0.0072 mm 0.0072 mm 0.0072 mm	Exhaust	24.476 ~ 24.500 mm (0.9636 ~ 0.9646 in)	24.451 mm
Bore 66.00 ~ 66.01 mm (2.5984 ~ 2.5988 in) (2.6024 in) (2.6024 in) (0.005 mm (0.0020 in) (·	(0.9626 in)
Maximum taper	Cylinders		
Maximum taper 0.05 mm (0.0020 in) Maximum out-of-round 0.05 mm (0.0020 in) Pistons Piston-to-cylinder clearance 0.020 ~ 0.045 mm (0.0008 ~ 0.0018 in) 0.15 mm (0.0059 in) Diameter "D" 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) Height "H" 9.0 mm (0.35 in) Piston pin bore (in the piston) 15.043 mm (0.5906 ~ 0.5911 in) 15.043 mm (0.5922 in) Offset 0.50 mm (0.0197 in) (0.5922 in) Offset direction Intake side Piston pin 0utside diameter 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	Bore	66.00 ~ 66.01 mm (2.5984 ~ 2.5988 in)	66.10 mm
Maximum out-of-round			(2.6024 in)
Maximum out-of-round 0.05 mm (0.0020 in) Pistons 0.020 ~ 0.045 mm (0.0008 ~ 0.0018 in) 0.15 mm (0.0059 in) Diameter "D" 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) Height "H" 9.0 mm (0.35 in) Piston pin bore (in the piston) 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) 15.043 mm (0.5922 in) Offset 0.50 mm (0.0197 in) Offset direction Intake side Piston pin 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) O.05894 in) 0.072 mm	Maximum taper		0.05 mm
Pistons 0.020 ~ 0.045 mm (0.0008 ~ 0.0018 in) 0.15 mm (0.0059 in) Diameter "D" 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) Height "H" 9.0 mm (0.35 in) Piston pin bore (in the piston) 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) 15.043 mm (0.5922 in) Offset 0.50 mm (0.0197 in) Offset direction 0.50 mm (0.0197 in) Piston pin 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Outside diameter 0.002 ~ 0.022 mm 0.072 mm			(0.0020 in)
Pistons 0.020 ~ 0.045 mm (0.0008 ~ 0.0018 in) 0.15 mm (0.0059 in) Diameter "D" 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) Height "H" 9.0 mm (0.35 in) Piston pin bore (in the piston) 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) 15.043 mm (0.5922 in) Offset 0.50 mm (0.0197 in) Offset direction Intake side Piston pin 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	Maximum out-of-round		0.05 mm
Piston-to-cylinder clearance Diameter "D" 0.020 ~ 0.045 mm (0.0008 ~ 0.0018 in) 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) Height "H" Piston pin bore (in the piston) Diameter 0.50 mm (0.35 in) 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) Offset Offset Offset direction Piston pin Outside diameter 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.15 mm (0.0059 in) 15.043 mm (0.5922 in) 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 0.5894 in) 0.072 mm			(0.0020 in)
Diameter "D" 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) Height "H" Piston pin bore (in the piston) Diameter 9.0 mm (0.35 in) 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) Offset Offset Offset direction Piston pin Outside diameter 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm (0.0059 in) 15.043 mm (0.5922 in) 14.971 mm (0.5894 in) 0.072 mm	Pistons		
Diameter "D" 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) Height "H" Piston pin bore (in the piston) Diameter 0ffset Offset Offset direction Piston pin Outside diameter 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in) 15.043 mm (0.5922 in) 14.971 mm (0.5894 in) 0.072 mm	Piston-to-cylinder clearance	0.020 ~ 0.045 mm (0.0008 ~ 0.0018 in)	0.15 mm
Height "H" Piston pin bore (in the piston) Diameter Offset Offset Offset direction Piston pin Outside diameter 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) 0.50 mm (0.0197 in) Intake side 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm		·	(0.0059 in)
Height "H" Piston pin bore (in the piston) Diameter 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) Offset Offset Offset direction Piston pin Outside diameter 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 9.0 mm (0.35 in) 15.043 mm (0.5922 in)	Diameter "D"	65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in)	
Piston pin bore (in the piston) 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) 15.043 mm (0.5922 in) Offset 0.50 mm (0.0197 in) Offset direction Intake side Piston pin 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	H		
Diameter 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in) 15.043 mm (0.5922 in) Offset 0.50 mm (0.0197 in) Offset direction Intake side Piston pin 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	Height "H"	9.0 mm (0.35 in)	
Offset 0.50 mm (0.0197 in) Offset direction Intake side Piston pin 0.4.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	Piston pin bore (in the piston)		
Offset direction	Diameter	15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in)	
Offset direction Intake side Piston pin 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	Offset	0.50 mm (0.0197 in)	
Outside diameter 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	Offset direction	Intake side	
Outside diameter 14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in) 14.971 mm (0.5894 in) Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	Piston pin		
Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm (0.5894 in) 0.072 mm	•	14.991 ~ 15.000 mm (0.5902 ~ 0.5906 in)	14.971 mm
Piston-pin-to-piston-pin-bore clear- 0.002 ~ 0.022 mm 0.072 mm	1	(3.2.2.2.2.2.2.2.2.3.1.1)	_
' ' '	Piston-pin-to-piston-pin-bore clear-	0.002 ~ 0.022 mm	,
∡ απου (υπουσου πουσου ΙΠΙ) 10.0020 IΠΙ	ance	(0.00008 ~ 0.00087 in)	(0.0028 in)



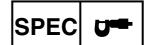
Item	Standard	Limit
Piston rings		
Top ring		
B		
Ring type	Barrel	
Dimensions (B × T)	$0.80 \times 2.45 \text{ mm } (0.03 \times 0.10 \text{ in})$	
End gap (installed)	0.15 ~ 0.25 mm (0.0059 ~ 0.0098 in)	0.50 mm (0.0197 in)
Ring side clearance	0.030 ~ 0.065 mm (0.0012 ~ 0.0026 in)	0.10 mm (0.0039 in)
2nd ring		
□ ↓ B		
Ring type	Taper	
Dimensions (B \times T)	$0.80 \times 2.50 \text{ mm } (0.03 \times 0.10 \text{ in})$	
End gap (installed)	0.40 ~ 0.50 mm (0.0157 ~ 0.0197 in)	0.75 mm (0.0295 in)
Ring side clearance	0.020 ~ 0.055 mm (0.0008 ~ 0.0022 in)	0.10 mm (0.0039 in)
Oil ring		
B		
Dimensions (B \times T)	$1.50 \times 2.00 \text{ mm } (0.06 \times 0.08 \text{ in})$	
End gap (installed)	0.10 ~ 0.35 mm (0.0039 ~ 0.0138 in)	
Ring side clearance	0.040 ~ 0.160 mm (0.0016 ~ 0.0063 in)	
Connecting rods		
Oil clearance (using plastigauge®)	0.026 ~ 0.050 mm (0.0010 ~ 0.0020 in)	
Bearing color code	1.Blue 2.Black 3.Brown 4.Green	
Small end inside diameter	15.005 ~ 15.018 mm (0.5907 ~ 0.5913 in)	



Item	Standard	Limit
Crankshaft		
C C		
E A A		
Width A	50.00 ~ 50.60 mm (1.969 ~ 1.992 in)	
Width B	118.55 ~ 118.60 mm (4.667 ~ 4.669 in)	
Maximum runout C		0.03 mm
		(0.0012 in)
Big end side clearance D	0.160 ~ 0.262 mm (0.0063 ~ 0.0103 in)	
Big end radial clearance E	0.026 ~ 0.050 mm (0.0010 ~ 0.0020 in)	
Crankshaft-journal-to-crankshaft-	0.040 ~ 0.082 mm (0.0016 ~ 0.0032 in)	
journal-bearing clearance		
Bearing color code	1.Blue 2.Black 3.Brown 4.Green	
Balancer		
Balancer drive method	Piston	
Clutch		
Clutch type	Wet, multiple disc automatic	
Clutch release method	Automatic	
Friction plates	0.75 0.05 (0.400 0.400)	0.05
Thickness	2.75 ~ 3.05 mm (0.108 ~ 0.120 in)	2.65 mm
Plate quantity	5	(0.104 in)
Clutch plate 1	3	
Thickness	1.30 ~ 1.50 mm (0.05 ~ 0.06 in)	
Plate quantity	4	
Maximum warpage		0.10 mm
		(0.0039 in)
Clutch plate 2		,
Thickness	1.80 ~ 2.00 mm (0.07 ~ 0.08 in)	
Plate quantity	2	
Maximum warpage		0.20 mm
		(0.0079 in)
Clutch springs		
Free length	25.9 mm (1.02 in)	25.4 mm
		(1.00 in)
Spring quantity	6	



Item	Standard	Limit
Clutch damper springs 1		
Height	3.30 mm (0.13 in)	2.90 mm
i ioigin		(0.11 in)
Spring quantity	6	
Clutch damper spring 2		
Height	4.70 mm (0.19 in)	4.40 mm
	6	(0.17 in)
Spring quantity	1	
V-belt		
V-belt width	32.0 mm (1.26 in)	30.5 mm
	,	(1.20 in)
Transmission		
Transmission type	V-belt automatic	
Primary reduction system	Spur gear/helical gear	
Primary reduction ratio	52/32 × 36/22 (2.659)	
Secondary reduction system	Chain drive	
Secondary reduction ratio	41/25 × 40/29 (2.262)	
Operation	Centrifugal automatic type	
Maximum main axle runout		0.08 mm
		(0.0031 in)
Maximum drive axle runout		0.08 mm
		(0.0031 in)
Air filter type	Dry element	
Fuel pump		
Pump type	Electrical	
Model/manufacturer	5VU/AISAN	
Consumption amperage (max.)	1.9 A	
Output pressure	246 ~ 254 kPa	
	(2.46 ~ 2.54 kg/cm ² , 35.0 ~ 36.1 psi)	
Electronic fuel injection		
Model	1100-87B60/1100-87B70	
Manufacturer	AISAN	
Throttle body		
Type/quantity	ACW31/1	
Manufacturer	MIKUNI	
ID mark	5VU1 00	
Throttle cable free play (at the flange	3 ~ 5 mm (0.12 ~ 0.20 in)	
of the throttle grip)		



Item	Standard	Limit
Frame		
Frame type	Diamond	
Caster angle	28°	
Trail	95 mm (3.74 in)	
Front wheel		
Wheel type	Cast wheel	
Rim		
Size	14M/C × MT3.50	
Material	Aluminum	
Wheel travel	120 mm (4.72 in)	
Wheel runout		
Maximum radial wheel runout		1 mm
		(0.04 in)
Maximum lateral wheel runout		0.5 mm
		(0.02 in)
Wheel axle bending limit		0.25 mm
		(0.01 in)
Rear wheel		
Wheel type	Cast wheel	
Rim		
Size	15M/C × MT5.00	
Material	Aluminum	
Wheel travel	117 mm (4.61 in)	
Wheel runout		
Maximum radial wheel runout		1 mm
		(0.04 in)
Maximum lateral wheel runout		0.5 mm
		(0.02 in)
Wheel axle bending limit		0.25 mm
		(0.01 in)
Front tire		
Tire type	Tubeless	
Size	120/70R14 M/C 55H	
Model/manufacturer	TH01F/BRIDGESTONE	
	D252F/DUNLOP	
Tire pressure (cold)		
0 ~ 90 kg (0 ~ 198 lbs)	225 kPa (2.25 kgf/cm ² , 33 psi)	
90 kg (198 lbs) ~ maximum load	225 kPa (2.25 kgf/cm ² , 33 psi)	
High-speed riding	225 kPa (2.25 kgf/cm ² , 33 psi)	
Minimum tire tread depth		1.6 mm
		(0.06 in)



Item	Standard	Limit
Rear tire		
Tire type	Tubeless	
Size	160/60R15 M/C 67H	
Model/manufacturer	TH01R/BRIDGESTONE	
	D252/DUNLOP	
Tire pressure (cold)		
0 ~ 90 kg (0 ~ 198 lbs)	250 kPa (2.50 kgf/cm², 36 psi)	
90 kg (198 lbs) ~ maximum load	280 kPa (2.80 kgf/cm², 41 psi)	
High-speed riding	250 kPa (2.50 kgf/cm², 36 psi)	
Minimum tire tread depth		1.6 mm
l minimum in a nead depun		(0.06 in)
Front brakes		
Brake type	Dual-disc brake	
Operation	Right-hand operation	
Recommended fluid	DOT 4	
Brake discs		
Diameter × thickness	267.0 × 4.0 mm (10.51 × 0.16 in)	
Minimum thickness		3.5 mm
		(0.14 in)
Maximum deflection		0.12 mm
		(0.0047 in)
Brake pad lining thickness ★	6.2 mm (0.24 in)	0.8 mm
3		(0.03 in)
*		,
Master cylinder inside diameter	14.00 mm (0.55 in)	
Caliper cylinder inside diameter	30.16 mm (1.19 in)	
	and 25.40 mm (1.00 in)	
Rear brake		
Brake type	Single-disc brake	
Operation	Left-hand operation	
Recommended fluid	DOT4	
Brake discs		
Diameter \times thickness	267.0 × 5.0 mm (10.51 × 0.20 in)	
Minimum thickness	·	4.5 mm
		(0.18 in)
Maximum deflection		0.15 mm
		(0.0059 in)
Brake pad lining thickness ★	8.3 mm (0.33 in)	0.8 mm
	, ,	(0.03 in)
↓ .		
*		
Mantan addington in aid a diagram	10.7 mm (0.50 in)	
Master cylinder inside diameter	12.7 mm (0.50 in)	
Caliper cylinder inside diameter	38.10 mm (1.50 in)	



Item	Standard	Limit			
Front suspension					
Туре	Telescopic fork				
Front fork type	Coil spring/oil damper				
Front fork travel	120.0 mm (4.72 in)				
Fork spring free length	405.0 mm (15.94 in)	400.0 mm			
		(15.75 in)			
Installed length	400.0 mm (15.75 in)				
Collar length	145.0 mm (5.71 in)				
Spring rate (K1)	15.60 N/mm (1.59 kg/mm, 89.08 lb/in)				
Spring rate (K2)	23.60 N/mm (2.41 kg/mm, 134.76 lb/in)				
Spring stroke (K1)	0 ~ 80.0 mm (0 ~ 3.15 in)				
Spring stroke (K2)	80.0 ~ 120.0 mm (3.15 ~ 4.72 in)				
Optional spring available	No				
Recommended oil	Fork oil 7.5 W or equivalent				
Quantity	0.512 L (0.451 Imp qt, 0.541 US qt)				
Level	109.0 mm (4.29 in)				
Inner tube outer diameter	41.0 mm (1.61 in)				
Inner tube bending limit		0.2 mm			
		(0.01 in)			
Steering					
Steering bearing type	Angular ball bearing				
Lock-to-lock angle (left)	38.5°				
Lock-to-lock angle (right)	38.5°				
Rear suspension					
Suspension type	Swingarm				
Rear shock absorber assembly type	Coil spring/gas-oil damper				
Rear shock absorber assembly travel	43.0 mm (1.69 in)				
Spring					
Free length	191.2 mm (7.53 in)				
Installed length	180.0 mm (7.09 in)				
Spring rate (K1)	225.60 N/mm				
	(23.00 kg/mm, 1,288.18 lb/in)				
Spring rate (K2)	294.00 N/mm				
	(29.98 kg/mm, 1,678.74 lb/in)				
Spring stroke (K1)	0 ~ 28.8 mm (0 ~ 1.13 in)				
Spring stroke (K2)	28.8 ~ 43.0 mm (1.31 ~ 1.69 in)				
Optional spring available	No				
Standard spring preload gas/air pres-	4,900 kPa (49.0 kg/cm², 696.9 psi)				
sure					



Item	Standard	Limit
Swingarm		
Free play (at the end of the swing-		
arm)		
Radial		1.0 mm
		(0.04 in)
Axial		1.0 mm
		(0.04 in)
Secondary drive chain		
Model/manufacturer	23RH303.5-82ASM/Borg warner	
Link quantity	82	
Primary drive chain		
Model/manufacturer	89HV302.5RCF-66/Borg warner	
Link quantity	66	

ELECTRICAL SPECIFICATIONS



ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
System voltage	12 V	
Ignition system		
Ignition system type	Transistorized coil ignition (digital)	
Ignition timing	10° BTDC at 1,200 r/min	
Advancer type	Digital	
Crankshaft position sensor resis-	189 ~ 231 Ω at 20 °C (68 °F)/gray–black	
tance/color		
ECU (engine)		
Model/manufacturer	TBDF07/DENSO (XP500)	
	TBDF13/DENSO (XP500A)	
Ignition coils		
Model/manufacturer	JO313/DENSO	
Minimum ignition spark gap	6 mm (0.24 in)	
Primary coil resistance	1.87 ~ 2.53 Ω at 20 °C (68 °F)	
Secondary coil resistance	12 ~ 18 kΩ at 20 °C (68 °F)	
Spark plug cap		
Material	Resin	
Resistance	10.0 kΩ at 20 °C (68 °F)	
Charging system		
System type	A.C. magneto	
Model/manufacturer	F4T383/MITSUBISHI	
Standard output	14.0 V 350 W/5,000 r/min	
Stator coil resistance/color	0.22 ~ 0.26 Ω at 20 °C (68 °F)/	
	white-white	
Rectifier/regulator		
Regulator type	Semiconductor/short-circuit type	
Model/manufacturer	SH719AA/SHINDENGEN	
No load regulated voltage (DC)	14.1 ~ 14.9 V	
Rectifier capacity (DC)	25 A	
Withstand voltage	240 V	
Battery		
Model	GT9B-4	
Voltage/capacity	12 V/8 Ah	
Manufacturer	GS	
Ten hour rate amperage	0.8 Ah	
Headlight type	Halogen bulb	

ELECTRICAL SPECIFICATIONS



Item	Standard	Limit
Bulbs (voltage, wattage × quantity)		
Headlight	12 V, 60 W/55 W + 12 V, 55 W	
Auxiliary light	12 V, 5 W × 2	
Tail/brake light	12 V, 5 W/21 W × 2	
Front turn signal light	12 V, 21 W × 2	
Rear turn signal light	12 V, 21 W × 2	
Licence plate light	12 V, 5 W × 1	
Meter light	14 V, 2 W × 3	
Indicator light	,	
Turn signal indicator light	14 V, 1.4 W × 2	
High beam indicator light	14 V, 1.4 W × 1	
Engine trouble warning light	14 V, 1.4 W × 1	
ABS warning light	14 V, 1.4 W × 1 (XP500A)	
Immobilizer system indicator light	LED	
Electric starting system		
System type	Constant mesh	
Starter motor		
Model/manufacturer	SM-13/MITSUBA	
Power output	0.7 kW	
Brushes		
Overall length	12.0 mm (0.47 in)	4.0 mm
o voram ronigan	12.6 (8)	(0.16 in)
Spring force	7.65 ~ 10.01 N	
3	(780 ~ 1,021 gf, 27.53 ~ 36.04 oz)	
Commutator resistance	0.0015 ~ 0.0025 Ω at 20 °C (68 °F)	
Commutator diameter	28 mm (1.10 in)	27 mm
	,	(1.06 in)
Mica undercut	0.7 mm (0.03 in)	
Starter relay		
Model/manufacturer	MS5F-561/JIDECO	
Amperage	180 A	
Coil resistance	4.18 ~ 4.62 Ω at 20 °C (68 °F)	
Horn		
Horn type	Plane	
Model/manufacturer × quantity	YF-12/NIKKO × 2	
Maximum amperage	3 A	
Coil resistance	1.15 ~ 1.25 Ω at 20 °C (68 °F)	
Performance	105 ~ 113 dB/2 m	
Turn signal/hazard relay		
Relay type	Full transistor	
Model/manufacturer	FE246BH/DENSO	
Self-cancelling device built-in	No	
Turn signal blinking frequency	75 ~ 95 cycles/minute	
Wattage	21 W × 2 + 3.4 W	

ELECTRICAL SPECIFICATIONS



lkovo	Ctondovd	Limait
Item	Standard	Limit
Fuel pump assembly (fuel sender)		
Model/manufacturer	5VU/AISAN	
Sender unit resistance-full	19 ~ 21 Ω	
Sender unit resistance-empty	137 ~ 143 Ω	
Coolant temperature sensor		
Model/manufacturer	5PS/DENSO	
Resistance at 20 °C (68 °F)	2.32 ~ 2.59 kΩ	
Resistance at 80 °C (176 °F)	0.310 ~ 0.326 kΩ	
Resistance at 110 °C (230 °F)	0.140 ~ 0.144 kΩ	
Fuses		
Main fuse	30 A	
Headlight fuse	15 A	
Signaling system fuse	20 A (XP500)	
	15 A (XP500A)	
Ignition fuse	10 A	
Radiator fan motor fuse	15 A	
Lighting system fuse	10 A	
Fuel injection system fuse	10 A	
ABS motor fuse	30 A (XP500A)	
ABS control unit fuse	5 A (XP500A)	
Backup fuse (storage box light,	10 A	
immobilizer unit, and meter assem-		
bly)		
Spare fuse	30 A	
Spare fuse	20 A (XP500)	
Spare fuse	15 A	
Spare fuse	10 A	
Spare fuse	5 A (XP500A)	

CONVERSION TABLE/ GENERAL TIGHTENING TORQUE SPECIFICATIONS



EAS0002

CONVERSION TABLE

All specification data in this manual are listed in SI and METRIC UNITS.

Use this table to convert METRIC unit data to IMPERIAL unit data.

Ex.

METRIC	I	MULTIPLIEF	IMPERIAL	
** mm	×	0.03937	=	** in
2 mm	×	0.03937	=	0.08 in

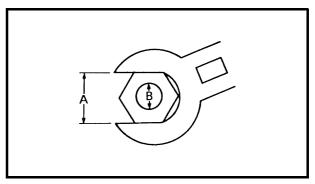
CONVERSION TABLE

METRIC TO IMPERIAL						
	Metric unit	Multiplier	Imperial unit			
Tighten-	m · kg	7.233	ft · lb			
ing torque	m · kg	86.794	in · lb			
	cm · kg	0.0723	ft · lb			
	cm · kg	0.8679	in · lb			
Weight	kg	2.205	lb			
weignt	g	0.03527	oz			
Speed	km/hr	0.6214	mph			
	km	0.6214	mi			
	m	3.281	ft			
Distance	m	1.094	yd			
	cm	0.3937	in			
	mm	0.03937	in			
	cc (cm ³)	0.03527	oz (IMP liq.)			
Volume/	cc (cm ³)	0.06102	cu · in			
Capacity	It (liter)	0.8799	qt (IMP liq.)			
	It (liter)	0.2199	gal (IMP liq.)			
	kg/mm	55.997	lb/in			
Misc.	kg/cm ²	14.2234	psi (lb/in²)			
IVIISC.	Centigrade (°C)	9/5+32	Fahrenheit (°F)			

EAS00030

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

22 mm

General tightening В Α torques (bolt) (nut) Nm $m \cdot kg$ ft · lb 10 mm 6 mm 6 4.3 0.6 12 mm 8 mm 15 1.5 11 14 mm 10 mm 30 22 3.0 17 mm 12 mm 55 5.5 40 19 mm 14 mm 85 8.5 61

130

13.0

94

16 mm



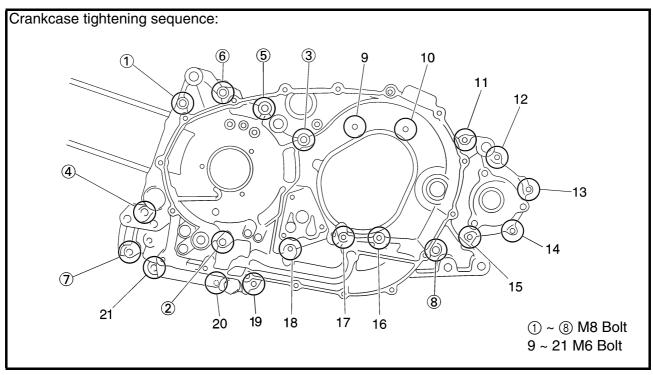
TIGHTENING TORQUES ENGINE TIGHTENING TORQUES

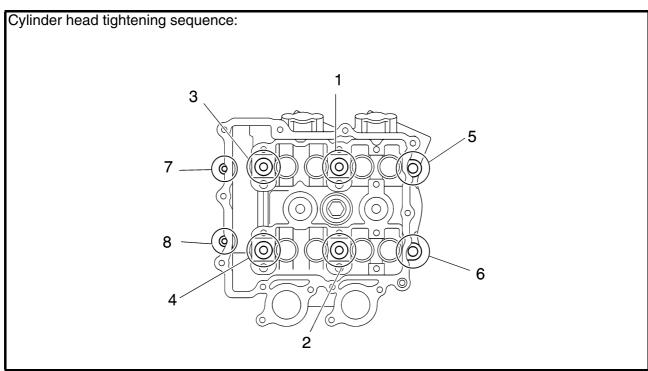
Itom	Dort name	Thread	O'th	Tight	ening to	orque	Remarks
Item	Part name	size	Q'ty	Nm	m · kg	ft · lb	nemarks
Spark plug		M10	2	13	1.3	9.4	
Cylinder head cover	Bolt	M6	10	10	1.0	7.2	
Camshaft cap	Bolt	M6	12	10	1.0	7.2	
Cylinder head and cylinder body	Nut	M9	4	35	3.5	25	
Cylinder head and cylinder body	Nut	M9	2	46	4.6	33	
Cylinder head and cylinder body	Bolt	M6	2	10	1.0	7.2	
Cylinder head (exhaust pipe)	Stud bolt	M8	4	15	1.5	11	
Cylinder body	Bolt	M6	1	10	1.0	7.2	
Connecting rod cap	Nut	M7	4	Se	e NOTE	Ξ*1	
Connecting rod cap (balancer)	Nut	M9	2	60	6.0	43	
Balancer piston cylinder	Bolt	M10	4	58	5.8	42	√6
A.C. magneto rotor	Nut	M18	1	Se	e NOTE	E*2	
Timing chain tensioner	Bolt	M6	2	10	1.0	7.2	
Timing chain tensioner cap bolt	Bolt	M6	1	7	0.7	5.1	
Chain guide (intake side)	Bolt	M6	2	10	1.0	7.2	√©
Water pump housing cover	Bolt	M6	2	10	1.0	7.2	
Water pump assembly	Bolt	M6	2	10	1.0	7.2	
Coolant pipe	Bolt	M6	2	10	1.0	7.2	
Radiator filler neck	Bolt	M6	1	7	0.7	5.1	
Radiator drain bolt	Screw	M12	1	1.6	0.16	1.2	
Water pump inlet pipe	Bolt	M6	1	10	1.0	7.2	
Water pump outlet pipe	Bolt	M6	1	10	1.0	7.2	
Thermostat cover	Bolt	M6	2	10	1.0	7.2	
Oil pump assembly	Bolt	M6	3	10	1.0	7.2	
Oil strainer assembly	Bolt	M6	2	10	1.0	7.2	√©
Oil cooler assembly	Bolt	M20	1	63	6.3	45	
Oil filter cartridge		M20	1	17	1.7	12	
Oil delivery pipe	Bolt	M6	1	10	1.0	7.2	√©
Intake manifold and cylinder head	Bolt	M6	4	10	1.0	7.2	
Silencer assembly	Bolt	M6	2	9	0.9	6.5	
Air filter case assembly	Bolt	M6	3	9	0.9	6.5	
Exhaust pipe	Nut	M8	4	20	2.0	14	
Muffler	Nut	M10	1	31	3.1	22	
Muffler protector 1	Bolt	M6	2	10	1.0	7.2	40
Muffler protector 2	Bolt	M6	1	10	1.0	7.2	⊣ 6
Crankcase	Bolt	M6	13	10	1.0	7.2	
Crankcase	Bolt	M8	8	24	2.4	17	
Engine oil drain bolt	Bolt	M14	1	43	4.3	31	
Main gallery plug	Plug	M20	1	12	1.2	8.7	
Oil tank	Bolt	M6	7	10	1.0	7.2	
Stator coil base	Screw	M6	3	12	1.2	8.7	⊣ 6

ThreadTightening torque								
Item	Part name	Thread	(.)'t\/				Remarks	
		size		Nm	m · kg	ft · lb		
Timing plug	Plug	M16	1	8	8.0	5.8		
A.C. magneto cover	Bolt	M6	19	10	1.0	7.2		
V-belt case	Bolt	M6	4	10	1.0	7.2		
V-belt case	Bolt	M8	6	24	2.4	17		
V-belt case cover 1	Bolt	M6	3	7	0.7	5.1		
V-belt case cover 2	Bolt	M6	2	7	0.7	5.1		
Plate and right crankcase cover	Bolt	M6	3	10	1.0	7.2		
Right crankcase cover	Bolt	M8	2	24	2.4	17		
V-belt case air filter cover and V-belt	Bolt	M6	3	7	0.7	5.1		
case air filter element (right)	DOIL	IVIO	3	/	0.7	5.1		
V-belt case air filter element (left)	Bolt	M6	2	7	0.7	5.1		
Generator cover protector	Bolt	M6	1	7	0.7	5.1		
Generator cover protector cover	Bolt	M6	2	7	0.7	5.1		
Starter clutch	Bolt	M8	3	30	3.0	22	-16	
Clutch boss nut	Nut	M36	1	90	9.0	65		
Clutch assembly	Nut	M16	1	65	6.5	47		
Chain drive holder assembly	Bolt	M8	3	30	3.0	22		
Chain drive drain bolt	Bolt	M12	1	20	2.0	14		
Chain drive case (outer)	Bolt	M6	18	10	1.0	7.2		
Chain drive case cover	Bolt	M6	2	7	0.7	5.1		
							BEL-RAY	
Primary sheave assembly	Nut	M20	1	160	16.0	115	assembly lube [®]	
Secondary sheave spring seat	Nut	M36	1	90	9.0	65		
Secondary sheave assembly	Nut	M18	1	90	9.0	65	Shell BT grease®	
Primary bearing retainer	Screw	M6	1	11	1.1	8.0	- 10	
Secondary shaft bearing retainer	Bolt	M6	1	12	1.2	8.7	-16	
Stator coil assembly	Bolt	M6	3	10	1.0	7.2	-16	
Crankshaft position sensor	Bolt	M5	2	7	0.7	5.1	-16	
Starter motor	Bolt	M6	2	10	1.0	7.2		
Starter motor lead	Nut	M6	1	5	0.5	3.6		
Thermostat cover	Bolt	M6	2	10	1.0	7.2		
Fuel injector assembly	Bolt	M6	2	12	1.2	8.7		
O ₂ sensor	_	M18	1	45	4.5	32		
Coolant temperature sensor	_	M12	1	18	1.8	13		
ECU (engine)	Screw	M6	2	3	0.3	2.2		
Intake air pressure sensor	Nut	M6	2	10	1.0	7.2		

NOTE: .

^{*1:}After tightening to 16 Nm (1.6 m \cdot kg, 11 ft \cdot lb), tighten another 90°. *2:After tightening to 60 Nm (6.0 m \cdot kg, 43 ft \cdot lb), tighten another 120°.







CHASSIS TIGHTENING TORQUES

	Thread	Tight	ening to	orque	Damada
Item	size	Nm	m · kg	ft · lb	Remarks
Upper bracket pinch bolt	M8	30	3.0	22	
Steering stem nut	M22	110	11.0	80	
Lower ring nut	M25	20	2.0	14	See NOTE.
Front fork cap bolt	M38	24	2.4	17	
Lower bracket pinch bolt	M8	23	2.3	17	
Front fender	M6	7	0.7	5.1	
Damper rod assembly bolt	M10	23	2.3	17	
Upper handlebar holder	M8	23	2.3	17	
Brake hose holder and upper bracket	M6	7	0.7	5.1	
Brake hose union bolt	M10	30	3.0	22	
Brake master cylinder holder	M6	10	1.0	7.2	
Master cylinder reservoir cap	M4	1	0.1	0.7	
Handlebar grip end	M16	26	2.6	19	
Engine mounting					
Front mounting nut (upper)	M12	87	8.7	63	
Front mounting bolt (lower)	M10	48	4.8	35	
Rear mounting nut	M12	87	8.7	63	
Front wheel axle	M14	59	5.9	43	
Front wheel axle pinch bolt	M8	23	2.3	17	
Rear wheel axle nut	M14	100	10.0	72	
Rear wheel axle pinch bolt	M8	17	1.7	12	
Front brake caliper bracket	M10	40	4.0	29	
Front brake caliper retaining bolt	M10	27	2.7	19	LS
Front brake disc	M8	18	1.8	13	-©
Rear brake caliper bracket	M10	40	4.0	29	
Rear brake caliper retaining bolt	M10	27	2.7	19	LS
Rear brake disc	M8	18	1.8	13	- 1€
Rear wheel drive hub	M10	69	6.9	50	- 1€
Rear brake lock lever cable holder	M8	22	2.2	16	
Brake caliper bleed screw	M7	6	0.6	4.3	
Rear wheel sensor (XP500A)	M8	30	3.0	22	
Front wheel sensor (XP500A)	M8	30	3.0	22	
ECU (ABS) bracket (XP500A)	M6	7	0.7	5.1	
Hydraulic unit (XP500A)	M8	16	1.6	11	
Brake lever	M6	7	0.7	5.1	
Swingarm and pivot shaft	M22	7	0.7	5.1	
Pivot shaft and lock nut	M22	100	10.0	72	
Chain drive case and swingarm	M10	40	4.0	29	
Rear shock absorber (front side)	M16	68	6.8	49	
Rear shock absorber (rear side)	M12	53	5.3	38	
Front cowling and frame	M6	7	0.7	5.1	
Inner fender and frame	M6	7	0.7	5.1	



Item	Thread	Tightening torque			Remarks
	size	Nm	m · kg	ft · lb	nemarks
Headlight unit and front cowling	M6	7	0.7	5.1	
Tail/brake light assembly and frame	M6	7	0.7	5.1	
Footrest board and frame	M6	7	0.7	5.1	
Upper side cover moulding and passenger foot- rest	M6	7	0.7	5.1	
Rear side cover and frame	M6	7	0.7	5.1	
Leg shield, footrest board and frame	M6	7	0.7	5.1	
Footrest board and frame	M6	7	0.7	5.1	
Seat damper	M8	16	1.6	11	
Fuel tank	M6	10	1.0	7.2	
Fuel pump	M5	4	0.4	2.9	
Grab bar	M8	16	1.6	11	
Seat lock	M6	7	0.7	5.1	
Storage box	M6	10	1.0	7.2	
Windshield	M5	0.4	0.04	0.3	
Coolant reservoir	M6	4	0.4	2.9	
Centerstand bracket	M10	55	5.5	40	
Centerstand	M10	55	5.5	40	
Sidestand (bolt and frame)	M10	9	0.9	6.5	
Sidestand (bolt and nut)	M10	40	4.0	29	
Passenger footrest	M8	23	2.3	17	

NOTE: .

^{1.} First, tighten the lower ring nut to approximately 52 Nm (5.2 m \cdot kg, 37 ft \cdot lb) with a torque wrench, then loosen the lower ring nut completely.

^{2.} Retighten the lower ring nut to 20 Nm (2.0 m \cdot kg, 14 ft \cdot lb) with a torque wrench.

LUBRICATION POINTS AND LUBRICANT TYPES



LUBRICATION POINTS AND LUBRICANT TYPES

ENGINE LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication point	Lubricant
Oil seal lips	LS
O-rings	
Bearing and bushes	→ [E]
Crankshaft pins	⊸ €
Piston surfaces	⊸ €
Piston pins and connecting rod small end	⊸ €
Balancer surface	⊸ €
Connecting rod big end thrust surface	⊸ €
Connecting rod bolts and nuts	– @
Crankshaft thrust surface	⊸ €
Crankshaft journals	⊸ €
Camshaft lobs	– @
Camshaft journals	– @
Camshaft cap	– @
Valve stems (intake and exhaust)	– @
Valve stem ends (intake and exhaust)	⊸ €
Cylinder head nut	→ E
Water pump impeller shaft	–@
Oil pump shaft	⊸ €
Oil pump rotors (inner and outer)	⊸ €
Oil pump O-ring	LS
Oil cooler union bolt	⊸ €
O-ring (fuel injector assembly)	Silicone oil
Starter clutch idle gear inner surface	⊸ €
Starter clutch	⊸ €
Main axle thrust surface	→ (B or → (LS)
Main and drive axle serration	→ © or - Ls
Drive axle spline	or Ls
Chain drive case and taper bearing	LS
Bearing (chain drive case)	Chain drive oil
Primary sheave spacer	Shell BT grease 3®
Primary sheave nut	Shell BT grease 3®

LUBRICATION POINTS AND LUBRICANT TYPES



	1	
Lubrication point	Lubricant	
Socondary choose nut	BEL-RAY	
Secondary sheave nut	assembly lube®	
Drimony about	BEL-RAY	
Primary sheave	assembly lube®	
Sacandary chaqua	BEL-RAY	
Secondary sheave	assembly lube®	
Swingarm pivot shaft bearing		
Crankcase mating surface	Yamaha bond	
Crankcase mating surface	No. 1215	
A.C. magneto lead	Yamaha bond	
A.O. magneto lead	No. 1215	
Cylinder head cover (goalest mating curface)	Yamaha bond	
Cylinder head cover (gasket mating surface)	No. 1215	
Cylinder head cover (guide stopper mating surface)	Yamaha bond	
Cylinder riead cover (guide stopper mating surface)	No. 1215	
Right crankcase cover (air duct seal mating surface)	Yamaha bond	
Thight Grankcase cover (an duct sear mating surface)	No. 1215	

LUBRICATION POINTS AND LUBRICANT TYPES



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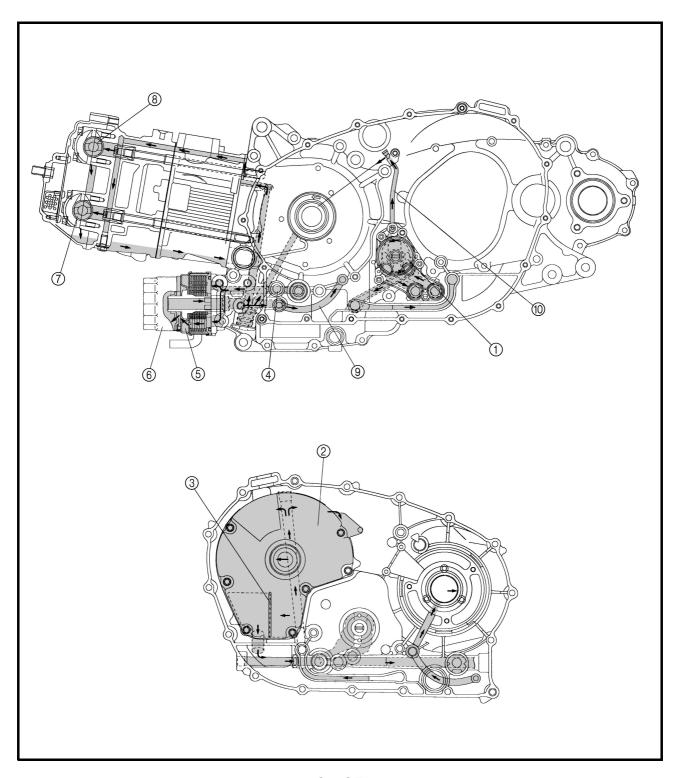
CHASSIS LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication Point	Symbol
Front wheel oil seal lip	LS
Steering bearings and oil seal lip	LSD-
Throttle grip inner surface and throttle cables	
Brake lever pivoting point and metal-to-metal moving parts (left and right)	- (g)
Parking brake lock lever cable and parking brake lock lever (cable connection area)	
Sidestand pivoting point, metal-to-metal moving parts	LSD
Centerstand shaft pivoting point and metal-to-metal moving parts	
Oil seal lip (chain drive case)	- (£)
Rear wheel drive hub spline	
Rear wheel oil seal lip	(3)
Passenger footrest pivoting point	(s)
Rear shock absorber bearing and collar inner surface	
Swingarm, oil seal lip and collar inner surface	
Rear shock absorber bolt (front side)	

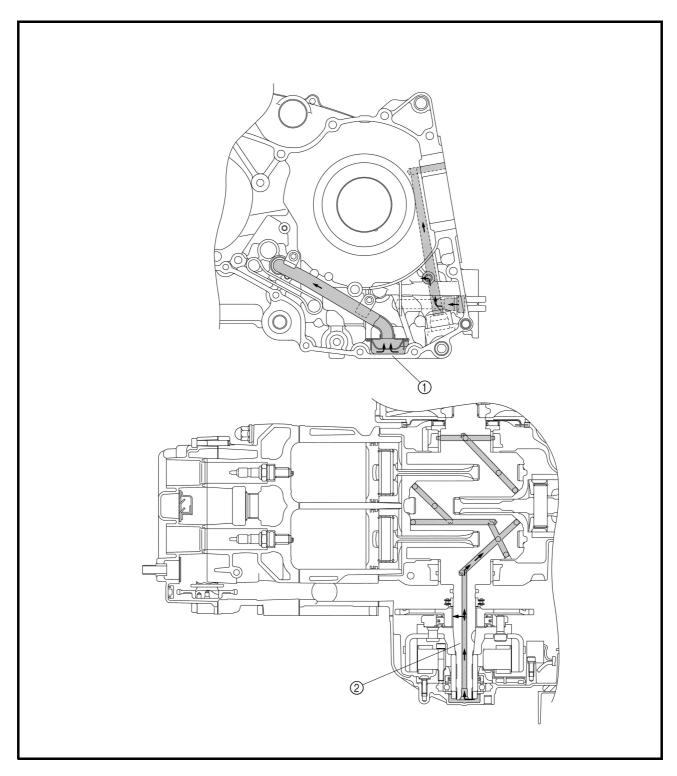
OIL FLOW DIAGRAMS

- ① Oil pump
- ② Oil tank
- ③ Oil strainer
- 4 Relief valve
- ⑤ Oil cooler
- 6 Oil filter cartridge
- ① Exhaust camshaft
- ® Intake camshaft

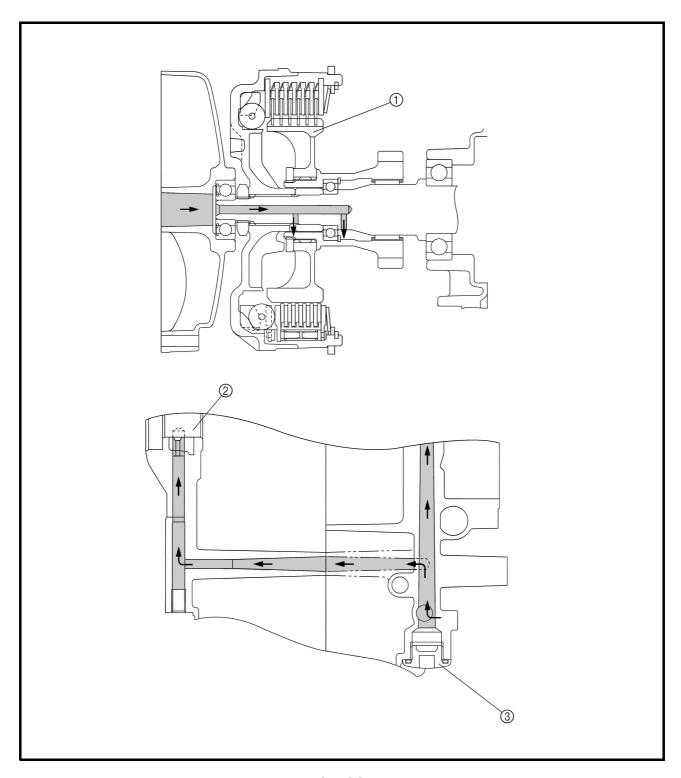
- 9 Oil pipe
- (1) Oil delivery pipe

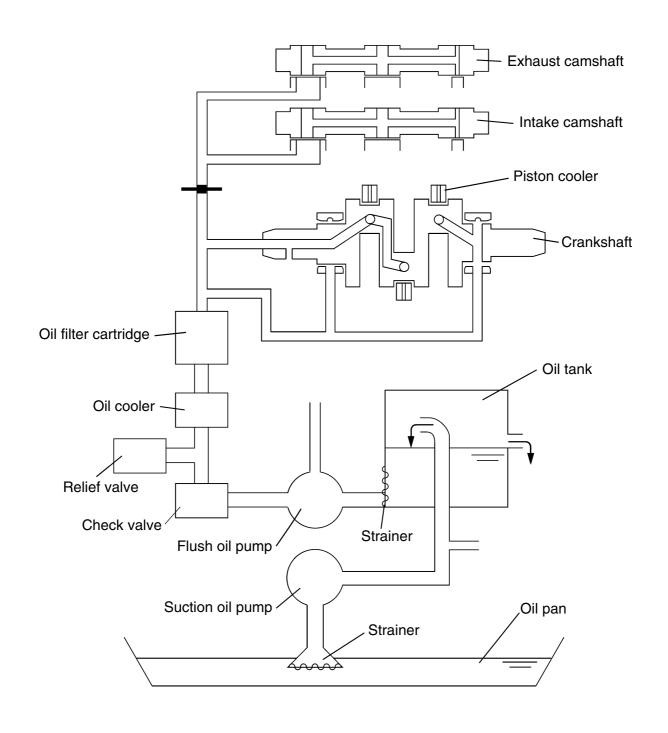


- Oil strainer
 Crankshaft



- Clutch
 Right main journal bearing
 Main gallery plug





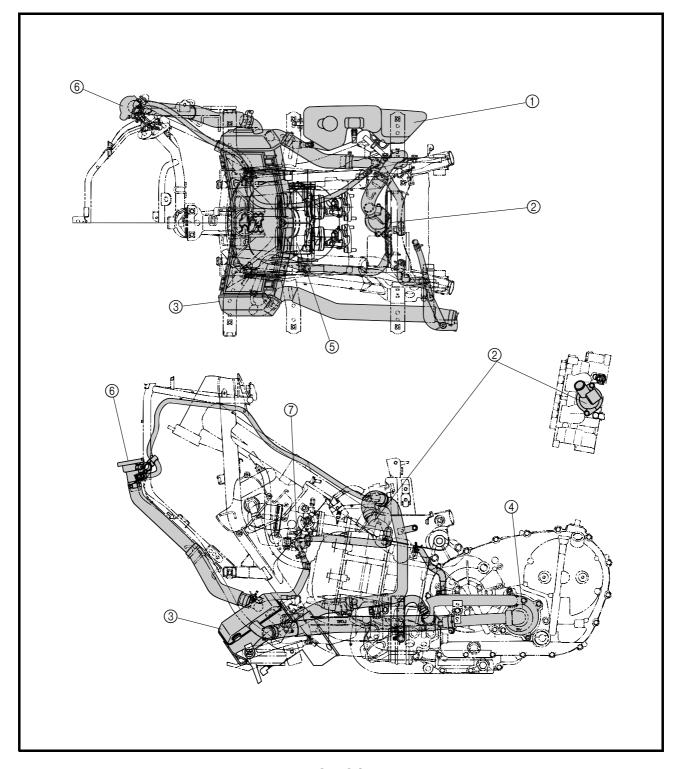
COOLANT FLOW DIAGRAMS



EAS00035

COOLANT FLOW DIAGRAMS

- ① Coolant reservoir
- ② Thermostat
- ③ Radiator
- Water pump
- ⑤ Radiator fan
- 6 Radiator cap
- Tast idle plunger



CABLE ROUTING



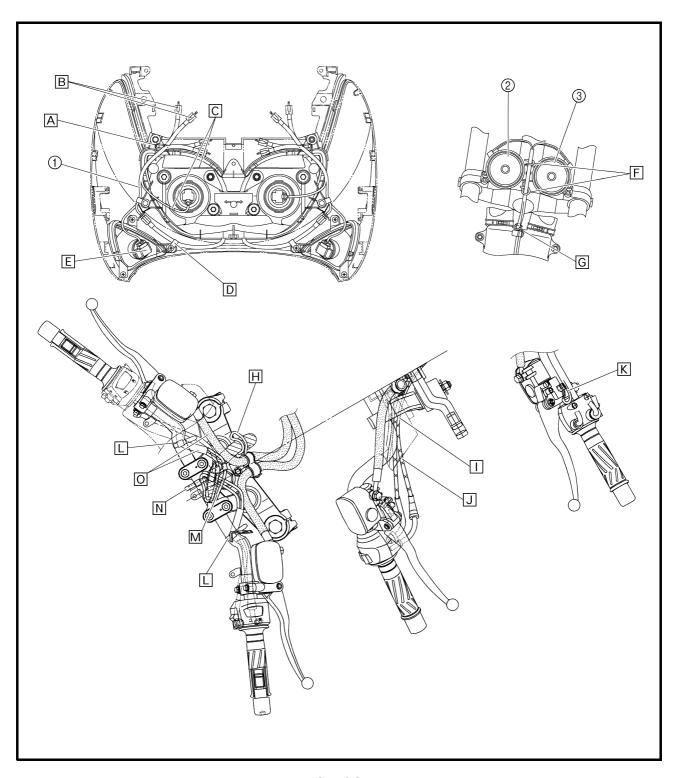
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CABLE ROUTING

- 1 Headlight sub-wire harness
- 2 Horn
- ③ Horn (H mark on the back of the horn)
- A Securely fasten the wire strap to the front cowling hook to prevent it from being pulled out by the headlight assembly. (left and right)
- B Connect the headlight sub-wire harness to the wire harness on top of the stay (left and right).

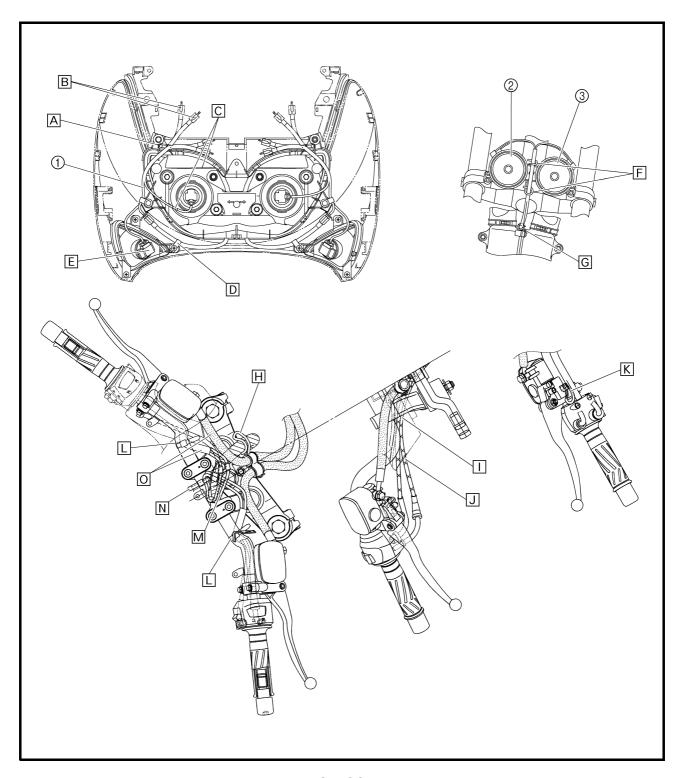
 After making the connection, push the coupler between the front cowling and the air filter case.
- © Connect the taped headlight lead coupler to the headlight's white marked side (left side: high beam side).

(For GB the right side is the high beam side.)

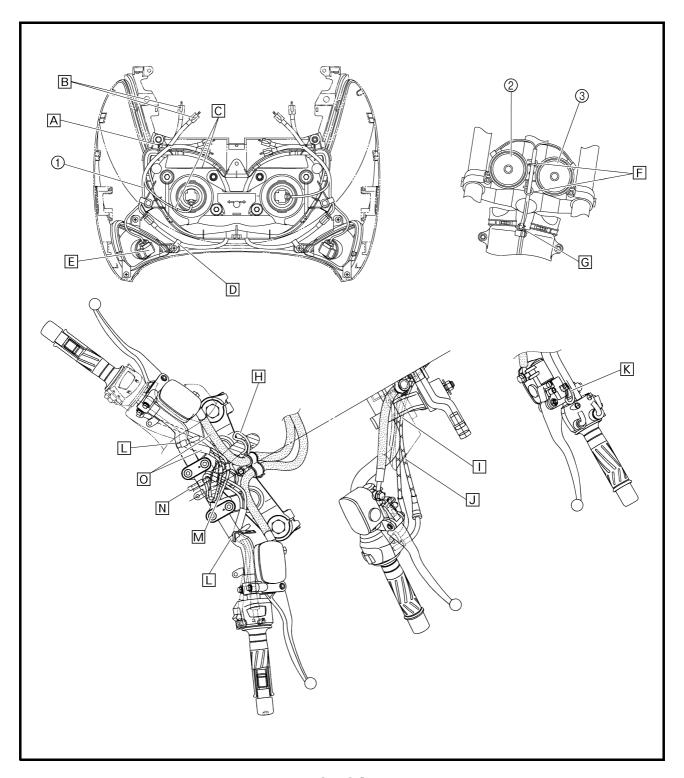




- □ Fasten the headlight sub-wire harness using a lead holder. (left and right)
- E Connect the turn signal light. (left and right)
- F Route the horn lead through the wire guide.
- G After passing the horn lead through the lead holder, crimp the lead holder.
- Install a wire harness guide to hold down the wire harness.
- ☐ Route the throttle cables between handle under cover and upper bracket.
- ☑ Route the throttle cables through the hole of the lower handlebar cover.
- K Connect the brake light switch lead through the handlebar switch side.
- ☐ Fasten the handlebar switch lead to the handlebar using a plastic band. The fastening location is the bend area on the bottom of the handlebar.
- M Route the left handlebar switch leads over the right handlebar switch leads.

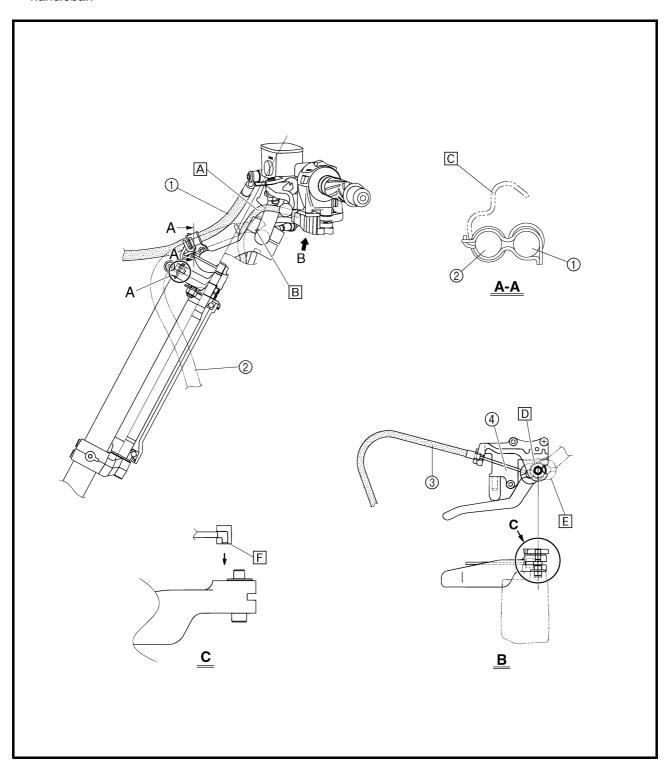


- N Fasten the right handlebar switch leads to the handlebar with a plastic band.
- O Route the rear brake hose and left handlebar switch leads over the wire harness.





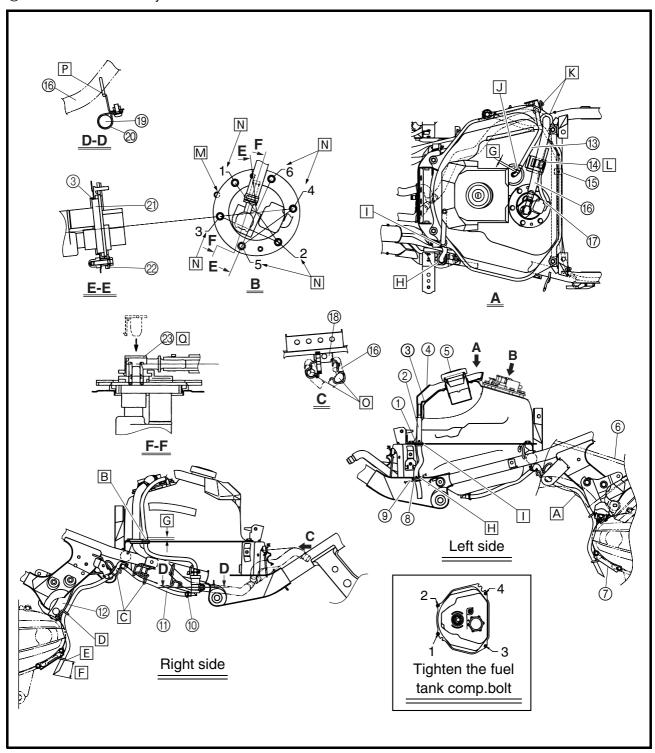
- 1 Rear brake hose
- 2 Front brake hose
- ③ Rear brake lock lever cable
- (4) Left handlebar switch
- A Route the rear brake lock lever cable in front of the handlebar, then down through the space between the handlebar and the upper bracket.
- B Fasten the wire harness by sliding the plastic holder on the wire harness onto the stud on the handlebar.
- © Fasten the grommets on the brake hoses with the holder.
- ☐ Install the rear brake lock lever cable after lubricating the grease to the cable end.
- E Install the rear brake lock lever cable after turning the parking brake lever as illustration.
- F Install the cable end (Face the notch side to lever).





- (1) Grommet
- ② Fuel over flow hose
- ③ Fuel tank
- 4 Fuel overflow tray
- ⑤ Fuel tank cap
- (6) Upper side cover moulding (left)
- 7 Hose guide
- ® Grommet
- Footrest board
- 10 Hose clamp
- 11) Fuel tank breather hose
- Rear footrest assembly

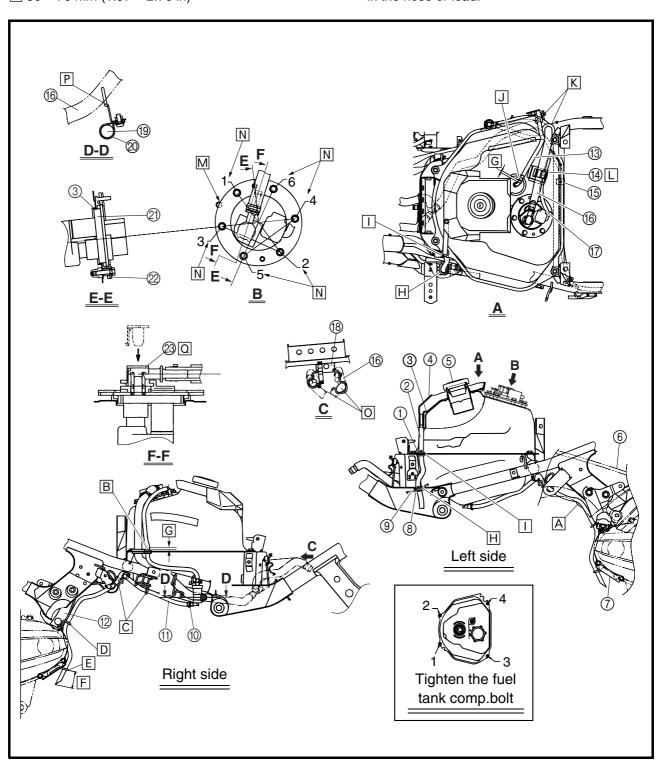
- (3) Fuel tank breather hose
- (14) Hose holder
- (15) Hose holder
- (6) Fuel hose
- 17) Fuel pump lead
- ® Hose guide
- (9) Roll over valve assembly
- 20 Holder
- 2) Fuel pump
- Fuel pump bracket
- Fuel hose connector cover





- A Do not protrude from the upper side cover moulding (left).
- B Fix the fuel overflow hose with the white paint mark as shown.
- © Pass the fuel tank breather hose to the hose guide of frame (both right and left).
- Department Pass the fuel tank breather hose to the hose guide of rear footrest assembly.
- E Pass the fuel tank breather hose to the hose guide of frame.
- F 50 ~ 70 mm (1.97 ~ 2.76 in)

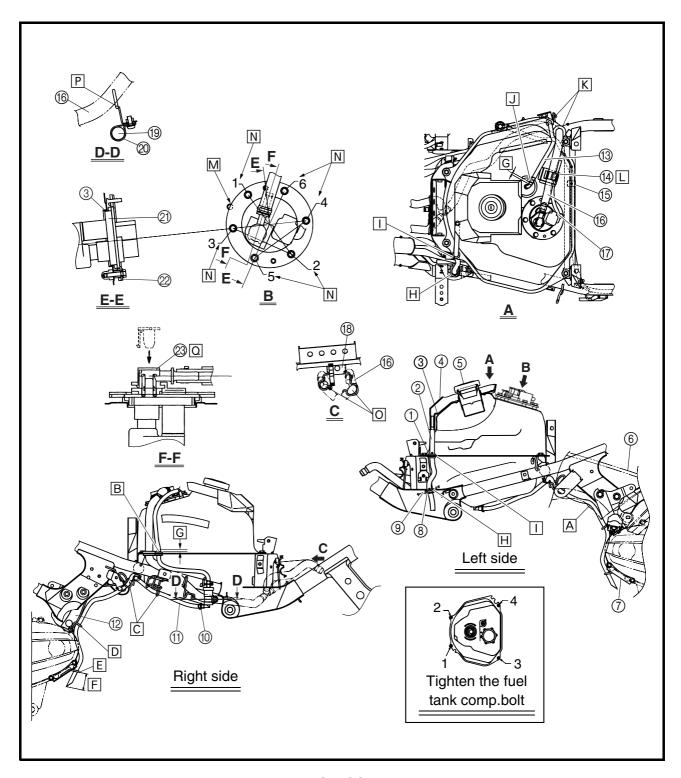
- G 2 ~ 5 mm (0.08 ~ 0.20 in)
- Install the grommet to the footrest board securely.
- Install the grommet to the fuel tank securely.
- J Make sure that the clip end faces to the front side.
- Install the grommet to the fuel tank securely after installing the hoses.
- ☐ Fasten the fuel hose and fuel pump lead with a hose holder, making sure that there are no twists in the hose or lead.





- M Align the projection on the fuel pump with the projection on the fuel tank when installing the fuel pump.
- N Tighten the fuel pump bolts in the proper tightening sequence as shown.
- O Pass the fuel hose to the hose guide.
- Pass the fuel hose to the inside of the frame guide.
- After connecting the fuel hose connector to the fuel tank, install the fuel hose connector cover completely onto the connector.
 Install and remove the fuel hose connector and

Install and remove the fuel hose connector and cover manually. Do not use tools.

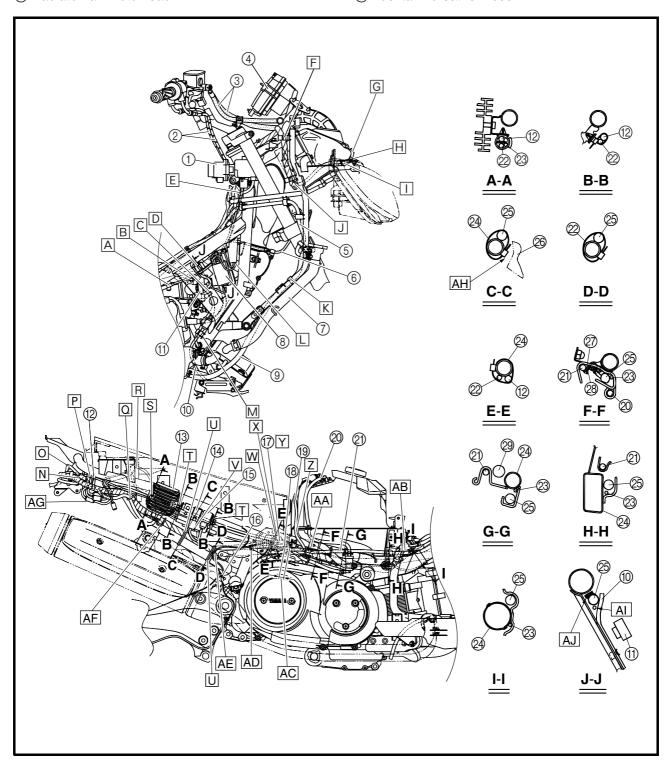




XP500

- ① Main switch/immobilizer unit
- ② Throttle cable
- ③ Brake hose
- 4 Meter assembly
- (5) Cooling system air bleed hose
- 6 Horn lead
- 7 Radiator filer hose
- ® Ignition coil
- (9) Coolant reservoir hose
- (10) Radiator fan motor lead

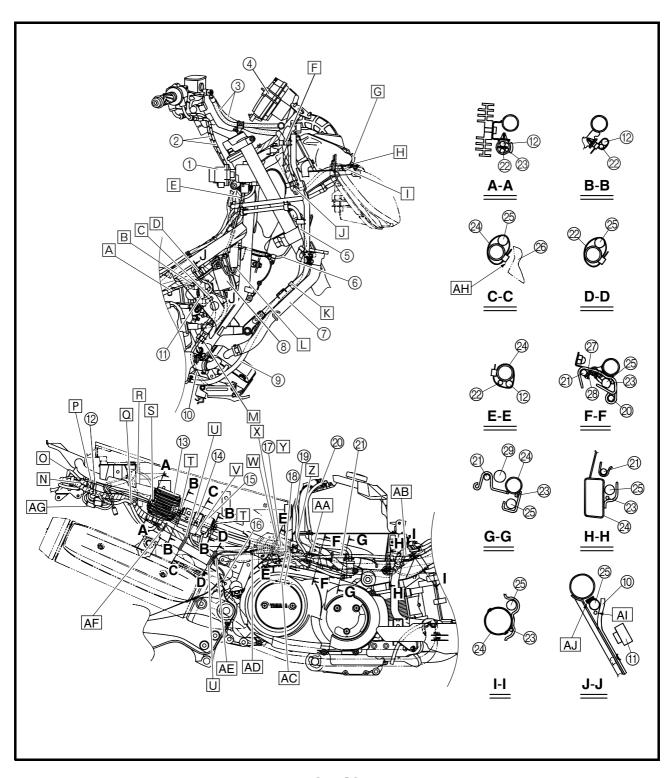
- 1) Throttle position sensor coupler
- 12 Starter motor lead
- ® Rectifier/regulator
- (4) Starting circuit cut-off relay 1
- (5) Turn signal/hazard relay
- [®] O₂ sensor
- 7 V-belt replacement indicator reset coupler
- ® O₂ sensor coupler
- (9) Fuel pump lead
- @ Fuel tank breather hose





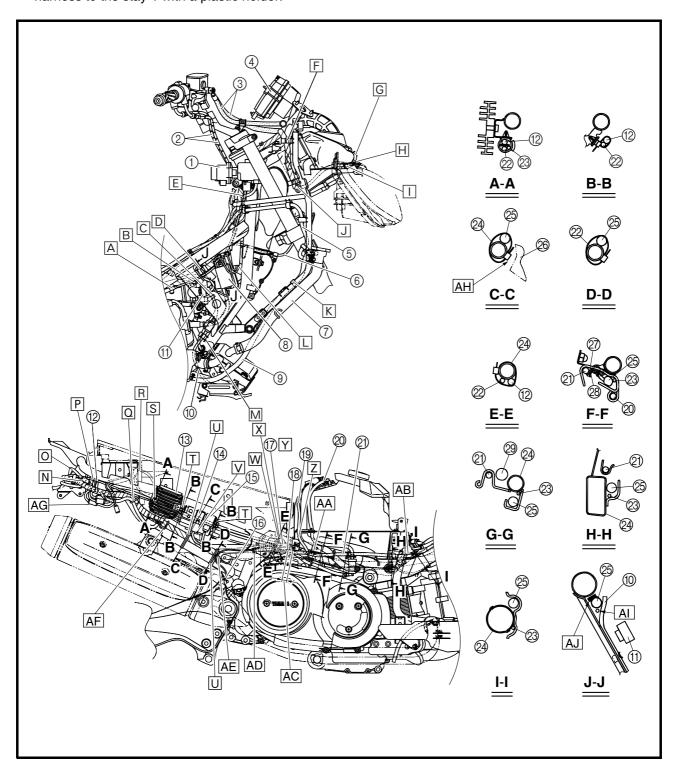
- ② Rear brake lock lever cable
- 2 Negative battery lead
- 3 Seat lock cable (left)
- ② Frame
- Wire harness
- Storage box
- ② V-belt replacement indicator reset coupler lead
- ⊗ O₂ sensor lead
- ② Fuel hose

- After adjusting the adjustment nut, attach the front and rear parts of the boot tightly.
- B Pass the seat lock cable between wire harness and frame.
- © Use the plastic holder on the back of the frame to hold the radiator fan motor lead.
- D Connect the wire harness (wire taped area) to the T stud of frame.
- E Pass the main switch lead between stay 1 and seat lock cable.



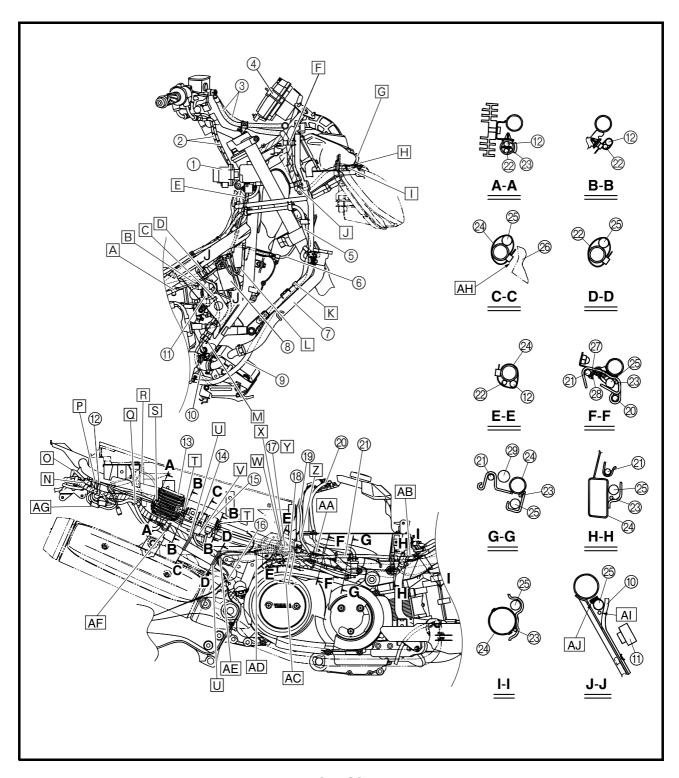


- F After connecting the wire harness and meter assembly lead, use a plastic holder to connect them to stay 1.
- G After connecting the left headlight sub-wire harness and wire harness (by matching the coupler colors), fold back the lead facing to the right and insert it into the air filter case rib.
- H Connect the wire harness to the headlight subwire harness (cowling side).
- ☐ Fasten the headlight and turn signal sub-wire harness to the stay 1 with a plastic holder.
- J Fasten the ECU (engine) lead to the stay 1 with a plastic holder. When fastening them using a plastic holder, make sure not to cross the branch leads.
- K Fasten the coolant reservoir hose to the stay 1 with a plastic holder.
- □ Route the ignition coil lead through the inside of the ignition coil bracket.
- M Fasten the radiator fan motor lead and sidestand switch lead to the frame with a plastic holder.



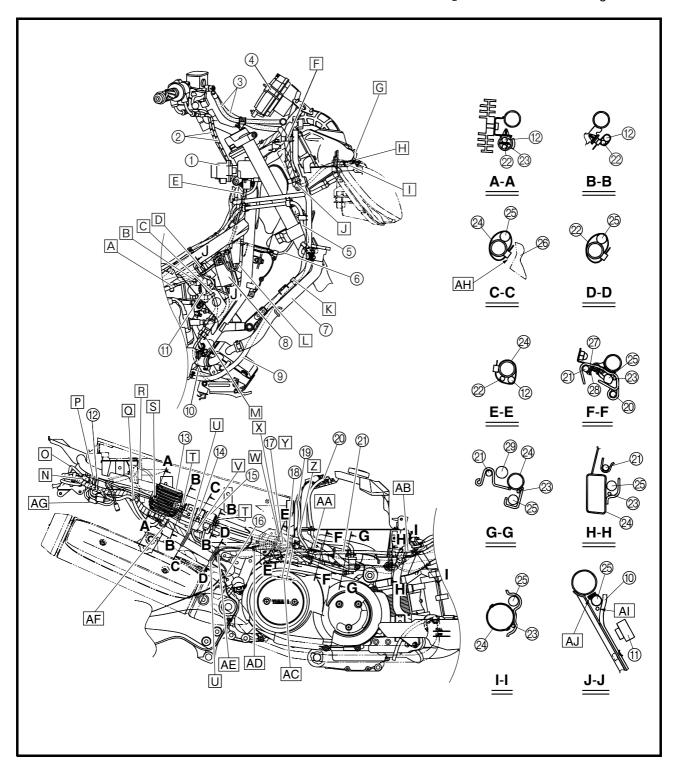


- N Insert the tail/brake light coupler between the wire harness and the seat lock cable (left).
- O To the tail/brake light
- P To the starter relay
- Q Route the wire harness and rectifier/regulator lead through the frame wire holder. Place the rectifier/regulator lead under the wire harness.
- R Make sure that the seat lock cable do not lean over the storage box.
- S Fasten the starter motor lead, negative battery lead and seat lock cable (right) to the frame with a plastic holder.
- Tasten the starter motor lead and negative battery lead to the frame with a plastic holder.
- U Fasten the wire harness to the frame with the plastic band. The buckle of the plastic band should be facing towards the storage box.
- ☑ Insert the seat lock cable and the cylinder mounting rubber into the frame stay.

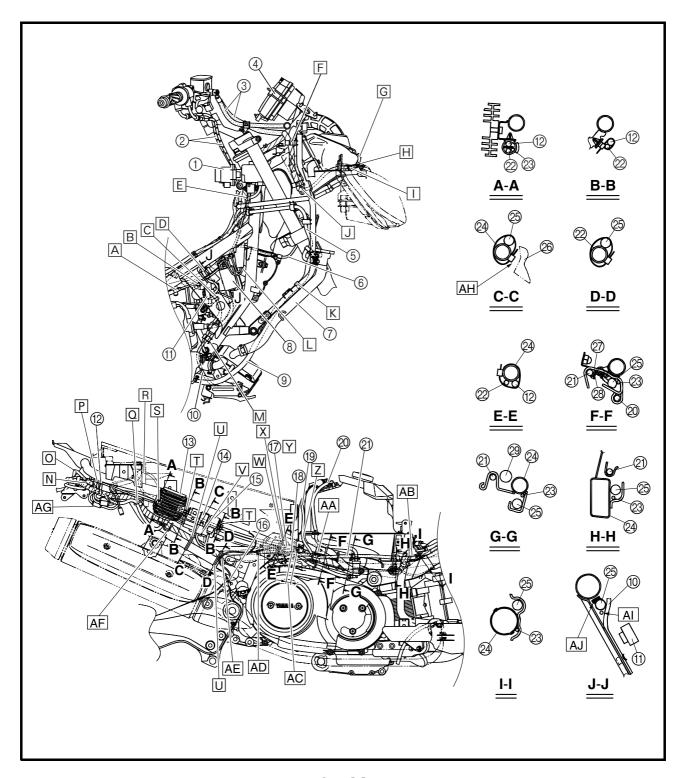




- W Fasten the starter motor lead and negative battery lead to the frame with a plastic band. Position the band clasp on the bottom of the frame and face the band end to the outside.
- $\overline{\mathbb{X}}$ Install the clamshell cover around the V-belt replacement indicator reset coupler and O_2 sensor coupler.
- Make sure that the V-belt replacement indicator reset coupler does not project out of the clamshell cover.
- Z Fasten the O₂ sensor lead and V-belt replacement indicator reset coupler lead to the frame with a plastic holder.
- AA Pass the wire harness and seat lock cable in the frame holder.
- AB Pass the rear brake lock lever cable under the coolant pipe.
- AC 40 ~ 50 mm (1.57 ~ 1.97 in)
- $\overline{\text{AD}}$ Fasten the O_2 sensor lead to the frame with a plastic band.
- AE Pass the O₂ sensor lead to the lead guide.



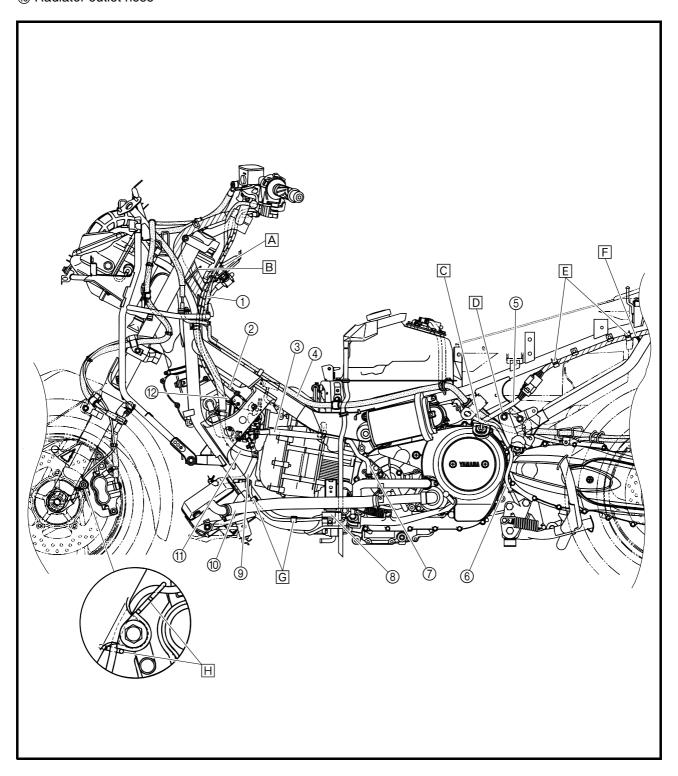
- AF Pass the wire harness to the frame wire harness holder.
- AG After making the connections, push the couplers into the space inside the frame above the mudguard.
- AH Install the band's fastened part between frame and storage box.
- A I Route the seat lock cable through the frame bracket side and under the wire harness.
- AJ T stud for position setting





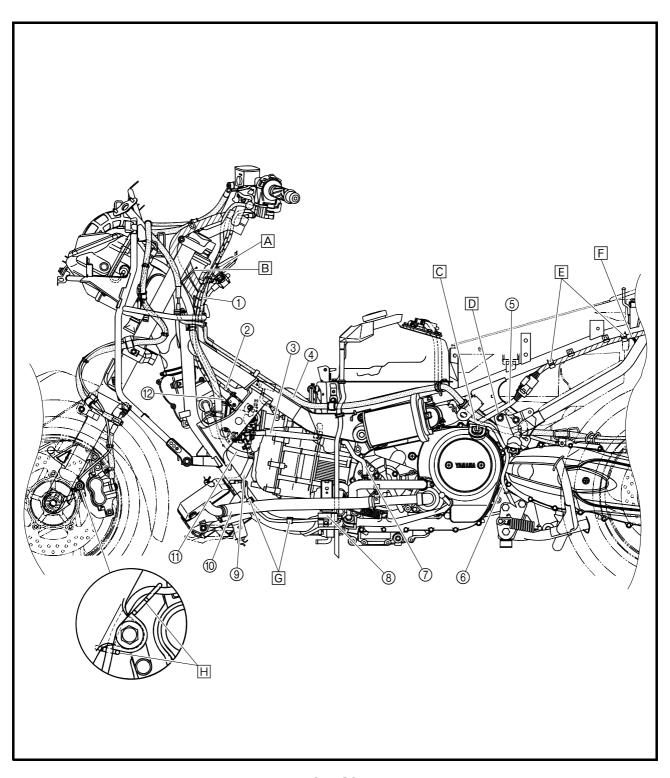
- 1) Rear brake lock lever cable
- ② Throttle cable (decelerator cable, double locknut)
- ③ Fast idle inlet hose
- 4 Rear brake hose
- ⑤ A.C. magneto lead
- 6 Fuel tank breather hose
- (7) Coolant hose
- (8) Sidestand switch
- Fast idle outlet hose
- Radiator outlet hose

- (1) Crankcase breather hose
- ② Throttle cable (accelerator cable, single locknut)
- A Pass the rear brake lock lever cable to the cable guide.
- B Route the wire harness through the frame guide. At this time, place the protector (for the handle cover inner side) on the bottom side.





- © Pass the fuel tank breather hose by the outside of the wire harness.
- D Pass the wire harness by the outside of the rear footrest mounting boss. (When installing the rear footrest, do not catch or pinch the A.C. magneto lead in the bracket.)
- E Fasten the wire harness to the frame with a plastic holder.
- F Pass the storage box light switch lead by the front of the frame back stay pipe.
- G Fasten the sidestand switch lead to the frame with a plastic holder.
- H Pass the speed sensor lead to the lead holder (2 locations).

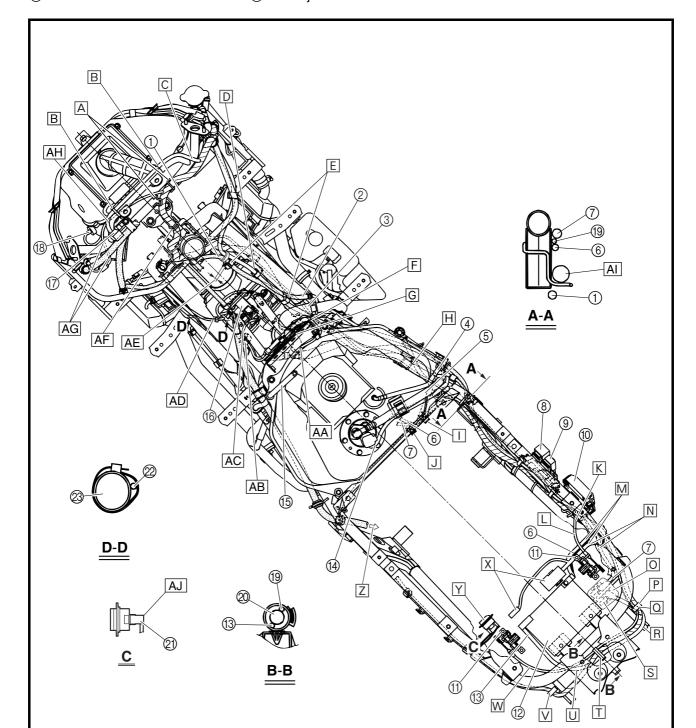


② Frame



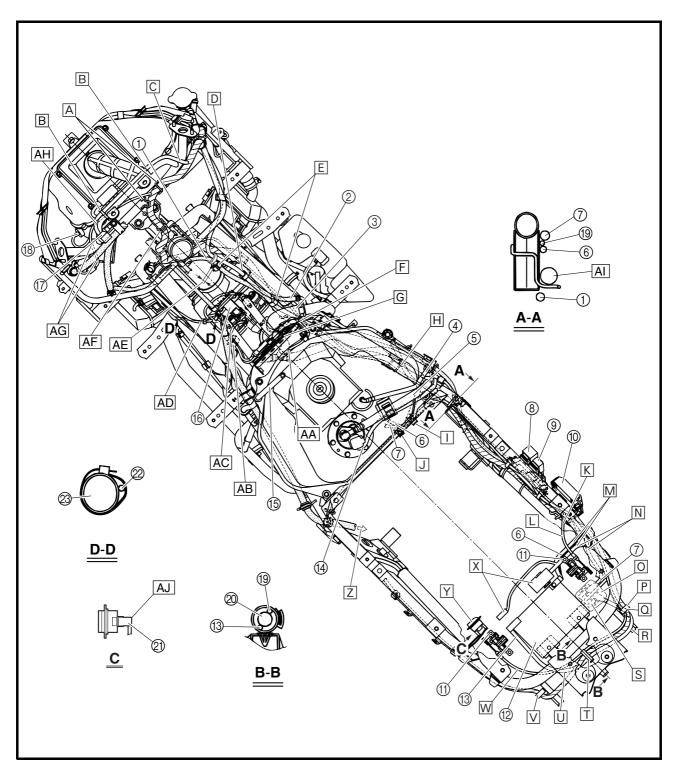
- 1) Rear brake lock lever cable
- ② Coolant system air bleed hose
- 3 Thermostat outlet hose
- (4) Fuel tank breather hose
- (5) Fuel hose
- **(6)** Negative battery lead
- (7) Starter motor lead
- ® Turn signal/hazard relay
- Starting circuit cut-off relay 1
- ® Rectifier/regulator
- ① Seat lock

- 12) Battery
- ® Positive battery lead
- (4) Fuel pump lead
- (5) Fuel overflow hose
- (f) Intake air pressure sensor
- Meter assembly coupler
- (8) Intake air temperature sensor
- (19) Seat lock cable
- Wire harness
- 2) Storage box light connector
- ② Fuel injector lead #2



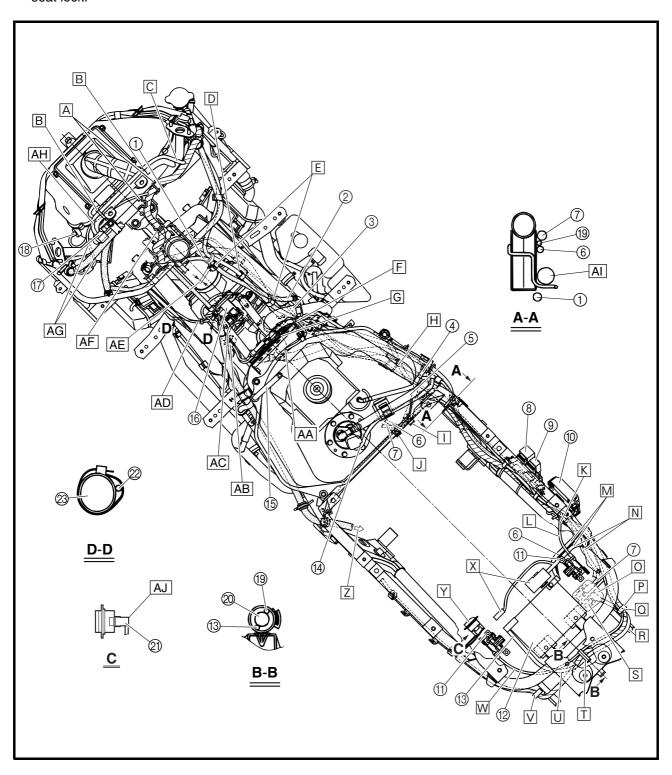


- A Route the wire harness against the stay 1 wire guide.
- B Fasten the lean angle cut-off switch lead to the stay 1 with a plastic band. Face the band end to the downward.
- © Route the lean angle cut-off switch lead through the back of the mirror stay (cross pipe).
- D Fasten the cooling system air bleed hose to the frame with a plastic holder.
- E Fasten the rear brake lock lever cable to the frame with a plastic holder.
- E Be sure not to pinch the storage box light switch lead when installing the fuel tank.
- G Connect the fuel injector leads and intake air pressure sensor lead, storage box light switch lead to the pipe guide with a plastic holder. Connect the couplers in right side of the holder.



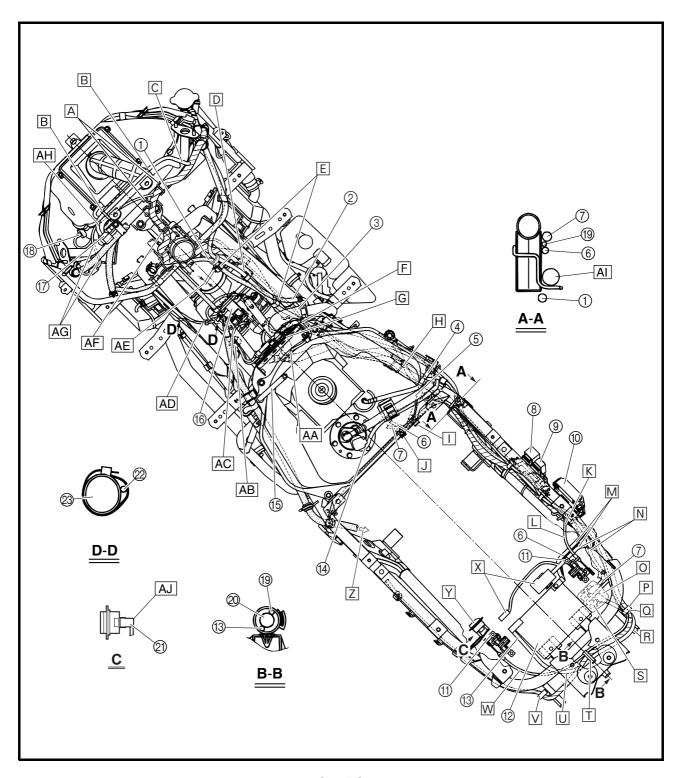


- H Pass the wire harness and seat lock cable through the guide.
- ☐ Fasten the negative battery lead and the starter motor lead to the frame with a plastic holder.
- ☐ Fasten the fuel tank breather hose to the frame with a plastic holder.
- Representation Pass the seat lock cable (black) between the negative battery lead, starter motor lead and the frame.
- Connect the seat lock cable (black) to the right seat lock.
- M Route the negative battery lead and the fuse box lead from the storage box opening to the bottom of the cross pipe.
- N Route the fuse box lead above the starter motor lead.
- O Place the rubber cover over the starter relay, starter relay coupler, positive battery lead terminal, and starter motor lead terminal.
- P Align the plastic clamp with the white tape on the wire harness and fasten to the frame.



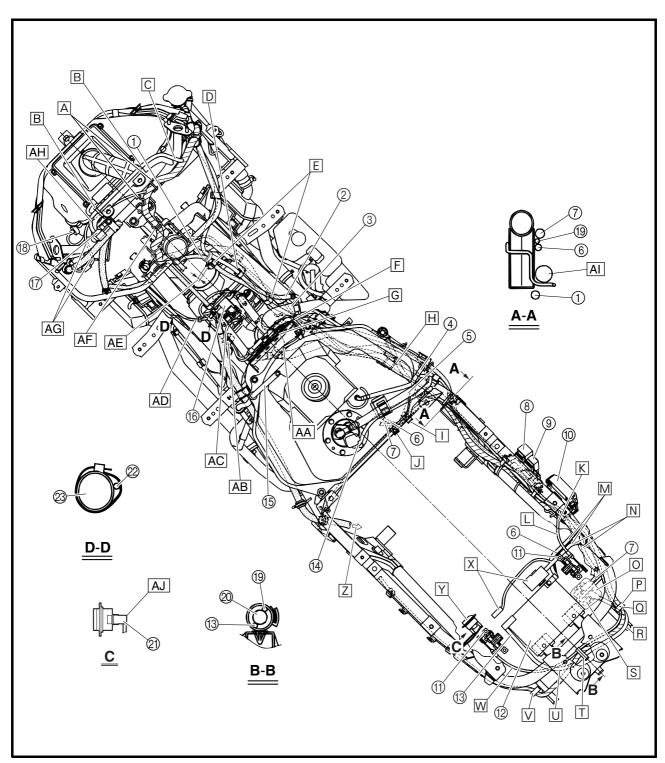


- Fasten the wire harness and seat lock cable to the frame with a plastic holder.
- R Pass the wire harness, lead and cable the outside of the frame bracket.
- S Install the starter relay to the mad guard.
- ☐ Fasten the wire harness, positive battery lead and seat lock cable to the mad guard with a plastic holder.
- Route the positive battery lead through the under the seat lock cable.
- ∇ Fasten the wire harness to the frame with a plastic holder.
- Install the fuse box assembly to the storage box.
- Z To the rear brake caliper





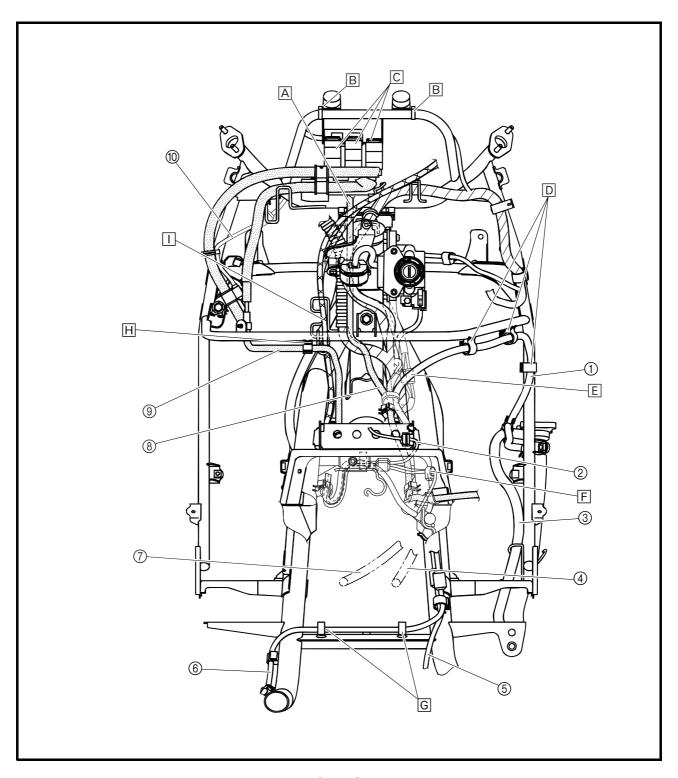
- AA To the storage box light switch on the seat hinge.
- AB Fasten the fuel injector lead (#1/#2), intake air pressure sensor lead to the frame with a plastic holder.
- AC Route the intake air pressure sensor lead over the fuel hose.
- AD Bundle the fuel injector lead (#2) to the frame with a plastic band softly (the band possible to turn), face the end of the plastic band to the inside of the frame.
- AE 10 ~ 15 mm (0.39 ~ 0.59 in)
- AF Route the wire harness through the wire guide.
- AG Pass the speed sensor lead under the stay 1 and cross pipe, and then over the brake hose guide.
- AH Place the speed sensor lead between the ribs of the air filter case.
- A I Pass the wire harness over the wire guide.
- A J Connect the storage box light lead connectors to the storage box light with the leads routed downward.



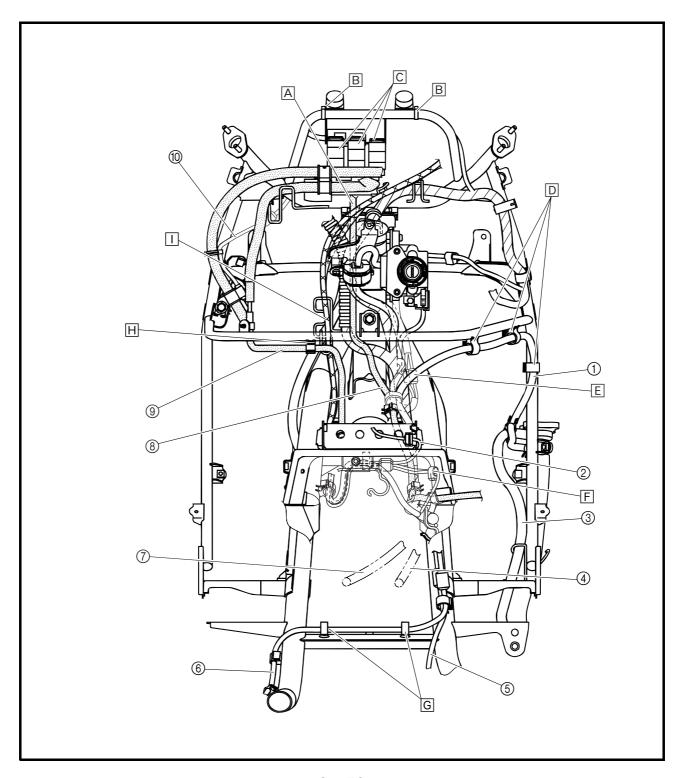


- 1) Cooling system air bleed hose
- ② Storage box light switch lead
- 3 Coolant reservoir hose
- 4 Spark plug lead #2
- **⑤** Radiator fan motor lead
- **6** Sidestand switch lead
- (7) Spark plug lead #1
- ® Rear brake lock lever cable
- (9) Rear brake hose
- (10) Speed sensor lead

- A Pass the rear brake lock lever cable on the front side of throttle cable.
- B Position of clamp.
- © Position the relay straighten.
- □ Fasten the cooling system air bleed hose to the stay 1 with a plastic holder.
- E The main switch lead couplers should not protrude to the outside of the frame.
- F Fasten the fuel injector leads with the plastic holder.



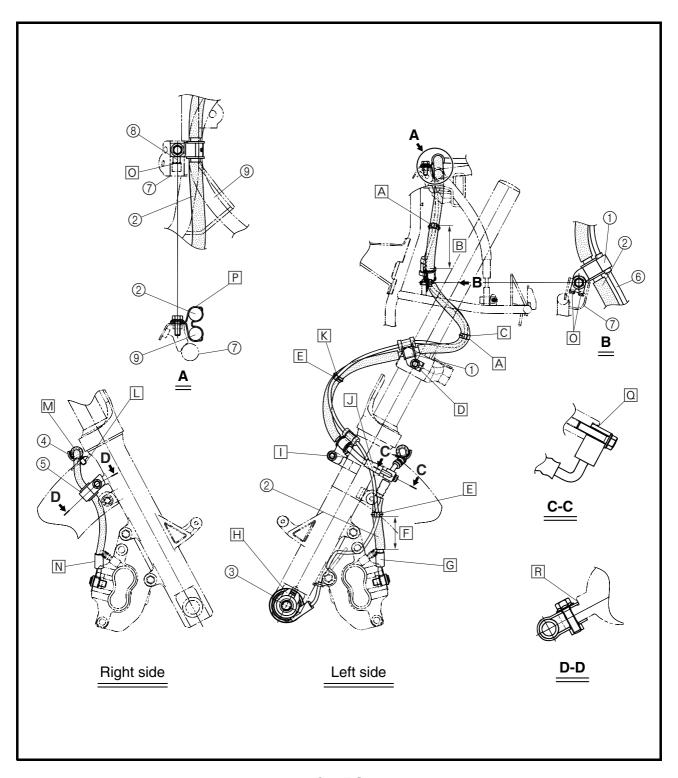
- G Fasten the sidestand switch lead to the frame with a plastic holder.
- H Fasten the rear brake hose to the stay 1 with a plastic holder.
- Route the throttle cable through the cable holder.





- 1 Brake hose holder 1
- ② Front brake hose
- 3 Speed sensor
- 4 Plastic holder
- ⑤ Brake hose holder 2
- **6** Speed sensor lead
- 7 Stay1
- ® Brake hose holder 3

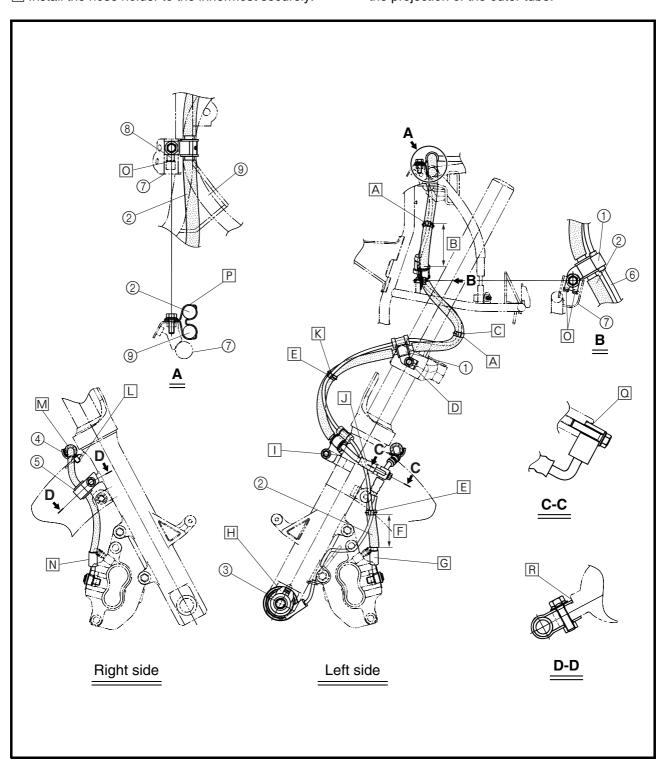
- A Fasten the speed sensor lead along the inside of the brake hose.
- **B** 50 ~ 60 mm (1.97 ~ 2.36 in)
- Turn the handlebar completely to the right, and then fasten the brake hose and speed sensor lead together with the plastic holder.
- D Install the stopper to lower bracket projection.
- E Fasten the speed sensor lead along the outside of the brake hose.
- **F** 30 ~ 40 mm (1.18 ~ 1.57 in)





- G Make sure that brake pipe touches the projection.
- H Make sure that the slot in the speed sensor fits stopper on the outer tube.
- Pass the speed sensor lead between the brake hose and front fork.
- K Fasten the speed sensor lead to the center of brake hose holder.
- L Install the hose holder to the innermost securely.

- M Engage the hose holder rib more than 3 notch. Face the hose holder projection to the back.
- N Make sure that the white paint on the brake hose faces to back (right side only).
- O Install the stopper to the stay 1.
- P Fasten the front brake hose and rear brake hose with a hose holder.
- Make sure that the brake hose joint touches the projection of the outer tube.
- R Make sure that the brake hose holder touches the projection of the outer tube.

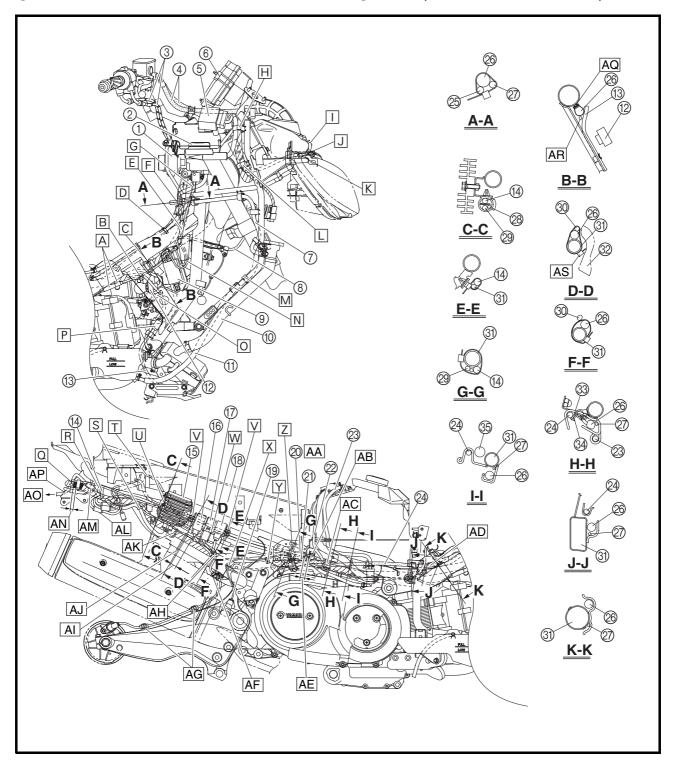




XP500A

- 1) Main switch/immobilizer unit
- ② ECU (ABS)
- ③ Throttle cable
- 4 Brake hose
- (5) Fail-safe relay
- 6 Meter assembly
- 7 Coolant system air bleed hose
- ® Horn lead
- (9) Ignition coil
- ® Radiator filer hose

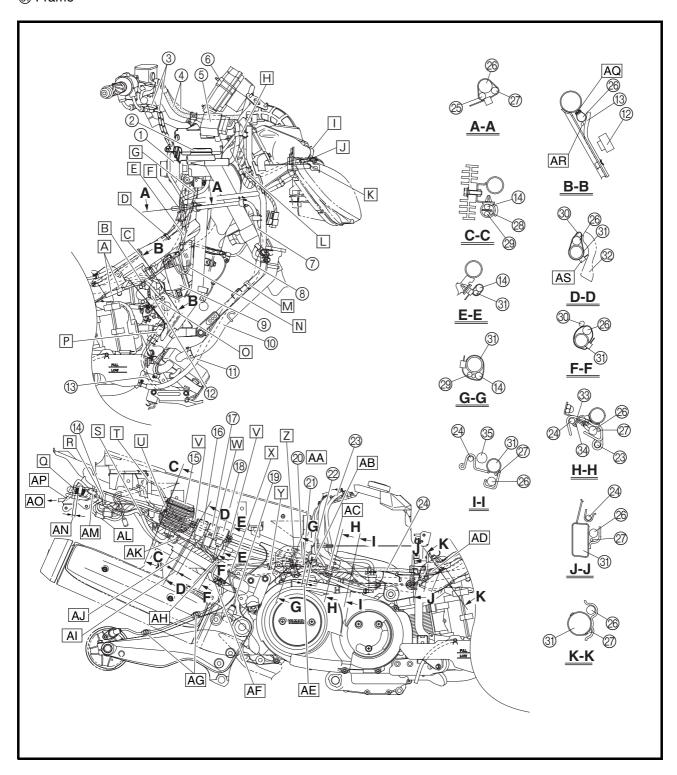
- (1) Coolant reservoir hose
- Throttle position sensor coupler
- (13) Radiator fan motor lead
- (4) Starter motor lead
- (5) Rectifier/regulator
- 16 Starting circuit cut-off relay 2
- (7) Starting circuit cut-off relay 1
- ® Turn signal/hazard relay
- 19 O₂ sensor
- V-belt replacement indicator reset coupler





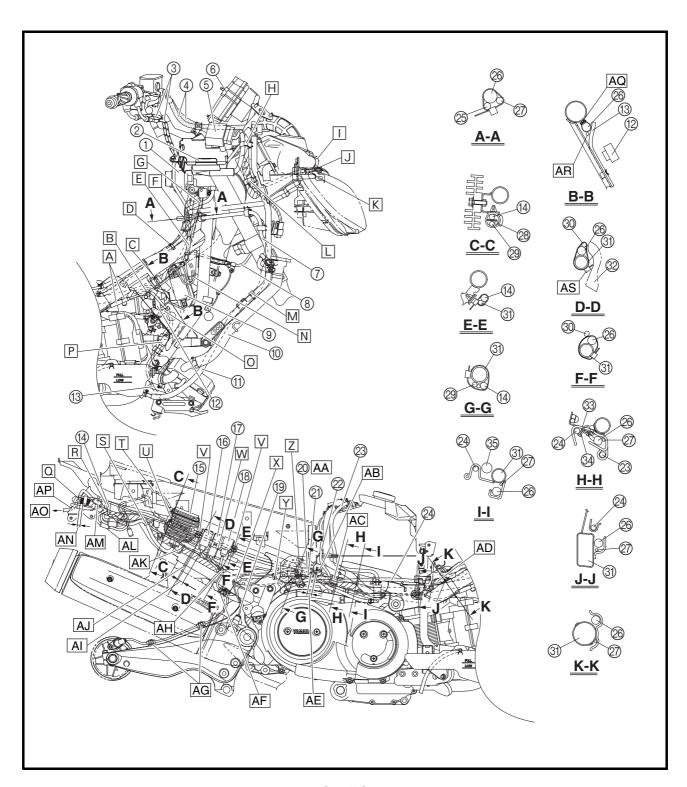
- ② O₂ sensor coupler
- 2 Fuel pump lead
- 3 Fuel tank breather hose
- 24 Rear brake lock lever cable
- 25 Main switch lead
- **®** Wire harness
- ② Seat lock cable
- Seat lock cable (left)
- Negative battery lead
- Rear wheel sensor lead
- ③ Frame

- 32 Storage box
- 3 V-belt replacement indicator reset coupler lead
- 34 O₂ sensor lead
- 35 Fuel hose



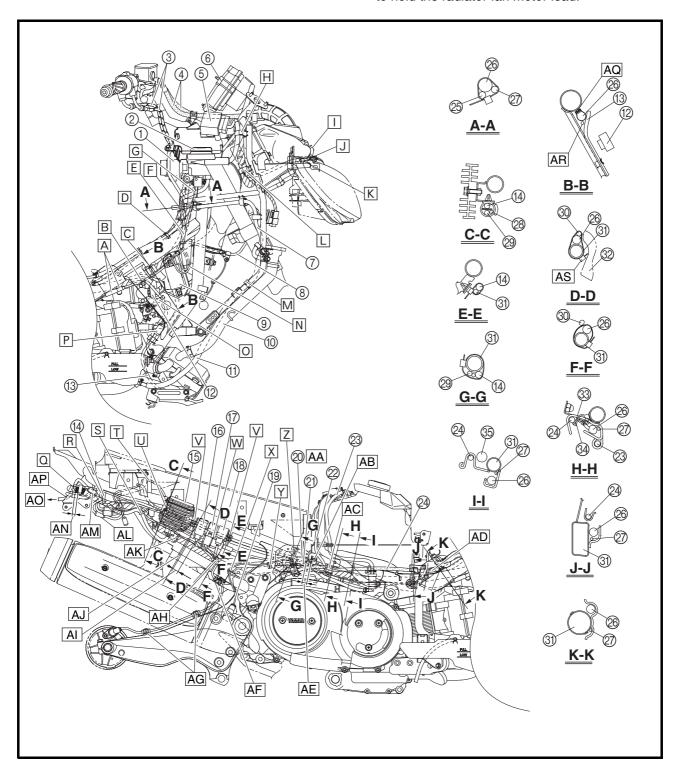


- After adjusting the adjustment nut, attach the front and rear parts of the boot tightly.
- B Pass the seat lock cable between wire harness and frame.
- © Connect the wire harness (wire taped area) to the T stud of frame.
- D Fasten the cooling system air bleed hose and rear brake lock lever cable together with the plastic clip. The open ends of the clip should face downward.
- E Route the main switch lead in front of the ignition coil bracket, then to the outside of the frame.
- F Fasten the wire harness, main switch lead, and seat lock cable with the plastic band under the stay 1. Be sure to fasten the seat lock cable on the metal section of the outer cable.
- G Pass the main switch lead between stay 1 and seat lock cable.
- ☐ Fasten the wire harness and ECU (engine) lead to the stay 1 with a holder.



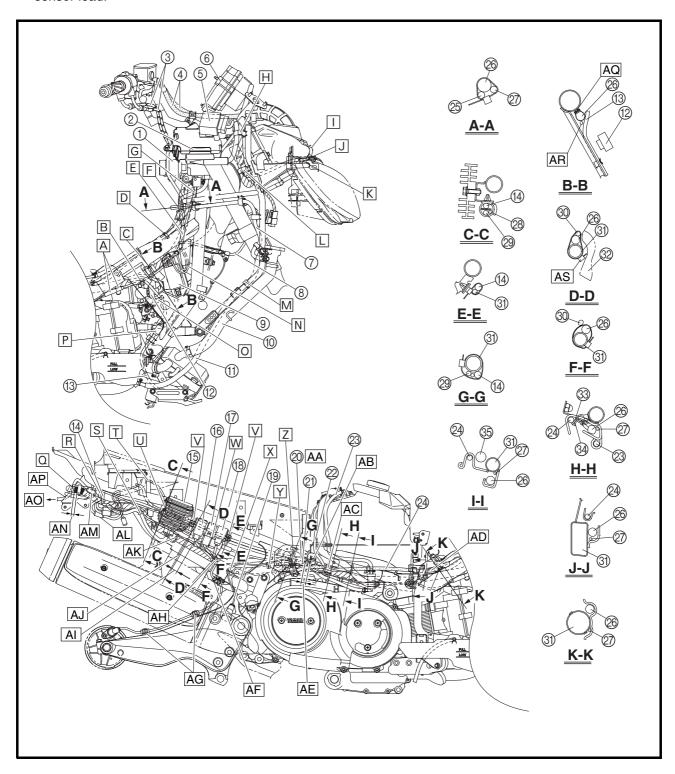


- After connecting the left headlight sub-wire harness and wire harness (by matching the coupler colors), fold back the lead facing to the right and insert it into the air filter case rib.
- ☐ Connect the wire harness to the headlight subwire harness (cowling side).
- K Fasten the headlight and turn signal sub-wire harness to the stay 1 with a plastic holder.
- ☐ Fasten the ECU (engine) lead, ABS test coupler lead and headlight sub-wire harness to the stay 1 with a plastic holder. When fastening them using a plastic holder, make sure not to cross the branch leads.
- M Fasten the coolant reservoir hose to the stay 1 with a plastic holder.
- N Route the ignition coil lead through the inside of the ignition coil bracket.
- O Use the plastic holder on the back of the frame to hold the radiator fan motor lead.



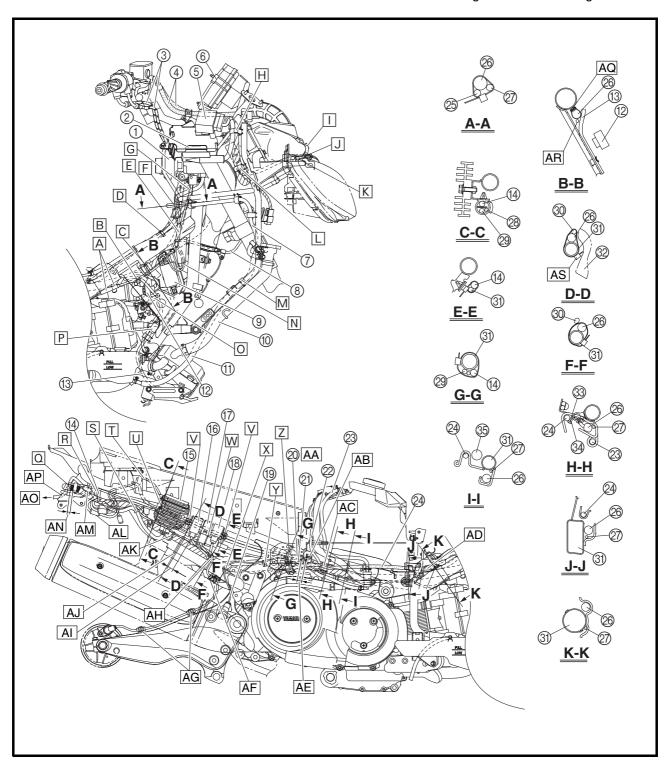


- P Fasten the radiator fan motor lead and sidestand switch lead to the frame with a plastic holder.
- Pasten the wire harness and positive battery leads with a plastic band. Face the end of the plastic band upward.
- R To the starter relay
- S Pass the wire harness, rectifier/regulator lead, and rear wheel sensor lead through the guide, making sure that the rectifier/regulator lead is routed below the wire harness and rear wheel sensor lead.
- ☐ Fasten the starter motor lead, negative battery lead and seat lock cable (left) to the frame with a plastic holder.
- Fasten the starter motor lead and negative battery lead to the frame with a plastic holder.
- M Insert the seat lock cable and the cylinder mounting rubber into the frame stay.
- \boxtimes Pass the O_2 sensor lead to the lead guide.



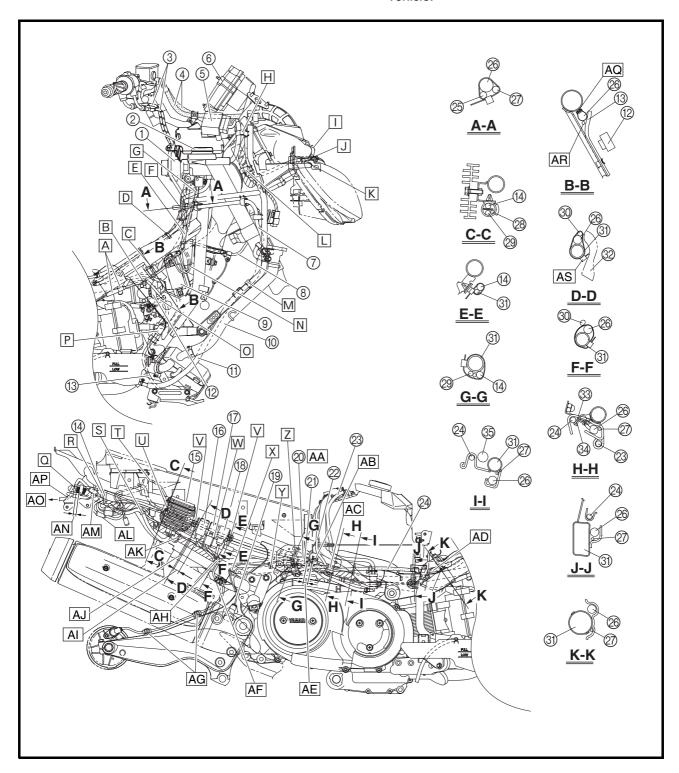


- Y Fasten the O_2 sensor lead to the frame with a plastic band.
- Easten the starter motor lead and negative battery lead to the frame with a plastic band. Position the band clasp on the bottom of the frame and face the band end to the outside.
- AA Make sure that the V-belt replacement indicator reset coupler does not project out of the clamshell cover.
- AB Fasten the O₂ sensor lead and V-belt replacement indicator reset coupler lead to the frame with a plastic holder.
- AC Pass the wire harness and seat lock cable in the frame holder.
- AD Pass the rear brake lock lever cable under the coolant pipe.
- AE 40 ~ 50 mm (1.57 ~ 1.97 in)
- AF Fasten the wire harness to the frame with the plastic band. The buckle of the plastic band should be facing towards the storage box.



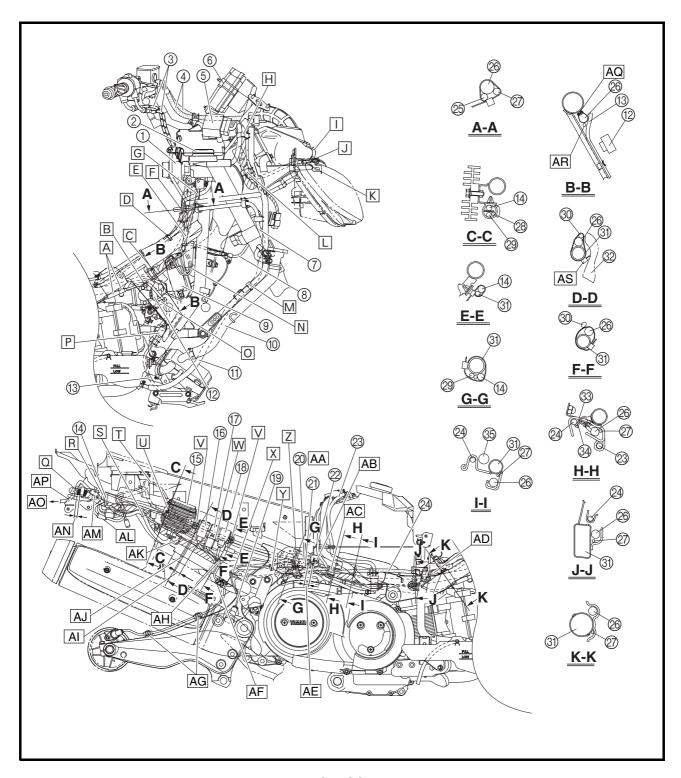


- AG Fasten the rear wheel sensor lead to the swingarm with the plastics holders. The open end of each holder should be facing downward.
- AH Route the rear wheel sensor lead behind the relay leads.
- A I 10 ~ 20 mm (0.39 ~ 0.79 in)
- AJ Fasten the rear wheel sensor lead and wire harness to the frame with the plastic band.
- AK Pass the wire harness and rear wheel sensor lead to the frame wire harness holder.
- ALL After making the connections, push the couplers into the space inside the frame above the mudguard.
- AM Insert the tail/brake light coupler between the wire harness and the seat lock cable (left).
- AN 20 ~ 30 mm (0.79 ~ 1.18 in)
- AO To the tail/brake light
- AP Route the tail/brake light switch lead under the seat lock cable, wire harness, and positive battery leads and then towards the inside of the vehicle.





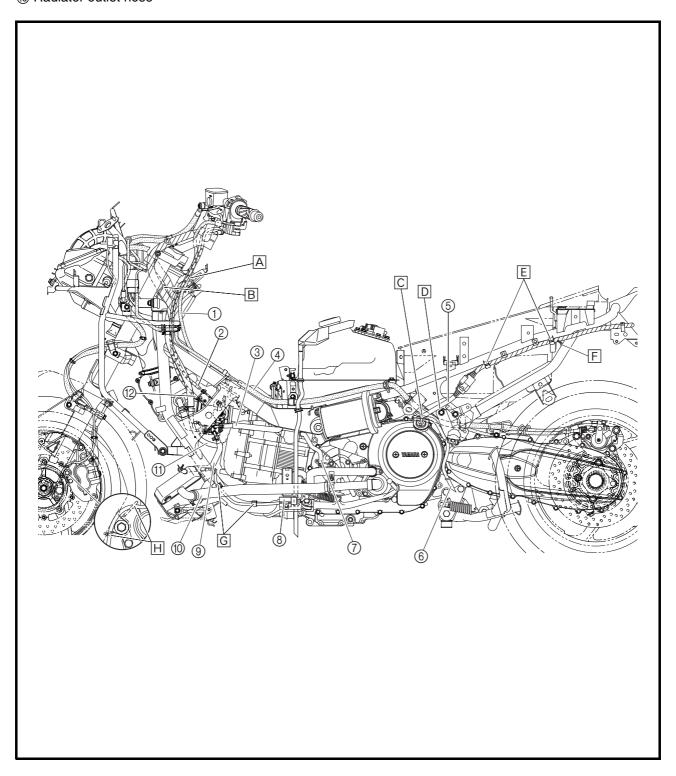
- AQ T stud for position setting
- AR Route the seat lock cable through the frame bracket side and under the wire harness.
- AS Install the band's fastened part between frame and storage box.





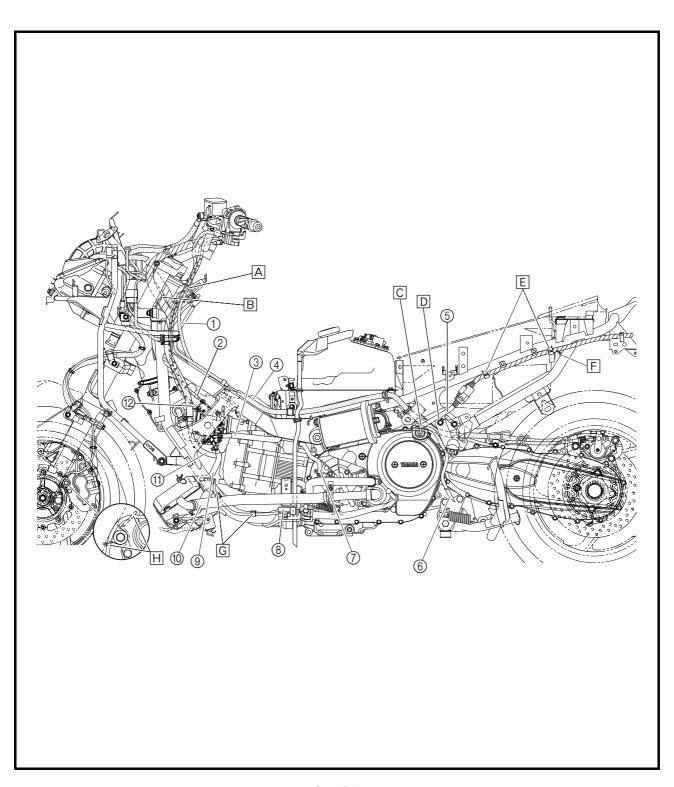
- 1) Rear brake lock lever cable
- ② Throttle cable (decelerator cable, double locknut)
- ③ Fast idle inlet hose
- 4 Rear brake hose
- ⑤ A.C. magneto lead
- 6 Fuel tank breather hose
- (7) Coolant hose
- (8) Sidestand switch
- Fast idle outlet hose
- Radiator outlet hose

- (1) Crankcase breather hose
- Throttle cable (accelerator cable, single locknut)
- A Pass the rear brake lock lever cable to the cable guide.
- B Route the wire harness through the frame guide.
- © Pass the fuel tank breather hose by the outside of the wire harness.





- D Pass the wire harness by the outside of the rear footrest mounting boss. (When installing the rear footrest, do not catch or pinch the A.C. magneto lead in the bracket.)
- E Fasten the wire harness to the frame with a plastic holder.
- F Pass the storage box light switch lead by the front of the frame back stay pipe.
- G Fasten the sidestand switch lead to the frame with a plastic holder.
- H Pass the front wheel sensor lead to the lead holder (2 locations).

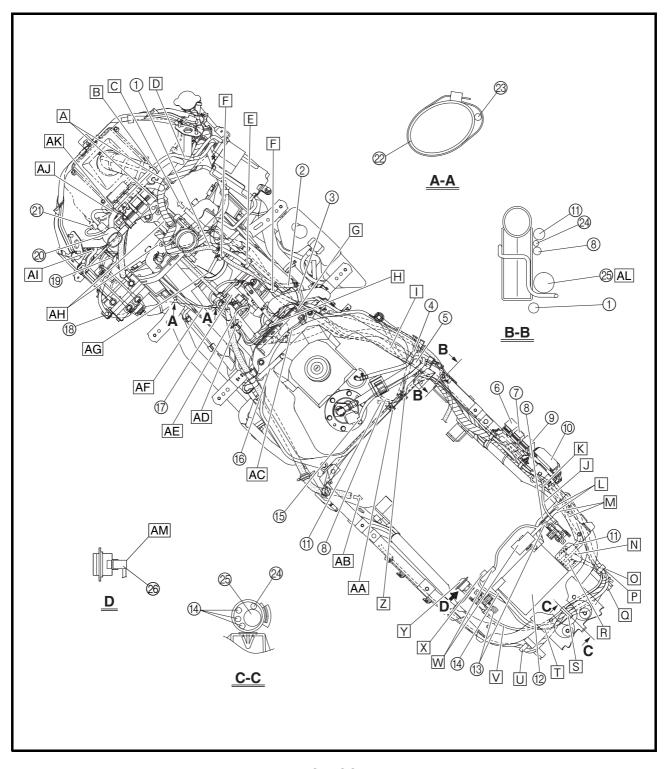




- 1) Rear brake lock lever cable
- ② Cooling system air bleed hose
- ③ Thermostat outlet hose
- (4) Fuel tank breather hose
- ⑤ Fuel hose
- 6 Turn signal/hazard relay
- 7) Starting circuit cut-off relay 1
- ® Negative battery lead
- Starting circuit cut-off relay 2
- Rectifier/regulator
- (1) Starter motor lead

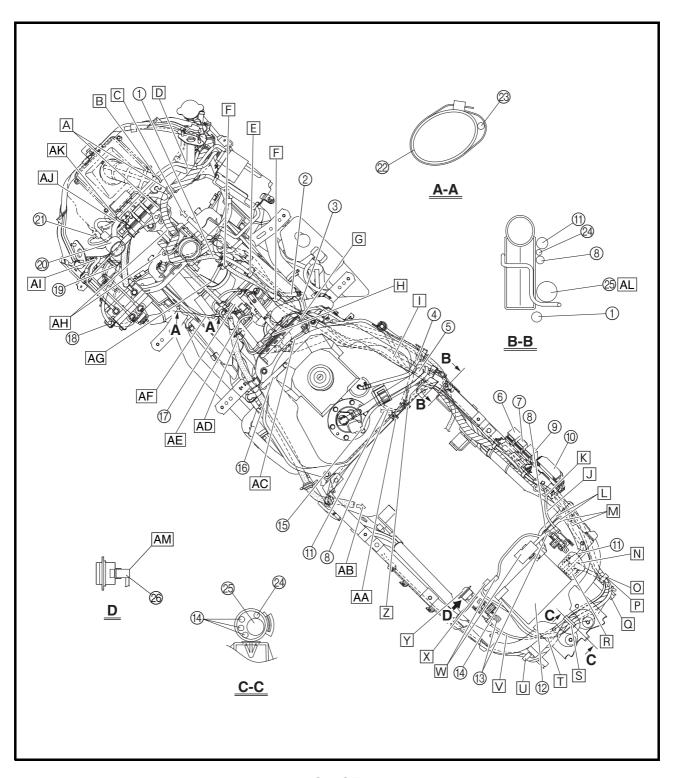
- Battery
- (13) Seat lock
- (4) Positive battery lead
- 15 Fuel pump lead
- (6) Fuel overflow hose
- ① Intake air pressure sensor
- (8) Hydraulic unit solenoid coupler
- (9) ABS motor coupler
- Meter assembly coupler
- ② Intake air temperature sensor
- 2 Frame

- 23 Fuel injector lead #2
- ② Seat lock cable
- 25 Wire harness
- Storage box light connector



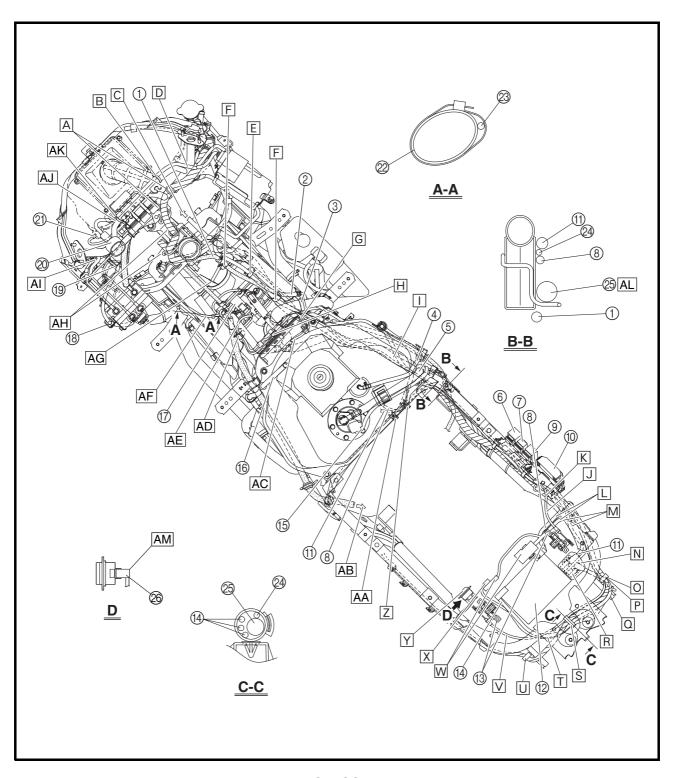


- A Route the wire harness against the stay 1 wire guide.
- B Fasten the lean angle cut-off switch lead to the stay 1 with a plastic band. Face the band end to the downward.
- C To the main switch
- D Route the lean angle cut-off switch lead through the back of the mirror stay (cross pipe).
- E Fasten the cooling system air bleed hose to the frame with a plastic holder.
- Fasten the rear brake lock lever cable to the frame with a plastic holder.
- G Be sure not to pinch the storage box light switch lead when installing the fuel tank.
- ⊞ Connect the fuel injector leads and intake air pressure sensor lead, storage box light switch lead to the pipe guide with a plastic holder. Con-nect the couplers in right side of the holder.
- Pass the wire harness and seat lock cable through the guide.





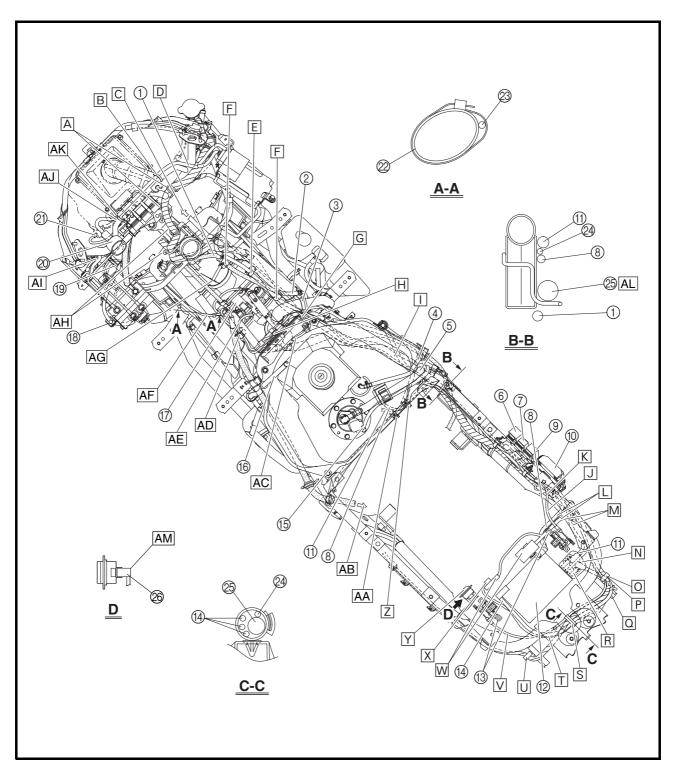
- ☐ Connect the seat lock cable (black) to the right seat lock.
- Replace Pass the seat lock cable (black) between the negative battery lead, starter motor lead and the frame.
- □ Route the negative battery lead and the fuse box lead from the storage box opening to the bottom of the cross pipe.
- M Route the fuse box lead above the starter motor lead.
- N Place the rubber cover over the starter relay, starter relay coupler, positive battery lead terminal, and starter motor lead terminal.
- O Align the plastic clamp with the white tape on the wire harness and fasten to the frame.
- P Fasten the wire harness and seat lock cable to the frame with a plastic holder.
- Pass the wire harness, lead and cable the outside of the frame bracket.
- R Install the starter relay to the mad guard.





- S Fasten the wire harness, positive battery lead and seat lock cable to the mad guard with a plastic holder.
- ☐ Route the positive battery lead through the under the seat lock cable.
- ☐ Fasten the wire harness to the frame with a plastic holder.
- Connect the seat lock cable (gray) to the left seat lock.
- W Install the fuse box assembly to the storage box.

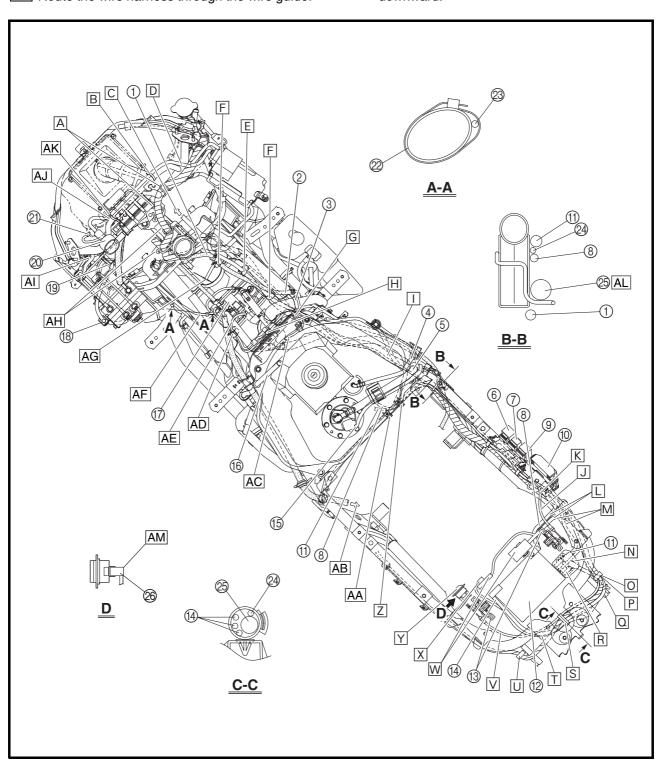
- X Connect the ABS motor fuse box to the fuse box 2.
- In Fasten the negative battery lead and the starter motor lead to the frame with a plastic holder.
- AA Fasten the fuel tank breather hose to the frame with a plastic holder.
- AB To the rear brake caliper
- AC To the storage box light switch on the seat hinge.





- AD Fasten the fuel injector lead (#1/#2), intake air pressure sensor lead to the frame with a plastic holder.
- AE Pass the intake air pressure sensor lead over the fuel hose.
- AF Bundle the fuel injector lead (#1) to the frame with a plastic band softly (the band possible to turn), face the end of the plastic band to the inside of the frame.
- AG 10 ~ 15 mm (0.39 ~ 0.59 in)
- AH Route the wire harness through the wire guide.

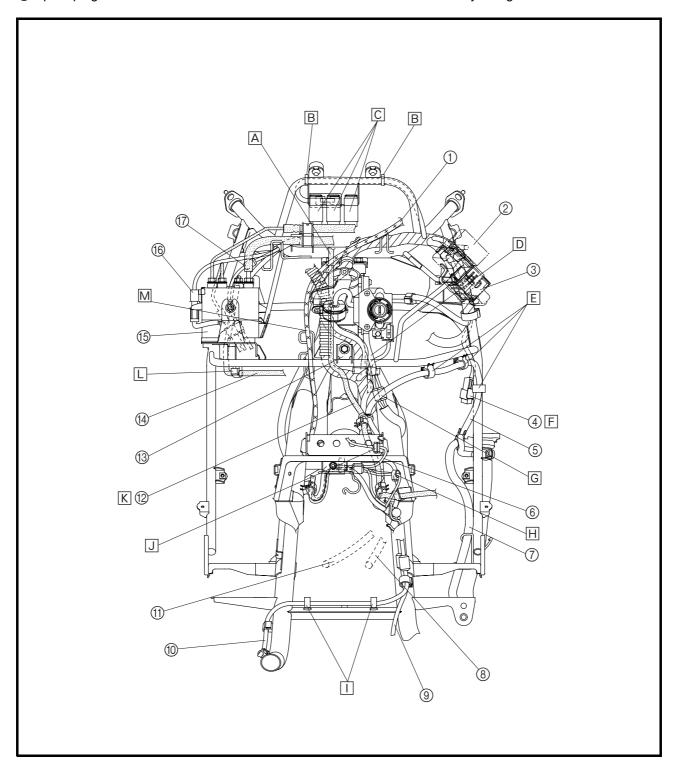
- A I Pass the front wheel sensor lead under the stay 1 and cross pipe.
- AJ Place the front wheel sensor lead between the ribs of the air filter case.
- AK Fasten the protective tube around the lean angle cut-off switch lead to the stay 1 with a plastic band. Face the end of the plastic band downward.
- AL Pass the wire harness over the wire guide.
- AM Connect the storage box light lead connectors to the storage box light with the leads routed downward.





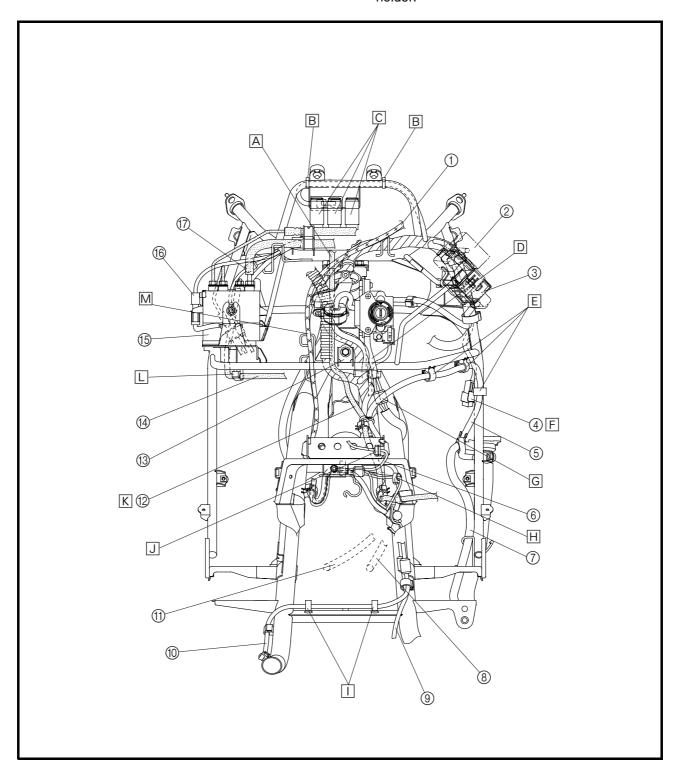
- 1) Throttle cable
- ② Fail-safe relay
- ③ ECU (ABS)
- 4 ABS test coupler
- ⑤ Cooling system air bleed hose
- ® Storage box light switch lead
- (7) Coolant reservoir hose
- ® Spark plug lead #2
- 10 Sidestand switch lead
- (1) Spark plug lead #1

- 12 Rear brake lock lever cable
- (13) Stay 1
- (4) Rear brake hose
- (5) Hydraulic unit
- (6) Hydraulic unit solenoid coupler
- (7) Front wheel sensor coupler
- A Pass the rear brake lock lever cable on the front side of throttle cable.
- B Position of clamp.
- © Position the relay straighten.





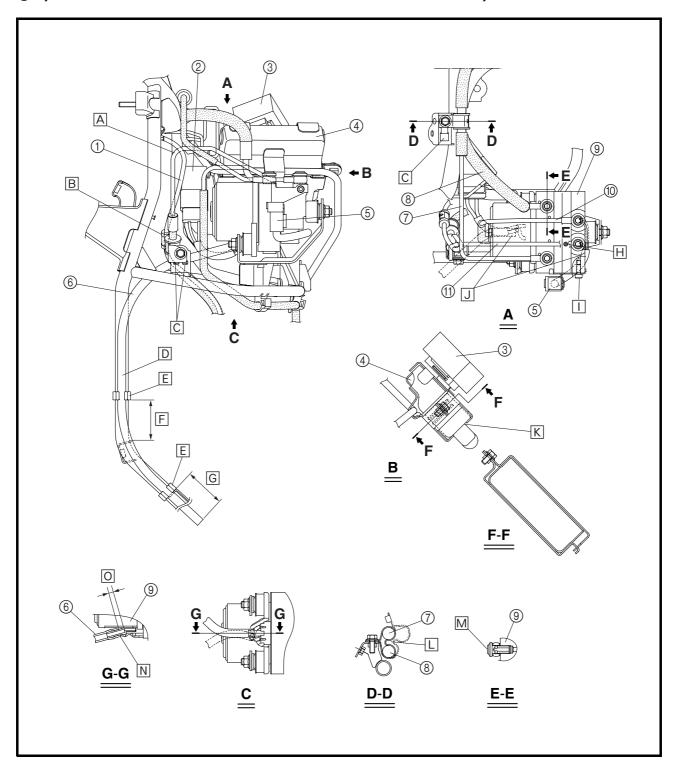
- D Route the main switch lead over the tube of the stay 1.
- E Fasten the cooling system air bleed hose to the stay 1 with a plastic holder.
- F After checking the ABS, install the ABS test coupler into the stay 1.
- G The main switch lead couplers should not protrude to the outside of the frame.
- H Fasten the fuel injection leads with a plastic holder.
- ☐ Fasten the sidestand switch lead to the frame with a plastic holder.
- ☐ Fasten the storage box light switch lead to the frame with a plastic clamp. Face the clamp clasp to the up side.
- K Route the rear brake lock lever cable to the left of the bracket welded to the stay 1.
- □ Fasten the rear brake hose to the stay 1 with a plastic holder.
- M Route the throttle cable through the cable holder.





- (1) Front wheel sensor
- ② ABS motor coupler
- ③ Fail-safe relay
- 4 ECU (ABS)
- (5) Hydraulic unit solenoid coupler
- **(6)** Hydraulic unit overflow hose
- ⑦ Brake hose (front brake master cylinder to hydraulic unit)
- ® Brake hose (rear brake master cylinder to hydraulic unit)
- Hydraulic unit

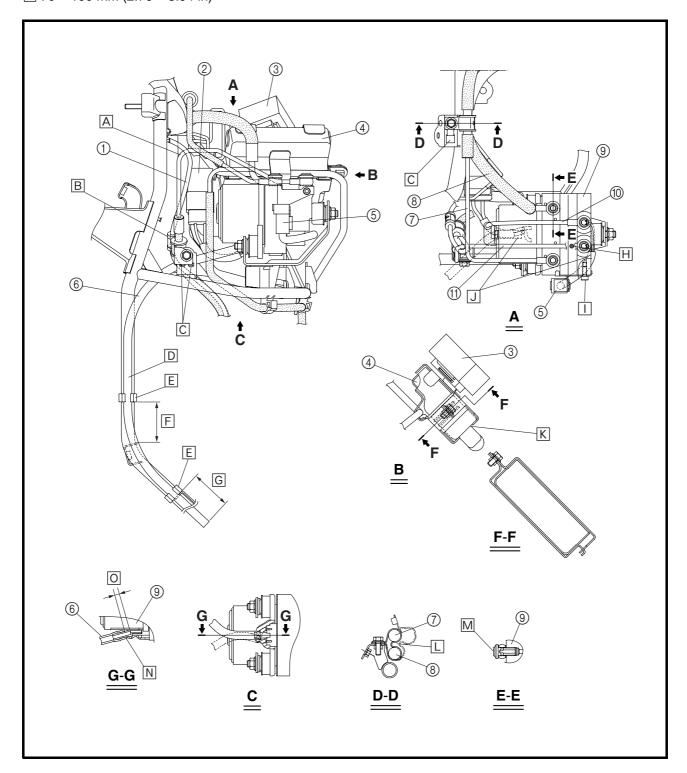
- (1) Brake hose (hydraulic unit to rear brake caliper)
- (1) Brake hose (hydraulic unit to front brake caliper)
- A Route the front wheel sensor lead in front of the brake hose (hydraulic unit to front brake calipers) as shown in the illustration.
- B Fasten the grommets on the front wheel sensor lead and brake hose (hydraulic unit to front brake calipers) with the holder.
- © Install the holder with its projections inserted into the slots in the stay 1.





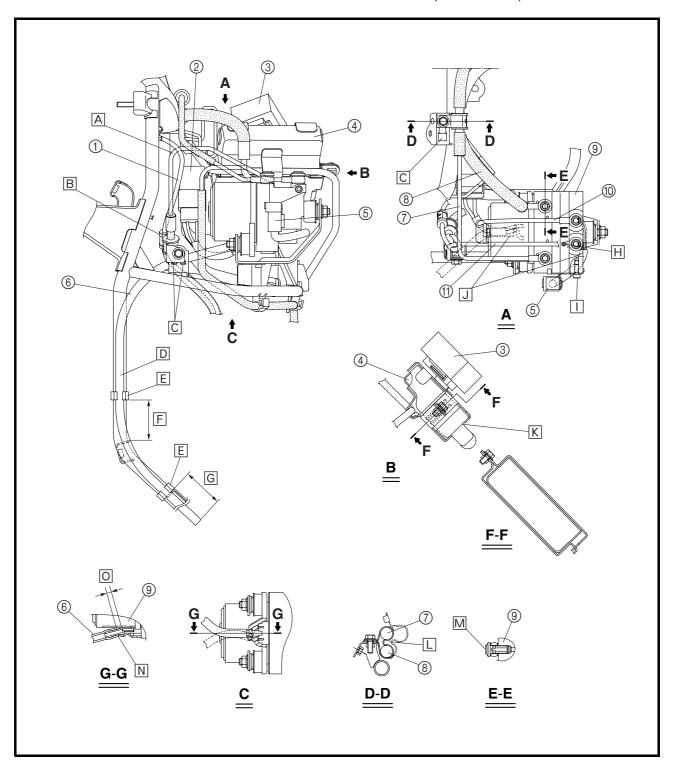
- □ Route the hydraulic unit overflow hose to the outside of the stay 1.
- E Fasten the hydraulic unit overflow hose with the lower hose holder first, and then fasten it with the upper hose holder. Make sure that the lower hose holder is contacting the top of the bracket welded to the stay 1 and the end of the hose extends 70 ~ 100 mm (2.76 ~ 3.94 in) past the holder.
- F 40 ~ 60 mm (1.57 ~ 2.36 in)
- G 70 ~ 100 mm (2.76 ~ 3.94 in)

- Install the brake hose (hydraulic unit to front brake caliper) onto the hydraulic unit. The brake hose and its union bolt hole are identified by white paint marks.
- ☐ Install the hydraulic unit solenoid coupler bracket onto the hydraulic unit, making sure that the projections on the bracket are aligned with the edges of the hydraulic unit.





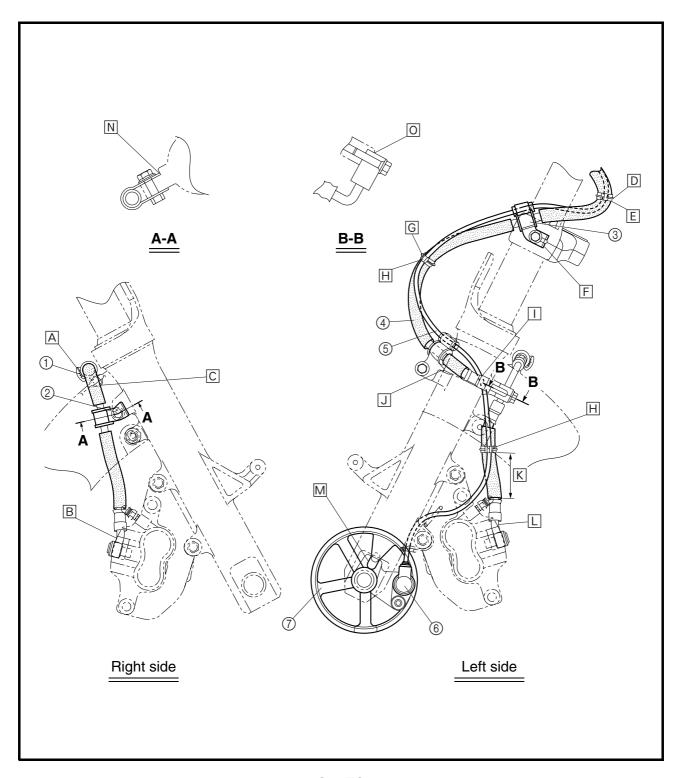
- Route the hydraulic unit solenoid lead and ABS motor lead under the hydraulic unit when installing the unit, making sure not to pinch the leads between the hydraulic unit and hydraulic unit bracket.
- K Install the ECU (ABS) lead coupler boot all the way onto the ECU (ABS), making sure that the section of the boot that covers the ECU (ABS) is not pinched between the ends of the upper and lower ECU (ABS) brackets.
- ☐ Fasten the grommets on the brake hose (front brake master cylinder to hydraulic unit) and the brake hose (rear brake master cylinder to hydraulic unit) with the brake hose holder.
- M When tightening the union bolt, make sure that the brake hose contacts the left side of the stopper on the hydraulic unit.
- N Install the hydraulic unit overflow hose onto the hydraulic unit, making sure that the hose contacts the unit.
- 0 5 ~ 7 mm (0.20 ~ 0.28 in)





- 1) Plastic holder
- ② Brake hose holder 2
- ③ Brake hose holder 1
- (4) Front brake hose
- (5) Front wheel sensor lead
- **6** Front wheel sensor
- (7) Front housing

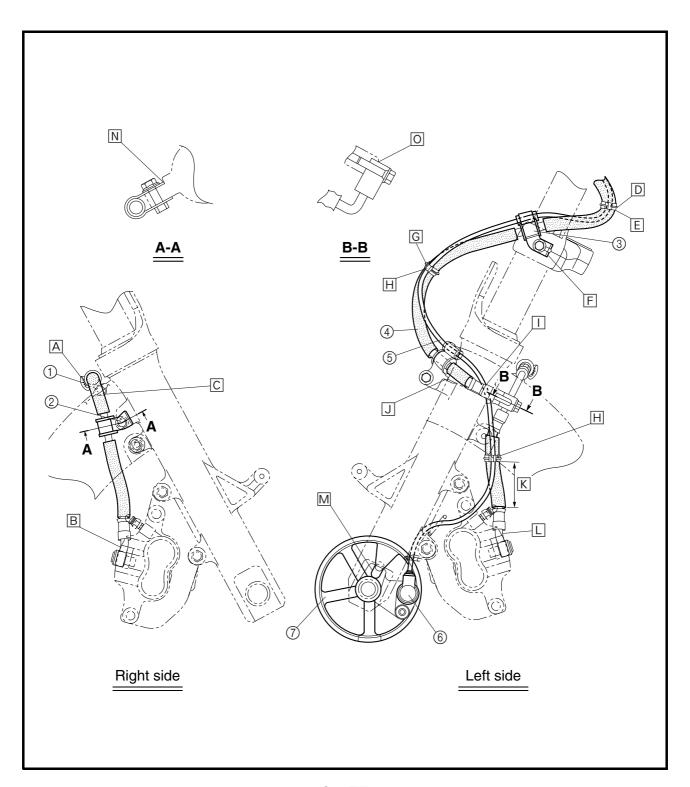
- A Engage the hose holder rib more than 3 notch. Face the hose holder projection to the back.
- B Make sure that the white paint on the brake hose faces to back (right side only).
- C Install the hose holder to the innermost securely.
- D Turn the handlebar completely to the right, and then fasten the brake hose and front wheel sensor lead together with the plastic holder.
- E Fasten the front wheel sensor lead along the inside of the brake hose.

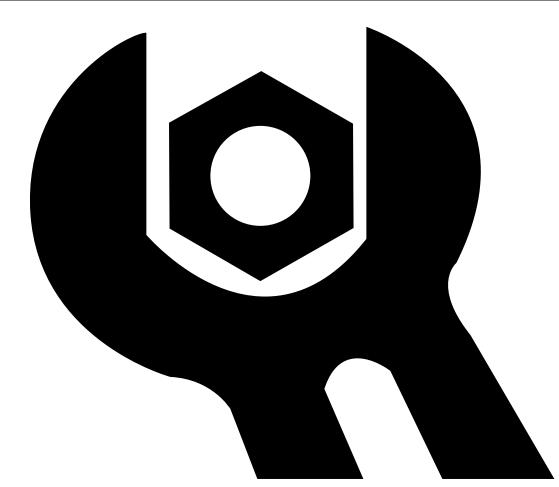




- F Install the stopper to lower bracket projection.
- G Fasten the front wheel sensor lead to the center of brake hose holder.
- H Fasten the front wheel sensor lead along the outside of the brake hose.
- ☐ Pass the front wheel sensor lead between the brake hose and front fork.
- K 30 ~ 40 mm (1.18 ~ 1.57 in)

- ☐ Make sure that brake pipe touches the projection.
- M Make sure that the slot in the sensor housing fits stopper on the outer tube.
- N Make sure that the brake hose holder touches the projection of the outer tube.
- O Make sure that the brake hose joint touches the projection of the outer tube.









CHAPTER 3 PERIODIC CHECKS AND ADJUSTMENTS

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INTRODUCTION/ PERIODIC MAINTENANCE AND LUBRICATION CHART



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PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

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

PERIODIC MAINTENANCE AND LUBRICATION CHART

NOTF:

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

N	_	ITEM	CHECK OF MAINTENANCE TOP	ODC	METER	READIN	G (× 100	km)	ANNUAL
N	0.	IIEM	CHECK OR MAINTENANCE JOB	1	10	20	30	40	CHECK
1	*	Fuel line (See page 3-37.)	Check fuel hoses for cracks or damage.		√	V	√	√	√
2		Spark plugs (See page 3-25.)	Check condition. Clean and regap.		√		√		
		(See page 3-25.)	Replace.			√		√	
3	*	Valves (See page 3-11.)	Check valve clearance. Adjust.			Every	40000 kı	n	
4		Air filter element	Clean.		√		√		
_		(See page 3-34.)	Replace.			√		√	
		V-belt case air fil-	Clean.		$\sqrt{}$		$\sqrt{}$		
5	*	ter elements (See page 3-35.)	Replace.			√		√	
6	*	Front brake (See page 3-47,	Check operation, fluid level and vehicle for fluid leakage.	√	√	√	√	√	√
		3-48.)	Replace brake pads.	Whenever worn to the limit					
7	*	Rear brake (See page 3-47,	Check operation, fluid level and vehicle for fluid leakage.	√	√	√	√	√	√
		3-48.)	Replace brake pads.	Whenever worn to the limit					
8		Rear brake lock (See page 3-46.)	Check operation. Adjust.	V	√	√	√	√	√
9	*	Brake hoses	Check for cracks or damage.		√	√	V	V	V
9		(See page 3-48.)	Replace.		•	Every	y 4 years		
10	*	Wheels (See page 3-59.)	Check runout and for damage.		√	√	√	√	
11	*	Tires (See page 3-57.)	Check tread depth and for damage. Replace if necessary. Check air pressure. Correct if necessary.		√	V	V	V	V
12	*	Wheel bearings (See page 4-8.)	Check bearing for looseness or damage.		V	√	√	√	

PERIODIC MAINTENANCE AND LUBRICATION CHART

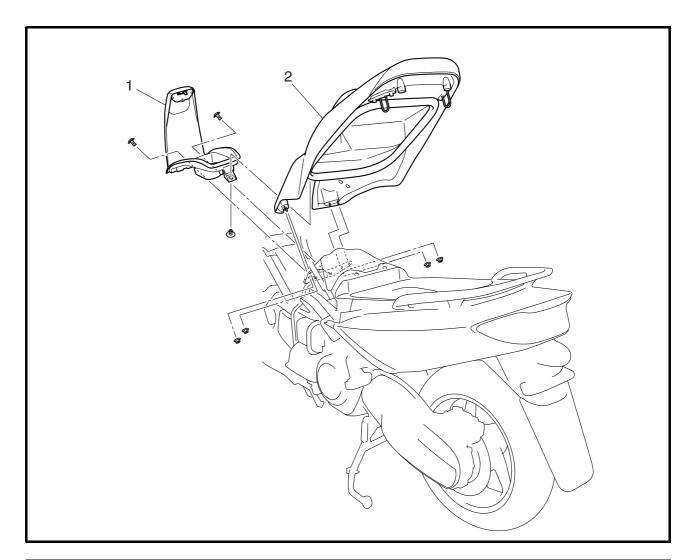


	ODOMETER READING (× 1000 km)		ODO	METER	RFADIN	G (× 1000) km)	ANNUAL	
N	Э.	ITEM	CHECK OR MAINTENANCE JOB	1	10	20	30	40	CHECK
	,	Steering bearings	Check bearing play and steering for roughness.	√	√	√	√	√	
13	*	(See page 4-86.)	Lubricate with lithium-soap-based grease.	Every 20000 km		n	<u> </u>		
14	*	Chassis fasteners (See page 2-22.)	Make sure that all nuts, bolts and screws are properly tightened.		V	√	V	√	V
15		Sidestand, center- stand (See page 3-60, 3-61.)	Check operation. Lubricate.		V	V	V	V	V
16	*	Sidestand switch (See page 8-5.)	Check operation.	V	V	V	V	V	V
17	*	Front fork (See page 3-56.)	Check operation and for oil leakage.		V	V	V	√	
18	*	Shock absorber assembly (See page 4-91.)	Check operation and shock absorber for oil leakage.		V	V	V	V	
19	*	Electronic fuel injection (See page 3-17, 3-22.)	Adjust engine idling speed and synchronization.	V	V	V	V	V	V
20		Engine oil	Change.	V	When		change i		flashes
		(See page 3-30.)	Check oil level and vehicle for oil leakage.		Eve	ery 5000	km		√
21		Engine oil filter cartridge (See page 3-30.)	Replace.	V		V		V	
22	*	Cooling system (See page 3-39,	Check coolant level and vehicle for coolant leakage.		V	V	V	V	V
		3-40, 3-41.)	Change.	Every 3 years					
23		Chain drive oil (See page 3-43, 3-44.)	Check vehicle for oil leakage.Change.		√	√	√	V	
24	*	V-belt (See page 5-63.)	Replace.	Whe	the V-b	-	cement i 20000 kr		r flashes
25	*	Front and rear brake switches (See page 8-5.)	Check operation.	V	V	V	V	V	V
26		Moving parts and cables (See page 3-60.)	Lubricate.		V	V	V	V	V
27	*	Throttle grip housing and cable (See page 3-23.)	 Check operation and free play. Adjust the throttle cable free play if necessary. Lubricate the throttle grip housing and cable. 		V	V	V	V	V
28	*	Lights, signals and switches (See page 3-71, 8-5.)	Check operation. Adjust headlight beam.	V	V	V	V	V	V

NOTE: _

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

SEAT

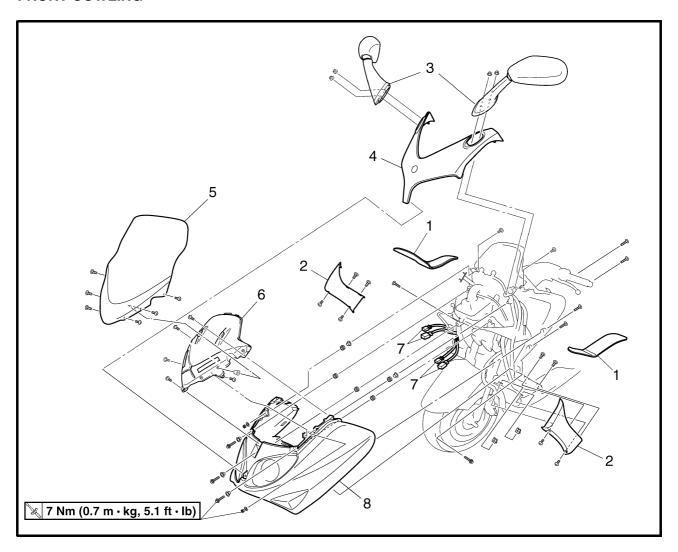


Order	Job/Part	Q'ty	Remarks
R	Removing the seat		Removing the parts in the order listed.
1 Fu	uel lid	1	
2 Se	Seat	1	
			For installation, reverse the removal procedure.



COVER AND PANEL

FRONT COWLING

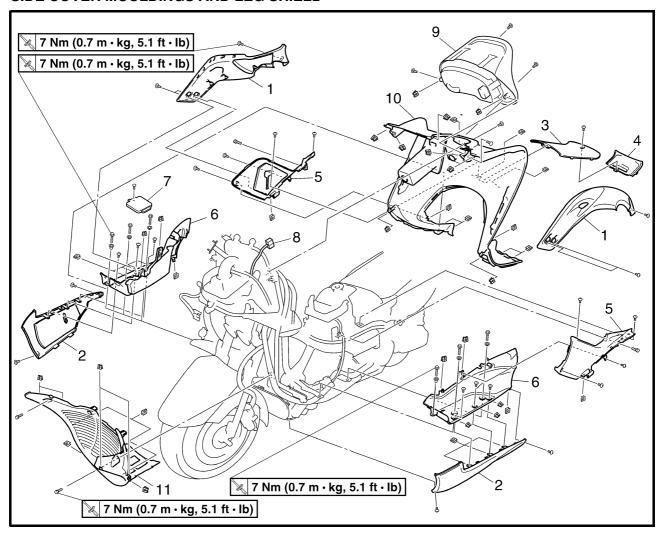


Order	Job/Part	Q'ty	Remarks
	Removing the front cowling		Removing the parts in the order listed.
1	Footrest board mat (left and right)	2	
2	Front side cover moulding (left and	2	
	right)		
3	Rearview mirror (left and right)	2	
4	Front cowling upper cover	1	
5	Windshield	1	
6	Front cowling inner panel	1	
7	Headlight sub-wire harness coupler	4	Disconnect.
8	Front cowling	1	
			For installation, reverse the removal pro-
			cedure.

COVER AND PANEL



SIDE COVER MOULDINGS AND LEG SHIELD

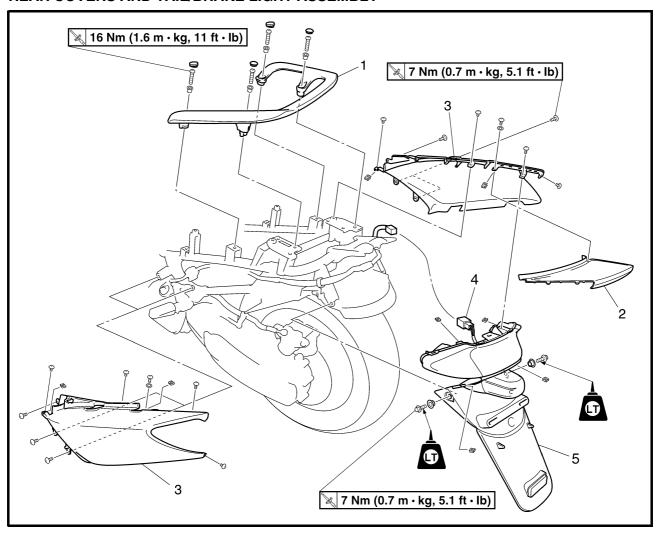


Order	Job/Part	Q'ty	Remarks
	Removing the side cover mouldings		Removing the parts in the order listed.
	and leg shield		
1	Upper side cover mole (left and right)	2	
2	Lower side cover mole (left and right)	2	
3	Center cover	1	
4	Hinge cover	1	
5	Side cover (left and right)	2	
6	Footrest board (left and right)	2	
7	Coolant reservoir cap access panel	1	
8	Meter assembly coupler	1	Disconnect.
9	Meter assembly	1	
10	Leg shield	1	
11	Inner fender	1	
			For installation, reverse the removal pro-
			cedure.

COVER AND PANEL

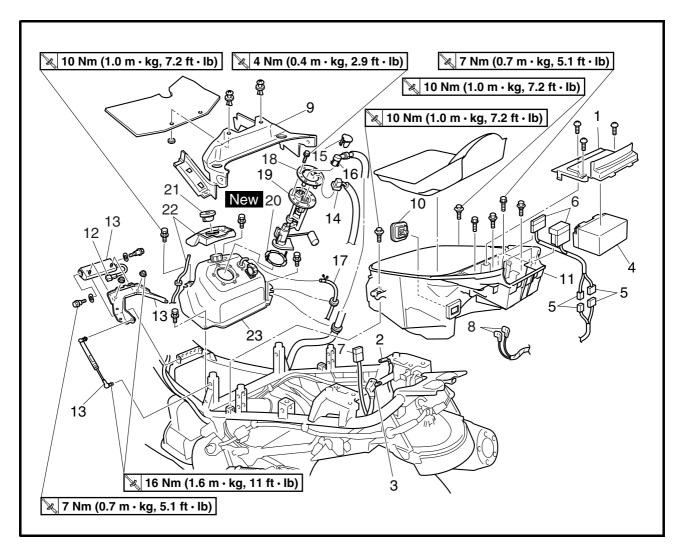


REAR COVERS AND TAIL/BRAKE LIGHT ASSEMBLY

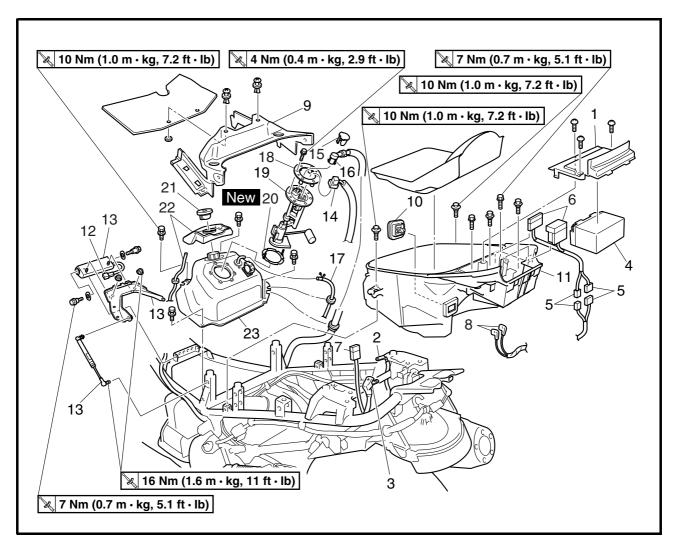


Order	Job/Part	Q'ty	Remarks
	Removing the rear covers and tail/		Removing the parts in the order listed.
	brake light assembly		
	Seat		Open.
	Upper side cover mole (left and right)		Refer to "SIDE COVER MOULDINGS
			AND LEG SHIELD".
1	Grab bar	1	
2	Rear cover	1	
3	Rear side cover (left and right)	2	
4	Tail/brake light assembly coupler	1	Disconnect.
5	Tail/brake light assembly	1	
			For installation, reverse the removal pro-
			cedure.

FUEL TANK



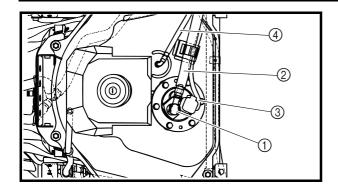
Order	Job/Part	Q'ty	Remarks
	Removing the fuel tank		Remove the parts in the order listed.
1	Battery cover	1	
2	Negative battery lead	1	Disconnect.
3	Positive battery lead	1	Disconnect.
4	Battery	1	
5	Fuse box assembly coupler	2	Disconnect.
6	Fuse box assembly	1	
7	ABS motor fuse box	1	(XP500A)
8	Storage box light connector	2	Disconnect.
9	Fuel tank cover	1	
10	Storage box light	1	
11	Storage box	1	
12	Storage box light switch coupler	1	Disconnect.
13	Hinge/damper	2/1	



Order	Job/Part	Q'ty	Remarks
14	Fuel pump coupler	1	Disconnect. 7 Refer to "REMOVING
15	Fuel hose connector cover	1	THE FUEL TANK" and
16	Fuel hose	1	"INSTALLING THE FUEL
17	Fuel tank breather hose	1	J TANK".
18	Fuel pump bracket	1	Refer to "REMOVING THE FUEL
19	Fuel pump	1	-PUMP" and "INSTALLING THE FUEL
20	Fuel pump gasket	1	PUMP".
21	Fuel tank cap	1	
22	Fuel overflow tray/fuel overflow hose	1/1	
23	Fuel tank	1	Refer to "REMOVING THE FUEL TANK"
			and "INSTALLING THE FUEL TANK".
			For installation, reverse the removal pro-
			cedure.

FUEL TANK





REMOVING THE FUEL TANK

- 1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
- 2. Remove:
- fuel hose connector cover (1)
- 3. Disconnect:
- fuel hose ②
- fuel pump coupler ③
- fuel tank breather hose 4

CAUTION:

- Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.
- Although the fuel has been removed from the fuel tank, be careful when removing the fuel hoses, since there may be fuel remaining in it.
- Do not disconnect the fuel hose except the fuel hose connector of the fuel pump feeding side.

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

- 4. Remove:
- fuel tank

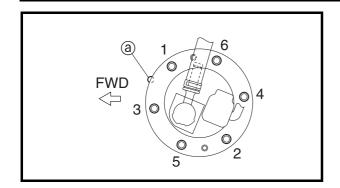
REMOVING THE FUEL PUMP

- 1. Remove:
- fuel pump bracket
- fuel pump
- fuel pump gasket

CAUTION:

- Do not drop the fuel pump or give it a strong shock.
- Do not touch the base section of the fuel sender.





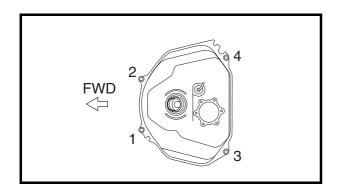
INSTALLING THE FUEL PUMP

- 1. Install:
- fuel pump gasket New
- fuel pump
- fuel pump bracket

🔌 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.
- Align the projection (a) on the fuel pump with the projection in the fuel tank.
- Tighten the bolts to the specified torque in the proper tightening sequence as shown.
- Install the fuel pump in the direction shown in the illustration.



INSTALLING THE FUEL TANK

- 1. Install:
- fuel tank

№ 10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

Tighten the bolts to the specified torque in the proper tightening sequence as shown.

- 2. Connect:
- fuel hose
- · fuel breather hose
- fuel pump coupler

CAUTION:

- Be sure to connect the fuel hose by hand.
 Do not forcefully connect the hose with tools.
- When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holders are in the correct position, otherwise the fuel hose will not be properly installed.
- 3. Install:
 - fuel pump connector cover



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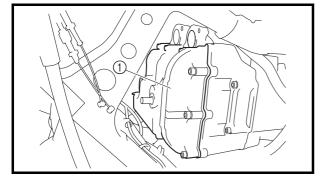
ENGINE

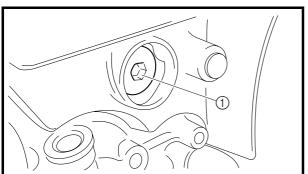
ADJUSTING THE VALVE CLEARANCE

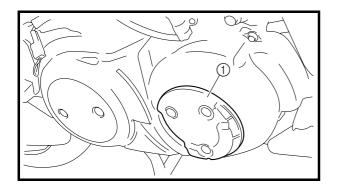
The following procedure applies to all of the valves.

NOTE: _

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.
- 1. Remove:
- front cowling Refer to "FRONT COWLING".
- footrest boards
- leg shield
- inner fender
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 2. Remove:
 - radiator
 Refer to "RADIATOR AND OIL COOLER" in
 chapter 6.
- 3. Remove:
- · spark plug
- cylinder head cover ①
- cylinder head cover gasket
- 4. Remove:
- throttle body
- intake manifold Refer to "THROTTLE BODY" in chapter 7.
- 5. Remove:
- timing plug ①

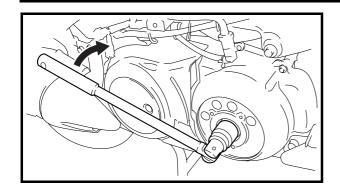


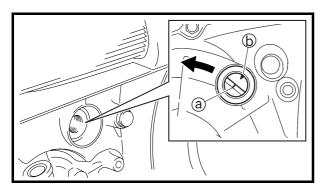


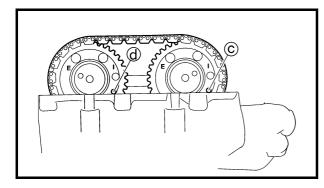


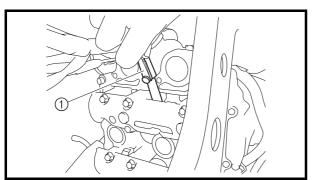
- 6. Remove:
- V-belt case cover 1 ①











- 7. Measure:
 - valve clearance
 Out of specification → Adjust.



Valve clearance (cold)
Intake valve
0.15 ~ 0.20 mm
(0.0059 ~ 0.0079 in)
Exhaust valve
0.25 ~ 0.30 mm
(0.0098 ~ 0.0118 in)

- a. Turn the crankshaft counterclockwise.
- b. When piston #1 is at TDC on the compression stroke, align the "I" mark (a) on the A.C. magneto rotor with the stationary pointer (b) on the A.C. magneto cover.

NOTE:

- TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.
- In order to be sure that the piston is at TDC, the alignment mark © on the intake camshaft sprocket and the alignment mark @ on the exhaust camshaft sprocket must align with the cylinder head mating surface as shown in the illustration.
- c. Measure the valve clearance with a thickness gauge ①.



Thickness gauge 90890-03079, YM-34483

NOTE: _

- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.
- d. Turn the crankshaft 360° counterclockwise and check the valve clearance of piston #2.



- 8. Remove:
- intake camshaft
- · exhaust camshaft

CAUTION:

Before removing the camshafts from the cylinder head, tilt up the engine at least 25°.

NOTE: _

- Refer to "CAMSHAFTS" in chapter 5.
- · When removing the timing chain and camshafts, fasten a wire to the timing chain to retrieve it if it falls into the crankcase.
- 9. Adjust:
- · valve clearance

a. Remove the valve lifter (1) and the valve pad 2).



Valve lapper 90890-04101

NOTE:

11171102

I1172204

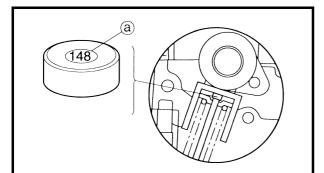
2

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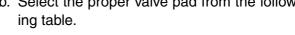
- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve lifter 1) and valve pad 2) so that they can be installed in the correct place.
- b. Select the proper valve pad from the follow-

I -	nd thick- range	Available valve pads
Nos. 120 ~ 240	1.20 ~ 2.40 mm (0.0472 ~ 0.0945 in)	25 thicknesses in 0.05 mm (0.002 in) increments



1

EX IN



-	ad thick- range	Available valve pads
Nos. 120 ~ 240	1.20 ~ 2.40 mm (0.0472 ~ 0.0945 in)	25 thicknesses in 0.05 mm (0.002 in) increments

NOTE:

- The thickness @ of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.
- · Since valve pads of various sizes are originally installed, the valve pad number must be rounded in order to reach the closest equivalent to the original.



c. Round off the original valve pad number according to the following table.

Last digit	Rounded value
0 or 2	0
5	5
8	10

EXAMPLE:

Original valve pad number = 148 (thickness = 1.48 mm (0.058 in))

Rounded value = 150

d. Locate the rounded number of the original valve pad and the measured valve clearance in the valve pad selection table. The point where the column and row intersect is the new valve pad number.



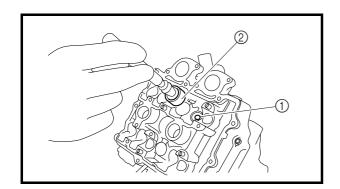
The new valve pad number is only an approximation. The valve clearance must be measured again and the above steps should be repeated if the measurement is still incorrect.

e. Install the new valve pad ① and the valve lifter ②.

NOTE:

Apply molybdenum disulfide to the valve pad.

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





f. 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" in chapter 5.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- · Align the camshaft sprocket marks with the edge of the cylinder head.
- Turn the crankshaft counterclockwise several turns to seat the parts.
- g. Measure the valve clearance again.
- h. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.



VALVE PAD SELECTION TABLE INTAKE

MEASURED VALVE									-	ORIG	INA	_ VAI	LVE	PAD	NUN	/BEF	}								
	120	125	130	135	140	145	150	155										205	210	215	220	225	230	235	240
0.00 ~ 0.02																							215		
0.03 ~ 0.07			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.08 ~ 0.10		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.11 ~ 0.20										S	TAN	DAR	D CL	EAR	ANC	E									
			135																						
			140																						
0.28 ~ 0.32	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
			150																		240				
			155																	240					
			160																						
			165															240							
			170																						
			175																						
			180																						
			185																						
			190																						
			195											Exa											
			200											Valv	e cl	eara	nce	(colc	l)						
			205											C).11	~ 0.2	20 m	m (C	0.004	13 ~	0.00	79 iı	n)		
			210						240					Rou	nde	d val	ue 1	50							
			215					240						N	/leas	sure	d val	ve c	eara	ance	is 0.	.24 r	nm		
			220				240							(0.00	94 ir	1)								
			225			240								٠,		pad	,	with	ากลด	1 160)				
			230		240											No.						1 in	1		
			235	240												No. ⁻						-			
			240																	•		,	ı ımbe	r fo	oina
		240												dow	-	ıısıa		valv	e pa	au w	iui ü	i e iit	ai i i DE	i idi	onig
1.33 ~ 1.37	240													uow	11.										

EXHAUST

MEASURED VALVE										ORIG	INA	L VAI	VF	PAD	NUN	1BFF	₹								
	120	125	130	135	140	145	150	155		-					_			205	210	215	220	225	230	235	240
0.00 ~ 0.02																	175								
0.03 ~ 0.07					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.08 ~ 0.12				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.13 ~ 0.17			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.18 ~ 0.20		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.21 ~ 0.30																									
						155											_		_	_	_]	
						160																240			
						165																			
						170														240					
						175																			
	155					180																			
																	240								
						190										240									
						195									240	J									
						200								240											
						205								_											
						210						240		Exa											
						215					240						nce								
						220				240							30 m	•	0.008	33 ~	0.01	18 ii	n)		
						225		_	240					Rou	nde	d val	lue 1	75							
						230		240						Ν	/leas	sure	d val	ve c	leara	ance	is 0	.35 r	nm		
						235	240							(0.01	38 ir	า)								
		220				240								Rep	lace	pad	150) with	n pad	d 18	5				
		225 230			240									F	ad I	No. ⁻	175 =	= 1.7	75 m	m (0	.068	9 in))		
		235		240													185 =			•		•			
		240															II the			•		•		er fac	cina
	240	240												dow	-				- -						9
1.40 ~ 1.47	24 0													3077											

ADJUSTING THE VALVE CLEARANCE/ SYNCHRONIZING THE THROTTLE BODIES



10.Install:

all removed parts

NO	ΓE:			
	installation,	the	removal	proce-
dure	<i>j</i>			

SYNCHRONIZING THE THROTTLE BODIES

ИO.	TΕ	:	

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 scooter on a level surface.

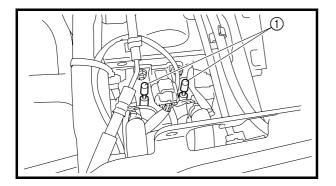
NOTE: _

Place the scooter on a suitable stand.

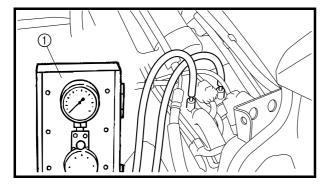
- 2. Remove:
 - seat

Refer to "SEAT".

- · center cover
- side cover (left and right)
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".



- 3. Remove:
- synchronizing pipe caps (1)



- 4. Install:
- vacuum gauge ①
 (onto the synchronizing pipe)



Vacuum gauge 90890-03094, YU-44456

5. Start the engine and let it warm up for several minutes.

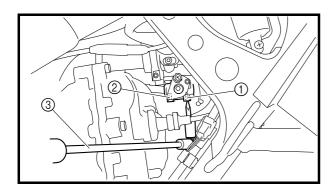
SYNCHRONIZING THE THROTTLE BODIES



- 6. Measure:
- engine idling speed
 Out of specification → Adjust.
 Refer to "ADJUSTING THE ENGINE IDLING SPEED".



Engine idling speed 1,100 ~ 1,300 r/min



- 7. Adjust:
- throttle body synchronization
- a. Turn the throttle body #1 air screw ①, and #2 air screw ②. Using the carburetor angle driver ③.

NOTE: _

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

CAUTION:

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



Carburetor angle driver 90890-03158



Vacuum pressure at engine idling speed

33 kPa (248 mmHg, 9.7 inHg)

NOTE: _

The difference in vacuum pressure between two throttle bodies should not exceed 1.3 kPa (10 mmHg, 0.38 inHg).

- 8. Measure:
- engine idling speed
 Out of specification → Adjust.
 Make sure that the vacuum pressure is within specification.

SYNCHRONIZING THE THROTTLE BODIES/ ADJUSTING THE EXHAUST GAS VOLUME



9. Stop the engine and remove the measuring equipment.

10.Adjust:

 throttle cable free play Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY".



Throttle cable free play (at the flange of the throttle grip) 3 ~ 5 mm (0.12 ~ 0.20 in)

11.Remove:

· vacuum gauge

12.Install:

- side cover (left and right)
- · center cover Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- seat Refer to "SEAT".

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ADJUSTING THE EXHAUST GAS VOLUME

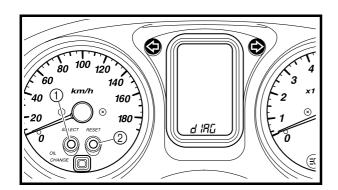
Be sure to set the CO density level to standard, and then adjust the exhaust gas volume.

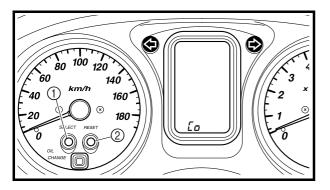
- 1. Turn the main switch to "OFF" and set the engine stop switch to "\;\tag{"}.
- 2. Simultaneously press and hold "SELECT" ① and "RESET" ② buttons, turn

the main switch to "ON", and continue to press the buttons for 8 seconds or more.



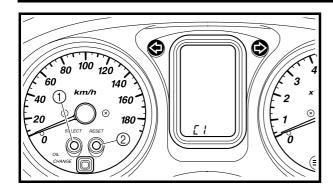
- All displays on the meter disappear except the clock and tripmeter displays.
- "dIAG" appears on the tripmeter LCD.
- 3. Press the "SELECT" (1) button to select the CO adjustment mode "CO" or the diagnostic mode "dIAG".
- 4. After selecting "CO", simultaneously press the "SELECT" (1) and "RESET" (2) buttons for 2 seconds or more to execute the selection.





ADJUSTING THE EXHAUST GAS VOLUME/ CHECKING THE EXHAUST GAS AT IDLE



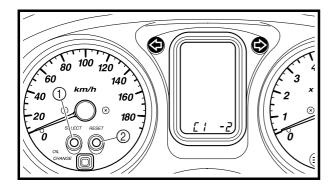


5. Press the "SELECT" ① and "RESET" ② buttons to select a cylinder.

NOTE:

The selected cylinder number appears on the tripmeter LCD.

- Both the "SELECT" button and "RESET" button can be used to change the selected cylinder number.
- After selecting the cylinder, simultaneously press the "SELECT" and "RESET" buttons for 2 seconds or more to execute the selection.



7. Change the CO adjustment volume by pressing the "SELECT" ① and "RESET" ② buttons.

NOTE:

The CO adjustment volume appears on the tripmeter LCD.

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

CHECKING THE EXHAUST GAS AT IDLE

(Measuring the exhaust gas at idle [when catalytic converter is operating])

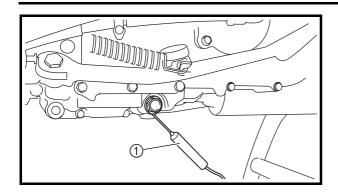
1. Stand the scooter on a level surface.

NOTE:

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

CHECKING THE EXHAUST GAS AT IDLE





- 2. Remove:
 - · center cover
- side cover (left and right)
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 3. Install:
- pocket tester ①
 (onto the engine oil drain bolt)



Pocket tester 90890-03112, YU-03112-C

4. Start the engine and warm it up until the specified oil temperature is reached.

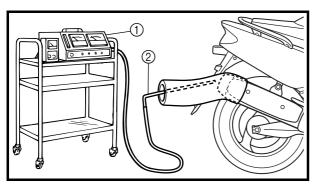


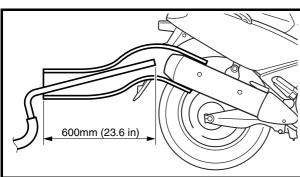
Oil temperature 70 °C (158 °F)

- 5. Measure:
- engine idling speed
 Out of specification → Adjust.
 Refer to "ADJUSTING THE ENGINE IDLING SPEED".



Engine idling speed 1,100 ~ 1,300 r/min





- 6. Install:
 - CO/HC tester (1)
- sampling probe ②

NOTE: _

- Since it is necessary to insert the sampling.
- Probe 600 mm (23.6 in) into the exhaust pipe, be sure to use a heat-resistant rubber tube as shown in the illustration.
- Be sure to set the heat-resistant rubber tube so that exhaust gas does not leak out.
- Before using the carbon CO/HC tester, be sure to read the user's manual.

CHECKING THE EXHAUST GAS AT IDLE/ ADJUSTING THE ENGINE IDLING SPEED



- 7. Measure:
- · carbon monoxide density
- hydrocarbon density
 Out of specification → Replace the muffler assembly.



Carbon monoxide density (when catalytic converter is operating)
0.2 ~ 1.2%
(Reference value)

8. After replacing the muffler assembly, recheck the exhaust gas at idle when catalytic converter is operating.

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ADJUSTING THE ENGINE IDLING SPEED

NOTE:

Prior to adjusting the engine idling speed, the throttle bodies synchronization should be adjusted properly, and the engine should have adequate compression.

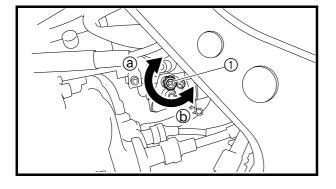
- 1. Remove:
- right side cover
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 2. Start the engine and let it warm up for several minutes.
- 3. Check:
- engine idling speed
 Out of specification → Adjust.



Engine idling speed 1,100 ~ 1,300 r/min

- 4. Adjust:
- engine idling speed
- a. Turn the Idle adjust screw ① in direction ②
 or ⑤ until the specified engine idling speed
 is obtained.

Direction ⓐ	Engine idling speed is increased.
Direction (b)	Engine idling speed is decreased.



ADJUSTING THE ENGINE IDLING SPEED/ ADJUSTING THE THROTTLE CABLE FREE PLAY



- 5. Adjust:
- throttle cable free play Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY".



Throttle cable free play (at the flange of the throttle grip) 3 ~ 5 mm (0.12 ~ 0.20 in)

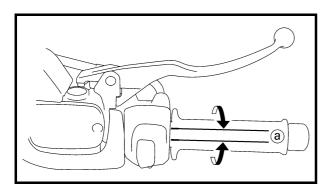
- 6. Install:
- right side cover
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".

EAS0005

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE: _

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



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

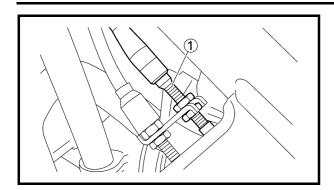


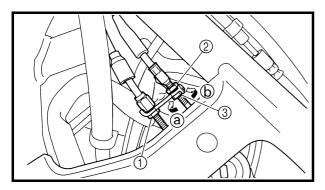
Throttle cable free play (at the flange of the throttle grip) 3 ~ 5 mm (0.12 ~ 0.20 in)

- 2. Remove:
- · center cover
- left side cover
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".

ADJUSTING THE THROTTLE CABLE FREE PLAY







3. Adjust:

• throttle cable free play

NOTE: ______ When the scooter is accelerating, the accelerator cable (1) is pulled.

Throttle body side

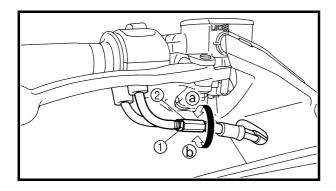
- a. Loosen the locknut ① on the decelerator cable.
- b. Loosen the locknut ② on the accelerator cable.
- c. Turn the adjusting nut ③ in direction ⑥ or
 ⑥ until the specified throttle cable free play is obtained.

Direction (a)	Throttle cable free play is decreased.
Direction (b)	Throttle cable free play is increased.

d. Tighten the locknuts.

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 cover
- b. Loosen the locknut ①.
- c. Turn the adjusting nut ② in direction ③ or
 ⑤ 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 (1).

ADJUSTING THE THROTTLE CABLE FREE PLAY/ CHECKING THE SPARK PLUGS



e. Slide the rubber cover to its original position.

WARNING

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

- 4. Install:
 - · left side cover
 - center cover
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

- 1. Remove:
- center cover
- side cover (left and right)
- inner fender Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 2. Disconnect:
- spark plug caps
- 3. Remove:
- spark plugs

CAUTION:

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

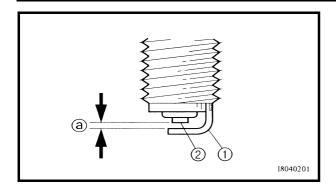
- 4. Check:
- spark plug type Incorrect → Change.



Spark plug type (manufacturer) CR7E (NGK)

CHECKING THE SPARK PLUGS/ CHECKING THE IGNITION TIMING





- 5. Check:
- electrode ①
 Damage/wear → Replace the spark plug.
- insulator ②
 Abnormal color → Replace the spark plug.
 Normal color is a medium-to-light tan color.
- 6. Clean:
 - spark plug (with a spark plug cleaner or wire brush)
- 7. Measure:
- spark plug gap ⓐ
 (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

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 caps

10.Install:

- Inner fender
- side cover (left and right)
- center cover
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".

EAS00062

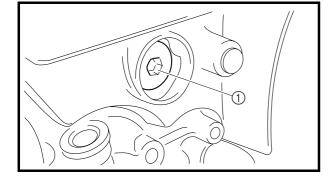
CHECKING THE IGNITION TIMING

NOTE:

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

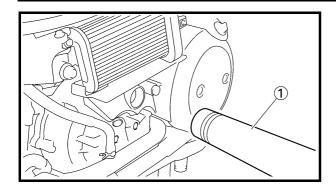


- · center cover
- side cover (left and right)
- left footrest board
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 2. Remove:
- timing plug ①



CHECKING THE IGNITION TIMING/ MEASURING THE COMPRESSION PRESSURE





- 3. Install:
- timing light ①
 (onto the spark plug lead of cylinder #1)



Timing light 90890-03141, YM-33277-B

- 4. 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 1,100 ~ 1,300 r/min

b. Check that the stationary pointer ⓐ is within the firing rang ⓑ on the A.C. magneto.
 Incorrect firing range → Check the ignition system.

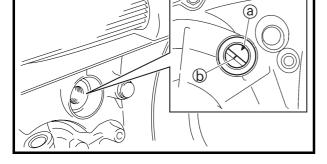
NOTE:

The ignition timing is not adjustable.

- 5. Install:
- timing plug

№ 8 Nm (0.8 m · kg, 5.8 ft · lb)

- 6. Install:
- · left footrest board
- side cover (left and right)
- center cover
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".



EAS00065

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

NOTE: _

Insufficient compression pressure will result in a loss of performance.

MEASURING THE COMPRESSION PRESSURE



- 1. Remove:
 - footrest board (left and right)
- inner fender Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 2. Measure:
- valve clearance
 Out of specification → Adjust.
 Refer to "ADJUSTING THE VALVE CLEARANCE".
- 3. Start the engine, warm it up for several minutes, and then turn it off.
- 4. Disconnect:
 - spark plug cap
- 5. Remove:
 - · spark plug

CAUTION:

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



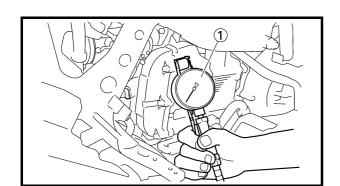
Compression gauge 90890-03081, YU-33223 Extension 90890-04082

- 7. Measure:
 - compression pressure
 Out of specification → Refer to steps (c)
 and (d).

Compression pressure



at 360 r/min (at sea level)
Minimum
1,200 kPa
(12.0 kg/cm², 170.7 psi)
Standard
1,400 kPa
(14.0 kg/cm², 199.1 psi)
Maximum
1,570 kPa
(15.7 kg/cm², 223.3 psi)



MEASURING THE COMPRESSION PRESSURE



a. Set the main switch to "ON".

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

WARNING

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

NOTE:

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 14.22 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 engine of 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 with- out oil	Piston wear or damage → Repair.	
Same as without oil	Piston ring(s), valve(s), cylinder head gasket or pis- ton possibly defec- tive → Repair.	

8. Install:

spark plug

13 Nm (1.3 m ⋅ kg, 9.4 ft ⋅ lb)

9. Connect:

• spark plug cap

10.Install:

• inner fender

 footrest board (left and right)
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".

CHECKING THE ENGINE OIL LEVEL/ CHANGING THE ENGINE OIL



CHECKING THE ENGINE OIL LEVEL

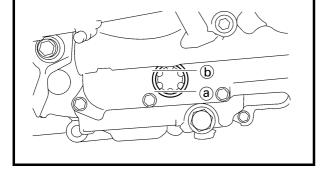
1. Stand the scooter on a level surface.

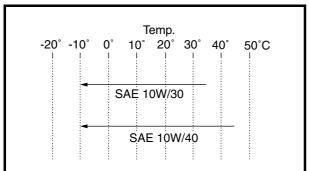
NOTE:

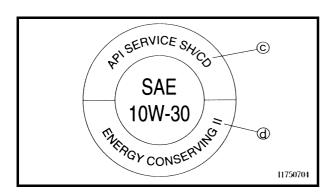
- Place the scooter on a suitable stand.
- Make sure that the scooter is upright.
- 2. Start the engine when the engine is cool, let it idle for two minutes, and then stop it.
- Wait two minutes until the oil settles, and then check the oil level through the check window located at the bottom-left side of the crankcase.
- 4. Check:
 - engine oil level

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

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









Recommended oil

Refer to the chart for the engine oil grade which is best suited for certain atmospheric temperatures.

API standard
SE or higher grade
ACEA standard
G4 or G5

CAUTION:

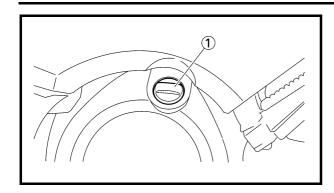
- Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a grade of CD © or higher and do not use oils labeled "ENERGY CON-SERVING II" @ or higher.
- Do not allow foreign materials to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

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.

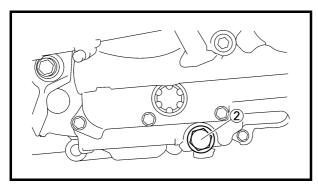
CHANGING THE ENGINE OIL

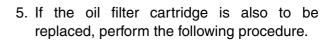


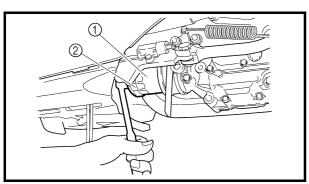




- engine oil filler cap ①
- engine oil drain bolt ② (along with the gasket)
- 4. Drain:
- engine oil (completely from the crankcase)







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



Oil filter wrench 90890-01469

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

CAUTION:

Make sure that the O-ring 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.

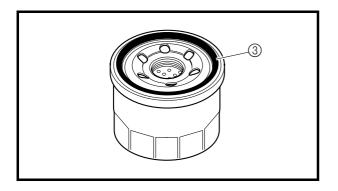


Oil filter cartridge 17 Nm (1.7 m · kg, 12 ft · lb)

6. Check:

- engine oil drain bolt gasket Damage → Replace.
- 7. Install:
 - engine oil drain bolt (along with the gasket)

43 Nm (4.3 m ⋅ kg, 31 ft ⋅ lb)



CHANGING THE ENGINE OIL



- 8. Fill:
 - crankcase
 (with the specified amount of the recommended engine oil)

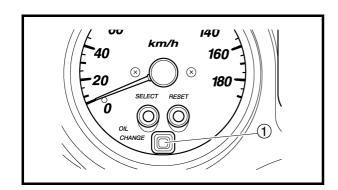


Quantity
Total amount
3.6 L (3.17 Imp qt, 3.81 US qt)
Without oil filter cartridge
replacement
2.8 L (2.46 Imp qt, 2.96 US qt)
With oil filter cartridge replacement
2.9 L (2.55 Imp qt, 3.07 US qt)

- 9. Install:
- engine oil filler cap
- 10.Start the engine, warm it up for several minutes, and then turn it off.
- 11.Check:
- engine (for engine oil leaks)
- 12.Check:
- engine oil level Refer to "CHECKING THE ENGINE OIL LEVEL".
- 13.Reset:
- · engine oil change indicator light
- a. Turn the key to "ON".
- b. Hold the "OIL CHANGE" button ① pushed for two to eight seconds.
- c. Release the "OIL CHANGE" button ①, and the oil change indicator light will go off.



If the engine oil is changed before the oil change indicator light comes on (i.e. before the periodic oil change interval has been reached), the indicator light must be reset after the oil change for the next periodic oil change to be indicated at the correct time. To reset the oil change indicator light before the periodic oil change interval has been reached, follow the above procedure, but note that the indicator light will come on for 1.4 seconds after releasing the "OIL CHANGE" button, otherwise repeat the procedure.



MEASURING THE ENGINE OIL PRESSURE



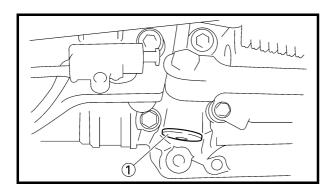
EAS0007

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. Remove:
 - left lower side cover mole
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 3. Start the engine, warm it up for several minutes, and then turn it off.

CAUTION:

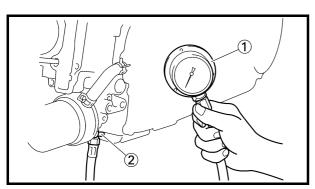
When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.



- 4. Remove:
 - main gallery plug ①
 - O-ring

WARNING

The engine, muffler and engine oil are extremely hot.



- 5. Install:
- pressure gauge 1
- oil pressure adapter B ②



Pressure gauge 90890-03153 Oil pressure adapter B 90890-03124

MEASURING THE ENGINE OIL PRESSURE/ **CLEANING THE AIR FILTER ELEMENT**



- 6. Measure:
- engine oil pressure (at the following conditions) Out of specification \rightarrow Replace.



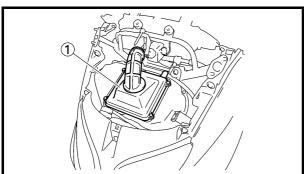
Engine oil pressure 150 kPa (1.50 kg/cm², 21.8 psi) at 1,200 r/min Engine oil temperature 70 °C (158 °F)

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:
- O-ring New
- main gallery plug

№ 12 Nm (1.2 m · kg, 8.7 ft · lb)

- 8. Install:
- left lower side cover mole Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".



CLEANING THE AIR FILTER ELEMENT

- 1. Remove:
- front cowling upper cover
- windshield
- front cowling inner panel Refer to "FRONT COWLING".
- 2. Remove:
- air filter case cover (1)
- air filter element
- 3. Clean:
- air filter element Apply compressed air to the outer surface of the air filter element.
- 4. Check:
- air filter element Damage \rightarrow Replace.

CLEANING THE AIR FILTER ELEMENT/ CLEANING THE V-BELT CASE AIR FILTER ELEMENT



- 5. Install:
- · air filter element
- air filter case cover

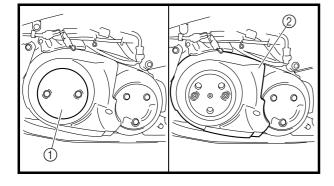
CAUTION:

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

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

- 6. Install:
- front cowling inner panel
- windshield
- front cowling upper cover Refer to "FRONT COWLING".

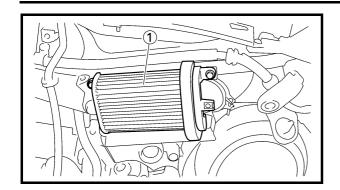


CLEANING THE V-BELT CASE AIR FILTER ELEMENT

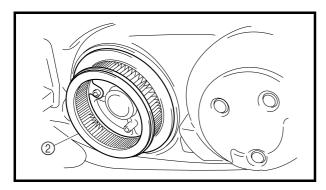
- 1. Remove:
- left upper side cover mole
- left footrest board
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 2. Remove:
- V-belt case cover 2 ①
- V-belt case air filter cover ②

CLEANING THE V-BELT CASE AIR FILTER ELEMENT





- 3. Remove:
- V-belt case air filter element (left) ①
- V-belt case air filter element (right) ②





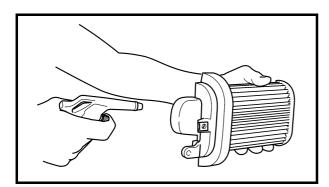
V-belt case air filter element
 Apply compressed air to the inner surface of V-belt case air filter element.



• V-belt case air filter element $\mathsf{Damage} \to \mathsf{Replace}.$



Since the V-belt case air filter element is a dry type, do not let grease or water contact it.



- 6. Install:
- V-belt case air filter element (right)
- V-belt case air filter cover

№ 7 Nm (0.7 m · kg, 5.1 ft · lb)

• V-belt case cover 2

№ 7 Nm (0.7 m · kg, 5.1 ft · lb)

• V-belt case air filter element (left)

№ 7 Nm (0.7 m · kg, 5.1 ft · lb)

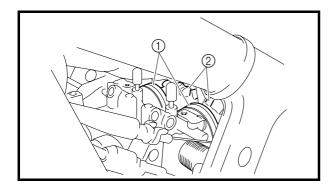
- 7. Install:
- · left footrest board
- left upper side cover mole
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".



CHECKING THE THROTTLE BODY JOINTS AND INTAKE MANIFOLDS

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

- 1. Remove:
- leg shield
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".



2. Check:

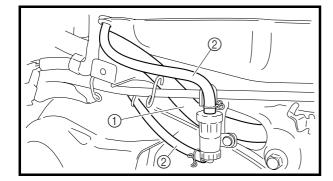
- throttle body joints ①
- intake manifolds ②
 Cracks/damage → Replace.
 Refer to "THROTTLE BODY" in chapter 7.
- 3. Install:
 - leg shield Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".

EAS00097

CHECKING THE FUEL HOSES AND FUEL TANK BREATHER HOSE

The following procedure applies to all of the fuel hoses and fuel tank breather hose.

- 1. Remove:
 - · right footrest board
- right upper side cover mole
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 2. Check:
- fuel hose 1
- fuel tank breather hose ②
 Cracks/damage → Replace.
- 3. Install:
 - right upper side cover mole
- right footrest board
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".



CHECKING THE CRANKCASE BREATHER HOSE

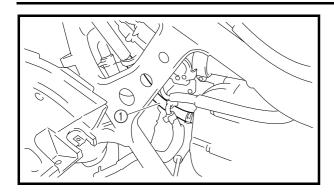
1. Remove:

LEG SHIELD".

leg shield
 Refer to "SIDE COVER MOULDINGS AND

CHECKING THE CRANKCASE BREATHER HOSE/ CHECKING THE EXHAUST SYSTEM





2. Check:

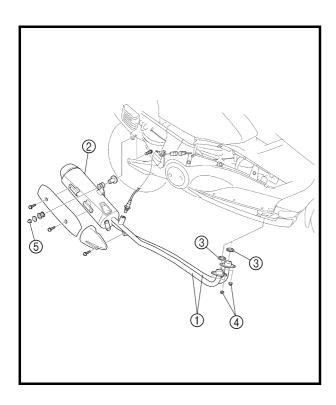
crankcase breather hose ①
 Cracks/damage → Replace.
 Loose connection → Connect properly.

CAUTION:

Make sure that the crankcase breather hose is routed correctly.

3. Install:

 leg shield Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".



FAS00099

CHECKING THE EXHAUST SYSTEM

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

1. Remove:

- right rear side cover
 Refer to "REAR COVERS AND TAIL/ BRAKE LIGHT ASSEMBLY".
- inner fender Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 2. Check:
 - exhaust pipes (1)
- muffler 2Cracks/damage \rightarrow Replace.
- gasket ③ New Exhaust gas leaks → Replace.
- 3. Check:
- tightening torque



Exhaust pipe nut ④
20 Nm (2.0 m · kg, 14 ft · lb)
Muffler nut ⑤
31 Nm (3.1 m · kg, 22 ft · lb)

CHECKING THE EXHAUST SYSTEM/ CHECKING THE COOLANT LEVEL



- 4. Install:
 - inner fender Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- right rear side cover
 Refer to "REAR COVERS AND TAIL/ BRAKE LIGHT ASSEMBLY".

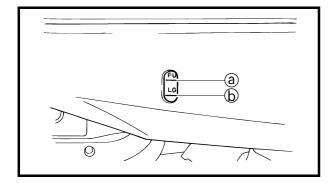
EAS00103

CHECKING THE COOLANT LEVEL

1. Stand the scooter on a level surface.

NOTE: _

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



2. Check:

· coolant level

The coolant level should be between the maximum level mark (a) and minimum level marks (b).

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

CAUTION:

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

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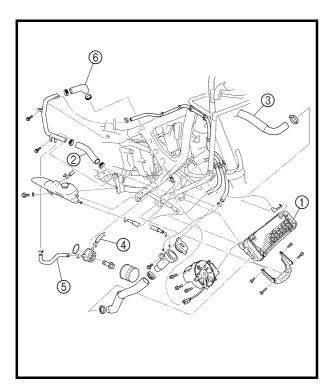
Before checking the coolant level, wait a few minutes until it settles.

CHECKING THE COOLING SYSTEM



CHECKING THE COOLING SYSTEM

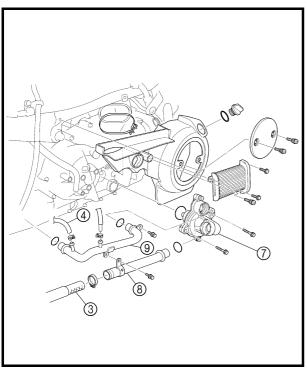
- 1. Remove:
- footrest board (left and right)
- leg shield
- inner fender Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".



2. Check:

- radiator ①
- radiator inlet hose ②
- radiator outlet hose ③
- oil cooler inlet hose 4
- oil cooler outlet hose ⑤
- thermostat outlet hose (6)
- water pump ⑦
- water pump inlet pipe (8)
- water pump outlet pipe ⑨
 Cracks/damage → Replace.

 Refer to "COOLING SYSTEM" in chapter 6.
- 3. Install:
- inner fender
- leg shield
- footrest board (left and right)
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".

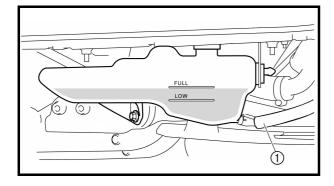


CHANGING THE COOLANT



CHANGING THE COOLANT

- 1. Remove:
- · left footrest board mat
- front side cover mole (left and right) Refer to "FRONT COWLING".
- coolant reservoir cap access panel
- lower side cover mole (left and right)
- inner fender Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- 2. Disconnect:
- coolant reservoir hose (1)
- 3. Drain:
 - coolant (from the coolant reservoir)



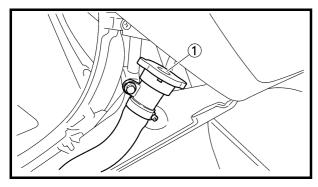
4. Remove:

radiator cap ①

WARNING

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

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



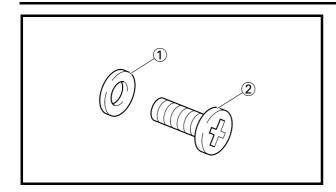


5. Remove:

- coolant drain bolt ①
 (along with the rubber washer)
- 6. Drain:
- coolant

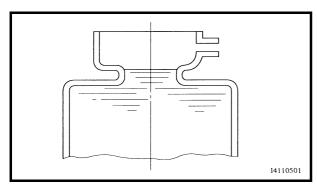
CHANGING THE COOLANT





- 7. Check:
- rubber washer ①
- drain bolt ②
- 8. Install:
 - drain bolt

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- 9. Connect:
- coolant reservoir hose



10.Fill:

 cooling system (with the specified amount of the recommended coolant)



Recommended antifreeze
High-quality ethylene glycol
antifreeze containing corrosion
inhibitors for aluminum engines
Mix ratio
50% antifreeze/50% water
Quantity
Total amount
1.5 L
(1.32 Imp qt, 1.59 US qt)
Coolant reservoir capacity
0.35 L
(0.31 Imp qt, 0.37 US qt)

Handling notes for coolant

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

⚠ WARNING

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

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.

CHANGING THE COOLANT/ CHECKING THE CHAIN DRIVE OIL LEVEL



- Use only distilled water. Soft water may be used if distilled water is not available.
- If coolant comes into contact with painted surfaces, immediately wash them with water.
- Do not mix different types of antifreeze.



• radiator cap

12.Fill:

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

13.Install:

- · coolant reservoir cap
- 14.Start the engine, warm it up for several minutes, and then turn it off.

15.Check:

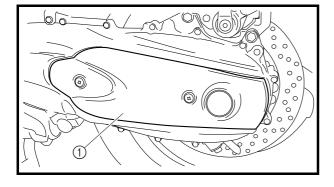
 coolant level Refer to "CHECKING THE COOLANT LEVEL".

NOTE: __

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

16.Install:

- inner fender
- lower side cover mole (left and right)
- coolant reservoir cap access panel
 Refer to "SIDE COVER MOULDINGS AND LEG SHIELD".
- front side cover mole (left and right)
- left footrest board mat Refer to "FRONT COWLING".



CHECKING THE CHAIN DRIVE OIL LEVEL

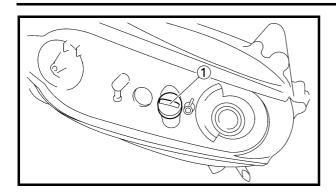
1. Stand the scooter on a level surface.

NOTE

- Place the scooter on a suitable stand.
- Make sure that the scooter up right.
- 2. Remove:
- chain drive case cover ①

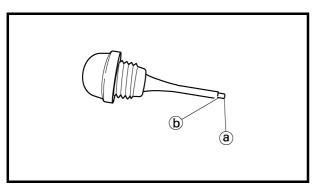
CHECKING THE CHAIN DRIVE OIL LEVEL/ CHANGING THE CHAIN DRIVE OIL





3. Remove:

• chain drive oil filler cap (1)



4. Check:

• chain drive oil level

Wipe the dipstick clean, insert it into the oil filler hole (without screw it in), and then remove it to check the oil level.

The chain drive oil level should be between the minimum level mark (a) and maximum level mark (b).

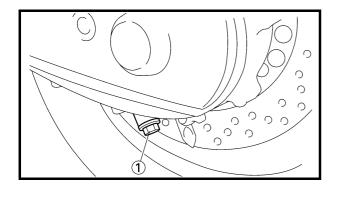
Below the minimum level mark \rightarrow Add the recommended chain drive oil to the proper level.



Recommended chain drive oil SAE 80 API GL-4 Hypoid gear oil

- 5. Install:
 - · chain drive oil filler cap
- · chain drive case cover

№ 7 Nm (0.7 m · kg, 5.1 ft · lb)



CHANGING THE CHAIN DRIVE OIL

- 1. Place a container under the chain drive.
- 2. Remove:
- chain drive case cover
- chain drive oil filler cap
- chain drive oil drain bolt ①
 Completely drain the chain drive of its oil.
- 3. Check:
- drain bolt gasket
 Damage → Replace.
- 4. Install:
 - chain drive oil drain bolt

20 Nm (2.0 m · kg, 14 ft · lb)

CHECKING THE CHAIN DRIVE OIL LEVEL



- 5. Fill:
- chain drive oil
 (with the specified amount of the recommended chain drive oil)



Quantity 0.70 L (0.62 Imp qt, 0.74 US qt)

- 6. Check:
- chain drive oil level Refer to "CHECKING THE CHAIN DRIVE OIL LEVEL".

ADJUSTING THE REAR BRAKE LOCK LEVER CABLE



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ADJUSTING THE REAR BRAKE LOCK LEVER CABLE

WARNING

Do not use the rear brake lock lever while driving.

NOTE: .

- Place the scooter on the centerstand.
- Before adjusting the rear brake lock lever, check the rear brake fluid level.



rear brake lock lever cable length ⓐ
 Out of specification → Adjust.



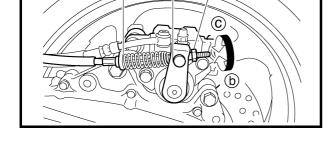
Rear brake lock lever cable length 45 ~ 47 mm (1.77 ~ 1.85 in)

- 2. Adjust:
- rear brake lock lever cable length

a. Slowly apply the rear brake several times.

- b. Turn the adjusting nut ① until rear brake lock lever cable length ② is 42 ~ 44 mm (1.65 ~ 1.73 in) with the rear brake lock lever released.
- c. Set the rear brake lock lever, wait more than 5 minutes, and then release the rear brake lock lever.
- d. Turn the adjusting nut ① until rear brake lock lever cable length ② is 45 ~ 47mm (1.77 ~ 1.85 in) with the rear brake lock lever released.

Direction (b)	Rear brake lock lever cable length increased.
Direction ©	Rear brake lock lever cable length decreased.



(a)

CHECKING THE BRAKE FLUID LEVEL



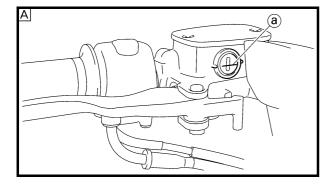
EAS00116

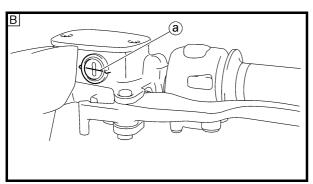
CHECKING THE BRAKE FLUID LEVEL

1. Stand the scooter on a level surface.

NOTE:

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





2. Check:

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



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

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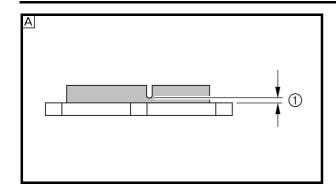
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

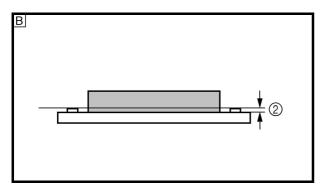
ı			

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

CHECKING THE BRAKE PADS/ CHECKING THE BRAKE HOSES







CHECKING THE BRAKE PADS

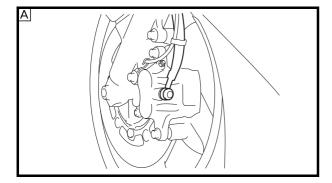
The following procedure applies to all of the brake pads.

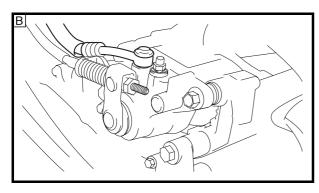
- 1. Operate the brake.
- 2. Check:
 - front brake pad
 Wear indicator groove ① almost disappeared → Replace the brake pads as a set.
 Refer to "FRONT AND REAR BRAKES" in chapter 4.
- rear brake pad
 Wear indicator ② almost touch the brake
 disc → Replace the brake pads as a set.
 Refer to "FRONT AND REAR BRAKES" in
 chapter 4.



Brake pad wear limit 0.8 mm (0.03 in)

- A Front brake
- **B** Rear brake





EAS00132

CHECKING THE BRAKE HOSES

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

- 1. Check:
- brake hose ${\it Cracks/damage/wear} \to {\it Replace}.$
- 2. Check:
- brake hose clamp
 Loose connection →Tighten.
- 3. Hold the scooter upright and apply the brake several times.
- 4. Check:
- brake hose

Brake fluid leakage \rightarrow Replace the damaged hose.

Refer to "FRONT AND REAR BRAKES" in chapter 4.

- A Front
- **B** Rear

BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)



EAS0013

BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)

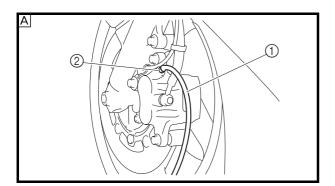
WARNING

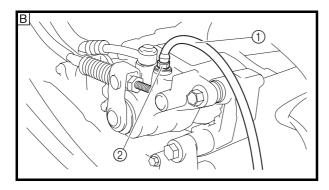
Bleed the hydraulic brake system whenever:

- the system was disassembled.
- a brake hose was 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 to overflow
- When bleeding the hydraulic brake system, make sure that there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic brake system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.





- 1. Bleed:
- hydraulic brake system
- a. Fill the brake master cylinder reservoir to the proper level with the recommended brake fluid.
- b. Install the brake master cylinder reservoir diaphragm.
- c. Connect a clear plastic hose ① tightly to the bleed screw ②.
- A Front
- **B** Rear
- d. Place the other end of the hose into a container
- e. Slowly apply the brake several times.
- f. Fully squeeze the brake lever and do not release it.

BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)/ BLEEDING THE BRAKE SYSTEM (XP500A)



g. Loosen the bleed screw.

NOTE:

Loosening the bleed screw will release the pressure and cause the brake levers to contact the handlebar.

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



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

k. Fill the brake fluid reservoir to the proper level.

Refer to "CHECKING THE BRAKE FLUID LEVEL".

⚠ WARNING

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

EAS00892

BLEEDING THE BRAKE SYSTEM (XP500A)

WARNING

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

CAUTION:

Bleed the brake system in the following order.

1st: Front brake caliper 2nd: Rear brake caliper

BLEEDING THE BRAKE SYSTEM (XP500A)



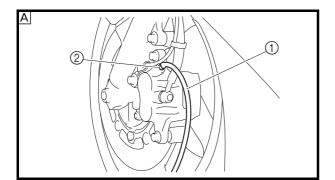
WARNING

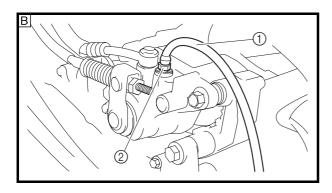
Bleed the ABS whenever:

- 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 to overflow.
- When bleeding the ABS, make sure there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the ABS, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours.
- Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.





- 1. Bleed:
 - ABS
- a. Fill the brake master cylinder reservoir to the proper level with the recommended brake fluid.
- b. Install the brake master cylinder reservoir diaphragm.
- c. Connect a clear plastic hose ① tightly to the bleed screw ②.
- A Front
- **B** Rear
- d. Place the other end of the hose into a container
- e. Slowly apply the brake several times.
- f. Fully squeeze the brake lever and do not release it.

BLEEDING THE BRAKE SYSTEM (XP500A)



g. Loosen the bleed screw.

NOTE:

Loosening the bleed screw will release the pressure and cause the brake levers to contact the handlebar.

- h. Tighten the bleed screw, and then release the brake lever.
- 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 "[D-6-3-1] Hydraulic unit operation test 1" in chapter 4.

CAUTION:

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

- k. After operating the ABS, repeat steps (e) to (i), and then fill the primary circuit with 60 cm³ (2.11 Imp oz, 2.03 US oz) of the recommended brake fluid.
- I. Tighten the bleed screw to the specified torque.



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

m. Fill the brake fluid reservoir to the proper level with the recommended brake fluid. Refer to "CHECKING THE BRAKE FLUID LEVEL".

⚠ WARNING

After bleeding the ABS, check the brake operation.

CHECKING AND ADJUSTING THE STEERING HEAD



EAS00146

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the scooter on a level surface.

WARNING

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

NOTE: ______ Place the scooter on a suitable stand so that the front wheel is elevated.

2. Check:

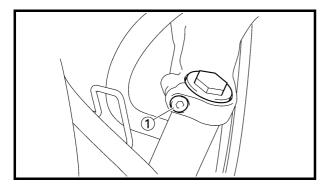
steering head
 Grasp the bottom of the front fork legs and gently rock the front fork.
 Looseness/binding → Adjust the steering head.

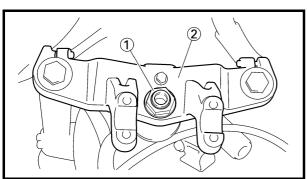
3. Remove:

handlebar
 Refer to "HANDLEBAR" in chapter 4.

4. Loosen:

• upper bracket pinch bolts ①



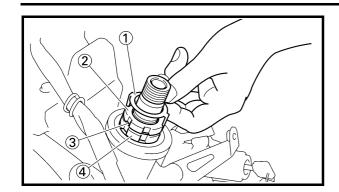


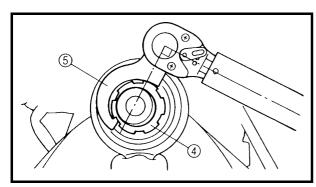
5. Remove:

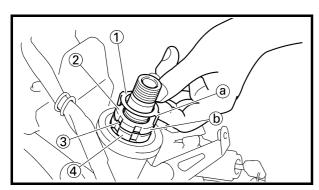
- steering stem nut 1
- upper bracket ②

CHECKING AND ADJUSTING THE STEERING HEAD









- 6. Adjust:
- steering head
- a. Remove the lock washer ①, the upper ring nut ②, and the rubber washer ③.
- b. Loosen the lower ring nut 4 and then tighten it to specification with a steering nut wrench 5.

NOTE: _

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



Steering nut wrench 90890-01403, YM-33975



Lower ring nut (initial tightening torque)

52 Nm (5.2 m · kg, 37 ft · lb)

c. Loosen the lower ring nut ④ completely, then tighten it to specification.

WARNING

Do not overtighten the lower ring nut.



Lower ring nut (final tightening torque)

20 Nm (2.0 m · kg, 14 ft · lb)

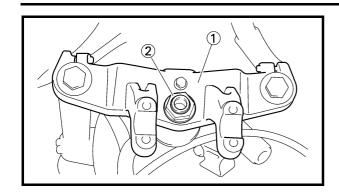
- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and inspect the upper and lower bearings.
 - Refer to "STEERING HEAD" in chapter 4.
- e. Install the rubber washer ③.
- f. Install the upper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

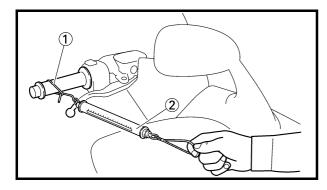
NOTE

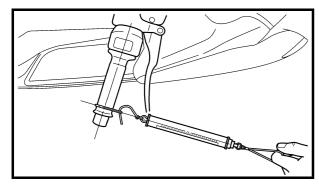
Make sure that the lock washer tabs ⓐ sit correctly in the ring nut slots ⓑ.

CHECKING AND ADJUSTING THE STEERING HEAD









- 7. Install:
- upper bracket ①
- steering stem nut ②
- 8. Tighten:
 - upper bracket pinch bolt

30 Nm (3.0 m ⋅ kg, 22 ft ⋅ lb)

steering stem nut

🗽 110 Nm (11.0 m · kg, 80 ft · lb)



 steering head tension (with the scooter still on the stand)

NOTE:

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

- a. Point the front wheel straight ahead.
- b. Install a plastic locking tie ① loosely around the end of the handlebar as shown.
- c. Hook a spring gauge ② onto the plastic locking tie.
- d. Hold the spring gauge at a 45° angle from the handlebar, pull the spring gauge, and record the measurement when the handlebar starts to turn.



Steering head tension

1.96 ~ 4.90 N

(200 ~ 500 gf, 7.06 ~ 17.65 oz)

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

CHECKING THE FRONT FORK



EAS00149

CHECKING THE FRONT FORK

1. Stand the scooter on a level surface.



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



inner tube
 Damage/scratches → Replace.

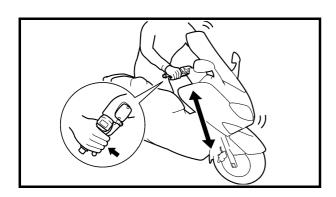


- 3. Hold the scooter upright and apply the front brake.
- 4. Check:
- front fork operation

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

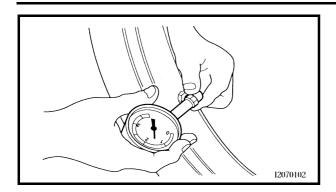
 $\mbox{Rough movement} \rightarrow \mbox{Repair}.$

Refer to "FRONT FORK" in chapter 4.



CHECKING THE TIRES





CHECKING THE TIRES

The following procedure applies to both of the tires.

- 1. Measure:
- tire pressure
 Out of specification → Regulate.

WARNING

- The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.
- The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
- Operation of an overloaded scooter could cause tire damage, an accident or an injury.

NEVER OVERLOAD THE SCOOTER.

Basic weight (with oil and a full fuel tank)	225 kg (496 l 230 kg (507 l	, ,
Maximum	190 kg (419 l	b) (XP500)
load*	185 kg (408 l	b) (XP500A)
Cold tire pressure	Front	Rear
Un to OO ka	225 kPa	250 kPa
Up to 90 kg load*	(2.25 kgf/cm ² ,	(2.50 kgf/cm ² ,
ioau	33 psi)	36 psi)
00 kg movi	225 kPa	280 kPa
90 kg ~ maxi- mum load*	(2.25 kgf/cm ² ,	(2.80 kgf/cm ² ,
mum load	33 psi)	41 psi)
High speed	225 kPa	250 kPa
High-speed riding	(2.25 kgf/cm ² ,	(2.50 kgf/cm ² ,
riding	33 psi)	36 psi)

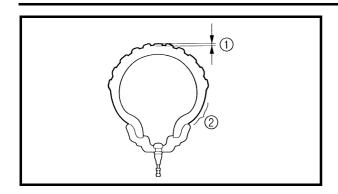
 ^{*} Total weight of rider, passenger, cargo and accessories

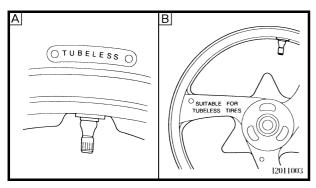
WARNING

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

CHECKING THE TIRES







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



Minimum tire tread depth 1.6 mm (0.06 in)

- 1) Tire tread depth
- ② Side wall

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 that 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

 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 scooter.

CHECKING THE TIRES/ CHECKING THE WHEELS



Front tire

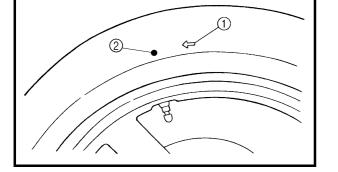
Manufacturer	Size	Model
BRIDGESTONE	120/70R14 M/C 55H	TH01F
DUNLOP	120/70R14 M/C 55H	D252F

Rear tire

Manufacturer	Size	Model	
BRIDGESTONE	160/60R-15 M/C 67H	TH01R	
DUNLOP	160/60R-15 M/C 67H	D252	

⚠ WARNING

After mounting a new tire, ride conservatively for a while to become accustomed to the "feel" of the new tire and to allow the tire to seat itself properly in the rim. Failure to do so could lead to an accident with possible injury to the rider or damage to the scooter.



NOTE: _

For tires with a direction of rotation mark (1):

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

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

- 1. Check:
- wheel $\label{eq:def-power} \mbox{Damage/out-of-round} \rightarrow \mbox{Replace}.$

WARNING

Never attempt to make any repairs to the wheel.

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1 1	$\mathbf{\circ}$		_	=

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



EAS00170

CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the cable sheaths and cables.

WARNING

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

- 1. Check:
 - cable sheath
 Damage → Replace.
- 2. Check:
- cable operation
 Unsmooth operation → 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.

EAS00171

LUBRICATING THE LEVERS

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



Recommended lubricant Lithium-soap-based grease

AS00173

LUBRICATING THE CENTERSTAND

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



Recommended lubricant Lithium-soap-based grease

LUBRICATING THE SIDESTAND



EAS00172

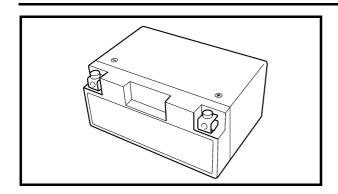
LUBRICATING THE SIDESTAND

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



Recommended lubricant Lithium-soap-based grease





EAS00179

ELECTRICAL SYSTEM CHECKING AND CHARGING THE BATTERY

WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- Wear protective eye gear when handling or working near batteries.
- · Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).
- DO NOT SMOKE when charging or handling batteries.
- KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.
- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.

FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

- Skin Wash with water.
- Eyes Flush with water for 15 minutes and get immediate medical attention.

INTERNAL

 Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.

CAUTION:

- This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
- Charging time, charging amperage and charging voltage for an MF battery are different from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.



NOTE:

Since MF batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

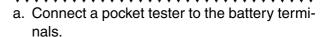


- battery cover Refer to "FUEL TANK".
- 2. Disconnect:
- battery leads (from the battery terminals)

CAUTION:

First, disconnect the negative battery lead ①, and then the positive battery lead ②.

- 3. Remove:
- battery
- 4. Check:
- · battery charge



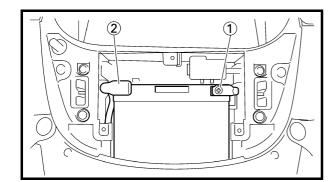
Positive tester probe \rightarrow positive battery terminal Negative tester probe \rightarrow negative battery terminal

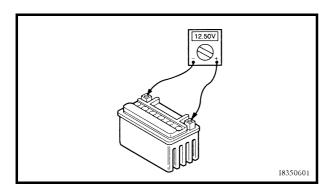
NOTE:

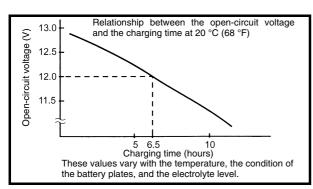
- The charge state of an MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.
- b. Check the charge of the battery, as shown in the charts and the following example.

Example

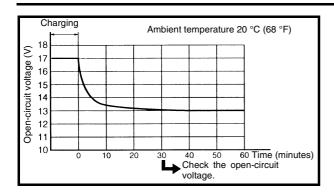
- c. Open-circuit voltage = 12.0 V
- d. Charging time = 6.5 hours
- e. Charge of the battery = $20 \sim 30\%$

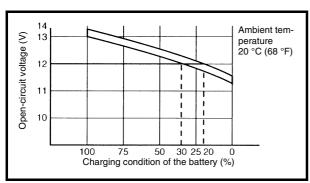












- 5. Charge:
 - battery (refer to the appropriate charging method illustration)

WARNING

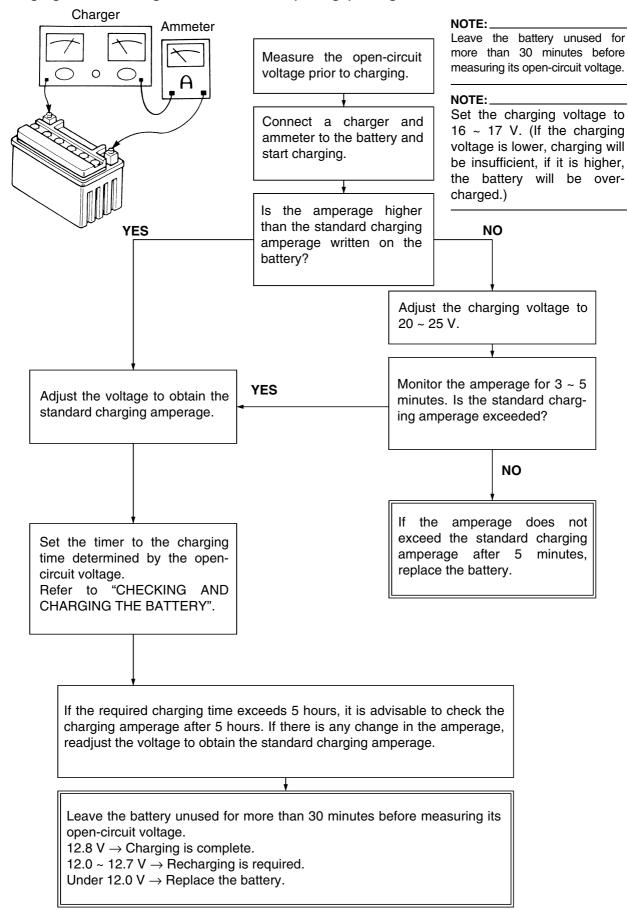
Do not quick charge a battery.

CAUTION:

- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the scooter. (If charging has to be done with the battery mounted on the scooter, disconnect the negative battery lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.

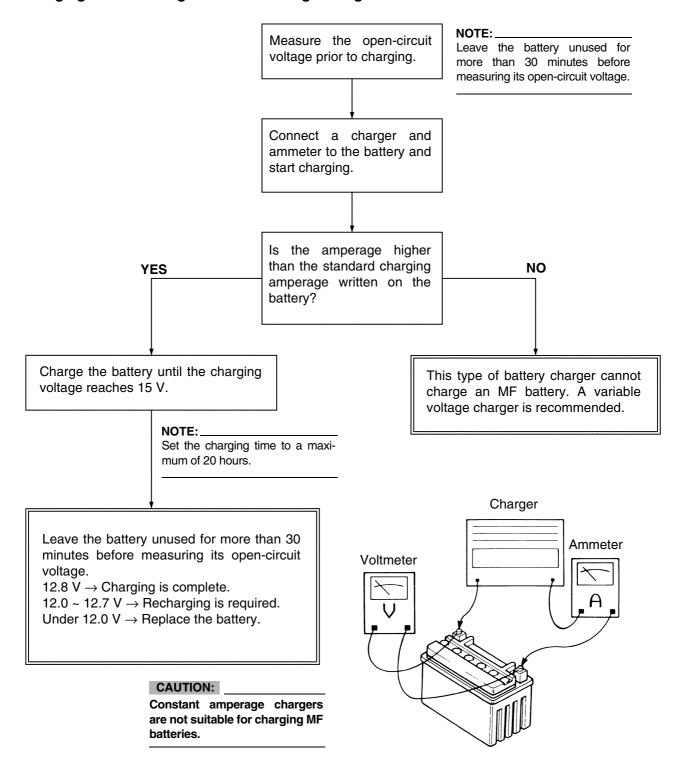


Charging method using a variable-current (voltage) charger



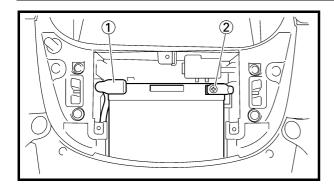


Charging method using a constant voltage charger



CHECKING AND CHARGING THE BATTERY/ CHECKING THE FUSES





- 6. Install:
- battery
- 7. Connect:
- battery leads (to the battery terminals)

CAUTION:

First, connect the positive battery lead \bigcirc , and then the negative battery lead \bigcirc .

- 8. Check:
- battery terminals
 Dirt → Clean with a wire brush.
 Loose connection → Connect properly.
- 9. Lubricate:
- · battery terminals



Recommended lubricant Dielectric grease

10.Install:

 battery cover Refer to "FUEL TANK".

EAS00181

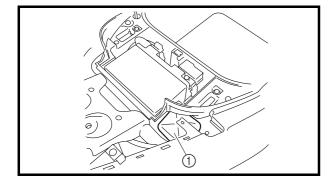
CHECKING THE FUSES

The following procedure applies to all of the fuses.

CAUTION:

To avoid a short circuit, always set the main switch to "OFF" when checking or replacing a fuse.

- 1. Remove:
- grab bar
- rear cover
 Refer to "REAR COVERS AND TAIL/ BRAKE LIGHT ASSEMBLY".
- battery cover Refer to "FUEL TANK".
- 2. Remove:
- starter relay cover (1)



CHECKING THE FUSES



- 3. Check:
- · continuity

a. Connect the pocket tester to the fuse and check the continuity.

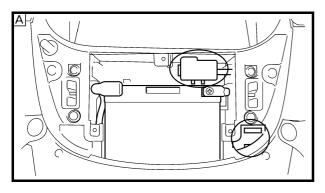
NOTE: _

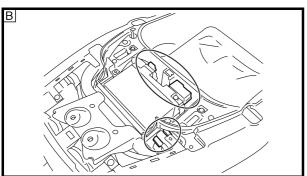
Set the pocket tester selector to " $\Omega \times 1$ ".



Pocket tester 90890-03112, YU-03112-C

b. If the pocket tester indicates " ∞ ", replace the fuse.





- 4. Replace:
- blown fuse
- a. Set the main switch to "OFF".
- b. Install a new fuse of the correct amperage.

- c. Set the main switch to "ON" and verify if the electrical circuit is operational.
- d. If the fuse immediately blows again, check the electrical circuit.
- A XP500
- **B** XP500A

CHECKING THE FUSES



Item	Amperage	Q'ty
Main fuse	30 A	1
Headlight fuse	15 A	1
Signaling system	20 A (XP500)	1
fuse	15 A (XP500A)	1
Ignition fuse	10 A	1
Radiator fan motor fuse	15 A	1
Lighting system fuse	10 A	1
Fuel injection sys- tem fuse	10 A	1
ABS motor fuse	30 A (XP500A)	1
ABS control unit fuse	5A (XP500A)	1
Backup fuse (stor- age box light, immo- bilizer unit, and meter assembly)	10 A	1
	30 A	1
	20 A (XP500)	1
Spare fuse	15 A	1
	10 A	1
	5 A (XP500A)	1

WARNING

Never use a fuse with an amperage 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.

- 5. Install:
- starter relay cover
- 6. Install:
- battery cover Refer to "FUEL TANK".
- rear cover
- grab bar Refer to "REAR COVERS AND TAIL/ BRAKE LIGHT ASSEMBLY".

REPLACING THE HEADLIGHT BULBS

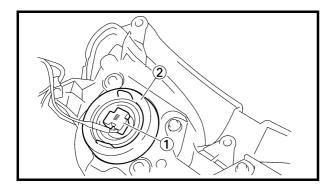


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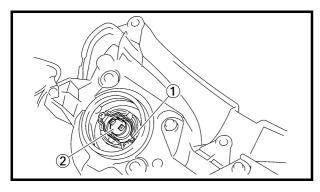
REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

- 1. Remove:
- front cowling Refer to "FRONT COWLING".



- 2. Disconnect:
- headlight coupler ①
- 3. Remove:
- headlight bulb holder 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

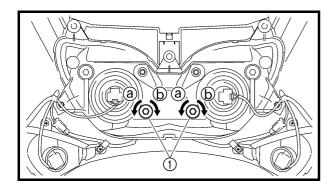
REPLACING THE HEADLIGHT BULBS/ ADJUSTING THE HEADLIGHT BEAM



- 8. Install:
- headlight bulb holder cover
- 9. Connect:
- · headlight coupler

10.Install:

• front cowling Refer to "FRONT COWLING".

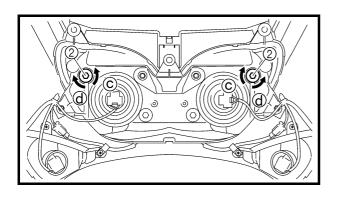


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ADJUSTING THE HEADLIGHT BEAM

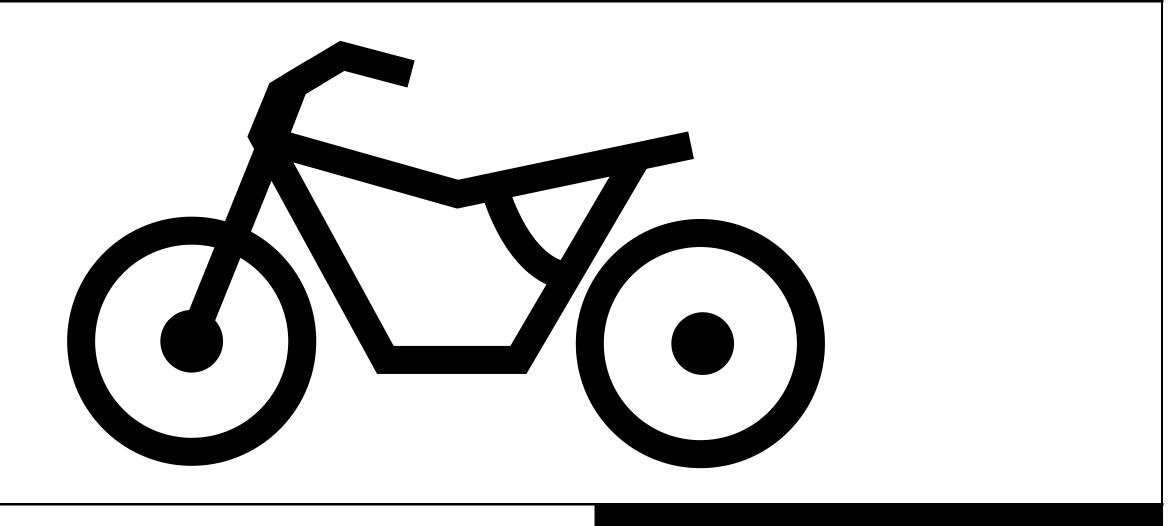
- 1. Adjust:
- headlight beam (vertically)
- a. Turn the adjusting screws ① in direction ② or ⑤.

Direction (a)	Headlight beam is raised.
Direction (b)	Headlight beam is lowered.



- 2. Adjust:
- headlight beam (horizontally)
- a. Turn the adjusting screws ② in direction ⓒ or ⓓ.

Direction ©	Headlight beam moves to the right.
Direction (d)	Headlight beam moves to the left.



CHAS [4]



CHAPTER 4 CHASSIS

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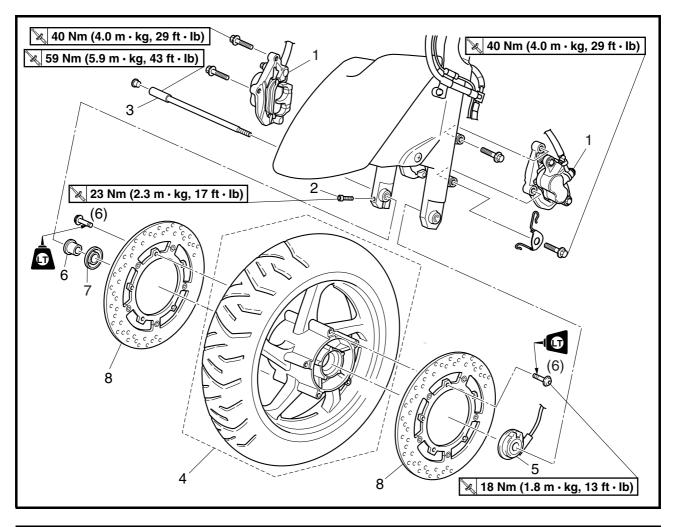


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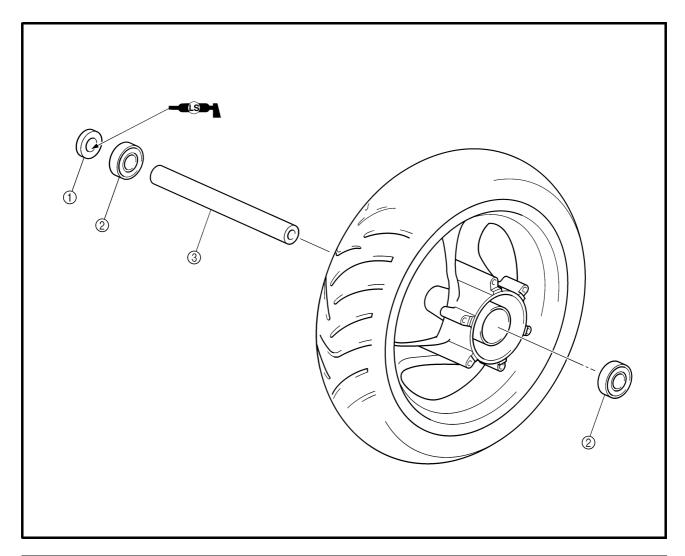


CHASSIS

FRONT WHEEL AND BRAKE DISC



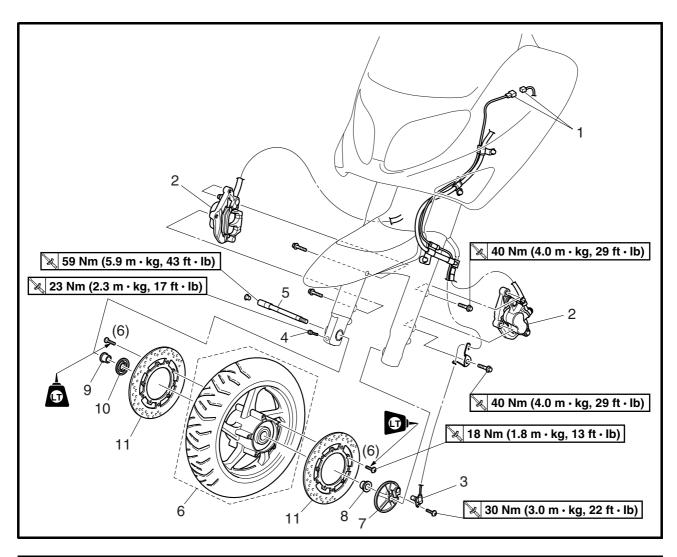
Order	Job/Part	Q'ty	Remarks
	Removing the front wheel and brake		Remove the parts in the order listed.
	disc (XP500)		NOTE:
			Place the scooter on a suitable stand so that the front wheel is elevated.
1	Front brake caliper (left and right)	2	Refer to "REMOVING
2	Front wheel axle pinch bolt	1	Loosen. THE FRONT WHEEL
3	Front wheel axle	1	- (XP500)" and "INSTALL-
4	Front wheel	1	ING THE FRONT WHEEL
5	Speed sensor	1	∫ (XP500)".
6	Collar	1	
7	Dust cover	1	
8	Brake disc	2	
			For installation, reverse the removal procedure.



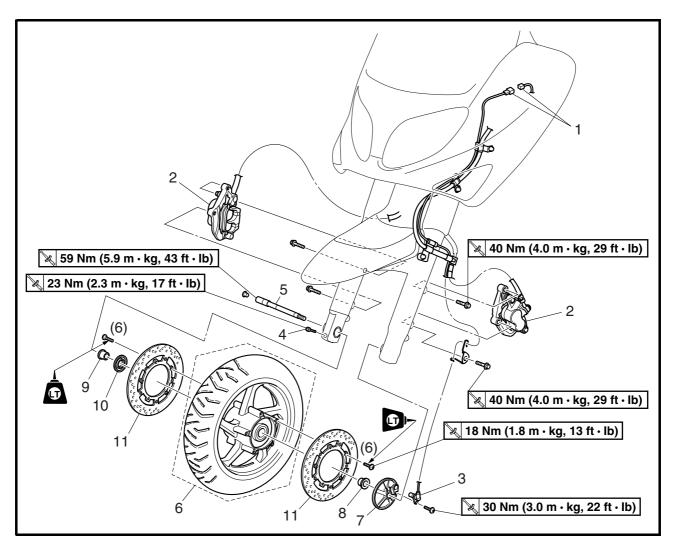
Order	Job/Part	Q'ty	Remarks
	Disassembling the front wheel (XP500)		Remove the parts in the order listed.
1	Oil seal	1	
2	Bearing	2	
3	Collar	1	
			For assembly, reverse the disassembly
			procedure.



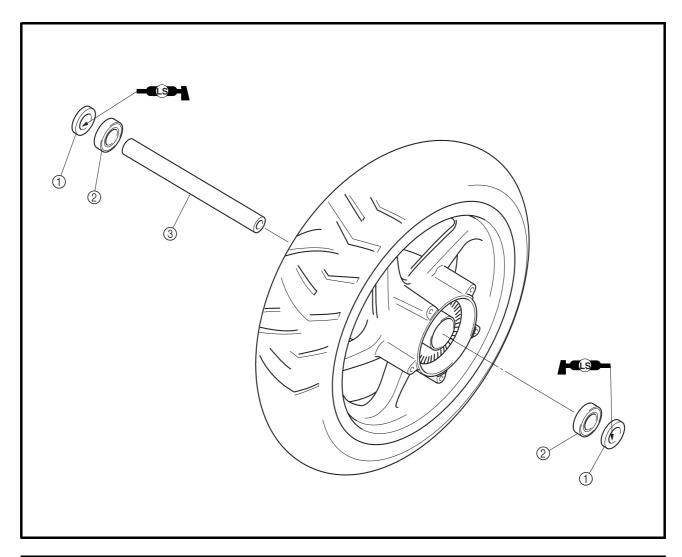
EAS00889



Order	Job/Part	Q'ty		Remarks
	Removing the front wheel and brake		Remove the p	parts in the order listed.
	disc (XP500A)		NOTE:	
				ooter on a suitable stand so wheel is elevated.
	Front cowling upper cover		Refer to "CO\ ter 3.	/ER AND PANEL" in chap-
1	Front wheel sensor coupler	1	Disconnect	Refer to "REMOVING
2	Front brake caliper (left and right)	2		THE FRONT WHEEL
3	Front wheel sensor	1		AND FRONT WHEEL
4	Front wheel axle pinch bolt	1	Loosen.	SENSOR (XP500A)" and
5	Front wheel axle	1		"INSTALLING THE
6	Front wheel	1		FRONT WHEEL AND
7	Sensor housing	1	-	FRONT WHEEL SENSOR (XP500A)".



Order	Job/Part	Q'ty	Remarks
8	Collar (left)	1	
9	Collar (right)	1	
10	Dust cover	1	
11	Brake disc	2	
			For installation, reverse the removal
			procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the front wheel (XP500A)		Remove the parts in the order listed.
1	Oil seal	2	
2	Bearing	2	
3	Collar	1	
			For assembly, reverse the disassembly
			procedure.



EAS00520

REMOVING THE FRONT WHEEL (XP500)

1. Stand the scooter on a level surface.

WARNING

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

NOTE: _

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

2. Remove:

• front brake calipers

NOTE:

Do not squeeze the brake lever when removing the brake caliper.

3. Loosen:

- front wheel axle pinch bolt ①
- front wheel axle ②
 Use the damper rod holder ③.



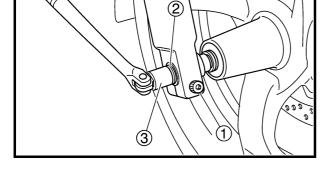
Damper rod holder (14 mm) 90890-04085

4. Elevate:

front wheel

NOTE:

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



FAS00520

REMOVING THE FRONT WHEEL AND FRONT WHEEL SENSOR (XP500A) ABS wheel sensor and sensor rotor

CAUTION:

- Handle the ABS components with care since they have been accurately adjusted.
 Keep them away from dirt and do not subject them to shocks.
- The ABS wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.



1. Stand the scooter on a level surface.

WARNING

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

NOTE: _

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



- plastic clamp 1
- front wheel sensor lead guide ②
- front wheel sensor ③

CAUTION:

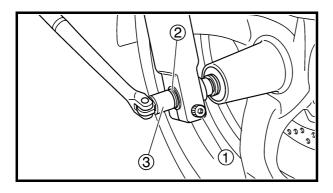
- Be sure not to contact the sensor electrode to any metal part when removing the front wheel sensor from the sensor housing.
- Do not operate the brake lever when removing the brake caliper.



· front brake calipers

NOTE:

Do not squeeze the brake lever when removing the brake caliper.



4. Loosen:

- wheel axle pinch bolt 1)
- front wheel axle ②
 Use the damper rod holder ③.



Damper rod holder (14 mm) 90890-04085

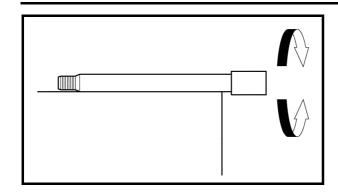
5. Elevate:

front wheel

NOTE:

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





EAS00525

CHECKING THE FRONT WHEEL

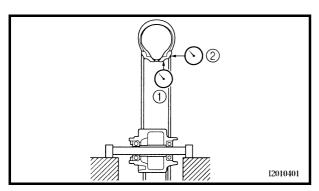
- 1. Check:
- wheel axle
 Roll the wheel axle on a flat surface.
 Bends → Replace.

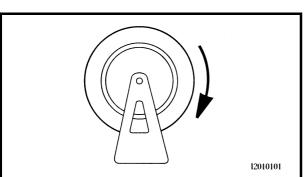
WARNING

Do not attempt to straighten a bent wheel axle.

- 2. Check:
- tire
- front wheel
 Damage/wear → Replace.

 Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in chapter 3.





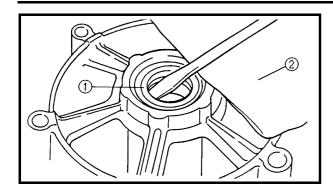
- 3. Measure:
 - front wheel radial runout ①
- front wheel lateral runout ②
 Over the specified limits → Replace.

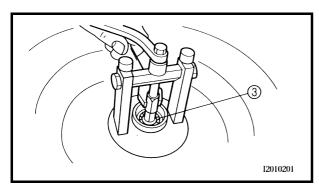


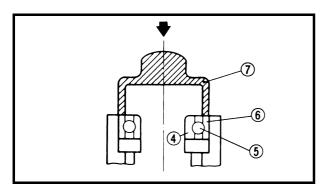
Front wheel radial runout limit 1 mm (0.04 in) Front wheel lateral runout limit 0.5 mm (0.02 in)

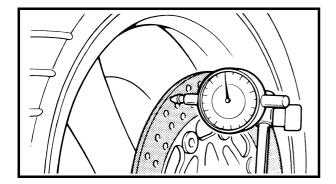
- 4. Check:
- wheel bearings
 Front wheel turns roughly or is loose →
 Replace the wheel bearings.
- oil seals
 Damage/wear → Replace.











- 5. Replace:
 - wheel bearings New
 - oil seals New

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

NOTE: .

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

- c. Remove the wheel bearings (3) with a general bearing puller.
- d. Install the new wheel bearings and oil seals in the reverse order of disassembly.

CAUTION:

Do not contact the wheel bearing center race 4 or balls 5. Contact should be made only with the outer race (6).

Use a socket (7) that matches the diameter of the wheel bearing outer race and oil seal.

FAS00528

CHECKING THE BRAKE DISC

The following procedure applies to all of the brake discs.

- 1. Check:
- brake disc Damage/galling \rightarrow Replace.
- 2. Measure:
 - brake disc deflection Out of specification -> Correct the brake disc deflection or replace the brake disc.



Maximum brake disc deflection Front: 0.12 mm (0.0047 in) Rear: 0.15 mm (0.0059 in)

a. Place the scooter 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.



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

Out of specification \rightarrow Replace.



Minimum brake disc thickness Front: 3.5 mm (0.14 in)

Rear: 4.5 mm (0.18 in)



4. Adjust:

brake disc deflection

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

NOTE:

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



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

- 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.

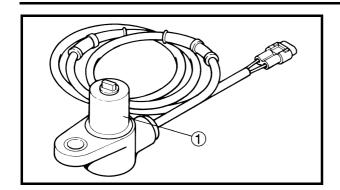


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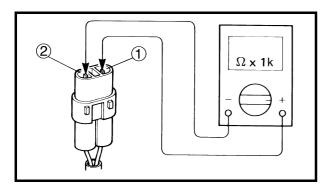


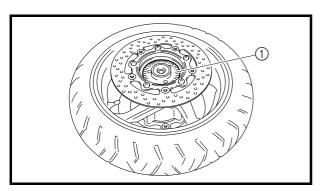




CHECKING THE FRONT WHEEL SENSOR AND SENSOR ROTOR (XP500A)

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





2. Measure:

front wheel sensor resistance
 Connect the pocket tester (Ω × 1k) to the terminals of the front wheel sensor coupler.

 Positive tester probe → Terminal ①
 Negative tester probe → Terminal ②



Regulated resistance 1.2 ~ 1.6 k Ω at 20 °C (68 °F)

Out of specification \rightarrow Replace.

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

NOTE: _

The wheel sensor rotor of the scooter cannot be replaced as a single unit. To replace the sensor rotor, replace the wheel assembly.

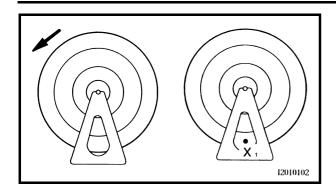
EAS00548

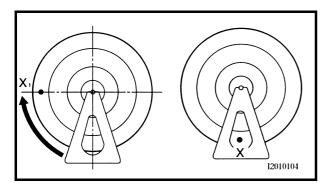
ADJUSTING THE FRONT WHEEL STATIC BALANCE

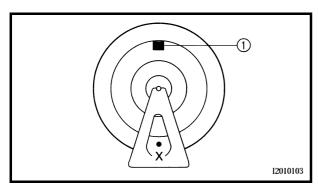
NOTE: _

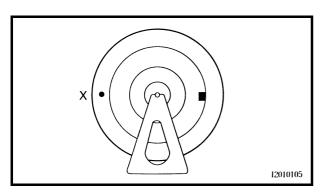
- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake disc installed.
- 1. Remove:
- balancing weight(s)

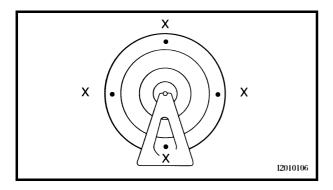












- 2. Find:
- front wheel's heavy spot

a. Place the front wheel on a suitable balancing stand.

- b. Spin the front wheel.
- c. When the front wheel stops, put an "X₁" mark at the bottom of the wheel.
- d. Turn the front wheel 90° so that the "X₁" mark is positioned as shown.
- e. Release the front wheel.
- f. When the front wheel stops, put an "X₂" mark at the bottom of the wheel.
- g. Repeat steps (e) through (g) several times until all the marks come to rest at the same spot.
- h. 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 that it stays at each position shown.

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



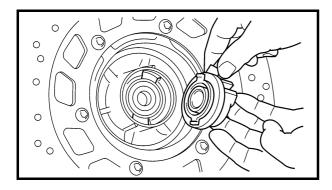
EAS00542

INSTALLING THE FRONT WHEEL (XP500)

- 1. Lubricate:
- oil seal lips
- speedometer drive gear
- speedometer driven gear



Recommended lubricant Lithium-soap-based grease

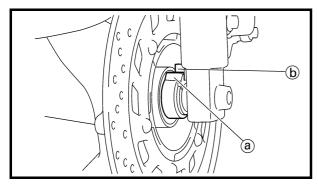


2. Install:

• speed sensor (to front wheel)

NOTE:

Make sure that the speed sensor unit and the wheel hub are installed with the two projections meshed into the two slots respectively.

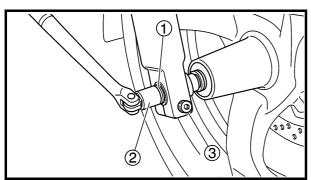


3. Install:

- · front wheel
- · front wheel axle
- · front wheel axle pinch bolt

NOTE: _

Make sure that the slot ⓐ in the speedometer gear unit fits over the stopper ⓑ on the front fork outer tube.



4. Tighten:

• front wheel axle 1)

№ 59 Nm (5.9 m · kg, 43 ft · lb)

Use the damper rod holder 2.

• front wheel axle pinch bolt ③

23 Nm (2.3 m · kg, 17 ft · lb)

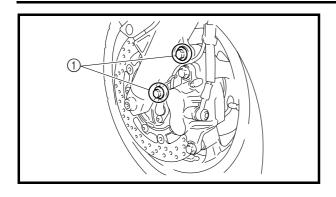


Damper rod holder (14 mm) 90890-04085

CAUTION:

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





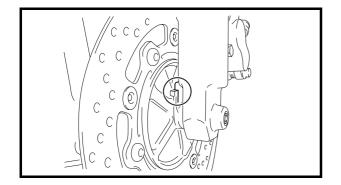
- 5. Install:
- front brake calipers

WARNING

Make sure that the brake hoses are routed properly.

- 6. Tighten:
- front brake caliper bracket bolt ①

¾ 40 Nm (4.0 m ⋅ kg, 29 ft ⋅ lb)



EAS00542

INSTALLING THE FRONT WHEEL AND FRONT WHEEL SENSOR (XP500A)

- 1. Lubricate:
 - · oil seal lips



Recommended lubricant Lithium-soap-based grease

- 2. Install:
- · front wheel
- · front wheel axle
- front wheel axle pinch bolt

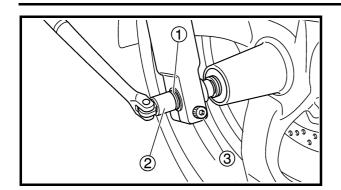
NOTE: .

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

CAUTION:

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





- 3. Tighten:
- front wheel axle ①

№ 59 Nm (5.9 m · kg, 43 ft · lb)

Use the damper rod holder 2.

• front wheel axle pinch bolt ③

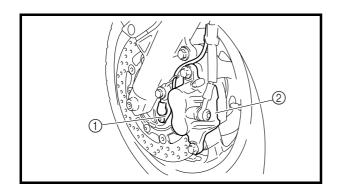
≥ 23 Nm (2.3 m · kg, 17 ft · lb)



Damper rod holder (14 mm) 90890-04085

CAUTION:

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



- 4. Install:
- front wheel sensor (1)

30 Nm (3.0 m ⋅ kg, 22 ft ⋅ lb)

- front wheel sensor lead guide
- front brake caliper ②

№ 40 Nm (4.0 m · kg, 29 ft · lb)

NOTE:

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

CAUTION:

To route the front wheel sensor lead, refer to "CABLE ROUTING" in chapter 2.

- 5. Check:
- front wheel sensor installation

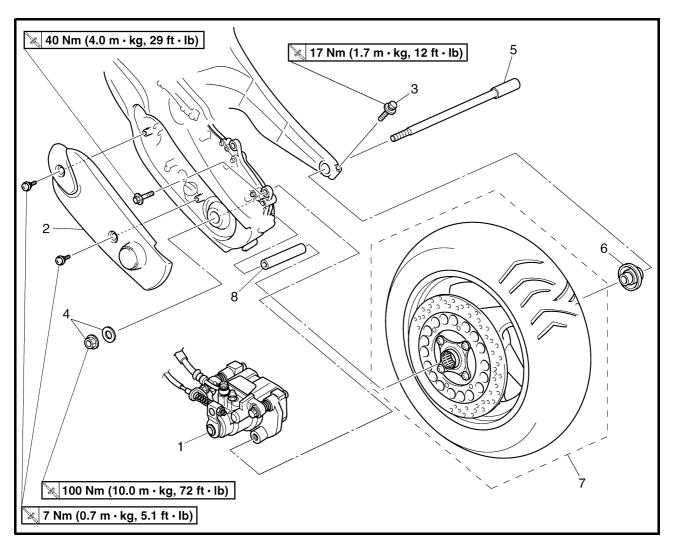
Check if the wheel sensor housing is installed properly.

Refer to "[D-3] Maintenance of the front wheel sensor and sensor rotor".

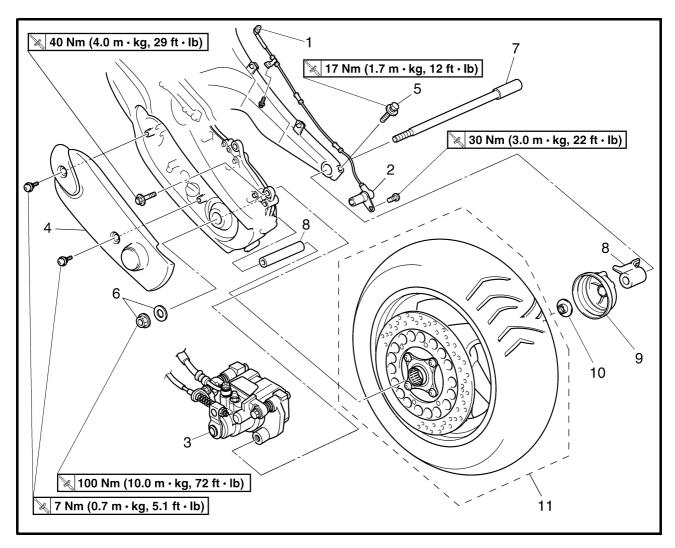
REAR WHEEL AND BRAKE DISC



REAR WHEEL AND BRAKE DISC

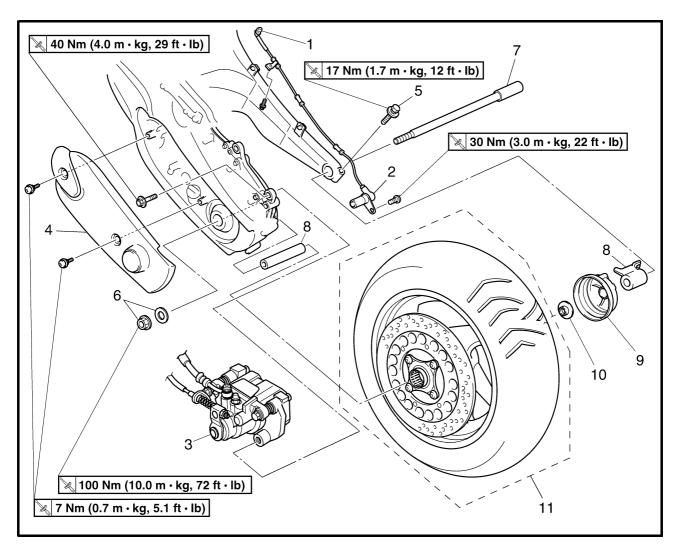


Order	Job/Part	Q'ty	Remarks
	Removing the rear wheel (XP500)		Remove the parts in the order listed.
			NOTE:
			Place the scooter on a suitable stand so
			that the rear wheel is elevated.
1	Rear brake caliper	1	
2	Chain drive case cover	1	
3	Rear wheel axle pinch bolt	1	Loosen.
4	Rear wheel axle nut/washer	1/1	
5	Rear wheel axle	1	
6	Collar	1	
7	Rear wheel	1	
8	Spacer	1	
			For installation, reverse the removal pro-
			cedure.

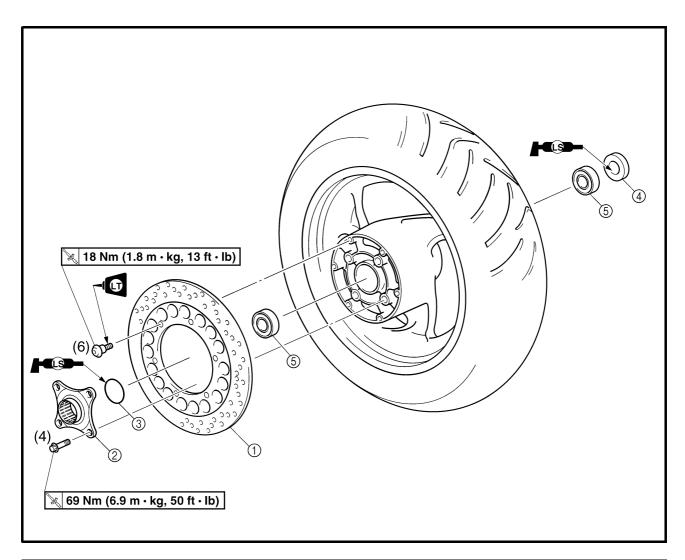


Order	Job/Part	Q'ty	Remarks
	Removing the rear wheel (XP500A)		Remove the parts in the order listed.
			NOTE:
			Place the scooter on a suitable stand so that the rear wheel is elevated.
	Tail/brake light assembly		Refer to "COVER AND PANEL" in chapter 3.
1	Rear wheel sensor coupler	1	Disconnect. 7 Refer to "REMOVING
2	Rear wheel sensor	1	-THE REAR WHEEL AND
3	Brake caliper	1	REAR WHEEL SENSOR (XP500A)" and "INSTALL- ING THE REAR WHEEL SENSOR (XP500A)".
4	Chain drive case cover	1	

REAR WHEEL AND BRAKE DISC



Order	Job/Part	Q'ty	Remarks
5	Rear wheel axle pinch bolt	1	Loosen. 7 Refer to "INSTALLING
6	Rear wheel axle nut/washer	1/1	∫THE REAR WHEEL SEN- SOR (XP500A)".
7	Rear wheel axle	1	
8	Collar	1	h
9	Sensor housing	1	Refer to "INSTALLING THE REAR
10	Collar	1	WHEEL SENSOR (XP500A)".
11	Rear wheel	1	μ
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the rear wheel		Remove the parts in the order listed.
1	Brake disc	1	
2	Rear wheel drive hub	1	
3	O-ring	1	
4	Oil seal	1	
(5)	Bearing	2	
			For assembly, reverse the disassembly
			procedure.



REMOVING THE REAR WHEEL (XP500)

1. Stand the scooter on a level surface.

▲ WARNING Securely support the scooter so that there is no danger of it falling over. NOTE: _ Place the scooter on a suitable stand so that the rear wheel is elevated. 2. Remove: brake caliper NOTE: Do not squeeze the brake lever when removing the brake caliper.

EAS00561

REMOVING THE REAR WHEEL AND REAR WHEEL SENSOR (XP500A)

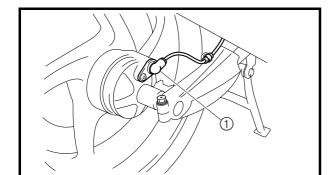
CAUTION:

- · Be sure not to contact the sensor electrode to any metal part when removing the front wheel sensor from the sensor housing.
- Do not operate the brake lever when removing the brake caliper.
- 1. Stand the scooter on a level surface.

WARNING

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

NOTE:
Place the scooter on a suitable stand so that
the rear wheel is elevated.



2. Remove:

• rear wheel sensor (1)

CA		

Be sure not to contact the sensor electrode to any metal part when removing the rear wheel sensor from the sensor housing.

3. Remove:

brake caliper

NOTE: _

Do not squeeze the brake lever when removing the brake caliper.

CHECKING THE REAR WHEEL SENSOR AND SENSOR ROTOR (XP500A)

Refer to "CHECKING THE FRONT WHEEL SENSOR AND SENSOR ROTOR (XP500A)".

FAS00565

CHECKING THE REAR WHEEL

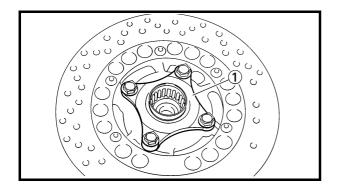
- 1. Check:
- wheel axle
- · rear wheel
- · wheel bearings
- oil seals

Refer to "CHECKING THE FRONT WHEEL".

- 2. Check:
- tire
- rear wheel Damage/wear \rightarrow Replace. Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in chapter 3.
- 3. Measure:
 - rear wheel radial runout
- rear wheel lateral runout Refer to "CHECKING THE FRONT WHEEL".

CHECKING THE REAR WHEEL DRIVE HUB

- 1. Check:
- rear wheel drive hub (1) Cracks/damage → Replace.



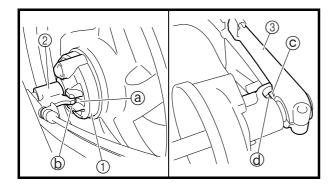


EAS00575

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".



INSTALLING THE REAR WHEEL SENSOR (XP500A)

- 1. Install:
- rear wheel

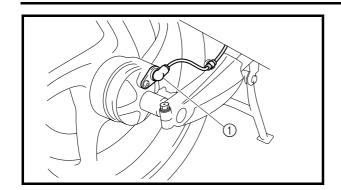
NOTE:

- Align the slot (a) of the sensor housing (1) with the projection (b) of the collar (2), and then assemble them.
- Align the slot © of the collar with the rib d of the swingarm 3, and then assemble them.

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





2. Install:

• rear wheel sensor ①

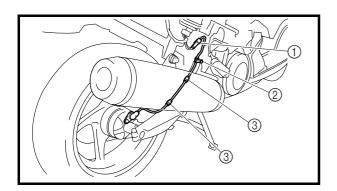
№ 30 Nm (3.0 m · kg, 22 ft · lb)

NOTE:

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

CAUTION:

To route the rear wheel sensor lead, refer to "CABLE ROUTING" in chapter 2.



3. Connect:

- rear wheel sensor coupler ①
- rear wheel sensor lead holder ②
- clamps ③

CAUTION:

To route the rear wheel sensor lead, refer to "CABLE ROUTING" in chapter 2.

- 4. Check:
- rear wheel sensor installation

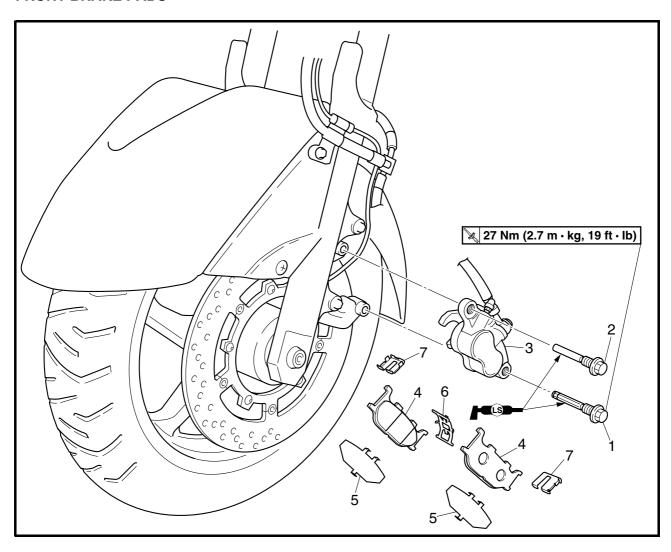
Check if the wheel sensor housing is installed properly.

Refer to "[D-4] Maintenance of the rear wheel sensor and sensor rotor".

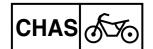


FRONT AND REAR BRAKES

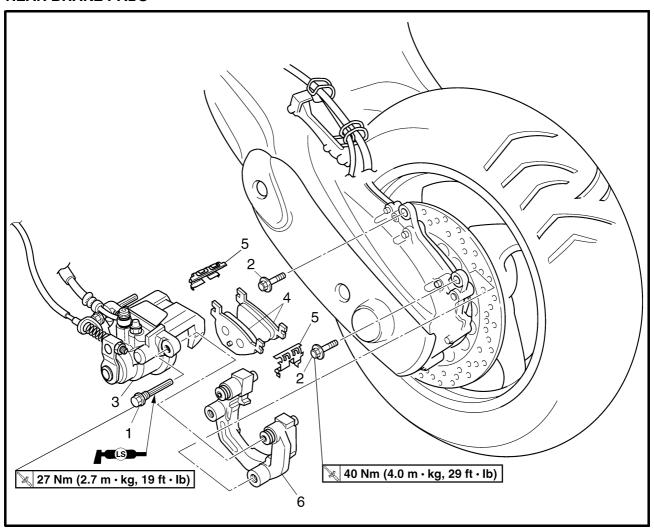
FRONT BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	Removing the front brake pads		Remove the parts in the order listed.
1	Front brake caliper retaining bolt (lower)	1	
2	Front brake caliper retaining bolt (upper)	1	
3	Brake caliper	1	Refer to "REPLACING THE FRONT
4	Brake pad	2	BRAKE PADS".
5	Brake pad shim	2	
6	Brake pad spring	1	
7	Brake pad spring	2	Ц
			For installation, reverse the removal procedure.



REAR BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake pads		Remove the parts in the order listed.
1	Rear brake caliper retaining bolt	1	
2	Rear brake caliper bracket bolt	2	
3	Brake caliper	1	h
4	Brake pad	2	Refer to "REPLACING THE REAR
5	Brake pad spring	2	BRAKE PADS".
6	Brake caliper bracket	1	<u> </u>
			For installation, reverse the removal pro-
			cedure.

EAS00579

CAUTION:

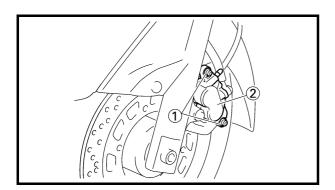
Disc brake components rarely require disassembly.

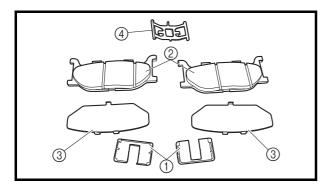
Therefore, always follow these preventive measures:

- 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 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.





EAS00581

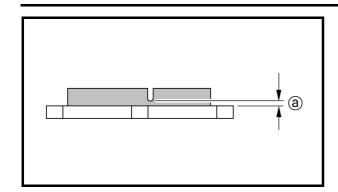
REPLACING THE FRONT BRAKE PADS

NOTE: .

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

- 1. Remove:
- front brake caliper retaining bolts (1)
- brake caliper ②
- 2. Remove:
- brake pad springs ①
- brake pads ②
- brake pad shims ③
- brake pad spring 4

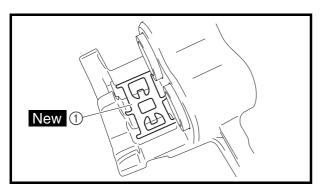




- 3. Measure:
 - brake pad thickness (a)
 Out of specification → Replace the brake pads as a set.



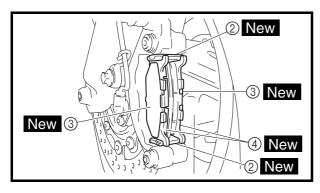
Minimum brake pad thickness 0.8 mm (0.03 in)



- 4. Install:
- brake pad spring ① New
- brake pad springs ② New
- brake pad shims ③ New
- brake pads 4 New



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

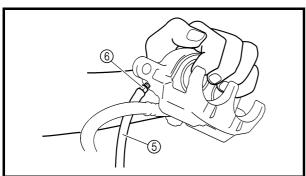


- a. Connect a clear plastic hose (5) tightly to the
- bleed screw **(6)**. Put the other end of the hose into an open container.
- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
- c. Tighten the bleed screw.



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

d. Install new brake pads, new brake shims and new brake pad springs.



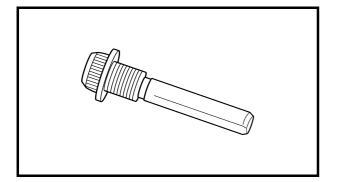
- 5. Lubricate:
- front brake caliper retaining bolts



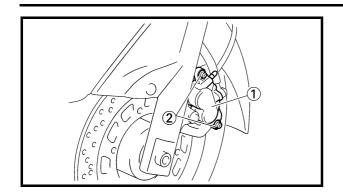
Recommended lubricant Lithium-soap-based grease

CAUTION:

- Do not allow grease to contact the brake pads.
- Remove any excess grease.

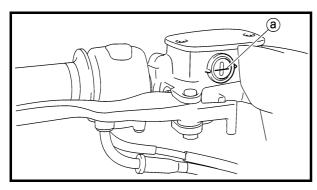






- 6. Install:
- brake caliper ①
- front brake caliper retaining bolts ②

≥ 27 Nm (2.7 m · kg, 19 ft · lb)



7. Check:

• brake fluid level

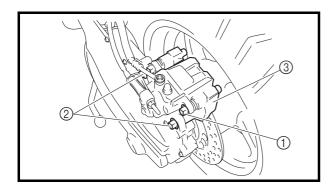
Below the minimum level mark $\textcircled{a} \to \mathsf{Add}$ the recommended brake fluid to the proper level.

Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

- 8. Check:
- brake lever operation

Soft or spongy feeling \rightarrow Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)" and "BLEEDING THE BRAKE SYSTEM (XP500A)" in chapter 3.



EAS00583

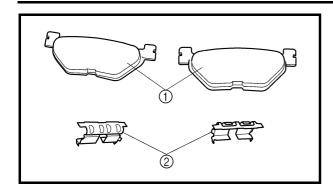
REPLACING THE REAR BRAKE PADS

NOTE:

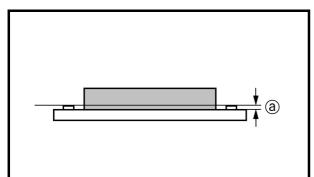
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

- 1. Remove:
 - rear brake caliper retaining bolt (rear) ①
- brake caliper bracket bolts ②
- brake caliper ③





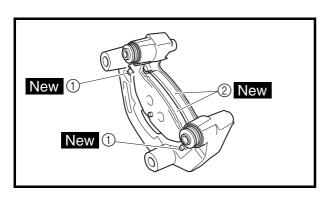
- 2. Remove:
- brake pads ①
- brake pad springs ②



- 3. Measure:
- brake pad thickness ⓐ
 Out of specification → Replace the brake pads as a set.



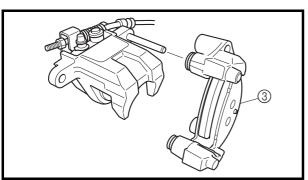
Minimum brake pad thickness 0.8 mm (0.03 in)



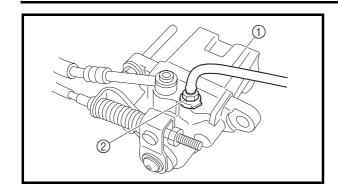
- 4. Install:
- brake pad springs ① New
- brake pads ② New
- rear brake caliper bracket ③ (to brake caliper)

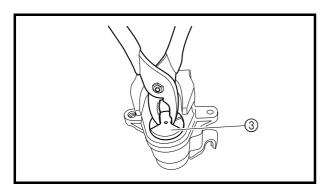
NOTE: _

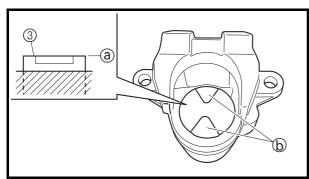
Always install new brake pads, and new brake pad springs as a set.

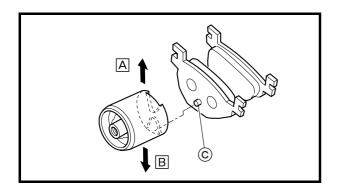












- a. Connect a suitable hose ① tightly to the brake caliper bleed screw ②. Put the other end of this hose into an open container.
- b. Loosen the brake caliper bleed screw, and then turn the brake caliper piston ③ clockwise until section ④ of the brake caliper piston is level with the surface of the brake caliper body.

NOTE: _

Align the recesses **(b)** in the brake caliper piston with the brake caliper body as shown in the illustration.

c. Tighten the brake caliper bleed screw.



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

d. Install new brake pads, new pad springs, and the rear brake caliper.

NOTE:

Align the projection © on the piston side of the brake pad with the lower recess in the brake caliper piston.

- A Up
- **B** Down



- 5. Lubricate:
- rear brake caliper retaining bolts



Recommended lubricant Lithium-soap-based grease

CAUTION:

- Do not allow grease to contact the brake pads.
- Remove any excess grease.
- 6. Install:
 - rear brake caliper retaining bolt

≥ 27 Nm (2.7 m · kg, 19 ft · lb)

- 7. Install:
 - rear brake caliper bracket bolts

40 Nm (4.0 m ⋅ kg, 29 ft ⋅ lb)

- 8. Check:
- brake fluid level

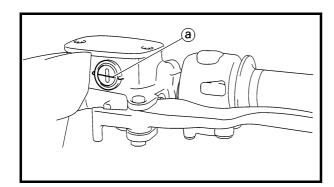
Below the minimum level mark $\textcircled{a} \to \mathsf{Add}$ the recommended brake fluid to the proper level.

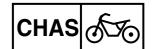
Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

- 9. Check:
- brake pedal operation

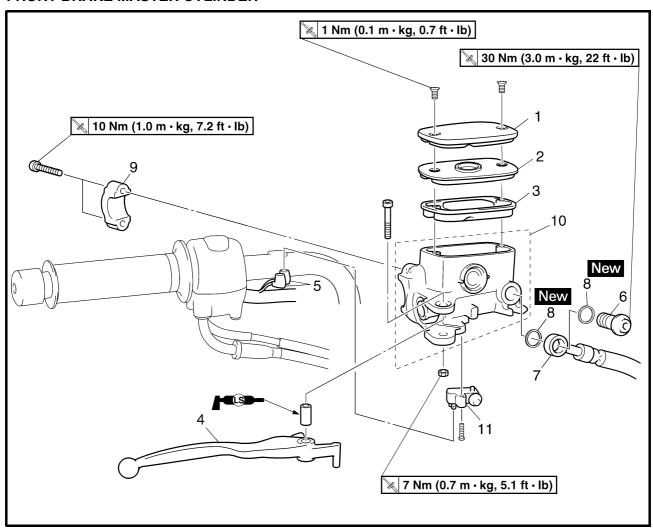
Soft or spongy feeling \rightarrow Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)" and "BLEEDING THE BRAKE SYSTEM (XP500A)" in chapter 3.



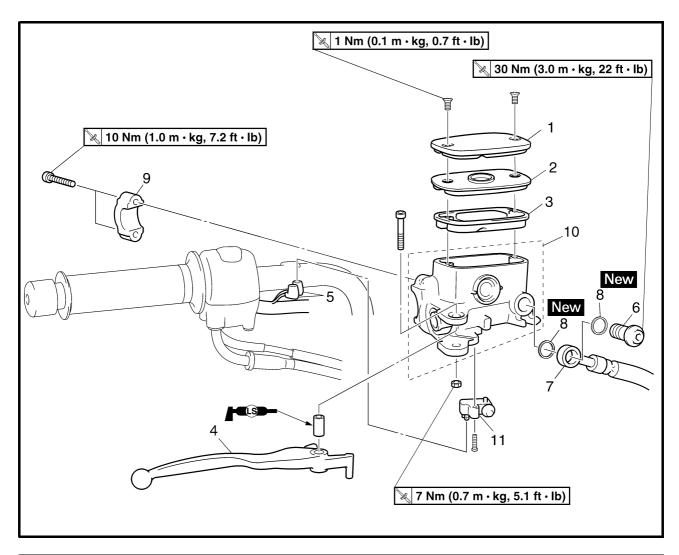


FRONT BRAKE MASTER CYLINDER

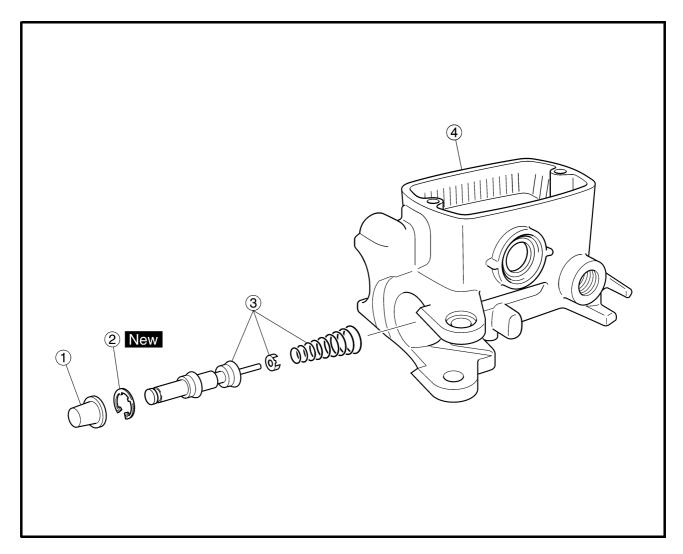


Order	Job/Part	Q'ty	Remarks
	Removing the front brake master cylinder		Remove the parts in the order listed.
	Upper handlebar cover		Refer to "HANDLEBAR".
	Brake fluid		Drain.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir dia- phragm holder	1	
3	Brake master cylinder reservoir dia- phragm	1	
4	Brake lever	1	
5	Front brake light switch connector	2	Disconnect.

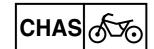




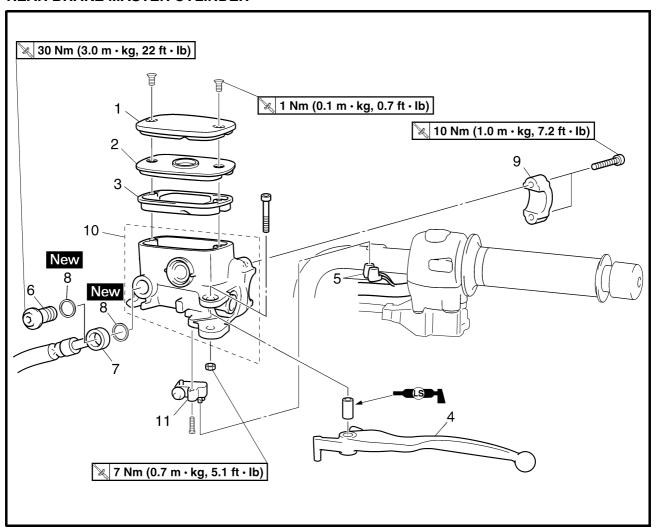
Order	Job/Part	Q'ty	Remarks
6	Union bolt	1	Refer to "DISASSEMBLING THE
7	Brake hose	1	FRONT BRAKE MASTER CYLINDER"
8	Copper washer	2	and "ASSEMBLING AND INSTALLING
9	Brake master cylinder holder	1	THE FRONT BRAKE MASTER CYLIN-
10	Brake master cylinder	1	DER".
11	Front brake light switch	1	
			For installation, reverse the removal pro-
			cedure.



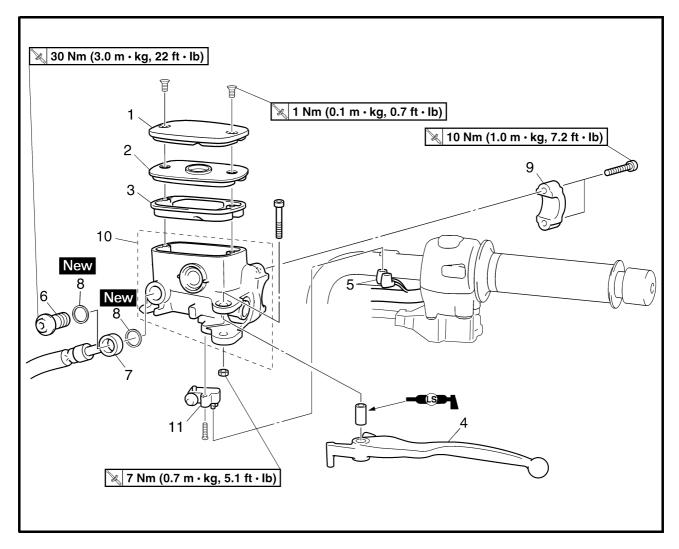
Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake mas-		Remove the parts in the order listed.
	ter cylinder		
1	Dust boot	1	
2	Circlip	1	
3	Brake master cylinder kit	1	
4	Brake master cylinder body	1	
			For assembly, reverse the disassembly
			procedure.



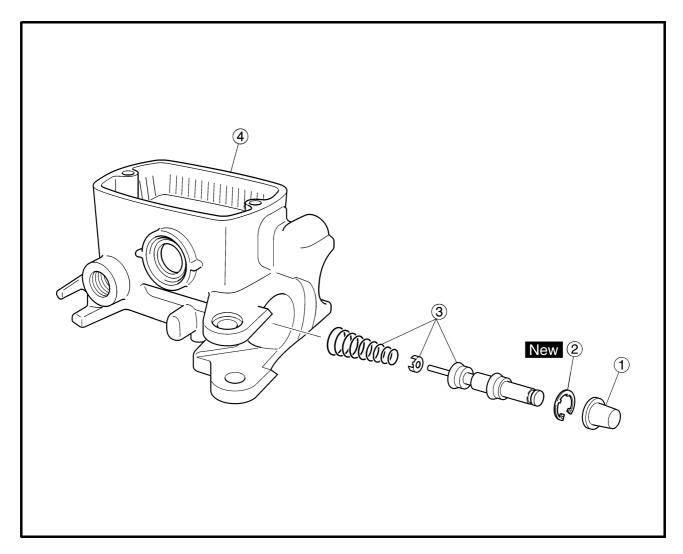
REAR BRAKE MASTER CYLINDER



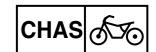
Order	Job/Part	Q'ty	Remarks
	Removing the rear brake master cyl-		Remove the parts in the order listed.
	inder		
	Upper handlebar cover		Refer to "HANDLEBAR".
	Brake fluid		Drain.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir dia- phragm holder	1	
3	Brake master cylinder reservoir dia- phragm	1	
4	Brake lever	1	
5	Rear brake light switch connector	2	Disconnect.



Order	Job/Part	Q'ty	Remarks
6 7 8 9 10 11	Union bolt Brake hose Copper washer Brake master cylinder holder Brake master cylinder Rear brake light switch	1 1 2 1 1	Refer to "DISASSEMBLING THE REAR BRAKE MASTER CYLINDER" and "ASSEMBLING AND INSTALLING THE REAR BRAKE MASTER CYLINDER". For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake mas-		Remove the parts in the order listed.
	ter cylinder		
1	Dust boot	1	
2	Circlip	1	
3	Brake master cylinder kit	1	
4	Brake master cylinder body	1	
			For assembly, reverse the disassembly
			procedure.



EAS0058

DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER

NOTE: _

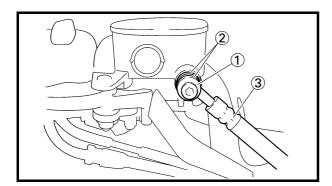
Before disassembling the front brake master cylinder, drain the brake fluid from the entire brake system.



- union bolt (1)
- copper washers ②
- brake hoses ③



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



EAS00589

DISASSEMBLING THE REAR BRAKE MASTER CYLINDER

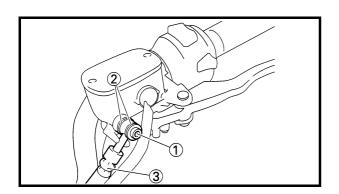
NOTE: _

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

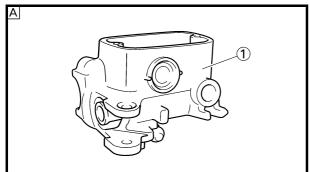
- 1. Remove:
- union bolt (1)
- copper washers ②
- brake hose ③

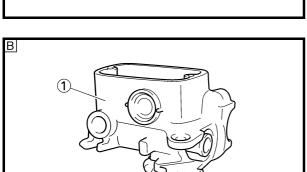
NOTE:

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







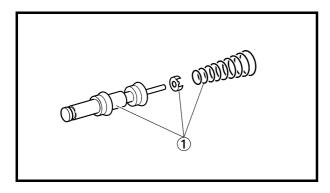




CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

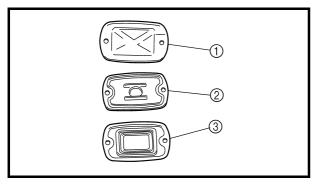
The following procedure applies to the both of the brake master cylinders.

- 1. Check:
- brake master cylinder ①
 Damage/scratches/wear → Replace.
- brake fluid delivery passages (brake master cylinder body)
 Obstruction → Blow out with compressed air.
- A Front
- **B** Rear



2. Check:

brake master cylinder kit ①
 Damage/scratches/wear → Replace.



3. Check:

- brake master cylinder reservoir cap ①
 Cracks/damage → Replace.
- brake master cylinder reservoir diaphragm holder ②

Damage/wear \rightarrow Replace.

brake master cylinder reservoir diaphragm
 3

Damage/wear \rightarrow Replace.

- 4. Check:
- brake hoses ${\sf Cracks/damage/wear} \to {\sf Replace}.$

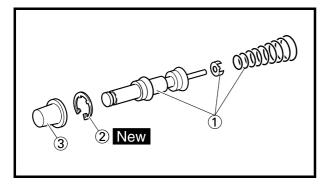


EAS00596

ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

WARNING

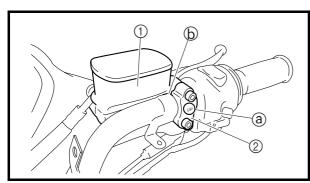
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.





Recommended brake fluid DOT 4

- 1. Install:
- brake master cylinder kit ①
- circlip ② New
- dust boot ③



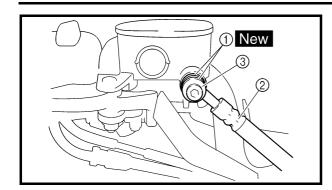
2. Install:

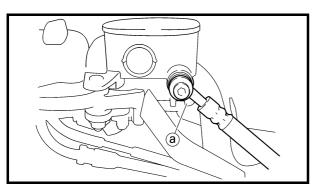
- brake master cylinder ①
- brake master cylinder holder ②

NOTE: .

- Install the brake master cylinder holder with the "UP" mark facing up (a).
- Align the brake master cylinder with the projection (b) in the handlebar.
- First, tighten the upper bolt, then the lower bolt.







- 3. Install:
- copper washers ① New
- brake hose ②
- union bolt ③ 30 Nm (3.0 m · kg, 22 ft · lb)

WARNING

Proper brake hose routing is essential to insure safe scooter operation. Refer to "CABLE ROUTING" in chapter 2.

NOTE:

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

CAUTION:

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

- 4. Connect:
- front brake light switch connector
- 5 Fill:
- brake master cylinder reservoir (with the specified amount of the recommended brake fluid)



Recommended brake fluid DOT 4

WARNING

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



• brake system

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)" and "BLEEDING THE BRAKE SYSTEM (XP500A)" in chapter 3.



(a)

brake fluid level

Below the minimum level mark $\textcircled{a} \to \mathsf{Add}$ the recommended brake fluid to the proper level.

Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

8. Check:

brake lever operation

Soft or spongy feeling \rightarrow Bleed the brake system.

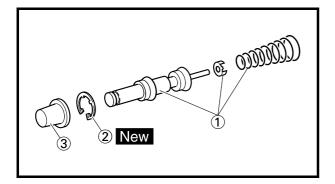
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)" and "BLEEDING THE BRAKE SYSTEM (XP500A)" in chapter 3.



ASSEMBLING AND INSTALLING THE REAR BRAKE MASTER CYLINDER

WARNING

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

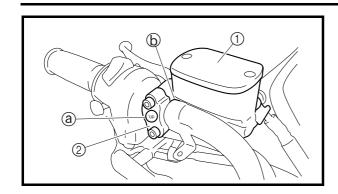




Recommended brake fluid DOT 4

- 1. Install:
- brake master cylinder kit ①
- circlip ② New
- dust boot ③

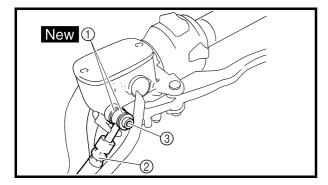


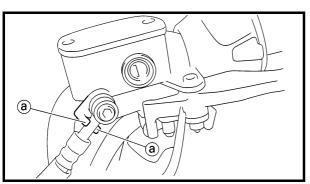


- 2. Install:
- brake master cylinder ①
- brake master cylinder holder ②

NOTE:

- Install the brake master cylinder holder with the "UP" mark facing up (a).
- Align the brake master cylinder with the projection (b) on the handlebar.
- First, tighten the upper bolt, then the lower bolt.





- 3. Install:
 - copper washer ① New
 - brake hose ②
 - union bolt ③ **30 Nm (3.0 m ⋅ kg, 22 ft ⋅ lb)**

WARNING

Proper brake hose routing is essential to insure safe scooter operation. Refer to "CABLE ROUTING" in chapter 2.

NOTE:

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

CAUTION:

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



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



Recommended brake fluid DOT 4

WARNING

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

CAUTION:

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

- 5. Bleed:
- brake system

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)" and "BLEED-ING THE BRAKE SYSTEM (XP500A)" in chapter 3.

- 6. Check:
- brake fluid level

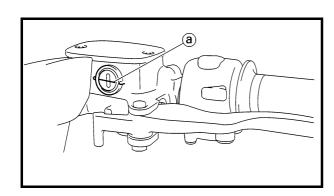
Below the minimum level mark $\textcircled{a} \to \mathsf{Add}$ the recommended brake fluid to the proper level.

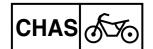
Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

- 7. Check:
- brake lever operation

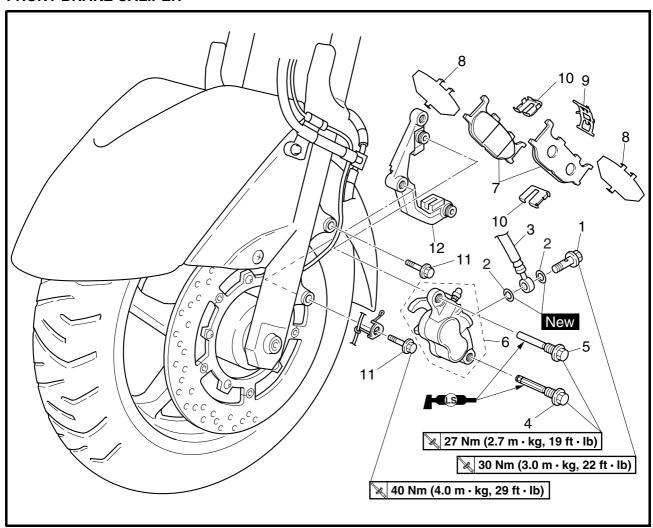
Soft or spongy feeling \rightarrow Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)" and "BLEEDING THE BRAKE SYSTEM (XP500A)" in chapter 3.

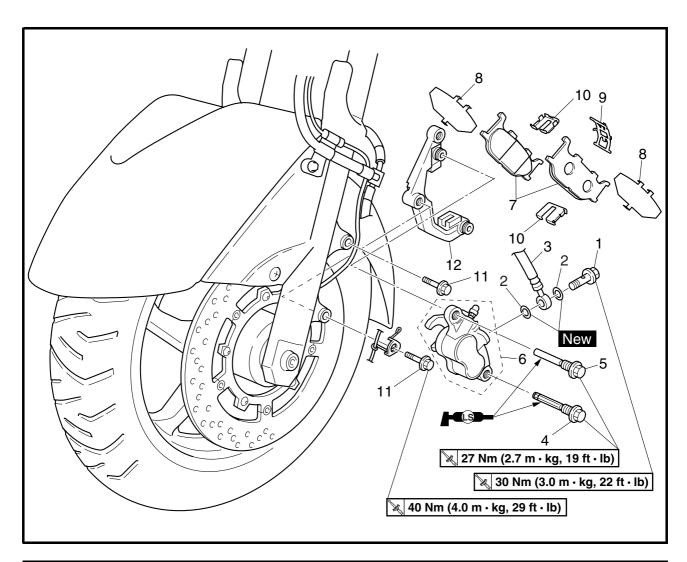




FRONT BRAKE CALIPER

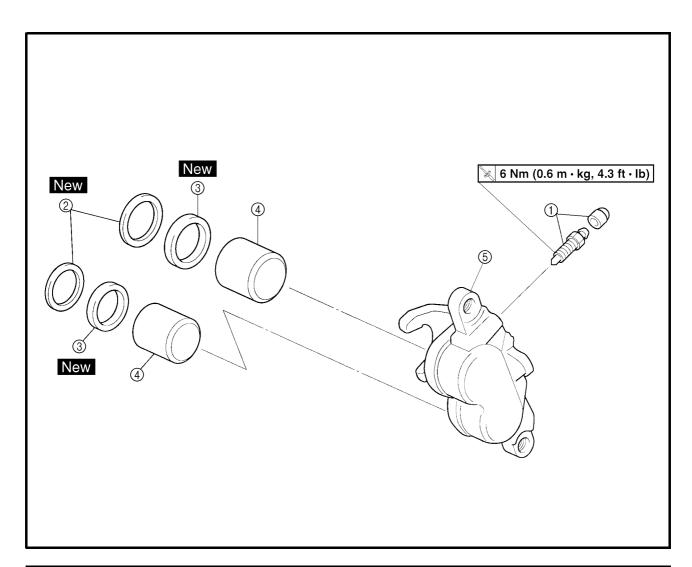


Order	Job/Part	Q'ty	Remarks
	Removing the front brake caliper		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Union bolt	1	Refer to "DISASSEMBLING THE
2	Copper washer	2	- FRONT BRAKE CALIPER" and
3	Brake hose	1	#ASSEMBLING AND INSTALLING THE
			FRONT BRAKE CALIPER".
4	Front brake caliper retaining bolt	1	h l
	(lower)		
5	Front brake caliper retaining bolt	1	
	(upper)		Defer to "ACCEMBLING AND INCTALL
6	Brake caliper	1	Refer to "ASSEMBLING AND INSTALL- ING THE FRONT BRAKE CALIPER".
7	Brake pad	2	ING THE PRONT BRAKE CALIPER.
8	Brake pad shim	2	
9	Brake pad spring	1	
10	Brake pad spring	2	μ

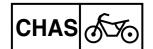


Order	Job/Part	Q'ty	Remarks
11	Front brake caliper bracket bolt 2	2	Refer to "ASSEMBLING AND INSTALL-
12	Brake caliper bracket	1	ING THE FRONT BRAKE CALIPER".
			For installation, reverse the removal pro-
			cedure.

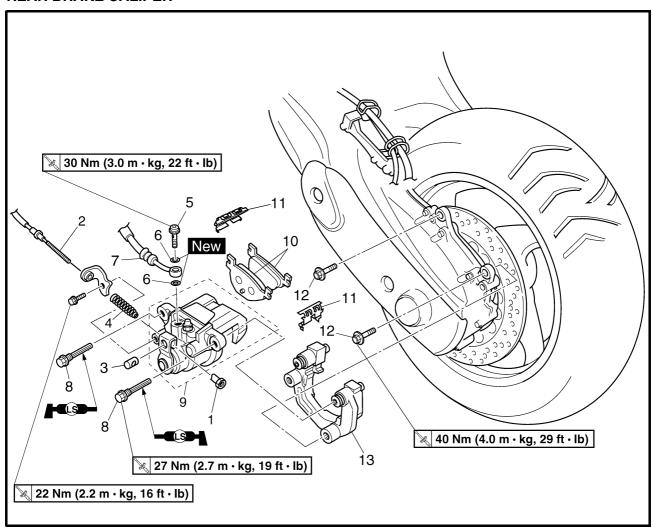
EAS00614



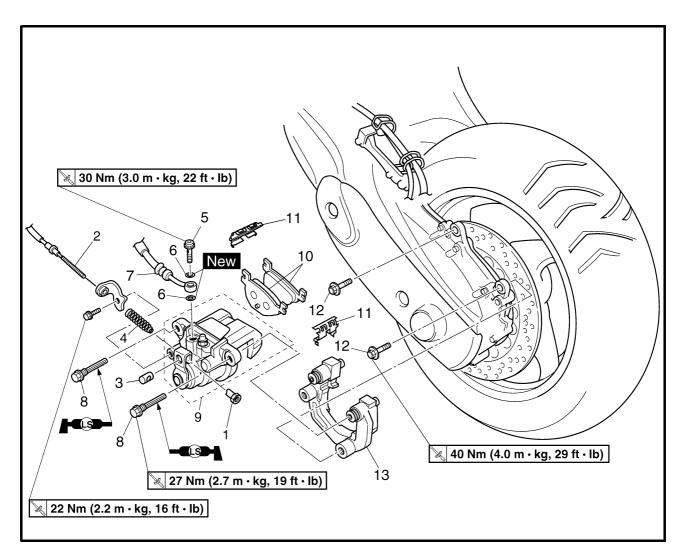
Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake cali-		Remove the parts in the order listed.
	per		
1	Bleed screw	1	
2	Dust seal	2	Refer to "DISASSEMBLING THE
3	Brake caliper piston seal	2	- FRONT BRAKE CALIPER" and
4	Brake caliper piston	2	"ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPER".
5	Brake caliper body	1	THORY BRUNKE ONEN ETT.
			For assembly, reverse the disassembly
			procedure.



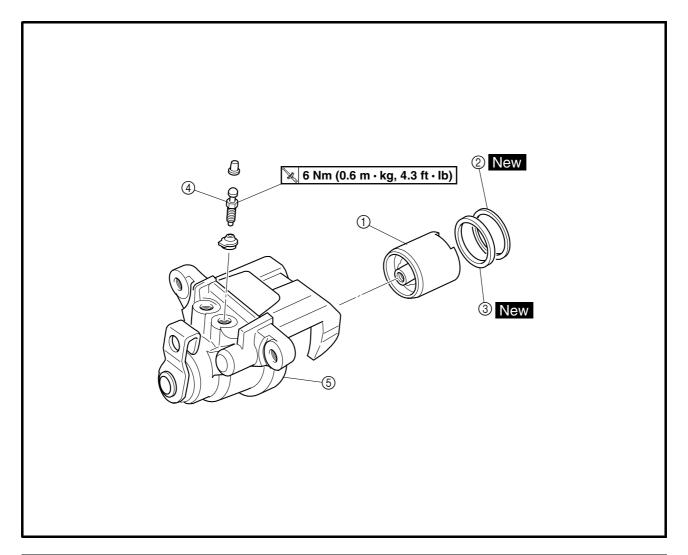
REAR BRAKE CALIPER



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake caliper		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Nut	1	h
2	Rear brake lock lever cable	1	Refer to "DISASSEMBLING THE REAR
3	Pin	1	BRAKE CALIPER".
4	Spring	1	<u> </u>
5	Union bolt	1	Refer to "DISASSEMBLING THE REAR
6	Copper washer	2	BRAKE CALIPER" and "ASSEMBLING
7	Brake hose	1	AND INSTALLING THE REAR BRAKE CALIPER".
8	Rear brake caliper retaining bolt	2	Defends "ACCEMBLING AND INCTALL
9	Brake caliper	1	Refer to "ASSEMBLING AND INSTALL- ING THE REAR BRAKE CALIPER".
10	Brake pad	2	I ING THE NEAR BRAKE CALIPER .



Order	Job/Part	Q'ty	Remarks
11 12 13	Brake pad spring Rear brake caliper bracket bolt Brake caliper bracket	2 2 1	Refer to "ASSEMBLING AND INSTALL- ING THE REAR BRAKE CALIPER".
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake cali-		Remove the parts in the order listed.
	per		
1	Brake caliper piston	1	Refer to "DISASSEMBLING THE REAR
2	Dust seal	1	- BRAKE CALIPER" and "ASSEMBLING
3	Piston seal	1	AND INSTALLING THE REAR BRAKE CALIPER".
4	Bleed screw	1	
(5)	Brake caliper body	1	
			For assembly, reverse the disassembly
			procedure.

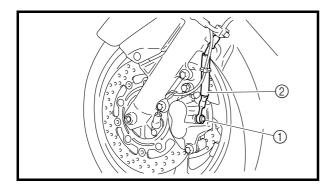


EAS0061

DISASSEMBLING THE FRONT BRAKE CALIPER

NOTE:

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

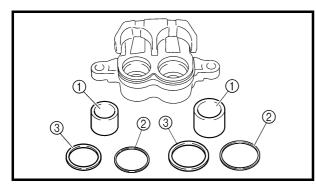


1. Remove:

- union bolt (1)
- · copper washers
- brake hose ②

NOTE:

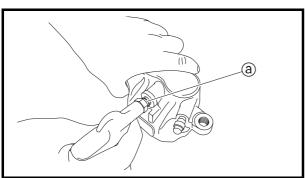
Put the end of the brake hose into a container and pump out the brake fluid carefully.



2. Remove:

- brake caliper pistons ①
- dust seals ②
- brake caliper piston seals ③

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



- 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 dust seal and brake caliper piston seals.

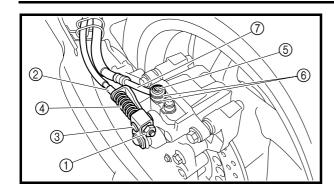
EAS0062

DISASSEMBLING THE REAR BRAKE CALIPER

NOTE:

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

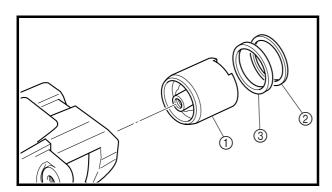




- 1. Remove:
- nut (1)
- rear brake lock lever cable ②
- pin ③
- spring 4
- union bolt ⑤
- copper washers (6)
- brake hose ⑦

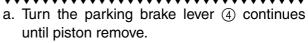
NOTE: _

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

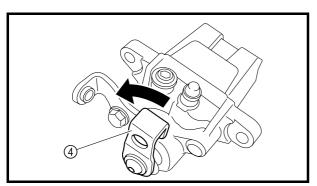




- brake caliper piston ①
- dust seal ②
- brake caliper piston seal ③



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

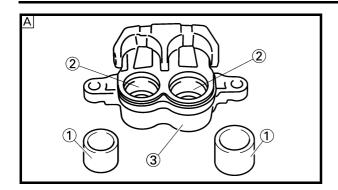


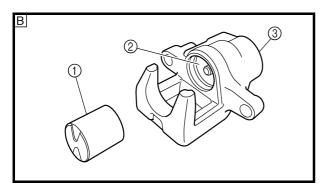
E4500631

CHECKING THE FRONT AND REAR BRAKE CALIPER

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





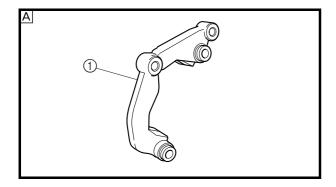


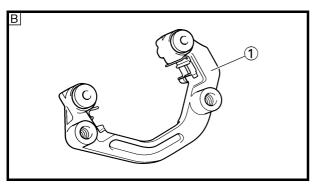
- 1. Check:
- brake caliper pistons ①
 Rust/scratches/wear → Replace the brake caliper.
- brake caliper cylinders ②
 Scratches/wear → Replace the brake caliper.
- brake caliper body ③
 Cracks/damage → Replace the brake caliper.
- brake fluid delivery passages (brake caliper body)
 Obstruction → Blow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

WARNING

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

- A Front
- **B** Rear





- 2. Check:
- brake caliper bracket ①
 Cracks/damage → Replace.
- A Front
- B Rear



EAS00635

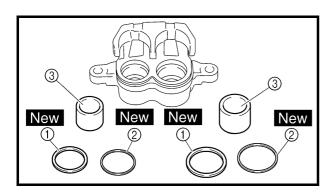
ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPER

WARNING

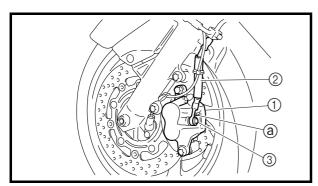
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston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



Recommended brake fluid DOT 4



- 1. Install:
- brake caliper piston seals ① New
- dust seals ② New
- brake caliper pistons ③



- 2. Install:
- brake caliper bracket

¾ 40 Nm (4.0 m · kg, 2.9 ft · lb)

- 3. Install:
- brake caliper (1) (temporarily)
- copper washers
 New
- brake hose ②
- union bolt ③ **30 Nm (3.0 m ⋅ kg, 22 ft ⋅ lb)**

WARNING

Proper brake hose routing is essential to insure safe scooter operation. Refer to "CABLE ROUTING" in chapter 2.

CAUTION:

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



- 4. Remove:
- brake caliper
- 5. Install:
 - brake pad springs
 - brake pads
- brake caliper
- front brake caliper retaining bolts

≥ 27 Nm (2.7 m · kg, 19 ft · lb)

Refer to "REPLACING THE FRONT BRAKE PADS".

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



Recommended brake fluid DOT 4

WARNING

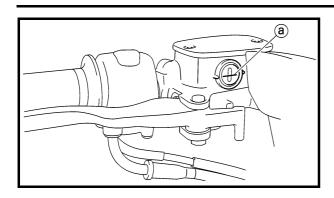
- Use only the designated brake fluid.
 Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake master cylinder 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 (XP500)" and "BLEED ING THE BRAKE SYSTEM (XP500A)" in
 chapter 3.





- 8. Check:
- brake fluid level

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

Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

- 9. Check:
- · brake lever operation

Soft or spongy feeling → Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)" and "BLEED-ING THE BRAKE SYSTEM (XP500A)" in chapter 3.

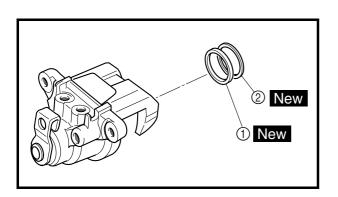
ASSEMBLING AND INSTALLING THE **REAR BRAKE CALIPER**

WARNING

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

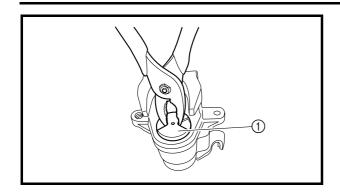


Recommended brake fluid DOT 4



- 1. Install:
- brake caliper piston seal ① New
- dust seal ② New



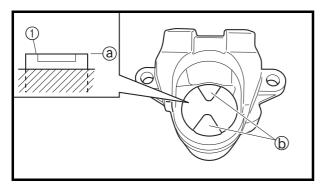


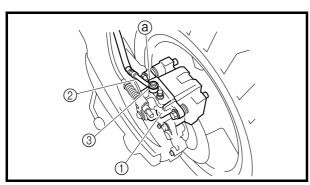
2. Install:

brake caliper piston ①
 Turn the brake caliper piston clockwise until section ② of the brake caliper piston is level with the surface of the brake caliper body.

NOTE:

Align the recesses **(b)** in the brake caliper piston with the brake caliper body as shown in the illustration.





3. Install:

• brake caliper bracket

№ 40 Nm (4.0 m · kg, 29 ft · lb)

4. Install:

- brake caliper (1) (temporarily)
- copper washers New
- brake hose ②
- union bolt ③ 🗽 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" in chapter 2.

CAUTION:

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

5. Remove:

• brake caliper



- 6. Install:
 - brake pad springs
- brake pads
- brake caliper
- rear brake caliper retaining bolts

≥ 27 Nm (2.7 m ⋅ kg, 19 ft ⋅ lb)

Refer to "REPLACING THE REAR BRAKE PADS".

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



Recommended brake fluid DOT 4

WARNING

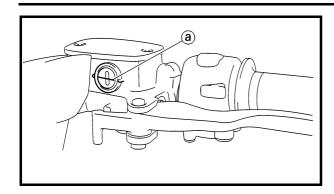
- Use only the designated brake fluid.
 Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

- 8. Bleed:
- brake system
 Refer to "BLEEDING THE HYDRAULIC
 BRAKE SYSTEM (XP500)" and "BLEED-ING THE BRAKE SYSTEM (XP500A)" in chapter 3.





- 9. Check:
- brake fluid level

Below the minimum level mark $\textcircled{a} \to \mathsf{Add}$ the recommended brake fluid to the proper level.

Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

10.Check:

• brake lever operation

Soft or spongy feeling \rightarrow Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (XP500)" and "BLEEDING THE BRAKE SYSTEM (XP500A)" in chapter 3.

11.Install:

- spring
- pin
- rear brake lock lever cable
- nut

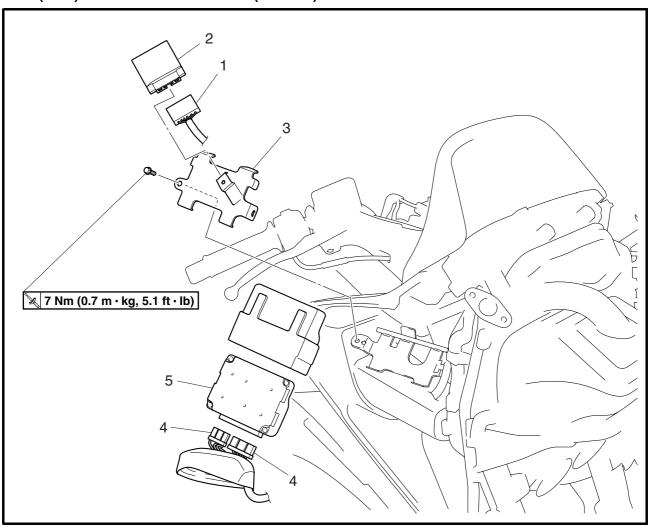
12.Adjust:

 rear brake lock lever cable length Refer to "ADJUSTING THE REAR BRAKE LOCK LEVER CABLE" in chapter 3.



EAS00888

ECU (ABS) AND FAIL-SAFE RELAY (XP500A)

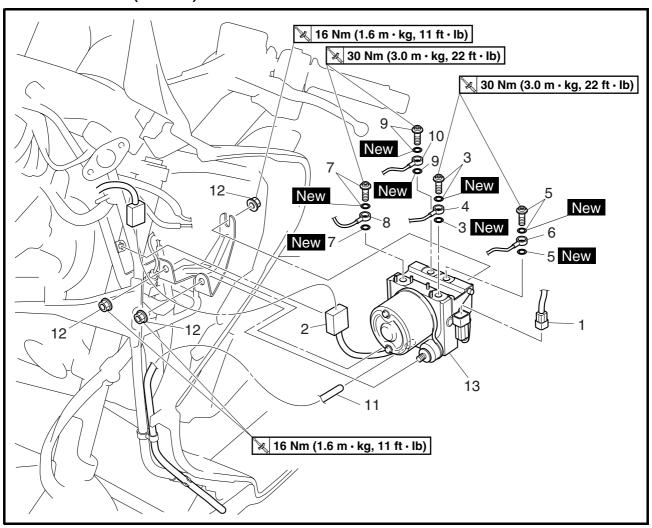


Order	Job/Part	Q'ty	Remarks
	Removing the ECU (ABS) and fail- safe relay (XP500A)		Remove the parts in the order listed.
	Front cowling		Refer to "COVER AND PANEL" in chapter 3.
1	Fail-safe relay coupler	1	Disconnect.
2	Fail-safe relay	1	
3	Upper ECU (ABS) bracket	1	
4	ECU (ABS) coupler	2	Disconnect.
5	ECU (ABS)	1	
			For installation, reverse the removal procedure.

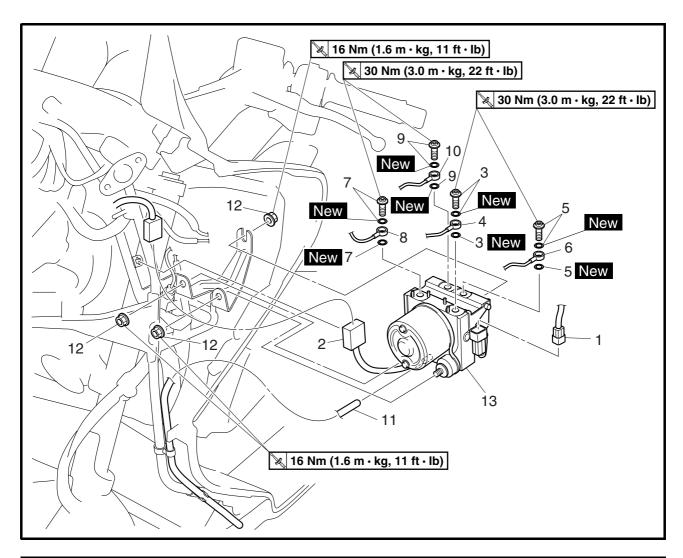


EAS00891

HYDRAULIC UNIT (XP500A)

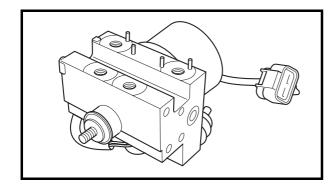


Order	Job/Part	Q'ty	Remarks
	Removing the hydraulic unit (XP500A)		Remove the parts in the order listed.
	Front cowling		Refer to "COVER AND PANEL" in chapter 3.
	Brake fluid		Drain.
1	Hydraulic unit solenoid coupler (wire harness side)	1	Disconnect.
2	ABS motor coupler	1	Disconnect.
3	Union bolt/copper washer	1/2	
4	Front brake hose	1	(front brake master cylinder to hydraulic unit)
5	Union bolt/copper washer	1/2	
6	Front brake hose	1	(hydraulic unit to front brake caliper)
7	Union bolt/copper washer	1/2	
8	Rear brake hose	1	(rear brake master cylinder to hydraulic unit)



Order	Job/Part	Q'ty	Remarks
9	Union bolt/copper washer	1/2	
10	Rear brake hose	1	(hydraulic unit to rear brake caliper)
11	ABS motor breather hose	1	
12	Nut	3	
13	Hydraulic unit	1	
			For installation, reverse the removal pro-
			cedure.





CAUTION:

Do not remove the hydraulic unit to check the resistance of the solenoid valves and the ABS motor for continuity.

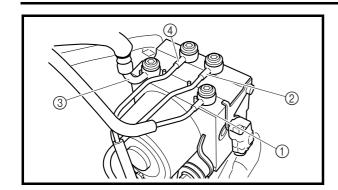
WARNING

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.

CAUTION:

- Handle the ABS components with care since they have been accurately adjusted.
 Keep them away from dirt and do not subject them to shocks.
- The ABS wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.
- Do not set the main switch to "ON" when removing the hydraulic unit.
- Do not clean with compressed air.
- · Do not reuse the brake fluid.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Do not allow any brake fluid to contact the couplers. Brake fluid may damage the couplers and cause bad contacts.
- If the union bolts for the hydraulic unit have been removed, be sure to tighten them to the specified torque and bleed the brake system.





REMOVING THE HYDRAULIC UNIT

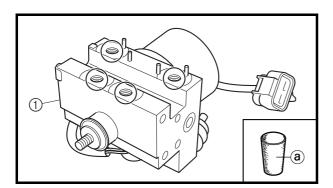
- 1. Remove:
- brake hose ① (from the front brake master cylinder)
- brake hose ② (to the front brake caliper)
- brake hose ③ (from the rear brake master cylinder)
- brake hose ④ (to the rear brake caliper)

NOTE

Do not operate the brake lever 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.

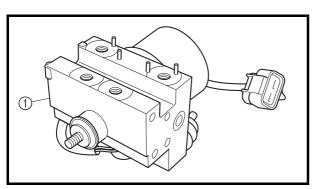


2. Remove:

• hydraulic unit 1

NOTE:

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



CHECKING THE HYDRAULIC UNIT

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



INSTALLING THE HYDRAULIC UNIT

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

- 1. Install:
- hydraulic unit

 16 Nm (1.6 m ⋅ kg, 11 ft ⋅ lb)

NOTE:

- When tightening the hydraulic unit nuts, first temporarily tighten the front nuts, and then tighten the rear nut and the front nuts to specification in the order given.
- 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.



- rubber plugs or bolts (M10 × 1.25)
- 3. Install:
 - copper washers New
 - brake hose ① (to the rear brake caliper)
- brake hose ② (from the rear brake master cylinder)
- brake hose ③ (to the front brake caliper)
- brake hose 4 (from the front brake master cylinder)
- union bolts

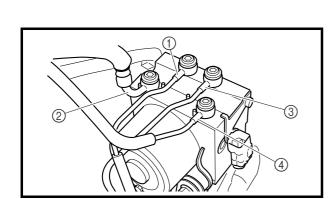
30 Nm (3.0 m ⋅ kg, 22 ft ⋅ lb)

WARNING

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

CAUTION:

To route the front and rear brake hoses, refer to "CABLE ROUTING" in chapter 2.





- 4. Fill:
- brake master cylinder reservoirs



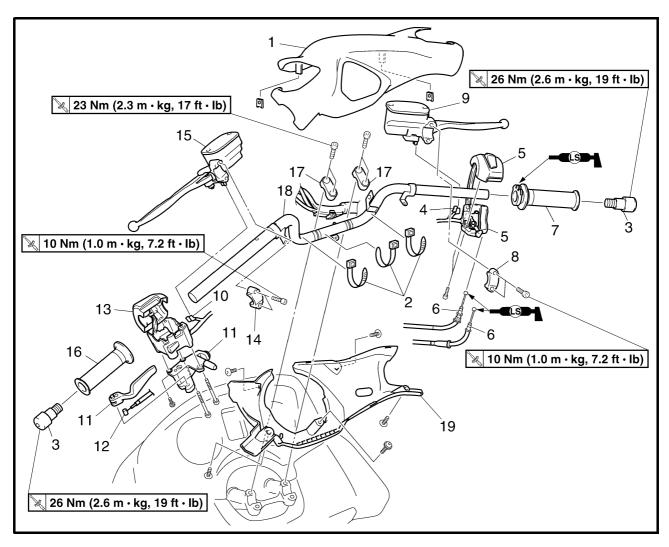
Recommended brake fluid DOT 4

- 5. Bleed the brake system.
- 6. Check the operation of the hydraulic unit according to the brake levers response. (Refer to "[D-6-3-1] Hydraulic unit operation test 1".)

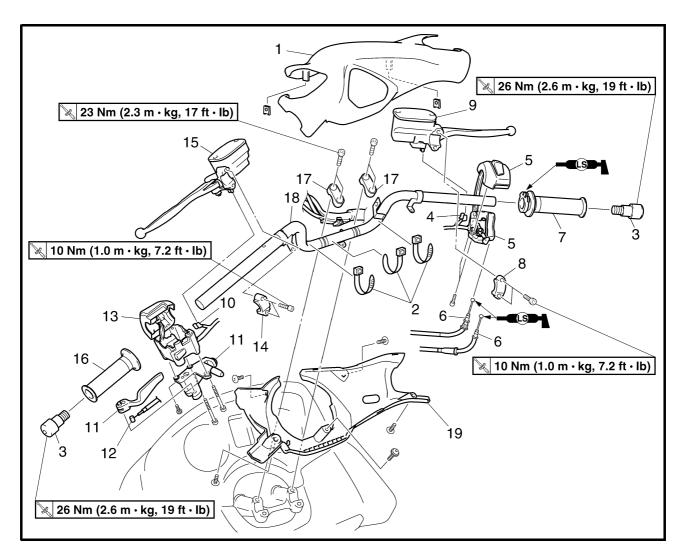
CAUTION:

Always check the operation of the hydraulic unit according to the brake levers response.





Order	Job/Part	Q'ty	Remarks
	Removing the handlebar		Remove the parts in the order listed.
1	Upper handlebar cover	1	
2	Band	3	
3	Grip end	2	
4	Front brake light switch connector	2	Disconnect.
5	Right handlebar switch	1	1
6	Throttle cable	2	Disconnect.
7	Throttle grip	1	Refer to "INSTALLING
8	Front brake master cylinder holder	1	THE HANDLEBAR".
9	Front brake master cylinder	1	
10	Rear brake light switch connector	2	Disconnect.



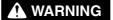
Order	Job/Part	Q'ty	Remark	(S
11	Parking brake lever/holder	1/1	7	
12	Rear brake lock lever cable	1	Disconnect.	"INSTALLING
13	Left handlebar switch	1		NDLEBAR".
14	Rear brake master cylinder holder	1		NULEDAN .
15	Rear brake master cylinder	1		
16	Handlebar grip	1	Refer to "REMOVING THE HANDLE-BAR" and "INSTALLING THE HANDLE BAR".	
17	Upper handlebar holder	2	Refer to "INSTALLING	THE HANDLE-
18	Handlebar	1	BAR".	
19	Lower handlebar cover	1		
			For installation, reverse cedure.	the removal pro-



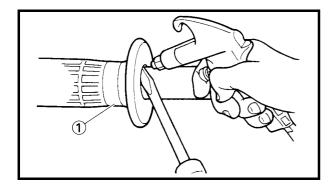
EAS00666

REMOVING THE HANDLEBAR

1. Stand the scooter on a level surface.



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

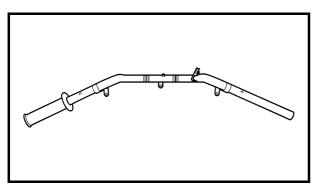


2. Remove:

• handlebar grip ①

NOTE:

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



CHECKING THE HANDLEBAR

- 1. Check:
- handlebar ${\sf Bends/cracks/damage} \to {\sf Replace}.$

⚠ WARNING

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

EAS00671

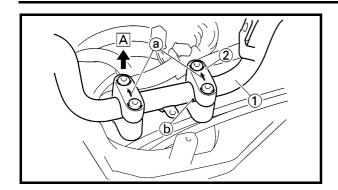
INSTALLING THE HANDLEBAR

1. Stand the scooter on a level surface.

WARNING

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





2. Install:

- handlebar (1)
- handlebar upper holders ②

≥ 23 Nm (2.3 m · kg, 17 ft · lb)

WARNING

First, tighten the bolts on the front side of the handlebar holder, then on the rear side.

NOTE: _

- The upper handlebar holders should be installed with the arrow marks @ facing forward A.
- Align the match mark
 on the handlebar with the upper surface of the lower handlebar holder.
- 3. Install:
 - handlebar grip
 - grip end
- a. Apply a thin coat of rubber adhesive onto the left end of the handlebar.
- b. Slide the handlebar grip over the left end of the 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.

4. Install:

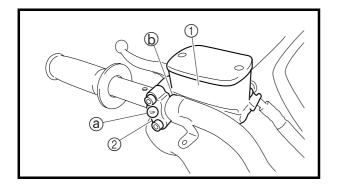
- rear brake master cylinder ①
- rear brake master cylinder holder ②

№ 10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE: _

- Install the rear brake master cylinder holder with the "UP" mark facing up (a).
- Align the rear brake master cylinder with the projection

 in the handlebar.
- First, tighten the upper bolt, then the lower bolt.

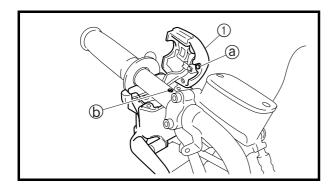


5. Connect:

• rear brake lock lever cable

NOTE: .

Lubricate the inside of the rear brake lock lever cable and parking brake lever with a thin coat of lithium-soap-based grease.

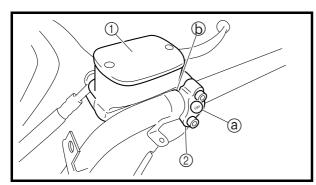


6. Install:

• left handlebar switch ①

NOTE:

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



7. Install:

- front brake master cylinder ①
- front brake master cylinder holder ②

🔪 10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE: _

- Install the front brake master cylinder holder with the "UP" (a) mark facing up.
- Align the front brake master cylinder with the projection (b) in the handlebar.
- First, tighten the upper bolt, then the lower bolt.

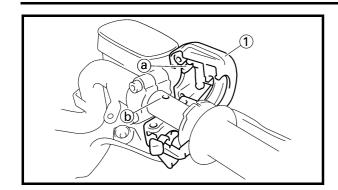
8. Install:

- throttle grip
- throttle cables

NOTE:

Lubricate the inside of the throttle grip with a thin coat of lithium-soap-based grease and install it onto the handlebar.





9. Install:

• right handlebar switch ①

WARNING

Make sure the throttle grip operates smoothly.

NOTE: _

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

10.Adjust:

 throttle cable free play Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" in chapter 3.

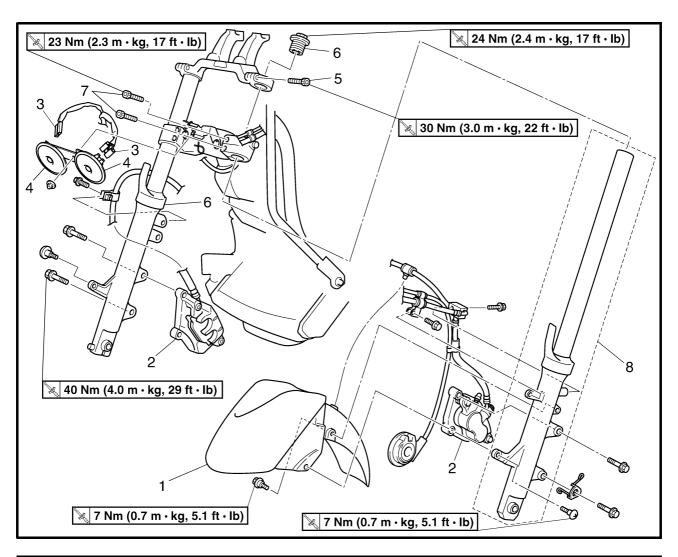


Throttle cable free play (at the flange of the throttle grip) 3 ~ 5 mm (0.12 ~ 0.20 in)

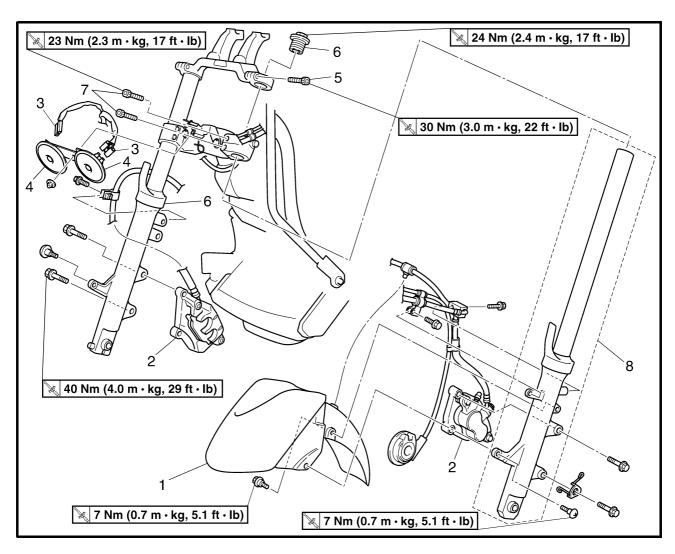
11.Adjust:

 rear brake lock lever cable length Refer to "ADJUSTING THE REAR BRAKE LOCK LEVER CABLE" in chapter 3.

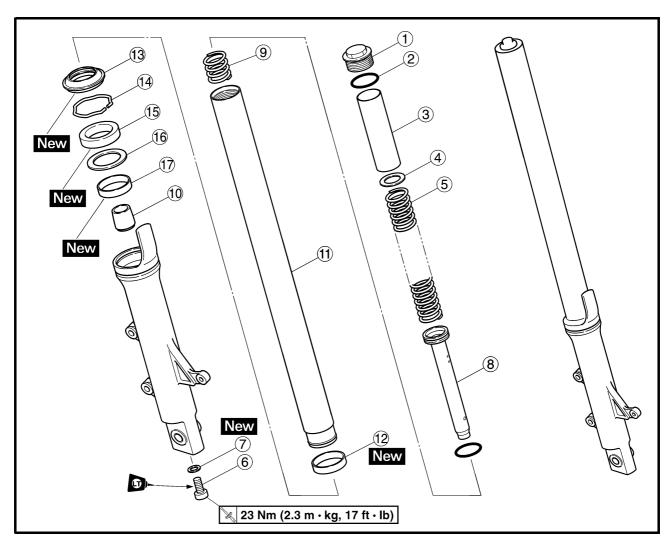




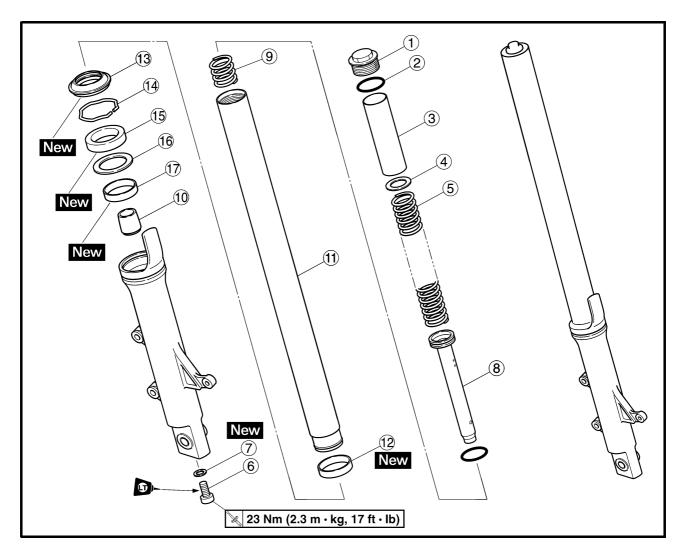
Order	Job/Part	Q'ty	Remarks
	Removing the front fork		Remove the parts in the order listed.
			The following procedure applies to both
			of the front fork legs.
	Front cowling/leg shield		Refer to "COVER AND PANEL" in chap-
			ter 3.
	Handlebar cover (upper and lower)		Refer to "HANDLEBAR".
	Front wheel		Refer to "FRONT WHEEL AND BRAKE
			DISC".
	ECU (ABS)		For XP500A
			Refer to "FRONT AND REAR BRAKES".
1	Front fender	1	
2	Front brake caliper	2	
3	Horn coupler	2	Disconnect.
4	Horn	2	



Order	Job/Part	Q'ty		Remarks
5	Upper bracket pinch bolt	2	Loosen.	Refer to "REMOVING
6	Cap bolt	1	Loosen.	THE FRONT FORK
7	Lower bracket pinch bolt	4	Loosen.	LEGS" and "INSTALLING
8	Front fork leg	2	_	THE FRONT FORK
				LEGS".
			For installation	n, reverse the removal pro-
			cedure.	



Order	Job/Part	Q'ty	Remarks
	Disassembling the front fork leg		Remove the parts in the order listed. The following procedure applies to both of the front fork legs.
1	Cap bolt	1	h
2	O-ring	1	
3	Spacer	1	
4	Fork spring seat	1	
(5)	Fork spring	1	Refer to "DISASSEMBLING THE
6	Damper rod assembly bolt	1	FRONT FORK LEGS" and "ASSEM-
7	Copper washer	1	BLING THE FRONT FORK LEGS".
8	Damper rod assembly	1	
9	Rebound spring	1	
10	Oil flow stopper	1	
11)	Inner tube	1	Ц



Order	Job/Part	Q'ty	Remarks
12	Inner tube bushing	1	7
13	Dust seal	1	Defer to "DICACCEMBLING THE
14)	Oil seal clip	1	Refer to "DISASSEMBLING THE FRONT FORK LEGS" and "ASSEM-
15	Oil seal	1	BLING THE FRONT FORK LEGS".
16	Washer	1	BEING THE FRONT FORK LEGS.
17	Outer tube bushing	1	<u> </u>
			For assembly, reverse the disassembly
			procedure.



EAS0065

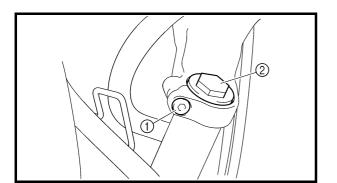
REMOVING THE FRONT FORK LEGS

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

1. Stand the scooter on a level surface.

WARNING

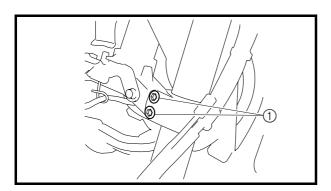
Securely support the scooter so that there is no danger of it falling over.



NOTE: __

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

- 2. Loosen:
- upper bracket pinch bolt (1)
- cap bolt ②

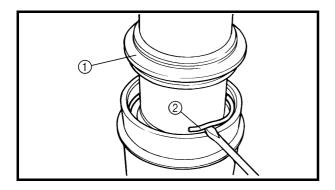


- 3. Loosen:
- lower bracket pinch bolts ①

WARNING

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

- 4. Remove:
- front fork leg



EAS00652

DISASSEMBLING THE FRONT FORK LEGS

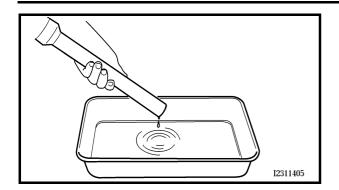
The following procedure applies to both of the front fork legs.

- 1. Remove:
- dust seal (1)
- oil seal clip ②
 (with a flat-head screwdriver)

CAUTION:

Do not scratch the inner tube.



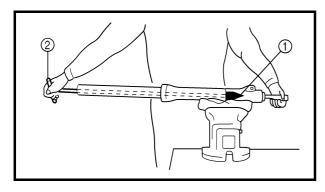


2. Drain:

· fork oil

NOTE:

Stroke the outer tube several times while draining the fork oil.



3. Remove:

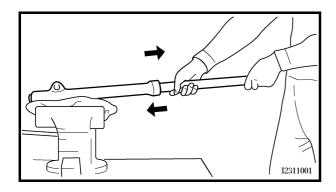
· damper rod assembly bolt

NOTE:

While holding the cartridge cylinder with the damper rod holder ① and T-handle ②, loosen the damper rod assembly bolt.



Damper rod holder 90890-01294, YM-01300 T-handle 90890-01326, YM-01326



4. Remove:

• inner tube

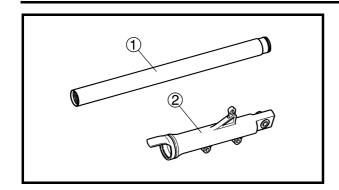
a. Hold the front fork leg horizontally.

- b. Securely clamp the brake caliper bracket in a vise with soft jaws.
- Separate the inner tube from the outer tube by pulling the inner tube forcefully but carefully.

CAUTION:

- Excessive force will damage the oil seal and bushing. A damaged oil seal or bushing must be replaced.
- Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.





EAS00656

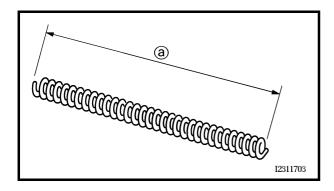
CHECKING THE FRONT FORK LEGS

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

- 1. Check:
 - inner tube (1)
- outer tube ②
 Bends/damage/scratches → Replace.

WARNING

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

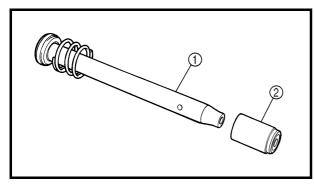




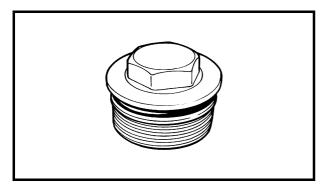
spring free length ⓐ
 Over the specified limit → Replace.



Spring free length limit 405.0 mm (15.94 in) <Limit>: 400.0 mm (15.75 in)



- 3. Check:
 - damper rod ①
 Damage/wear → Replace.
 Obstruction → Blow out all of the oil passages with compressed air.
- oil flow stopper ②
 Damage → Replace.



- 4. Check:
- cap bolt



EAS00659

ASSEMBLING THE FRONT FORK LEGS

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

WARNING

- Make sure that 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
 - oil seal
 - dust seal
- Before assembling the front fork leg, make sure that all of the components are clean.



- damper rod (1)
- rebound spring ②

CAUTION:

Allow the damper rod to slide slowly down the inner tube ③ until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

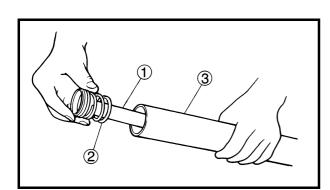


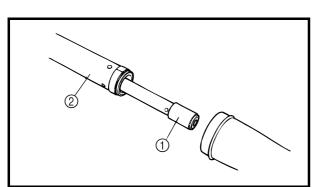
- oil flow stopper (1)
- 3. Lubricate:
- inner tube's outer surface (2)



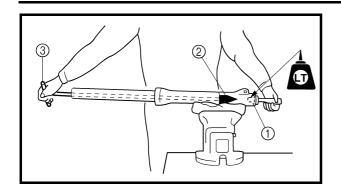
Recommended lubricant Fork oil 7.5 W or equivalent

- 4. Install:
- outer tube (onto the inner tube)
- copper washer New
- · damper rod assembly bolt









- 5. Tighten:
 - damper rod assembly bolt ①



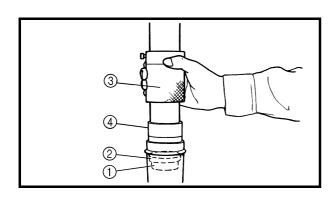
Damper rod assembly bolt 23 Nm (2.3 m · kg, 17 ft · lb) LOCTITE®

NOTE:

- Apply the locking agent (LOCTITE®) to the threads of the damper rod assembly bolt.
- While holding the damper rod with the damper rod holder ② and T-handle ③, tighten the damper rod assembly bolt.



Damper rod holder 90890-01294, YM-01300 T-handle 90890-01326, YM-01326

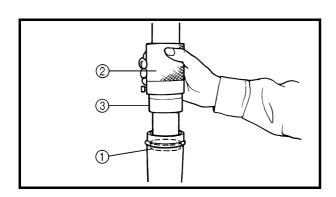


6. Install:

- outer tube bushing ① New
- washer ②
 (with the fork seal driver weight ③ and fork seal driver attachment ④)



Fork seal driver weight 90890-01367, YM-A5142-4 Fork seal driver attachment (41 mm) 90890-01381, YM-A5142-2



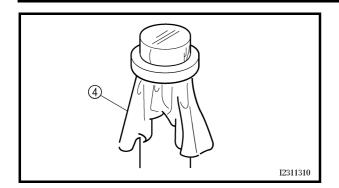
7. Install:

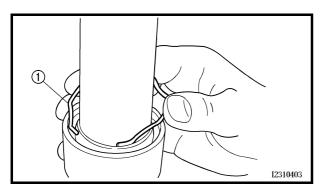
• oil seal ① New (with the fork seal driver weight ② and fork seal driver attachment ③)

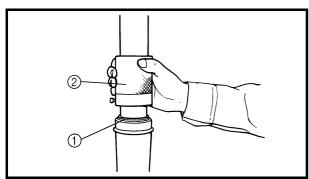
CAUTION:

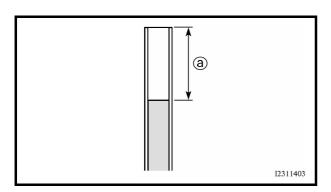
Make sure that the numbered side of the oil seal faces up.











NOTE: _

- · Before installing the oil seal, apply lithiumsoap-based grease onto its lips.
- · Apply fork oil onto the outer surface of the inner tube.
- · Before installing the oil seal, cover the top of the front fork leg with a plastic bag (4) to protect the oil seal during installation.

8. Install:

• oil seal clip 1

NOTE:

Adjust the oil seal clip so that it fits into the outer tube's groove.

- 9. Install:
- dust seal ① New (with the fork seal driver weight 2)



Fork seal driver weight 90890-01367, YM-A5142-4

10.Fill:

· front fork leg (with the specified amount of the recommended fork oil)



Quantity (each front fork leg) 0.512 L

(0.451 Imp qt, 0.541 US qt) Front fork leg oil level ⓐ (from the top of the inner tube, with the inner tube fully compressed and without the fork spring)

109.0 mm (4.29 in) Recommended oil

Fork oil 7.5 W or equivalent

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.

11.Install:

- fork spring
- fork spring seat
- spacer
- cap bolt

NOTE:

- Install the spring with the smaller pitch facing up.
- Before installing the cap bolt, lubricate its Oring with grease.
- Temporarily tighten the cap bolt.

EAS00663

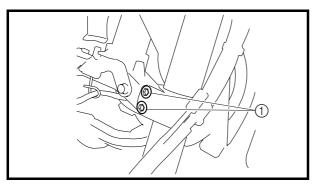
INSTALLING THE FRONT FORK LEGS

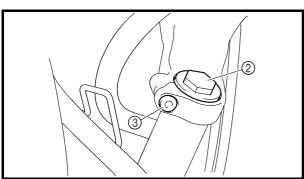
The following procedure applies to both of the front fork legs.

- 1. Install:
- front fork leg

NOTE:

Pull up the inner tube until it stops.





- 2. Tighten:
 - lower bracket pinch bolt 1)

≥ 23 Nm (2.3 m ⋅ kg, 17 ft ⋅ lb)

• cap bolt ②

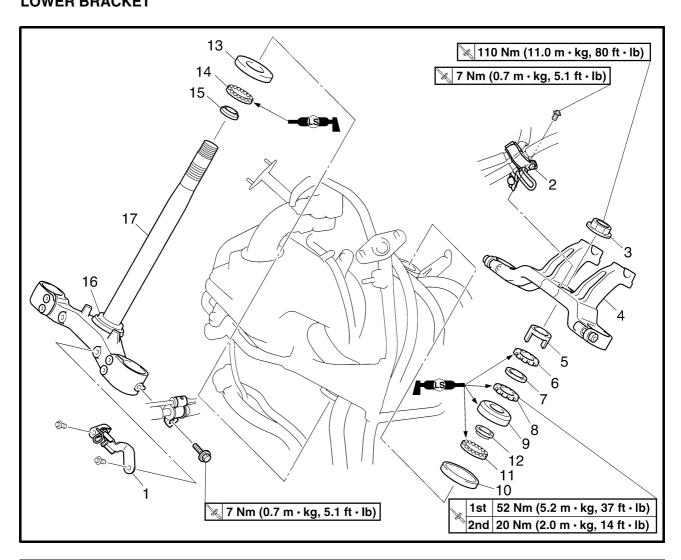
24 Nm (2.4 m · kg, 17 ft · lb)

• upper bracket pinch bolt ③

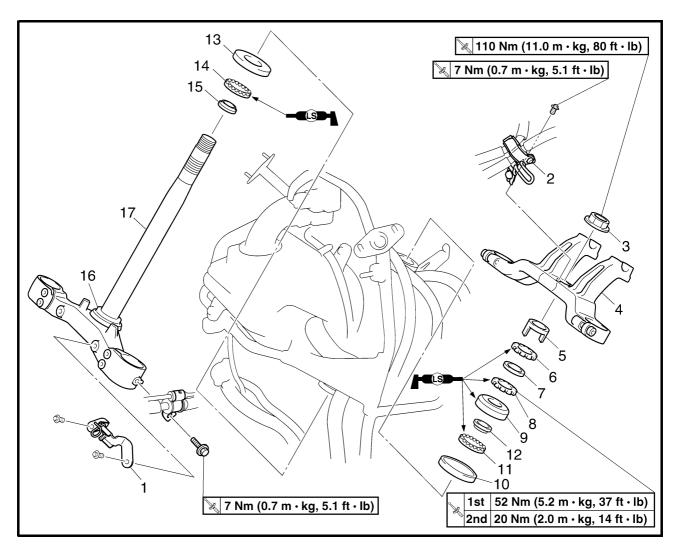
🗽 30 Nm (3.0 m ⋅ kg, 22 ft ⋅ lb)



STEERING HEAD LOWER BRACKET



Order	Job/Part	Q'ty	Remarks
	Removing the lower bracket		Remove the parts in the order listed.
	Front cowling		Refer to "COVER AND PANEL" in chapter 3.
	Front wheel		Refer to "FRONT WHEEL AND BRAKE DISC".
	Front fork legs		Refer to "FRONT FORK".
	Handlebar		Refer to "HANDLEBAR".
1	Horn bracket	1	
2	Brake hose holder	1	
3	Steering stem nut	1	
4	Upper bracket	1	Defeate "DEMOVING THE LOWED
5	Lock washer	1	Refer to "REMOVING THE LOWER
6	Upper ring nut	1	BRACKET" and "INSTALLING THE STEERING HEAD".
7	Rubber washer	1	STEETHING FIEAD.
8	Lower ring nut	1	<u> </u>



Order	Job/Part	Q'ty	Remarks
9	Bearing cover	1	
10	Bearing outer race	1	
11	Upper bearing	1	
12	Bearing inner race	1	Refer to "INSTALLING THE STEERING
13	Bearing outer race	1	HEAD".
14	Lower bearing	1	
15	Bearing inner race	1	<u> </u>
16	Oil seal	1	
17	Lower bracket	1	
			For installation, reverse the removal pro-
			cedure.

STEERING HEAD



EAS00678

REMOVING THE LOWER BRACKET

1. Stand the scooter on a level surface.

WARNING

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



- upper bracket
- 3. Remove:
- lock washer (1)
- upper ring nut ②
- rubber washer ③
- lower ring nut (4) (with the steering nut wrench)



Steering nut wrench 90890-01403, YU-33975 Ring nut wrench 90890-01268, YU-01268



Securely support the lower bracket so that there is no danger of it falling.

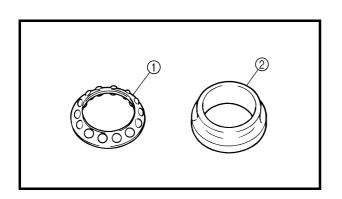
EAS00681

CHECKING THE STEERING HEAD

- 1. Wash:
- bearings
- bearing races



Recommended cleaning solvent Kerosine

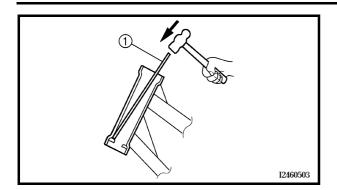


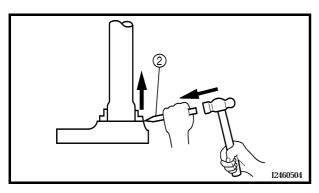
4).

- 2. Check:
- bearings ①
- bearing races ②
 Damage/pitting → Replace.

STEERING HEAD







- 3. Replace:
- bearings
- bearing races

a. Remove the bearing races from the steering

- a. Remove the bearing races from the steering head pipe with a long rod ① and hammer.
- b. Remove the bearing race from the lower bracket with a floor chisel ② and hammer.
- c. Install a new rubber seal and 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.
- Whenever the steering head is disassembled, replace the rubber seal.

- 4. Check:
- upper bracket
- lower bracket (along with the steering stem)
 Bends/cracks/damage → Replace.

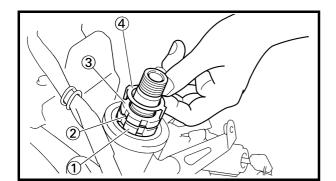
EAS00684

INSTALLING THE STEERING HEAD

- 1. Lubricate:
- upper bearing
- · lower bearing
- · bearing races



Recommended lubricant Lithium-soap-based grease

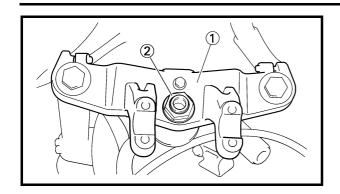


- 2. Install:
- lower ring nut 1
- rubber washer ②
- upper ring nut ③
- lock washer (4)

Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" in chapter 3.

STEERING HEAD





- 3. Install:
- upper bracket ①
- steering stem nut ②
- 4. Install:
- front fork legs Refer to "FRONT FORK".

NOTE

Temporarily tighten the lower bracket pinch bolts.

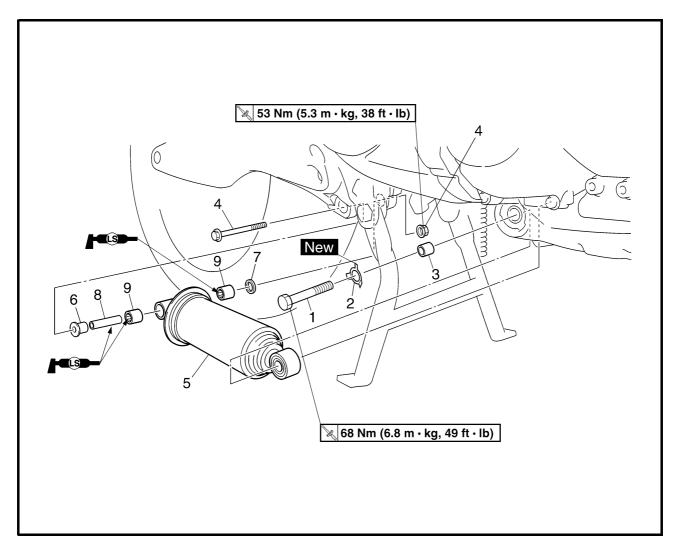
- 5. Tighten:
- steering stem nut ②

№ 110 Nm (11.0 m · kg, 80 ft · lb)

REAR SHOCK ABSORBER



REAR SHOCK ABSORBER



Order	Job/Part	Q'ty	Remarks
	Removing the rear shock absorber		Remove the parts in the order listed.
	Muffler		Refer to "MUFFLER ASSEMBLY" in
			chapter 5.
1	Bolt	1	
2	Lock washer	1	
3	Collar	1	
4	Bolt/nut	1/1	
5	Rear shock absorber	1	
6	Collar	1	
7	Washer	1	
8	Spacer	1	
9	Bearing	2	
			For installation, reverse the removal procedure.

REAR SHOCK ABSORBER



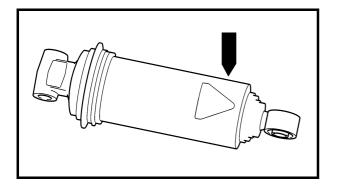
EAS00687

HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER

⚠ WARNING

This rear shock absorber and gas cylinder contain highly compressed nitrogen gas. Before handling the rear shock absorber or gas cylinder, 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 and gas cylinder.

- Do not tamper or attempt to open the rear shock absorber or gas cylinder.
- Do not subject the rear shock absorber or gas cylinder 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 or gas cylinder in any way. If the rear shock absorber, gas cylinder or both are damaged, damping performance will suffer.



EAS00689

DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER

Gas pressure must be released before disposing of a rear shock absorber and gas cylinder. To release the gas pressure, drill a 2 \sim 3 mm (0.08 \sim 0.12 in) hole through the gas cylinder at a point 15 \sim 20 mm (0.59 \sim 0.79 in) from its end as shown.

M WARNING

Wear eye protection to prevent eye damage from released gas or metal chips.

REAR SHOCK ABSORBER



EAS00693

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the scooter on a level surface.

WARNING

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

NOTE: ____

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



• rear shock absorber bolts (1)

NOTE:

When removing the rear shock absorber bolts ①, hold the swingarm so that it does not drop down.

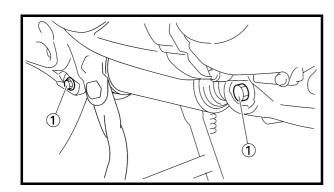
3. Remove:

rear shock absorber assembly

EAS00696

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY AND GAS CYLINDER

- 1. Check:
- rear shock absorber rod
 Bends/damage → Replace the rear shock
 absorber assembly.
- rear shock absorber
 Gas leaks/oil leaks → Replace the rear
 shock absorber assembly.
- spring
 Damage/wear → Replace the rear shock absorber assembly.
- gas cylinder
 Damage/gas leaks → Replace the rear shock absorber assembly.
- bushings
 Damage/wear → Replace.
- bolts Bends/damage/wear \rightarrow Replace.



REAR SHOCK ABSORBER

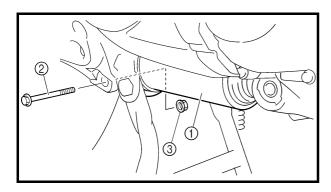


INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Lubricate:
- spacer
- bearings

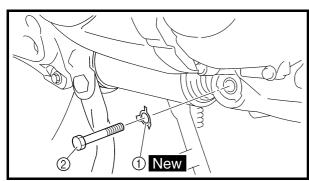


Recommended lubricant Lithium-soap-based grease



- 2. Install:
- rear shock absorber assembly ①
- bolt (rear side) ②
- nut ③

№ 53 Nm (5.3 m · kg, 38 ft · lb)



- 3. Install:
- lock washer ① New
- bolt (front side) ②

№ 68 Nm (6.8 m · kg, 49 ft · lb)

NOTE:

- When installing the bolt ①, hold the swingarm so that it does not drop down.
- Bend the lock washer ② tab along a flat side of the bolt ①.



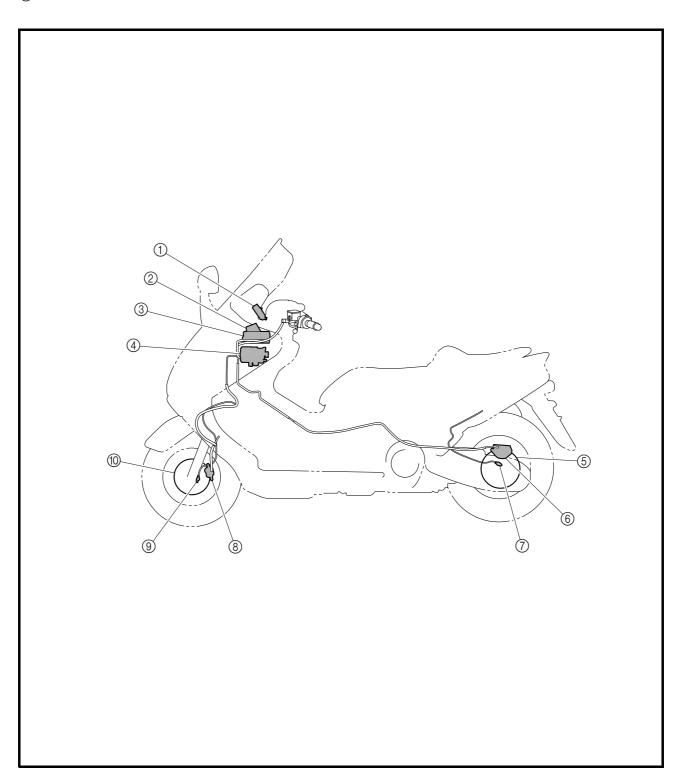
ANTI-LOCK BRAKE SYSTEM (XP500A)

EAS00882

ABS COMPONENTS

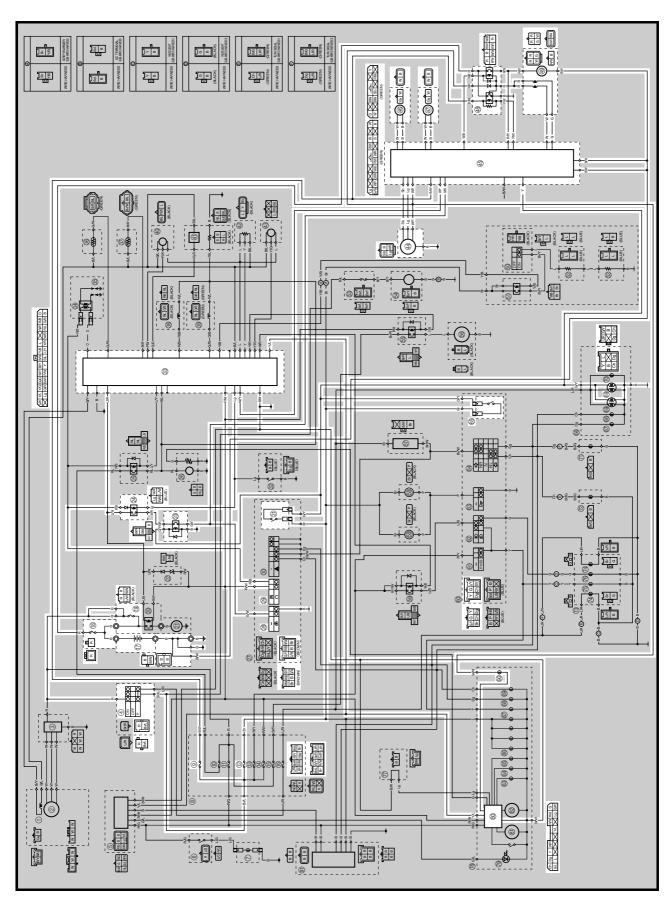
- ① ABS warning light
- ② Fail-safe relay
- ③ Electronic control unit (ECU)
- 4 Hydraulic unit
- ⑤ Rear disc rotor
- ® Rear brake caliper
- 7 Rear wheel sensor

- ® Front brake caliper
- Front wheel sensor
- 10 Front disc rotor





EAS00884
CIRCUIT DIAGRAM





- (4) Main switch
- ABS control unit fuse
- Signaling system fuse
- (7) Battery
- (8) ABS motor fuse
- 19 Main fuse
- 3 Starting circuit cut-off relay 2
- ② Starting circuit cut-off relay 1
- Start switch
- Engine stop switch
- Tront brake light switch
- 3 ECU (engine)
- (4) ABS test coupler
- 45 ECU (ABS)
- (46) Front wheel sensor
- Rear wheel sensor
- (48) Fail-safe relay
- 49 Hydraulic unit
- 6 Rear brake light switch
- 69 Tail/brake light
- Multi-function display
- ABS warning light



CAUTIONS FOR OPERATION

ABS warning light:

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

ABS function:

- A brake system in which the hydraulic control has been performed by the ABS alerts a rider that
 the wheels had a tendency to lock by generating a reaction-force pulsating action in the brake
 levers. 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 an 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 an ABS cannot be prevented from falling over if braked suddenly.
- The ABS does not work when the main switch is set 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 vehicles continues to travel.



TROUBLESHOOTING

EAS00881

ABS troubleshooting outline

Use this section to troubleshoot the ABS. Read this service manual carefully and make sure you understand the information provided before repairing any malfunctions or performing service.

The electronic control unit (ECU) has an ABS self-diagnostic function. When failures occur in the ABS, the ABS warning light on the meter assembly indicates a malfunction.

The troubleshooting below describes the problem identification and service method according to the indications by the multifunction display. For troubleshooting other than the following items, follow the normal service method.

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-6] Final check".)

- 1. ABS condition when the ABS warning light comes on
- 1) ABS warning light remains on. \rightarrow The ABS is not operating, manual braking is used.
- Diagnose the malfunction using the ABS self-diagnostic function.
- 2) Light comes on, and then goes off when starting \rightarrow ABS operation is normal.
- The ABS warning light comes on for 2 seconds, and then goes off every time the main switch is set to "ON".
- 3) ABS warning light flashes. \rightarrow ABS operation is normal.
- The brake switch is defective or improperly adjusted.
- The rear wheel is racing.
- The vehicle is continuously ridden on extremely uneven roads.
- Self-diagnosis and service

The ECU (ABS) has an ABS self-diagnostic function. By utilizing this function, quick problem identification and service are possible. The malfunction codes are stored in the memory of the ECU (ABS).

Malfunctions are detected

The ABS warning light cannot be used to recall the malfunction codes from the memory of the ECU (ABS) if the ABS warning light is already on. Connect the test coupler adaptor to the test coupler, connect a pocket tester to the terminal of the light green lead of the test coupler adaptor, and determine the malfunction codes by the movement of the pocket tester needle. (Refer to "[B-5] ABS malfunction check using the ABS self-diagnosis (present malfunction)".)

Malfunctions are not detected

The multifunction display indicates all the malfunction codes recorded in the ECU (ABS).

You can also recall the malfunction codes by using a pocket tester. Note all malfunction codes if more than two malfunction codes are stored in the memory.

Deleting the malfunction codes

When the service has been completed, check the normal operation of vehicle and then delete the malfunction codes. (Refer to "[D-6] Final check".) By deleting the malfunction code memory, it is possible to pursue the cause correctly if the next malfunction occurs.



ABS self-diagnosis by the ECU (ABS)

The ECU (ABS) performs a static check on the ABS when the main switch is set to "ON". The ECU (ABS) also monitors the ABS while riding the vehicle and checks for malfunctions. If malfunctions occur, the malfunction codes are stored in the memory of the ECU (ABS). The malfunction codes can be recalled from the memory using the ABS self-diagnostic function of the ECU (ABS) and a pocket tester or the multifunction display.

3. Handling and service

CAUTION:

Handling the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.

- The ECU (ABS), hydraulic unit, wheel sensors, and fail-safe relay cannot be disassembled.
- Always delete the malfunction codes stored in the memory of the ECU (ABS) after service has been completed.

EAS00885

Basic troubleshooting instructions

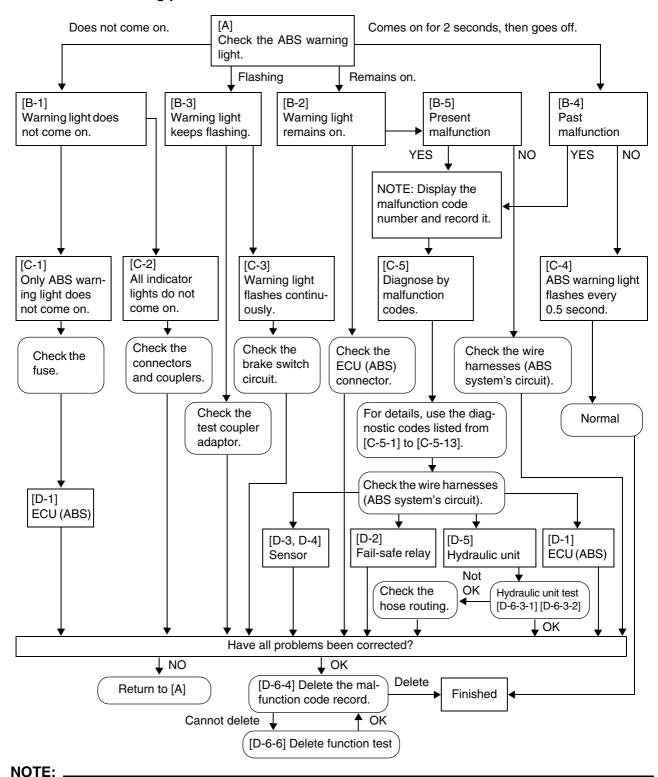
WARNING

- Perform the troubleshooting [A] → [B] → [C] → [D] in order. The malfunction will not be diagnosed correctly if the troubleshooting is performed in the wrong order or if the steps are omitted.
- Make sure that the battery has been sufficiently charged before troubleshooting.
- [A] ABS malfunction check using the ABS warning light
- [B] Detailed ABS malfunction check
 - The results of the self-diagnosis by the ECU (ABS) are displayed using the multifunction display or a pocket tester.
- [C] Determining the cause and location of the malfunction Determine the cause of the malfunction from the condition and place where the malfunction occurred.
- [D] ABS maintenance
 - Execute the final check after disassembly and reassembly.



EAS00886

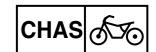
Basic troubleshooting process



Do not delete the malfunction codes during troubleshooting. Delete the malfunction codes only after service has been completed.

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-6] Final check".)



EAS00887

ABS troubleshooting

• [A] ABS malfunction check using the ABS warning light

Set the main switch to "ON". (Do not start the engine.)

1) Warning light does not come on. \rightarrow [B-1] 2) Warning light remains on. \rightarrow [B-2]

3) Warning light flashes. \rightarrow [B-3]

4) Warning light comes on for 2 seconds, then goes off. \rightarrow [B-4]

• [B] Detailed ABS malfunction check

• [B-1] Warning light does not come on

Do other indicators operate normally?

1) Yes. \rightarrow [C-1] 2) No. \rightarrow [C-2]

• [B-2] ABS warning light remains on

Check the ECU (ABS) and is located on the right side of the vehicle near the top of the front fork. Is the coupler connected securely?

1) Yes. \rightarrow [B-5]

2) No. \rightarrow Connect the coupler securely until a "click" sound is heard.

• [B-3] Warning light flashes

NOTE:

Check the battery voltage before proceeding.

Check the test coupler located in the front cowling. Is the T/C terminal grounded?

 Yes. → Disconnect the grounding lead from the T/C terminal and install the protective cap onto the test coupler.

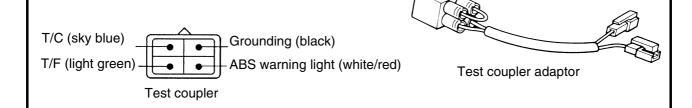
NOTE:

When the test coupler adaptor is connected to test coupler, the T/C terminal is grounded.

2) No. \rightarrow [C-3]

Function of the test coupler terminals

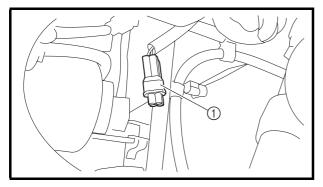
- The ABS self-diagnostic function of the ECU (ABS) is operated when the T/C terminal is grounded.
- The malfunction codes stored in the memory of the ECU (ABS) are recalled and output (rise and fall of voltage) at the T/F terminal.
- The ABS warning light terminal is used to check the ABS warning light circuit.
- To ground the T/C terminal, connect the test coupler adaptor to the test coupler.

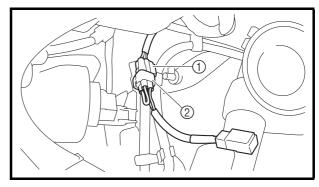




• [B-4] ABS malfunction check using the ABS self-diagnosis (past malfunction)

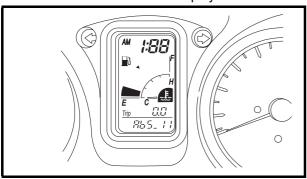
To access the test coupler ①. Remove the protective cap and connect the test coupler adaptor ② to the test coupler. The T/C terminal (sky blue) is now grounded.





1) Indicate the malfunction code (Example: malfunction code 11)

Multifunction display



2) ABS warning light flashes every 0.5 second for more than 6 seconds. \rightarrow [C-4, C-5] If the ABS warning light flashes every 0.5 second, the malfunction code of a past malfunction has not been stored in the memory of the ECU (ABS). If a malfunction code is displayed on the multifunction display, the ABS warning light flashes. Make sure that the customer understands the possible conditions when the ABS warning light comes on.

CAUTION:

- When checking for ABS malfunctions, the odometer and bottom tripmeter are not displayed.
- When checking for fuel injection system malfunctions or adjusting the exhaust gas volume, the ABS malfunction codes are not displayed.

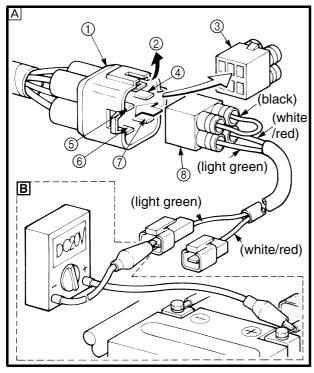


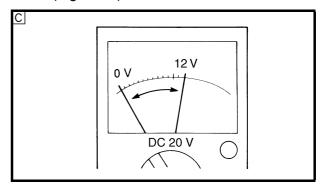
• [B-5] ABS malfunction check using the ABS self-diagnosis (present malfunction)

NOTE:

Before proceeding, read [B-3], "Function of the test coupler terminals".

To access the test coupler. Remove the protective cap and connect the test coupler adaptor to the test coupler. The T/C terminal (sky blue) is now grounded. (Figure A)



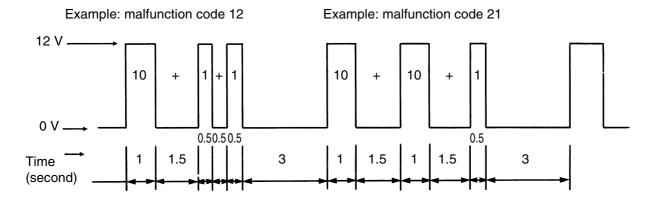


- 1 Test coupler
- ② Lock plate
- ③ Protective cap
- 4 Grounding
- (5) T/C terminal
- ⑥ T/F terminal
- 7 Light terminal
- ® Test coupler adaptor

Because malfunction codes for present malfunctions are not displayed on the meter assembly, check the malfunction code as follows.

Set the pocket tester range to DC 20 V. Connect the pocket tester negative probe to the T/F terminal (light green) of the test coupler adaptor and the pocket tester positive probe to the positive battery terminal. (Figure B)

Determine the malfunction code according to the movement of the pocket tester needle. (Figure ©) A tester reading with the digits of 10 and digits of 1 pattern is shown below.





- [C] Determining the cause and location of the malfunction
- [C-1] Only the ABS warning light does not come on when the main switch is set to "ON"

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Check following the steps in sequence.

- 1. Visual check
- 1) Check the ABS fuse.

Determine the cause of the blown fuse and repair. Replace with a new fuse. (Refer to "CHECK-ING THE FUSES" in chapter 3.)

- Check the wire harness (ABS system circuit) couplers.
 Check that the wire harness (ABS system circuit) couplers are securely connected.
- 3) Check the connection of the wire harness (ABS system circuit) to the ECU (ABS). Check that the wire harness (ABS system circuit) is securely connected to the ECU (ABS).
- 2. Confirmation using the test coupler adaptor
- 1) Connect the test coupler adaptor to the test coupler. (Refer to "[B-5] ABS malfunction check using the ABS self-diagnosis (present malfunction)".)
- 2) Ground the warning light terminal (white/red) of the test coupler adaptor or connect the warning light terminal to the negative battery terminal.
- If the ABS warning light comes on, the wire harness (ABS system circuit) may be disconnected.
- If the ABS warning light does not come on, the ABS warning light lead may be disconnected or the contact of the ABS warning light may be defective.
- 3) Remove the ECU (ABS) coupler and check the ECU (ABS) coupler and test coupler adaptor ends of the white/red lead for continuity.
- If there is continuity, the ECU (ABS) is defective. → Replace the ECU (ABS). (Refer to "[D-1] Maintenance of the ECU (ABS)".)
- If there is no continuity, the warning light circuit in the wire harness (ABS system circuit) is defective. Disconnection or short → Correct. (Refer to "CIRCUIT DIAGRAM".)
- [C-2] ABS warning light and all other indicators do not come on

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Check following the steps in sequence.

- 1. Check the power supply system.
- 1) Check that the battery is connected correctly.
- 2) Check the battery voltage. (Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.)
- 3) Check if the main fuse is blown. If the main fuse is blown, determine the cause and repair. Replace with a new fuse. (Refer to "CHECKING THE FUSES" in chapter 3.)
- 2. Check the connections.
- 1) Check that the main fuse coupler is securely connected.
- 2) Check that the wire harness (ABS system circuit) is securely connected.
- 3) Check that the main switch coupler is securely connected.
- 4) Check that the meter assembly coupler is securely connected.

When these checks are finished, return to [A] and check the ABS again.



• [C-3] ABS warning light flashes

With the engine off, check the front and rear brake switches.

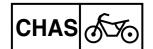
Check if the brake light comes on when the front or rear brake is applied.

- 1) The light does not come on for only one brake.
- → The corresponding brake switch connector is disconnected. (Refer to "CIRCUIT DIAGRAM".)
- \rightarrow The corresponding brake switch is defective.
- 2) The light does not come on for either brake.
- → The wire harness (ABS system circuit) may be disconnected or the fuse may be blown. Check the fuse and make sure the wire harness (ABS system circuit) (brown lead) is connected to the power source end of the brake switch. (Refer to "CIRCUIT DIAGRAM".)
- 3) The brake light comes on.
- → The wire harness (ABS system circuit) couplers may be disconnected.
- 4) Adjust the rear brake switch to the specified setting.

• [C-4] ABS warning light flashes every 0.5 second

If the ABS warning light flashes every 0.5 second, the malfunction code of a past malfunction has not been stored in the memory of the ECU (ABS). If a malfunction code is displayed on the multifunction display, the ABS warning light flashes. Make sure that the customer understands the possible conditions when the ABS warning light comes on.

- 1. 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 set to "OFF", then to "ON".
- 1) The rear wheel was rotated with the vehicle on the centerstand. \rightarrow The system is normal.
- 2) The rear wheel raced. \rightarrow The system is normal.
- 3) The vehicle was ridden on the rear wheel with the front wheel elevated. \rightarrow The system is normal.
- 4) The vehicle was ridden on extremely uneven roads continuously. \rightarrow The system is normal.
- 5) The brake switch is defective or improperly adjusted. → Replace or adjust.
- 2. Voltage drop
 - For the ABS to operate correctly, the voltage should be always higher than the specified voltage. If the voltage drops to lower than 10 V, the ABS warning light comes on and the ABS does not operate. When the voltage recovers to higher than 10 V, the ABS operates. However, the magneto, battery and rectifier/regulator must be checked. Follow the regular procedures for service of the power supply system.
- 3. ABS is stopped by the ECU (ABS)
 - The ECU (ABS) may stop the ABS operation if it is exposed to extremely strong electromagnetic waves or static electricity.
 - When the ECU (ABS) is no longer exposed to the electromagnetic waves, static electricity, and the ABS warning light is not flashing, there is no effect on the operation of the ABS. Explain to the customer that the ABS will operate normally.



• [C-5] Diagnosis by the malfunction code

Malfunction codes are used to determine the malfunctions that have occurred. (Refer to "[B-4] ABS malfunction check using the ABS self-diagnosis (past malfunction)" and "[B-5] ABS malfunction check using the ABS self-diagnosis (present malfunction)".) The malfunction codes are explained in the following table.

NOTE:	
Record all of the malfunction codes displayed and check the check points.	

Malfunction code	Problem	Check point	Reference
11 *1	Front wheel sensor signal is not received properly.	 Installation of the front wheel sensor Front wheel sensor lead and coupler Wire harness (ABS system's circuit) Front wheel sensor rotor 	[C-5-1] Mal- function code 11 (page 4-108)
12	Rear wheel sensor signal is not received properly.	 Installation of the rear wheel sensor Rear wheel sensor lead and coupler Wire harness (ABS system's circuit) Rear wheel sensor rotor 	[C-5-2] Mal- function code 12 (page 4-108)
13 (front) 14 (rear)	Incorrect signal is detected by the front (13) or rear (14) wheel sensor. 13 12 V	Wheel sensor installation Wheel sensor housings Wheel sensor rotors	[C-5-3] Mal- function codes 13 (front wheel) and 14 (rear wheel) (page 4-109)
15 (front) 16 (rear)	No continuity in the front or rear wheel sensor circuits 15	Continuity of sensor circuits Wire harness (ABS system's circuit) Connection of sensor coupler	[C-5-4] Mal- function codes 15 (front wheel sensor) and 16 (rear wheel sensor) (page 4-109)
21	Hydraulic unit solenoid circuit is broken or short-circuited.	Wire harness (ABS system's circuit) Hydraulic unit solenoid coupler Hydraulic unit solenoid	[C-5-5] Mal- function code 21 (page 4-109)
31	Disconnection is detected on the system of fail- safe relay and hydraulic unit solenoid coupler.	Wire harness (ABS system's circuit) Fail-safe relay circuit Hydraulic unit solenoid coupler	[C-5-6] Mal- function code 31 (page 4-110)
32	Defective operation of the fail-safe relay is detected. 12 V 0 V	Fail-safe relay Wire harness (ABS system's circuit)	[C-5-7] Mal- function code 32 (page 4-110)
33	Defective operation of the ABS motor is detected. (ABS motor stops and will not rotate.) 12 V 0 V	Wire harness (ABS system's circuit) ABS motor coupler Fail-safe relay ABS motor circuit	[C-5-8] Mal- function code 33 (page 4-111)



Malfunction code	Problem	Check point	Reference
34	Defective operation of the ABS motor is detected. (ABS motor keeps running and will not stop.) 12 V 0 V	Fail-safe relay Wire harness (ABS system's circuit) ABS motor circuit	[C-5-9] Mal- function code 34 (page 4-111)
41	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ECU (ABS) to release the hydraulic state (when the battery voltage is normal).	Brake dragging Hydraulic unit operation test 2 (Refer to [D-6-3-2].) Front wheel brake line	[C-5-10] Mal- function code 41 (page 4-112)
42	Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ECU (ABS) to release the hydraulic state (when the battery voltage is normal).	Brake dragging Hydraulic unit operation test 2 (Refer to [D-6-3-2].) Rear wheel brake line	[C-5-11] Mal- function code 42 (page 4-113)
51	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ECU (ABS) to release the hydraulic state (when the battery voltage is low).	Brake dragging Hydraulic unit operation test 2 (Refer to [D-6-3-2].) Front wheel brake line Battery voltage	[C-5-12] Malfunction code 51 (page 4-115)
52	Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ECU (ABS) to release the hydraulic state (when the battery voltage is low).	Brake dragging Hydraulic unit operation test 2 (Refer to [D-6-3-2].) Rear wheel brake line Battery voltage	[C-5-13] Mal- function code 52 (page 4-115)
Present mal- function (test always indi- cates 12 V)	ECU (ABS) may be malfunctioning 12 V 0 V	Wire harness (ABS system's circuit) (test coupler circuits) ECU (ABS) (Replace)	[D-1] Mainte- nance of the ECU (ABS) (page 4-116)

^{*1} Malfunction code 11 is indicated if the rear wheel rotates for more than 20 seconds with the front wheel stopped.

NOTE: _

Malfunction code 15 (front wheel sensor) or 16 (rear wheel sensor) is displayed if a defective connection to either the front or rear sensor is detected whether or not the vehicle is ridden.



• [C-5-1] Malfunction code 11 (Front wheel sensor signal is not received correctly.)

Set the main switch to "OFF", then back to "ON" after removing the test coupler adaptor.

- 1) ABS warning light remains on.
- → Defective connection in the front wheel sensor circuit.
- Front wheel sensor coupler is disconnected. \rightarrow [D-3]
- Front wheel sensor lead or coil is broken. → [D-3]
- Front wheel sensor circuit is broken. → (Refer to "CIRCUIT DIAGRAM".)
- ECU (ABS) coupler terminal is disconnected. \rightarrow [D-1]
- 2) ABS warning light comes on for 2 seconds, then goes off.
- ① With the front wheel stopped, the rear wheel was rotated for more than 20 seconds. This is not a malfunction.
- ② A signal is not generated at the front wheel sensor.
- Front wheel sensor is not installed properly. \rightarrow [D-3]
- Front wheel sensor rotor is defective. \rightarrow [D-3]
- ③ Front wheel sensor circuit is short-circuited.
- Front wheel sensor or lead is short-circuited. \rightarrow [D-3]
- ullet Front wheel sensor circuit is short-circuited. ullet (Refer to "CIRCUIT DIAGRAM".)
- (4) 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 when installed for looseness, distortion, and bends.

• [C-5-2] Malfunction code 12 (Rear wheel sensor signal is not received correctly.)

Set the main switch to "OFF", then back to "ON".

- 1) ABS warning light remains on.
- \rightarrow Defective connection in the rear wheel sensor circuit.
- Rear wheel sensor coupler is disconnected. → [D-4]
- Rear wheel sensor lead or coil is broken. → [D-4]
- Rear wheel sensor circuit is disconnected. → (Refer to "CIRCUIT DIAGRAM".)
- ECU (ABS) coupler terminal is disconnected. → [D-1]
- 2) ABS warning light comes on for 2 seconds, then goes off.
- ① With the rear wheel stopped, the front wheel was rotated at a speed faster than 11 km/h. This is not a malfunction.
- ② A signal is not generated at the rear wheel sensor.
- Rear wheel sensor is not installed properly. \rightarrow [D-4]
- Rear wheel sensor rotor is defective. \rightarrow [D-4]
- ③ Rear wheel sensor circuit is short-circuited.
- Rear sensor or lead is short-circuited. \rightarrow [D-3]
- Rear wheel sensor circuit is short-circuited. → (Refer to "CIRCUIT DIAGRAM".)
- (4) Rear wheel sensor output drops.
- Sensor signal output may drop due to failure of the bearings, wheel, or sensor housing of the rear wheel. Check these components when installed for looseness, distortion, and bends.

NOTE:

If the vehicle is ridden on extremely uneven roads continuously, the ABS warning light may flash and malfunction code 11 or 12 may be recorded depending on the condition.



• [C-5-3] Malfunction codes 13 (front wheel) and 14 (rear wheel) (Incorrect signal is detected from either the front or rear wheel.)

- 1) The wheel sensors or sensor rotors are not properly installed.
- 1) Installation of the front or rear wheel sensor
- Check that the wheel sensor is properly installed in the housing. \rightarrow [D-3, 4]
- Check if there is looseness between the housing and the wheel. \rightarrow [D-3, 4]
- (2) Installation of the front or rear wheel sensor rotor
- Check that the sensor rotor is correctly pressed in the wheel. \rightarrow [D-3, 4]
- Check the rotor and inside the rotor housing for foreign materials. \rightarrow [D-3, 4]
- 2) Teeth surfaces of the sensor rotors are defective.
- Check for flaws on the teeth surfaces of the front or rear wheel sensor rotors.
 Also, check for any foreign materials.

 \rightarrow [D-3, 4]

- 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 when installed for looseness, distortion, and bends.
- [C-5-4] Malfunction codes 15 (front wheel sensor) and 16 (rear wheel sensor) (No continuity in the sensor circuits.)

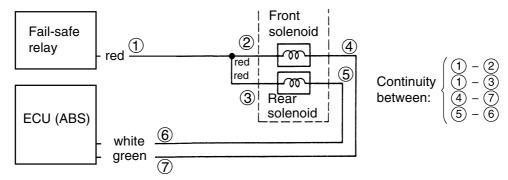
Broken front or rear wheel sensor circuit is detected.

- Front or rear wheel sensor coupler is broken. \rightarrow [D-3, 4]
- Front or rear wheel sensor or lead is broken. \rightarrow [D-3, 4]
- Front or rear wheel sensor circuit is broken. → (Refer to "CIRCUIT DIAGRAM".)
- Wire harness (ABS system circuit) is disconnected from the ECU (ABS) coupler terminal.

 \rightarrow [D-1]

NOTE:

- Check that both the front and rear wheel sensor couplers are connected securely.
- If the vehicle is ridden after malfunction code 15 (front wheel sensor) or 16 (rear wheel sensor) is displayed, the malfunction code will be overwritten from 15 to 11 (front wheel sensor signal) or from 16 to 12 (rear wheel sensor signal).
- [C-5-5] Malfunction code 21 (Hydraulic unit solenoid circuit is broken or short-circuited.) Check the following:
- 1) Hydraulic unit solenoid coupler
- Check if the hydraulic unit solenoid coupler terminal is disconnected.
- 2) Hydraulic unit solenoid
- Check the front and rear wheel solenoids for continuity \rightarrow [D-5]
- Check the insulation of all solenoid terminals and the negative battery terminal. \rightarrow [D-5]
- 3) Wire harness (ABS system circuit)
- Check the hydraulic unit solenoid circuits for continuity. (See the illustration below.)



• Check the insulation of the hydraulic unit solenoid circuits and the negative battery terminal.



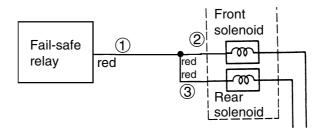
 [C-5-6] Malfunction code 31 (Disconnection is detected between the fail-safe relay and the hydraulic unit solenoid.)

Check the following:

- 1) ABS motor fuse
- Check if the ABS motor fuse beside the battery is blown.
- 2) Hydraulic unit solenoid coupler
- Check if the hydraulic unit solenoid coupler located in the front cowling is connected properly.
- 3) Wire harness (ABS system circuit)
 - Check the pink/white leads between the ECU (ABS) and the fail-safe relay for continuity. (Refer to "CIRCUIT DIAGRAM".)
 - ECU (ABS) coupler terminal (pink/white) is disconnected.

 \rightarrow [D-1]

• Check the red leads between ① and ②, and between ① and ③ of the hydraulic unit solenoid circuits for continuity.

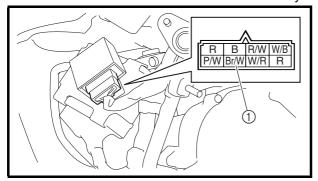


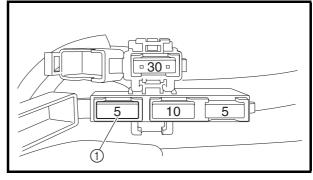
- 4) Fail-safe relay
- Check if the fail-safe relay operates correctly.

 \rightarrow [D-2]

- 5) Wire harness (ABS system circuit)
 - Check for continuity between the red terminal of the fail-safe relay coupler and the positive battery terminal.
 - Remove the ABS fuse and check for continuity between the brown/white lead of the fail-safe relay coupler and the ABS fuse. (See the illustration below.)

Check for continuity between these two points (1).





• [C-5-7] Malfunction code 32 (Fail-safe relay malfunction is detected.)

Check the following:

- 1) Fail-safe relay
- Check if the fail-safe relay operates correctly.

 \rightarrow [D-2]

- 2) Wire harness (ABS system circuit)
 - Disconnect the couplers from the fail-safe relay and the ECU (ABS), and then check the insulation of the fail-safe relay coupler between the red and red terminals.



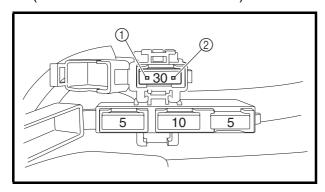
• [C-5-8] Malfunction code 33 (ABS motor operation malfunction is detected. [ABS motor stops and does not rotate.])

Check the following:

- 1) ABS motor fuse
- Check if the ABS motor fuse beside the battery is blown.
- 2) Fail-safe relay
- Check if the fail-safe relay operates correctly.

 \rightarrow [D-2]

- 3) Wire harness (ABS system circuit)
 - Remove the fail-safe relay and the ABS motor fuse, and then check for continuity between the red terminal of the wire harness (ABS system circuit) and the wire harness (ABS system circuit) end (terminal A shown in the illustration) of the ABS motor fuse terminal beside the battery. (Refer to "CIRCUIT DIAGRAM".)



- 1 Terminal A
- 2 Terminal B

- Check for continuity between the positive battery terminal and the battery end of the ABS motor fuse terminal (terminal B shown in the above illustration).
- Remove the ECU (ABS) and the fail-safe relay from the wire harness (ABS system circuit), and then check for continuity between the white/black lead terminals and the red/white lead terminals.
- [C-5-9] Malfunction code 34 (ABS motor operation malfunction is detected. [ABS motor keeps rotating and does not stop.])

Check the following:

- 1) ABS motor
- Check if the ABS motor coupler located in the battery cover is connected properly.
- Check the ABS motor for continuity.

 \rightarrow [D-5]

- 2) Wire harness (ABS system circuit)
- Remove the ABS motor coupler and check for continuity between the brown/white terminal of the ABS motor coupler and the negative battery terminal.
- Remove the ECU (ABS) coupler and check for continuity between the red/white terminal of the ECU (ABS) coupler and the red/white terminal of the ABS motor coupler. → [D-1]
- Remove the fail-safe relay and check for continuity between the red/white terminal of the ABS motor coupler and the positive battery terminal.
- 3) Fail-safe relay
- Check if the fail-safe relay operates correctly.

 \rightarrow [D-2]



• [C-5-10] Malfunction code 41 (Front wheel does not recover from the locking tendency even though the signal is continuously transmitted from the ECU (ABS) to release the hydraulic pressure [when the battery voltage is normal].)

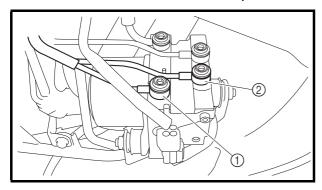
Check the following:

- 1) Rotation of the front wheel
- Check that there is no brake disc drag on the front wheel and make sure it rotates smoothly.
- Check the front wheel axle for loose bearings and bends, and the brake disc for distortion.
- 2) Brake master cylinder and brake caliper
 - Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake lever is operated and that the pressure decreases when the lever is released.
- 3) Brake fluid
- Visually check the brake fluid in the brake master cylinder reservoir and the fluid for water, foreign materials, solidification and contamination.
- Check for air in the brake hose lines.
- 4) Brake hose lines
- Check the brake hose lines for kinks and deterioration.

WARNING

Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake hose lines.

• Check that the connections of the brake hose lines from the brake master cylinder to the hydraulic unit and to the front brake caliper from the hydraulic unit are correct.



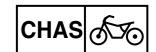
WARNING

The front brake will not function properly if the connections are reversed.

- Front brake hose ① inlet: from the front brake master cylinder
- Front brake hose ② outlet: to the front brake caliper

NOTE:

- If the front brake hose inlet and outlet connections are reversed on the hydraulic unit, the brake lever is pulled to full stroke without responding and will be pushed back slowly without pulsating when the final check in [D-6] is performed.
- If the front and rear brake hose connections are reversed on the hydraulic unit, the pulsating action in the brake levers will be performed in the reverse order when the final check in [D-6] is performed.



- 5) Hydraulic unit solenoid coupler terminal
- Check if the front and rear hydraulic unit solenoid coupler terminals (hydraulic unit and wire harness (ABS system circuit)) are reversed.

	Terminal color		
	Solenoid	Wire harness (ABS system circuit)	
Front	red, green	red, white	
Rear	red, white	red, green	

6) Hydraulic unit

If the malfunction is not corrected after performing steps 1) to 5), replace the hydraulic unit. Be sure to connect the brake hoses and couplers correctly and securely. Check the hydraulic unit operation. (Refer to "[D-6] Final check".)

• [C-5-11] Malfunction code 42 (Rear wheel does not recover from the locking tendency even though the signal is continuously transmitted from the ECU (ABS) to release the hydraulic pressure [when the battery voltage is normal].)

Check the following:

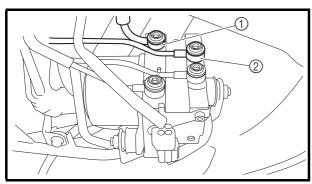
- 1) Rotation of the rear wheel
- Check that there is no brake drag on the rear wheel and make sure it rotates smoothly.
- · Check for brake disc distortion.
- 2) Brake master cylinder and brake caliper
 - Check that the brake fluid pressure is correctly transmitted to the brake disc when the brake lever 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 check the fluid for water, foreign materials, solidification and contamination.
- Check for air in the brake hose lines.
- 4) Brake hose lines
- Check the brake hose lines for kinks and deterioration (particularly between the hydraulic unit and the rear brake caliper).

WARNING

Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake hose lines.



 Check that the connections of the brake hose lines from the brake master cylinder to the hydraulic unit and to the rear brake caliper from the hydraulic unit are correct.



WARNING

The rear brake will not function properly if the connections are reversed.

- Rear brake hose ① inlet: from the rear brake master cylinder
- Rear brake hose ② outlet: to the rear brake caliper

NOTE:

- If the rear brake hose inlet and outlet connections are reversed on the hydraulic unit, the brake lever is pulled to full stroke without responding and will be pushed back slowly without pulsating when the final check in [D-6] is performed.
- If the front and rear brake hose connections are reversed on the hydraulic unit, the pulsating action in the brake levers will be performed in the reverse order when the final check in [D-6] is performed.
- 5) Hydraulic unit solenoid coupler terminal
- Check if the front and rear hydraulic unit solenoid coupler terminals (hydraulic unit and wire harness (ABS system circuit)) are reversed.

	Terminal color		
Solenoid		Wire harness (ABS system circuit)	
Front	red, green	red, white	
Rear	red, white	red, green	

6) Hydraulic unit

If the malfunction is not corrected after performing steps 1) to 5), replace the hydraulic unit. Be sure to connect the brake hose lines and couplers correctly and securely. Check the hydraulic unit operation. (Refer to "[D-6] Final check".)



• [C-5-12] Malfunction code 51 (Front wheel does not recover from the locking tendency even though the signal is continuously transmitted from the ECU (ABS) to release the hydraulic pressure [when the battery voltage is low].)

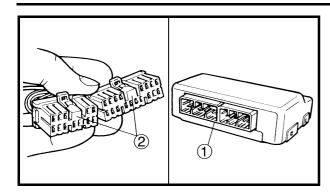
Check the following:

- Rotation of the front wheel Refer to "[C-5-10] Malfunction code 41".
- Brake master cylinder and brake caliper Refer to "[C-5-10] Malfunction code 41".
- 3) Brake fluid
 - Refer to "[C-5-10] Malfunction code 41".
- 4) Brake hose lines
 - Refer to "[C-5-10] Malfunction code 41".
- 5) Hydraulic unit solenoid coupler terminals Refer to "[C-5-10] Malfunction code 41".
- 6) Hydraulic unit
 - Refer to "[C-5-10] Malfunction code 41".
- Battery voltage
 Measure the battery voltage.
- [C-5-13] Malfunction code 52 (Rear wheel does not recover from the locking tendency even though the signal is continuously transmitted from the ECU (ABS) to release the hydraulic pressure [when the battery voltage is low].)

Check the following:

- 1) Rotation of the rear wheel
 - Refer to "[C-5-11] Malfunction code 42".
- 2) Brake master cylinder and brake caliper Refer to "[C-5-11] Malfunction code 42".
- 3) Brake fluid
 - Refer to "[C-5-11] Malfunction code 42".
- 4) Brake hose lines
 - Refer to "[C-5-11] Malfunction code 42".
- 5) Hydraulic unit solenoid coupler terminals Refer to "[C-5-11] Malfunction code 42".
- 6) Hydraulic unit
 - Refer to "[C-5-11] Malfunction code 42".
- 7) Battery voltage
 - Measure the battery voltage.



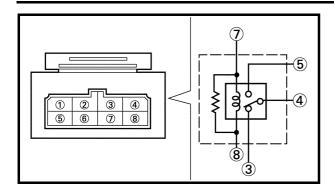


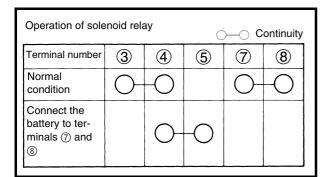
- [D-1] Maintenance of the ECU (ABS) CHECKING THE ECU (ABS)
- 1. Remove:
- ECU (ABS)
- 2. Check:
- ECU (ABS) terminals ①
 Cracks/damage → Replace the ECU (ABS).
- ECU (ABS) coupler terminals ②
 Defective connections/contamination/disconnections → Repair or clean.

NOTE: _

If the ECU (ABS) coupler terminals are clogged with mud or dirt, clean with compressed air.







• [D-2] Maintenance of the ABS fail-safe

CHECKING THE FAIL-SAFE RELAY

- 1. Check:
- solenoid relay for continuity Connect the pocket tester ($\Omega \times 1$) to the ter-

Check for continuity between terminals ③ and (4) of the solenoid relay.

Positive tester probe → **Terminal** ③ **Negative tester probe** → **Terminal** ④

Tester reading is " ∞ ". \rightarrow Replace the failsafe relay.

• Check for continuity between terminals (7) and (8) of the solenoid relay.

Positive tester probe → **Terminal** (7) **Negative tester probe** → **Terminal** (8)



Solenoid relay resistance 150 ~ 450 Ω

Tester reading is " ∞ ". \rightarrow Replace the failsafe relay.

· Connect the positive battery terminal to terminal 7 and the negative battery terminal to terminal (8), and then check for continuity between terminals (4) and (5) of the solenoid relay.

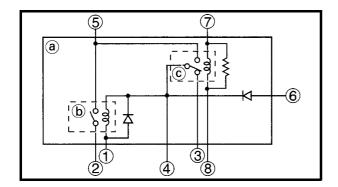
Positive tester probe → **Terminal** ④ **Negative tester probe** → **Terminal** ⑤

Tester reading is " ∞ ". \rightarrow Replace the failsafe relay.

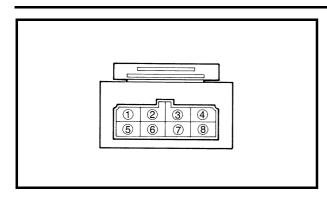
CAUTION:

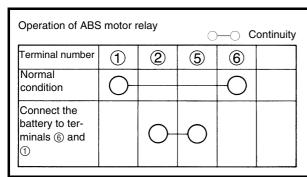
When connecting the solenoid relay and battery terminals, be careful not to shortcircuit the positive and negative battery terminals.

- (a) Fail-safe relay
- **(b)** ABS motor relay
- © Solenoid relay









- 2. Check:
 - ABS motor relay for continuity
 Connect the pocket tester (Ω × 1) to the terminals of the ABS motor relay.

Check for continuity between terminals ① and ⑥ of the ABS motor relay.

Positive tester probe → Terminal ①
Negative tester probe → Terminal ⑥



ABS motor relay resistance $50 \sim 150 \Omega$

Tester reading is " ∞ ". \rightarrow Replace the fail-safe relay.

CAUTION:

Do not reverse the connections. If the pocket tester leads are connected in reverse to terminals ① and ⑥, a correct pocket tester reading cannot be obtained.

Connect the positive battery terminal to terminal (a) and the negative battery terminal to terminal (1), and then check for continuity between terminals (2) and (5) of the ABS motor relay.

Positive tester probe \rightarrow Terminal ② Negative tester probe \rightarrow Terminal ⑤ Tester reading is " ∞ ". \rightarrow Replace the fail-safe relay.

CAUTION:

- Be sure to connect the pocket tester positive and negative probes correctly. If the pocket tester probes are connected in reverse, the diode of the fail-safe relay will be broken.
- When connecting the battery and the ABS motor relay terminals, be careful not to short-circuit the positive and negative battery terminals.
- [D-3] Maintenance of the front wheel sensor and sensor rotor

CHECKING THE FRONT WHEEL SENSOR AND SENSOR ROTOR Refer to "CHECKING THE FRONT WHEEL SENSOR AND SENSOR ROTOR (XP500A)".



 [D-4] Maintenance of the rear wheel sensor and sensor rotor

CHECKING THE REAR WHEEL SENSOR AND SENSOR ROTOR Refer to "CHECKING THE FRONT WHEEL SENSOR AND SENSOR ROTOR (XP500A)".

• [D-5] Maintenance of the hydraulic unit

CAUTION:

Do not remove the hydraulic unit to check the resistance of the solenoid valves and the ABS motor for continuity.

CHECKING THE RESISTANCE OF THE SOLENOID VALVES AND ABS MOTOR FOR CONTINUITY

CAUTION:

When check the hydraulic unit solenoid relay and ABS motor, do not remove the brake hoses.

- 1. Measure:
- resistance of the solenoid valve (front) Connect a pocket tester ($\Omega \times 1$) to the terminals of the solenoid valve (front).

Positive tester probe → Terminal ①
Negative tester probe → Terminal ②



Solenoid valve resistance 2.96 ~ 3.20 Ω at 20 °C (68 °F)

Out of specification \rightarrow Replace the hydraulic unit.

- 2. Measure:
 - resistance of the solenoid valve (rear)
 Connect the pocket tester (Ω × 1) to the terminals of solenoid valve (rear).

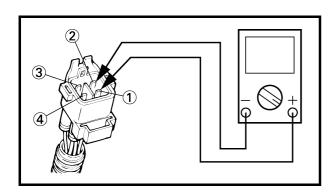
Positive tester probe → Terminal ④

Negative tester probe → Terminal ③

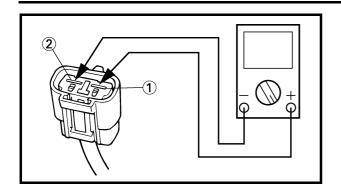


Solenoid valve resistance 2.96 ~ 3.20 Ω at 20 °C (68 °F)

Out of specification \rightarrow Replace the hydraulic unit.







- 3. Check:
 - ABS motor for continuity Connect the pocket tester ($\Omega \times 1$) to the terminals of the ABS motor coupler.

Positive tester probe \rightarrow Terminal ① Negative tester probe \rightarrow Terminal ②



There is continuity.

No continuity \rightarrow Replace the hydraulic unit.

• [D-6] Final check

CHECKING PROCEDURES

- 1. Check the brake fluid level in the brake master cylinder reservoirs.
- 2. Check the wheel sensors for proper installation.
- 3. Perform hydraulic unit operation test 1 or 2.
- 4. Delete the malfunction codes.
- 5. Perform a trial run.

• [D-6-1] Checking the brake fluid level of the brake master cylinder reservoirs

- 1. Check:
- brake fluid level
 Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

• [D-6-2] Checking the wheel sensors for proper installation

 Check if the front wheel sensor housing and the rear wheel sensor housing are installed correctly. (Refer to "[D-3] Maintenance of the front wheel sensor and sensor rotor" and "[D-4] Maintenance of the rear wheel sensor and sensor rotor".)



- 2. Check:
- installation of the wheel sensors to the sensor housings (Refer to "[D-3] Maintenance of the front wheel sensor and sensor rotor" and "[D-4] Maintenance of the rear wheel sensor and sensor rotor".)



Wheel sensor 30 Nm (3.0 m \cdot kg, 22 ft \cdot lb)

HYDRAULIC UNIT OPERATION TEST

The reaction-force pulsating action generated in the brake levers when the ABS is activated can be tested when the vehicle is stopped.

The hydraulic unit operation can be tested by the following two methods.

- Hydraulic unit operation test 1: this test generates the same reaction-force pulsating action that is generated in the brake levers when the ABS is activated.
- Hydraulic unit operation test 2: this test checks the function of the ABS after the system was disassembled, adjusted, or serviced.

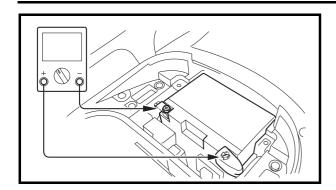
• [D-6-3-1] Hydraulic unit operation test 1

WARNING

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

- 1. Place the vehicle on the centerstand.
- 2. Set the main switch to "OFF".
- 3. Remove:
- battery cover Refer to "FUEL TANK" in chapter 3.





- 4. Check:
 - battery voltage

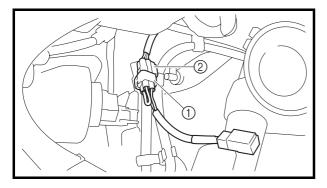


Battery voltage Higher than 12.8 V

Lower than 12.8 $V \rightarrow$ Charge or replace the battery.

NOTE:

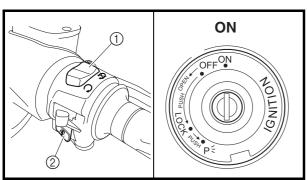
- If the battery voltage is lower than 12.8 V, charge the battery and perform hydraulic unit operation test 1.
- If the battery voltage is lower than 10 V, the ABS warning light comes on and the ABS does not operate.



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



Test coupler adaptor 90890-03149



- 6. Set the engine stop switch ① to " ⋈ ".
- 7. Set the main switch to "ON".

NOTE:

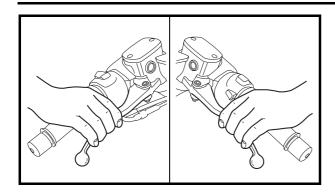
After setting the main switch to "ON", wait (approximately 2 seconds) until the ABS warning light goes off.

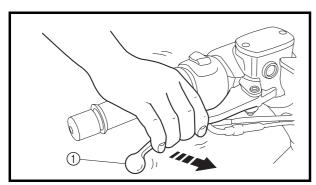
8. Push the start switch ② for at least 4 seconds.

CAUT	IU	I	B
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Do not operate the brake levers.



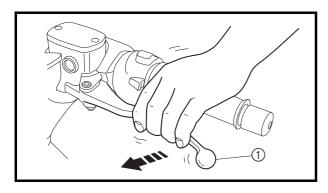




After releasing the start switch, operate the brake levers simultaneously.

NOTE:

- A reaction-force pulsating action is generated in the front brake lever ① 0.5 second after the rear brake lever and front brake lever are operated simultaneously and continues for approximately 1 second.
- Be sure to continue to operate the brake levers even after the pulsating action has stopped.



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

NOTE:

Be sure to continue to operate the brake levers even after the pulsating action has stopped.

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

CAUTION:

- Check that the pulsating action is felt in the front brake lever, rear brake lever, and again in the front brake lever, in this order.
- If the pulsating action is felt in the rear brake lever before it is felt in the front 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 levers, check that the brake hoses are connected correctly to the hydraulic unit.



- 12.Set the main switch to "OFF".
- 13. Remove the test coupler adaptor from the test coupler.
- 14.Set the main switch to "ON".
- 15.Set the engine stop switch to "()".
- [D-6-3-2] Hydraulic unit operation test 2

WARNING

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

- 1. Place the vehicle on the centerstand.
- 2. Set the main switch to "OFF".
- 3. Remove:
- front cowling
- battery Refer to "FUEL TANK" in chapter 3.
- 4. Check:
- battery voltage



Battery voltage Higher than 12.8 V

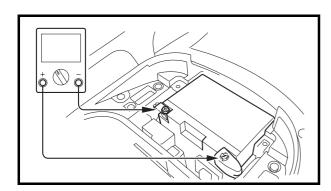
Lower than 12.8 $V \rightarrow$ Charge or replace the battery.

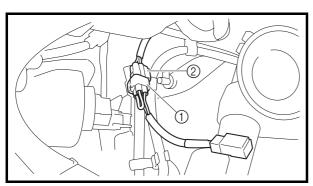
NOTE:

- If the battery voltage is lower than 12.8 V, charge the battery and perform hydraulic unit operation test 2.
- If the battery voltage is lower than 10 V, the ABS warning light comes on and the ABS does not operate.
- 5. Connect the test coupler adaptor ① to the test coupler ②.

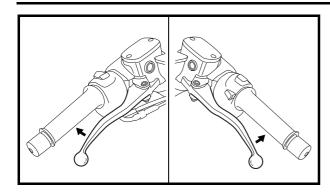


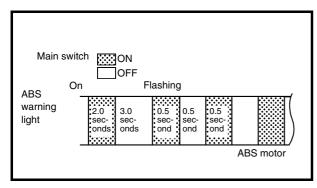
Test coupler adaptor 90890-03149

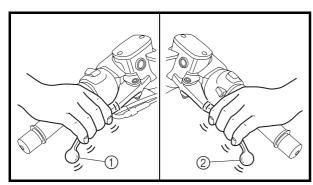












6. Set the main switch to "ON" while operating the brake levers simultaneously.

CAUTION:

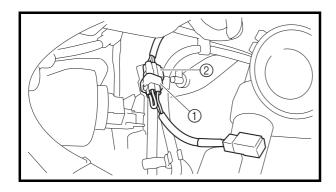
When the main switch is set to "ON", be sure to operate both the brake levers simultaneously. If only the brake levers are operated, set the main switch to "OFF" and start the procedure again.

7. Check:

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

CAUTION:

- Check that the front brake lever returns to its home position before the rear brake lever returns to its home position.
- If the rear brake lever returns to its home position before the front brake lever does, check that the brake hoses are connected correctly to the hydraulic unit.
- If either the brake levers returns to its home position slowly, check that the brake hoses are connected correctly to the hydraulic unit.
- If the operation of the hydraulic unit is normal, delete all of the malfunction codes.

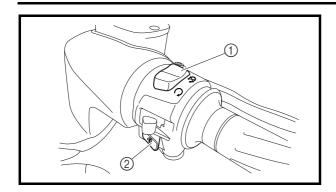


• [D-6-4] Deleting the malfunction codes

- 1. Connect the test coupler adaptor ① to the test coupler ②. (Refer to "[B-5] ABS malfunction check using the ABS self-diagnosis (present malfunction)".)
- 2. Set the main switch to "ON".

 The multifunction display indicates previously recorded malfunction codes.



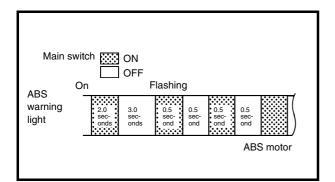


3. Set the engine stop switch (1) to "X".

CAUTION:

Be sure to set the engine stop switch to " \boxtimes ". If the start switch is pushed without setting the engine stop switch to " \boxtimes ", 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 multifunction meter display switches to the ODO/TRIP display and the ABS warning light flashes in 0.5 second intervals when the malfunction codes are deleted.



- 6. Set the main switch to "OFF".
- 7. Set the main switch to "ON". Check that the ABS warning light comes on for 2 seconds, goes off for 3 seconds, then starts flashing to confirm that all malfunction codes are deleted.
- 8. Set the main switch to "OFF".
- 9. Disconnect the test coupler adaptor from the test coupler and install the protective cap onto the test coupler.

NOTE:

Do not forget to install the protective cap onto the test coupler.

CAUTION:

Since the malfunction codes remain in the memory of the ECU (ABS) until they are deleted, always delete the malfunction codes after the service has been completed.

• [D-6-5] Trial run

After all checks and service have been completed, make sure that the motorcycle has no problems by performing a trial run at a speed faster than 10 km/h.

ANTI-LOCK BRAKE SYSTEM (XP500A)

(2)





- 1. Place the vehicle on the centerstand.
- 2. Set the main switch to "OFF".
- 3. Connect the test coupler adapter to the test coupler.
- 4. Set the main switch to "ON".
- 5. Check:
- ECU (ABS) voltage
 Connect the pocket tester (DC 20 V) to the
 ECU (ABS) coupler.

Positive tester probe \rightarrow brown/white 1

Negative tester probe \rightarrow black/white \bigcirc



Battery voltage Higher than 12.8 V

Lower than 12.8 $V \rightarrow$ Charge or replace the battery.

- 6. Check:
- ECU (ABS)-to-start-switch-lead continuity Connect the pocket tester ($\Omega \times 1$) to the ECU (ABS) coupler and start switch coupler.

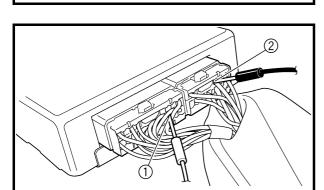
Positive tester probe →

green/white ① (ECU)

Negative tester probe \rightarrow

green/white ② (start switch)

No continuity \rightarrow Replace or repair the wire harness.



R/W R/B G/Y

Br B G/W

(2)

Lg A B/W W

Br/W W/Y G/W W/B P/W W/R B

(1)

7. Check:

• ECU (ABS) voltage

Connect the pocket tester (DC 20 V) to the ECU (ABS) coupler.

Positive tester probe → **green/white** ①

Negative tester probe → **black/white** ②

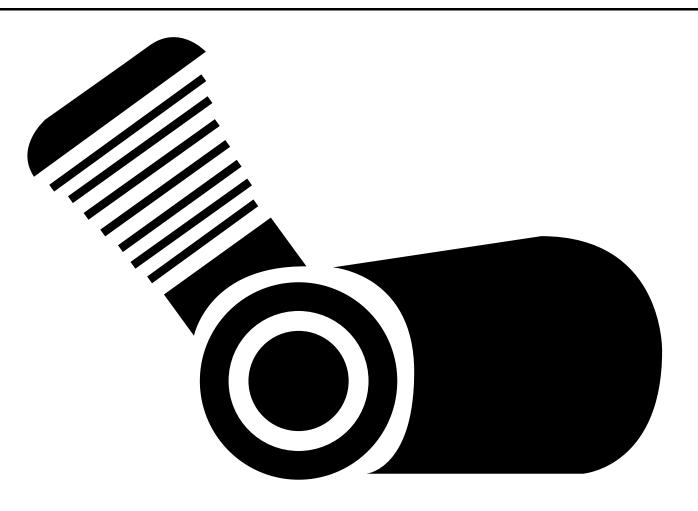
Push the start switch.



Start switch ON: less than 1 V Start switch OFF: more than 12 V

Out of specification \rightarrow Replace the handlebar switch.

8. If the above-mentioned checks are within specification, replace the ECU (ABS).



CHAPTER 5 ENGINE

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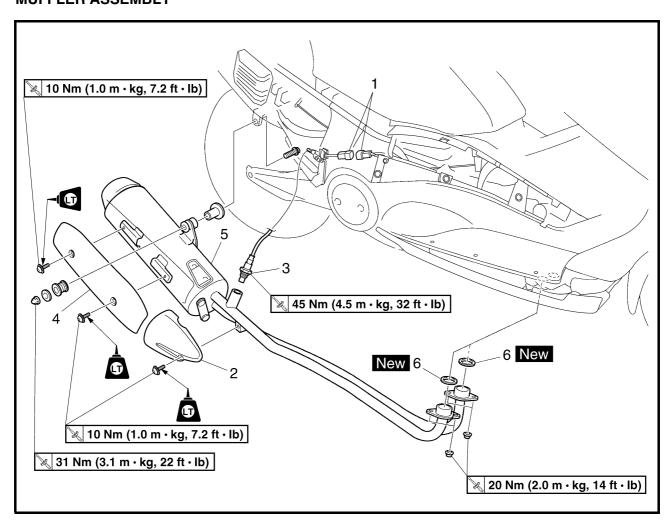
ENG 6





ENGINE

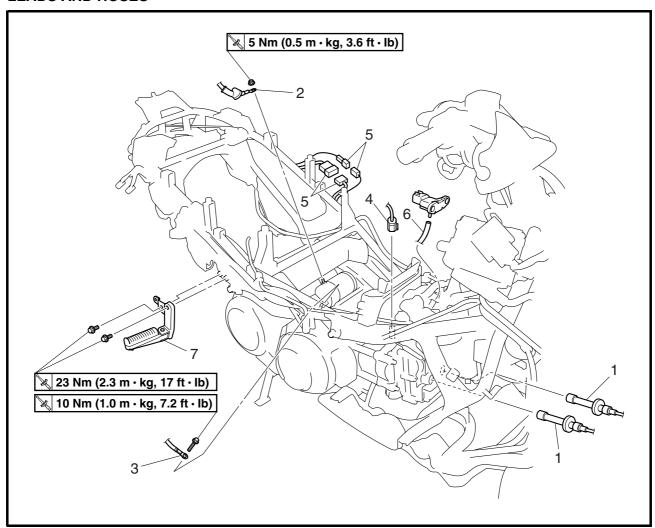
ENGINE REMOVAL MUFFLER ASSEMBLY



Order	Job/Part	Q'ty	Remarks
	Removing the muffler assembly		Remove the parts in the order listed.
	Right rear side cover/inner fender		Refer to "COVER AND PANEL" in chap-
			ter 3.
1	O ₂ sensor coupler	1	Disconnect.
2	Protector 1	1	
3	O ₂ sensor	1	
4	Protector 2	1	
5	Muffler assembly	1	
6	Gasket	2	
			For installation, reverse the removal pro-
			cedure.

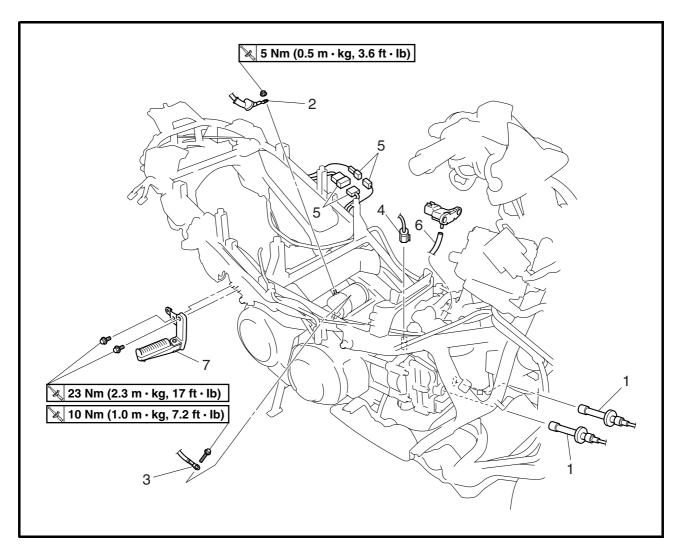


LEADS AND HOSES



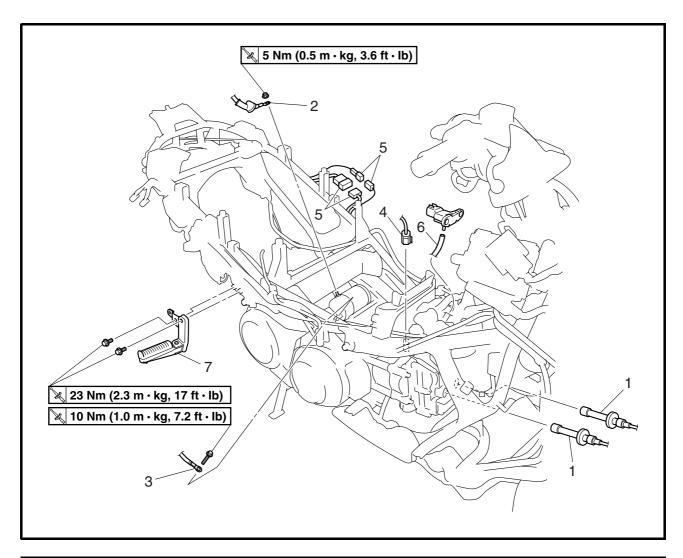
Order	Job/Part	Q'ty	Remarks
	Disconnecting the leads and hoses		Disconnect the parts in the order listed.
	Leg shield/footrest board		Refer to "COVER AND PANEL" in chap-
			ter 3.
	Storage box/fuel tank		Refer to "FUEL TANK" in chapter 3.
	Engine oil		Drain.
			Refer to "CHANGING THE ENGINE OIL"
			in chapter 3.
	Coolant		Drain.
			Refer to "CHANGING THE COOLANT" in
			chapter 3.
	Chain drive oil		Drain.
			Refer to "CHANGING THE CHAIN
			DRIVE OIL" in chapter 3.
	Thermostat outlet hose/coolant pipe/oil		Refer to "RADIATOR AND OIL COOLER"
	filter cartridge		in chapter 6.





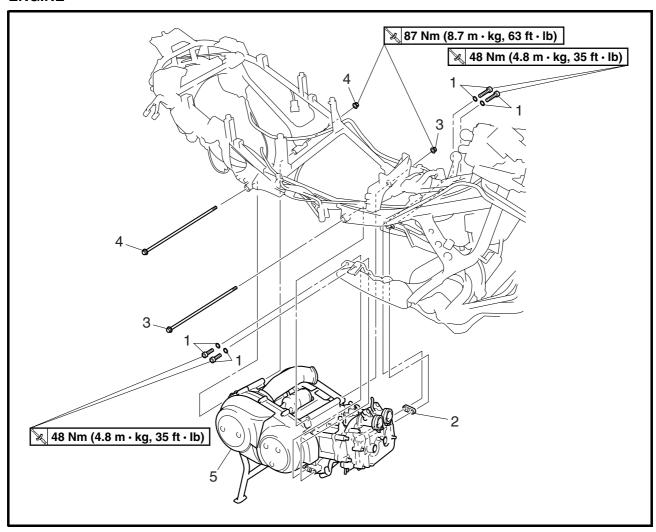
Order	Job/Part	Q'ty	Remarks
	V-belt case air filter element (left)/water		Refer to "WATER PUMP" in chapter 6.
	pump inlet pipe/water pump outlet pipe		
	Throttle body/injector		Refer to "THROTTLE BODY" in chapter
			7.
	Muffler assembly		Refer to "ENGINE REMOVAL".
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER" in
			chapter 4.
	Chain drive assembly		Refer to "CHAIN DRIVE".
1	Spark plug cap	2	Disconnect.
2	Starter motor lead	1	Disconnect.
3	Battery negative lead	1	Disconnect.
4	Coolant temperature sensor coupler	1	Disconnect.
5	A.C. magneto lead	2	Disconnect.





Order	Job/Part	Q'ty	Remarks
6	Intake air pressure sensor hose	1	Disconnect.
7	Right passenger footrest	1	
			For installation, reverse the removal pro-
			cedure.

ENGINE

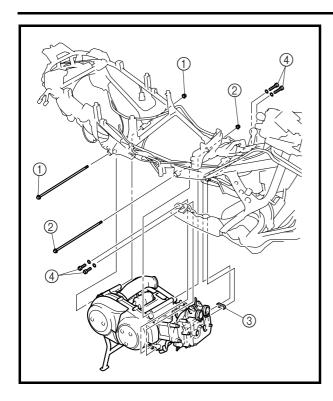


Order	Job/Part	Q'ty	Remarks
	Removing the engine		Remove the parts in the order listed.
1	Front lower mounting bolt/washer	4/4	h
2	Spacer	1	- Refer to "INSTALLING THE ENGINE".
3	Front upper mounting bolt/nut	1/1	FREIER TO INSTALLING THE ENGINE .
4	Rear mounting bolt/nut	1/1	<u> </u>
5	Engine	1	
			For installation, reverse the removal pro-
			cedure.

ENGINE REMOVAL







INSTALLING THE ENGINE

- 1. Install:
- rear mounting bolt/nut ①
- front upper mounting bolt/nut ②
- washers
- spacer ③
- front lower mounting bolts 4

NOTE:

Do not fully tighten the bolts.

- 2. Tighten:
- rear mounting nut ①

№ 87 Nm (8.7 m · kg, 63 ft · lb)

• front upper mounting nut ②

№ 87 Nm (8.7 m · kg, 63 ft · lb)

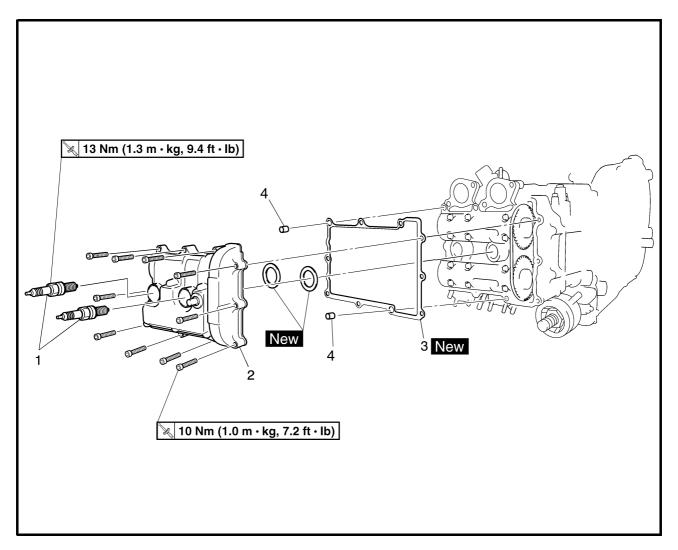
• front lower mounting bolts 4

№ 48 Nm (4.8 m · kg, 35 ft · lb)



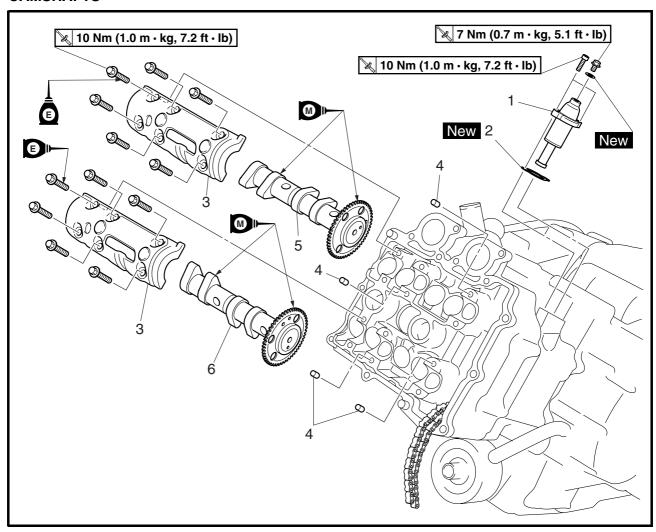


CAMSHAFTS CYLINDER HEAD COVER



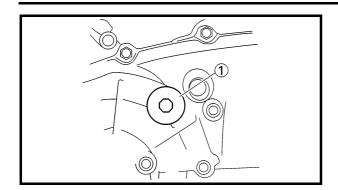
Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head cover		Remove the parts in the order listed.
	Engine		Refer to "ENGINE REMOVAL".
	Intake manifold		Refer to "THROTTLE BODY" in chapter
			7.
1	Spark plug	2	
2	Cylinder head cover	1	
3	Cylinder head cover gasket	1	
4	Dowel pin	2	
			For installation, reverse the removal pro-
			cedure.





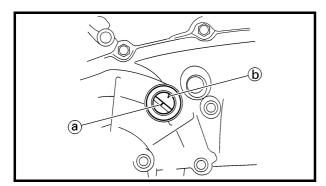
Order	Job/Part	Q'ty	Rema	ırks
	Removing the camshafts		Remove the parts in th	ne order listed.
1	Timing chain tensioner	1	٦	
2	Timing chain tensioner gasket	1		
3	Camshaft cap	2		
4	Dowel pin	4	During removal, the dowel pins may still be con-	Refer to "REMOV- NG THE CAM- SHAFTS" and NSTALLING THE CAMSHAFTS".
5	Intake camshaft	1		
6	Exhaust camshaft	1	<u> </u>	
			For installation, reverse cedure.	se the removal pro-





REMOVING THE CAMSHAFTS

- 1. Remove:
- timing plug ①



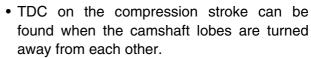


 "I" mark (a) on the A.C. magneto rotor (with the stationary pointer (b) on the A.C. magneto cover)

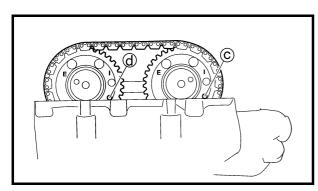
a. Turn the crankshaft counterclockwise.

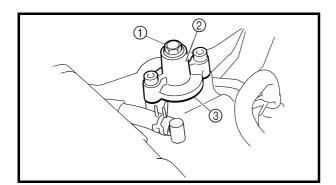
b. When piston #1 is at TDC on the compression stroke, align the "I" mark (a) on the A.C. magneto rotor with the stationary pointer (b) on the A.C. magneto rotor cover.

NOTE: _



 In order to be sure that the piston is at TDC, the alignment mark © on the intake camshaft sprocket and the alignment mark @ on the exhaust camshaft sprocket must align with the cylinder head mating surface as shown in the illustration.

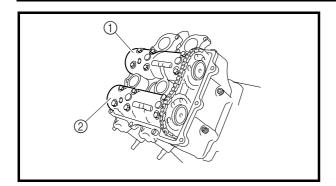




- 3. Loosen:
- timing chain tensioner cap bolt ①
- 4. Remove:
- timing chain tensioner (2)
- timing chain tensioner gasket ③







5. Remove:

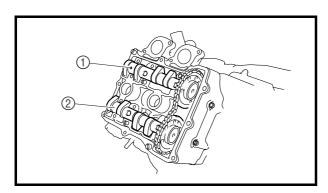
CAUTION:

Before removing the camshafts from the cylinder head, tilt up the engine at least 25°.

- intake camshaft cap ①
- exhaust camshaft cap ②
- dowel pins

CAUTION:

To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.



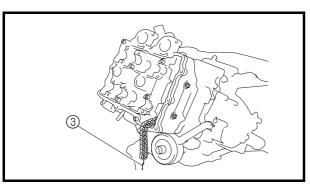
6. Remove:

- intake camshaft ①
- exhaust camshaft ②

NOTE:

To prevent the timing chain from falling into the crankcase, faster it with a wire ③.

- 7. Remove:
- timing chain guide (exhaust side)



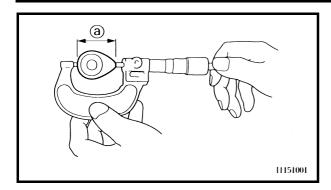
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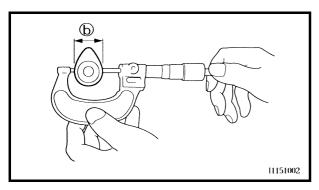
CHECKING THE CAMSHAFTS

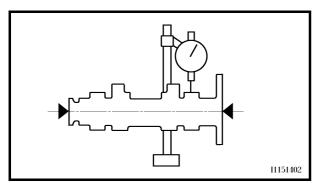
- 1. Check:
- $\begin{tabular}{ll} \bullet & camshaft lobes \\ Blue & discoloration/pitting/scratches \rightarrow \\ Replace & the camshaft. \\ \end{tabular}$

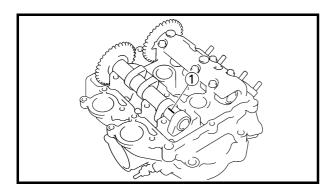












2. Measure:

camshaft lobe dimensions ⓐ and ⓑ
Out of specification → Replace the camshaft.



Camshaft lobe dimension Intake

- (a) 33.252 ~ 33.352 mm (1.3091 ~ 1.3131 in) <Limit>: 33.152 mm (1.3052 in)
- (0.9825 ~ 0.9865 in) <Limit>: 24.856 mm (0.9786 in)

Exhaust

- (a) 33.252 ~ 33.352 mm (1.3091 ~ 1.3131 in) <Limit>: 33.152 mm (1.3052 in)
- (0.9825 ~ 25.056 mm (0.9825 ~ 0.9865 in) <Limit>: 24.856 mm (0.9786 in)

3. Measure:

camshaft runout
 Out of specification → Replace.



Camshaft runout limit 0.03 mm (0.0012 in)

4. Measure:

 camshaft-journal-to-camshaft-cap clearance

Out of specification \rightarrow Measure the camshaft journal diameter.



Camshaft-journal-to-camshaftcap clearance

0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)

Limit>: 0.08 mm (0.0031 in)

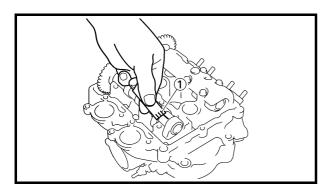
- a. Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
- b. Position a strip of Plastigauge® ① onto the camshaft journal as shown.



c. Install the dowel pins and camshaft caps.

NOTE:

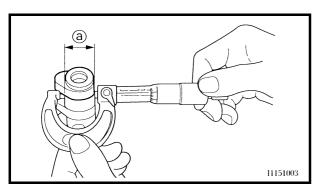
- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft-journal-to-camshaft cap clearance with the Plastigauge[®].





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.



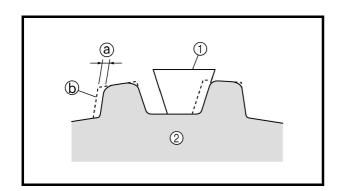
5. Measure:

camshaft journal diameter ⓐ
 Out of specification → Replace the camshaft.

Within specification \rightarrow Replace the cylinder head and the camshaft caps as a set.



Camshaft journal diameter 22.967 ~ 22.980 mm (0.9042 ~ 0.9047 in)



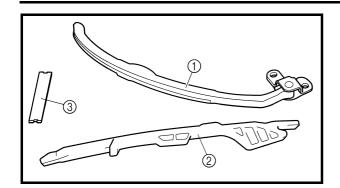
CHECKING THE CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES

The following procedure applies to all of the camshaft sprockets and timing chain guides.

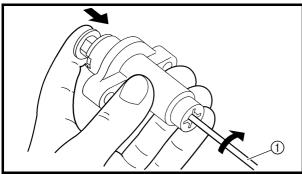
- 1. Check:
- camshaft sprocket
 More than 1/4 tooth wear ⓐ → Replace the
 camshaft sprockets and the timing chain as
 a set.
- (a) 1/4 tooth
- (b) Correct
- 1 Timing chain roller
- ② Camshaft sprocket







- 2. Check:
- timing chain guide (intake side) ①
- timing chain guide (exhaust side) ②
- timing chain guide (top side) ③
 Damage/wear → Replace the defective part(-s).



CHECKING THE TIMING CHAIN TENSIONER

- 1. Check:
- timing chain tensioner
 Cracks/damage/rough movement →
 Replace.

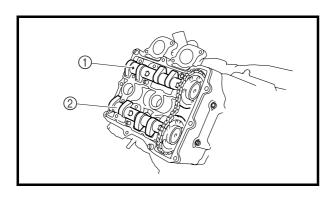


 a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

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.

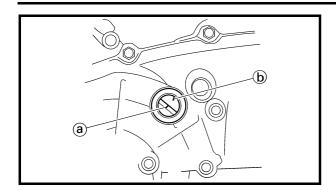


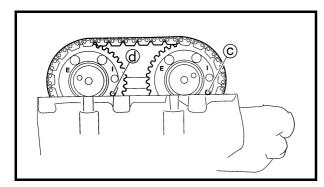
INSTALLING THE CAMSHAFTS

- 1. Install:
- intake camshaft ①
- exhaust camshaft ②









a. Turn the crankshaft counterclockwise.

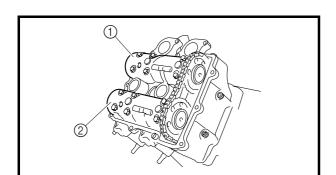
- b. When piston #1 is at TDC on the compression stroke, align the "I" mark (a) on the A.C. magneto rotor with the stationary pointer (b) on the A.C. magneto cover.
- c. Install the timing chain onto both camshaft sprockets, and then install the camshafts onto the cylinder head.

NOTE:

The camshafts should be installed onto the cylinder head so that the alignment mark © on the intake camshaft sprocket and the alignment mark © on the exhaust camshaft sprocket align with the cylinder head mating surface, as shown in the illustration.

CAUTION:

Do not turn the crankshaft when installing the camshafts to avoid damage or improper valve timing.



2. Install:

- dowel pins
- intake camshaft cap ①
- exhaust camshaft cap (2)
- · camshaft cap bolts

> 10 Nm (1.0 m ⋅ kg, 7.2 ft ⋅ lb)

CAUTION:

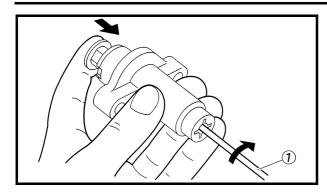
The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft cap, and camshafts will result.

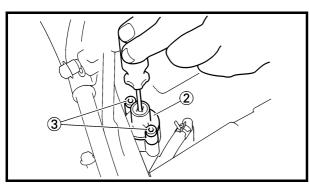
NOTE

Lubricate the camshaft cap bolt threads with engine oil.











- timing chain tensioner gasket
- timing chain tensioner

- a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.
- b. While pressing the timing chain tensioner rod, wind it clockwise with a thin screwdriver
 until if stops.
- c. With the screwdriver still inserted into the timing chain tensioner, install the timing chain tensioner ②, gasket onto the cylinder block. Then, tighten the timing chain tensioner bolts ③ to the specified torque.

WARNING

Always use a new gasket.



Timing chain tensioner bolt 10 Nm (1.0 m · kg, 7.2 ft · lb)

d. Remove the screwdriver, make sure that the timing chain tensioner rod releases, and tighten the timing chain tensioner cap bolt to the specified torque.



Timing chain tensioner cap bolt 7 Nm (0.7 m · kg, 5.1 ft · lb)

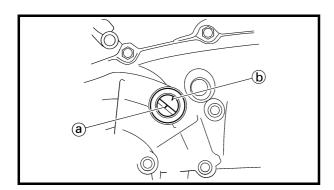


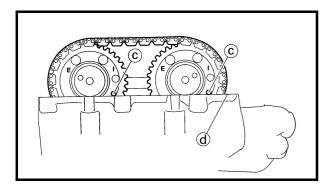
- crankshaft (several turns counterclockwise)
- 5. Check:
- "I" mark @

Make sure that the "I" mark is aligned with the stationary pointer **(b)**.

camshaft sprocket alignment marks ©
 Make sure that the camshaft sprocket alignment mark is aligned with the cylinder head edge @.

Out of alignment \rightarrow Reinstall. Refer to the installation steps above.







- 6. Measure:
- valve clearance
 Out of specification → Adjust.
 Refer to "ADJUSTING THE VALVE CLEARANCE" in chapter 3.
- 7. Install:
- cylinder head cover gasket New
- cylinder head cover

🔪 10 Nm (1.0 m · kg, 7.2 ft · lb)

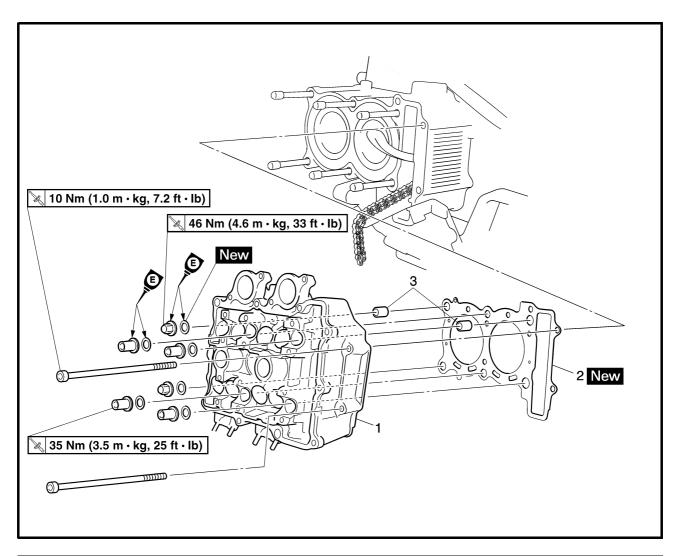
NOTE:

Tighten the cylinder head cover bolts in stages and in a crisscross pattern.





CYLINDER HEAD

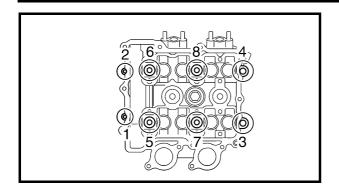


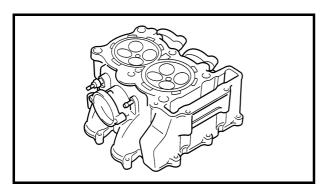
Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head		Remove the parts in the order listed.
	Intake and exhaust camshafts		Refer to "CAMSHAFTS".
1	Cylinder head	1	Refer to "REMOVING THE CYLINDER HEAD" and "INSTALLING THE CYLINDER HEAD".
2	Cylinder head gasket	1	
3	Dowel pin	2	
			For installation, reverse the removal procedure.

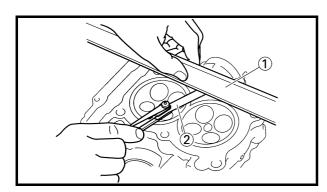
CYLINDER HEAD

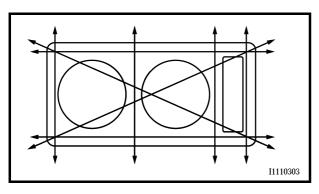












REMOVING THE CYLINDER HEAD

- 1. Remove:
- · cylinder head bolts
- · cylinder head nuts

NOTE:

- Loosen the nuts and bolts in the proper sequence as shown.
- Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.

EAS00229

CHECKING THE CYLINDER HEAD

- 1. Eliminate:
- combustion chamber carbon deposits (with a rounded scraper)

NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

- spark plug bore threads
- · valve seats
- 2. Check:
- cylinder head
 Damage/scratches → Replace.
- cylinder head water jacket
 Mineral deposits/rust → Eliminate.
- 3. Measure:
 - cylinder head warpage
 Out of specification → Resurface the cylinder head.



Maximum cylinder head warpage 0.03 mm (0.0012 in)

- a. Place a straightedge ① and a thickness gauge ② across the cylinder head.
- b. Measure the warpage.
- c. If the limited 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.

NOTF:

To ensure an even surface, rotate the cylinder head several times.

CYLINDER HEAD



INSTALLING THE CYLINDER HEAD

- 1. Install:
- dowel pins
- cylinder head gasket New
- 2. Install:
- cylinder head

NOTE: .

Pass the timing chain through the timing chain cavity.



• cylinder head nuts ①

35 Nm (3.5 m ⋅ kg, 25 ft ⋅ lb)

• cylinder head nuts ②

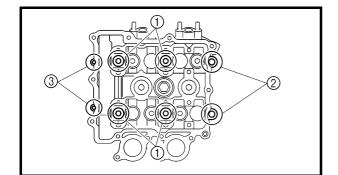
№ 46 Nm (4.6 m · kg, 33 ft · lb)

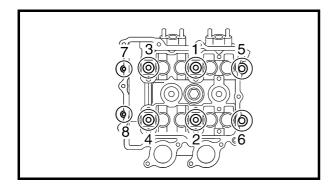
• cylinder head bolts ③

№ 10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE: _

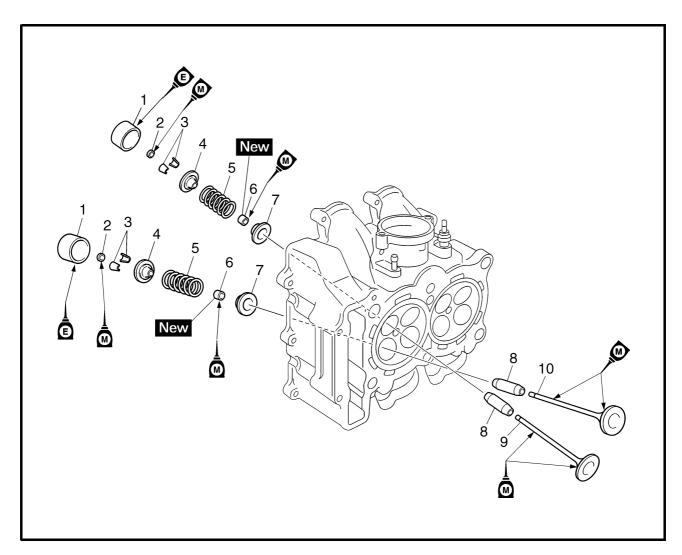
- Apply engine oil onto the threads of the cylinder head nuts.
- Tighten the cylinder head nuts and bolts in the proper tightening sequence as shown and torque them in two stages.











Order	Job/Part	Q'ty	Remarks	
	Removing the valves and valve		Remove the parts in the order listed.	
	springs			
	Cylinder head		Refer to "CYLINDER HEAD".	
1	Valve lifter	8	h	
2	Valve pad	8		
3	Valve cotter	16		
4	Valve retainer	8		
5	Valve spring	8	Refer to "REMOVING THE VALVES"	
6	Valve stem seal	8	and "INSTALLING THE VALVES".	
7	Valve spring seat	8		
8	Valve guide	8		
9	Intake valve	4		
10	Exhaust valve	4	Ц	
			For installation, reverse the removal pro-	
			cedure.	



EAS0023

REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

NOTE:

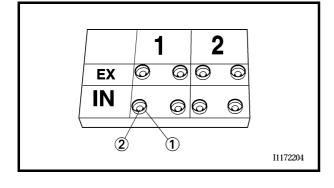
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure that the valves properly seal.



- valve lifter (1)
- valve pad ②

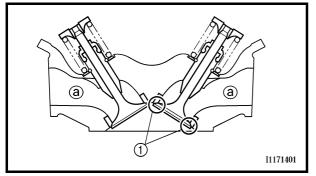


Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.



2. Check:

valve sealing
 Leakage at the valve seat → Check the
 valve face, valve seat, and valve seat width.
 Refer to "CHECKING THE VALVE SEATS".



- a. Pour a clean solvent ⓐ into the intake and exhaust ports.
- b. Check that the valves properly seal.

NOTE:

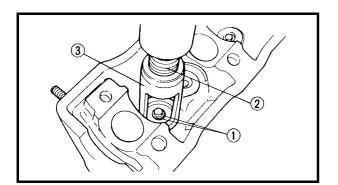
There should be no leakage at the valve seat ①.

3. Remove:

• valve cotters ①

NOTE: _

Remove the valve cotters by compressing the valve spring with the valve spring compressor ② and valve spring compressor attachment ③.

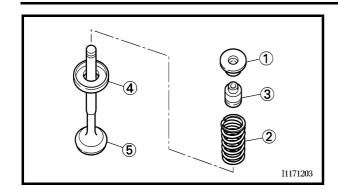


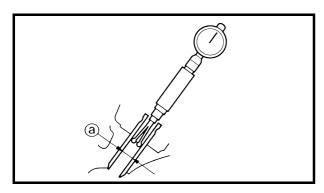


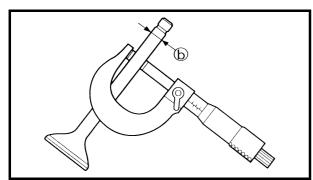
Valve spring compressor 90890-04019, YM-04019 Valve spring compressor attachment 90890-04114, YM-04114











4. Remove:

- valve retainer (1)
- valve spring ②
- valve stem seal ③
- valve spring seat (4)
- valve (5)

NOTE:

Identify the position of each part very carefully so that it can be reinstalled in its original place.

EAS00239

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

Valve-stem-to-valve-guide clearance = Valve guide inside diameter (a) – Valve stem diameter (b)

Out of specification \rightarrow Replace the valve guide.



Valve-stem-to-valve-guide clearance

Intake

0.010 ~ 0.037 mm

 $(0.0004 \sim 0.0015 in)$

<Limit>: 0.080 mm (0.0031 in)

Exhaust

0.025 ~ 0.052 mm

 $(0.0010 \sim 0.0020 in)$

<Limit>: 0.100 mm (0.0039 in)

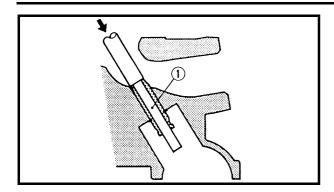
- 2. Replace:
- valve guide

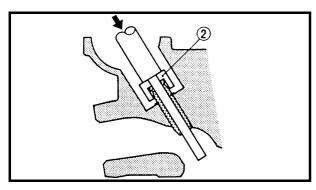
NOTE: .

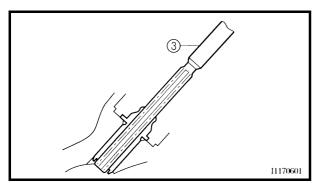
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

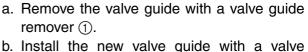












b. Install the new valve guide with a valve guide installer ② and valve guide remover ①.

c. After installing the valve guide, bore the valve guide with a valve guide reamer ③ to obtain the proper valve-stem-to-valve-guide clearance.

NOTE: _

After replacing the valve guide, reface the valve seat.



Valve guide remover (4 mm) 90890-04111, YM-04111 Valve guide installer (4 mm) 90890-04112, YM-04112 Valve guide reamer (4 mm) 90890-04113, YM-04113

3. Eliminate:

carbon deposits
 (from the valve face and valve seat)

4. Check:

valve face
 Pitting/wear → Grind the valve face.

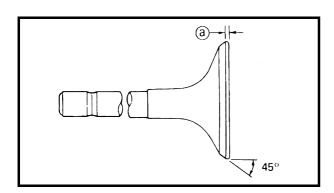
valve stem end
 Mushroom shape or diameter larger than
 the body of the valve stem → Replace the
 valve.

5. Measure:

valve margin thickness ⓐ
 Out of specification → Replace the valve.

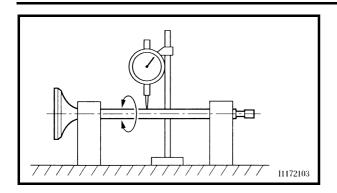


Valve margin thickness 0.6 ~ 0.8 mm (0.0236 ~ 0.0315 in) <Limit>: 0.5 mm (0.0197 in)









- 6. Measure:
 - valve stem runout
 Out of specification → Replace the valve.

NOTF:

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the oil seal.



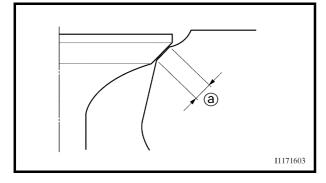
Valve stem runout 0.04 mm (0.0016 in)

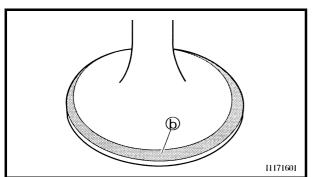


CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

- 1. Eliminate:
- carbon deposits
 (from the valve face and valve seat)
- 2. Check:
 - valve seat
 Pitting/wear → Replace the cylinder head.
- 3. Measure:
 - valve seat width ⓐ
 Out of specification → Replace the cylinder head.







Valve seat width
Intake
0.9 ~ 1.1 mm
(0.0354 ~ 0.0433 in)
<Limit>: 1.6 mm (0.06 in)
Exhaust
0.9 ~ 1.1 mm
(0.0354 ~ 0.0433 in)
<Limit>: 1.6 mm (0.06 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.

ı	N	1	T	F	

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 ⓐ to the valve face.

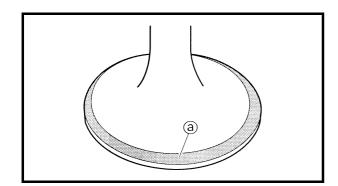
CAUTION:

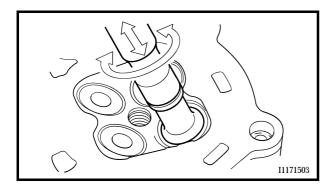
Do not let the lapping compound enter the gap between the valve stem and the valve guide.

- 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.



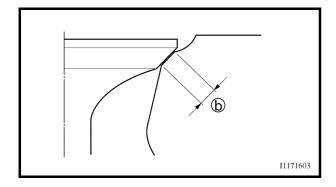






- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply Mechanic's blueing dye (Dykem) onto the valve face.
- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impres-
- j. Measure the valve seat width (b) again. If the valve seat width is out of specification, reface and lap the valve seat.







CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

- 1. Measure:
- valve spring free length (a) Out of specification → Replace the valve



Valve spring free length (intake and exhaust) 35.59 mm (1.40 in)

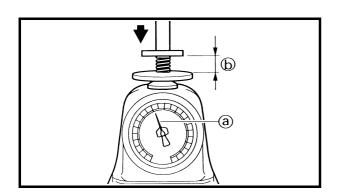
<Limit>: 33.81 mm (1.33 in)



2. Measure:

 compressed spring force (a) Out of specification \rightarrow Replace the valve spring.

(b) Installed length

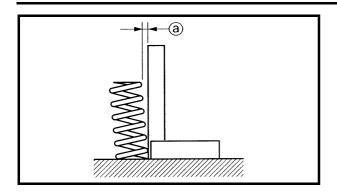




Compressed spring force Intake valve spring 91.2 ~ 104.9 N at 30.4 mm $(9.3 \sim 10.7 \text{ kg at } 30.4 \text{ mm})$ 20.5 ~ 23.6 lb at 1.20 in) **Exhaust valve spring** 91.2 ~ 104.9 N at 30.4 mm $(9.3 \sim 10.7 \text{ kg at } 30.4 \text{ mm})$ 20.5 ~ 23.6 lb at 1.20 in)



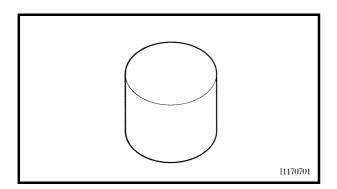




- 3. Measure:
- valve spring tilt ⓐ
 Out of specification → Replace the valve spring.



Maximum spring tilt Intake valve spring 1.6 mm (0.06 in) Exhaust valve spring 1.6 mm (0.06 in)

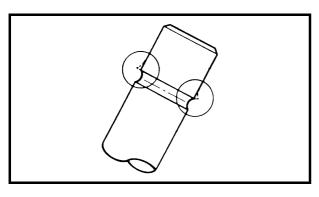


FAS00242

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.

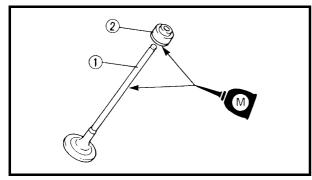


EAS00245

INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

- 1. Deburr:
- valve stem end (with an oil stone)



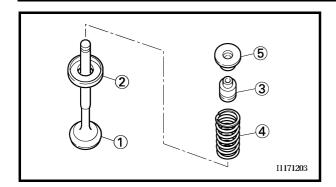
- 2. Lubricate:
- valve stem 1
- valve stem seal ②
 (with the recommended lubricant)

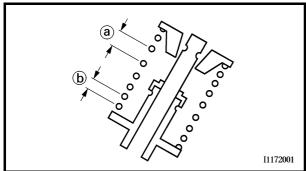


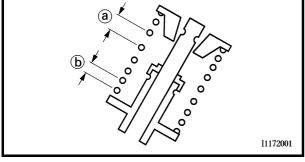
Recommended lubricant Molybdenum disulfide oil

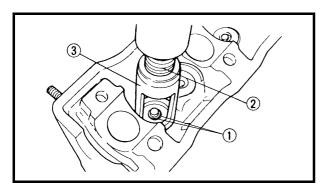












3. Install:

- valve (1)
- valve spring seat ②
- valve stem seal (3) New
- valve spring 4
- valve retainer (5) (into the cylinder head)

NOTE:

- · Make sure that each valve is installed in its original place.
- Install the valve spring with the larger pitch a facing up.
- **(b)** Smaller pitch

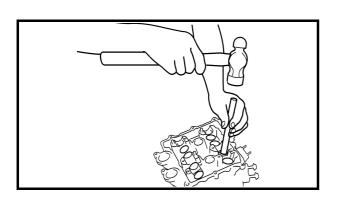
- 4. Install:
- valve cotters 1

NOTE: _

Install the valve cotters by compressing the valve spring with the valve spring compressor 2) and valve spring compressor attachment (3).



Valve spring compressor 90890-04019, YM-04019 Valve spring compressor attach-90890-04114, YM-04114



5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

CAUTION:

Hitting the valve tip with excessive force could damage the valve.





- 6. Lubricate:
- valve pad (with the recommended lubricant)



Recommended lubricant Molybdenum disulfide oil

- 7. Install:
- valve pad
- · valve lifter

CAUTION:

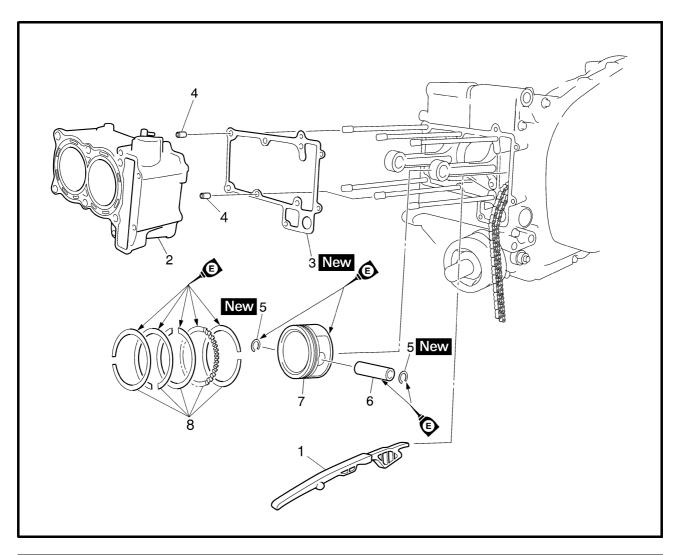
After making sure that the valve pads are fully inserted, install the valve lifter taking care so that the pads do not fall.

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.



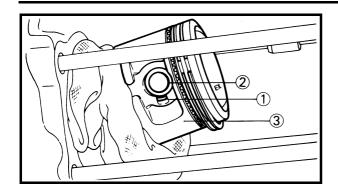


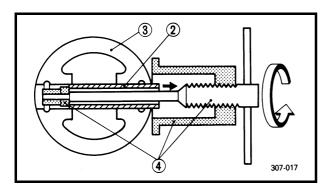


Order	Job/Part	Q'ty	Remarks
	Removing the cylinder and piston		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
1	Timing chain guide (exhaust side)	1	
2	Cylinder	1	
3	Cylinder gasket	1	
4	Dowel pin	2	
5	Piston pin clip	4	
6	Piston pin	2	Refer to "REMOVING THE CYLINDERS
7	Piston	2	- AND PISTONS" and "INSTALLING THE PISTONS AND CYLINDERS".
8	Piston ring set	2	FISTONS AND CTEINDERS.
			For installation, reverse the removal procedure.









REMOVING THE CYLINDERS AND PISTONS

The following procedure applies to all of the pistons.

- 1. Remove:
- piston pin clip ①
- piston pin ②
- piston ③

CAUTION:

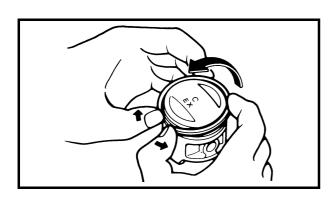
Do not use a hammer to drive the piston pin out.

NOTE: .

- Before removing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
- 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 (4).



Piston pin puller set 90890-01304, YU-01304



- 2. 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.



CHECKING THE CYLINDERS AND PISTONS

The following procedure applies to all of the cylinders and pistons.

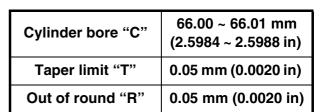
- 1. Check:
- piston wall
- cylinder wall Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.
- 2. Measure:
- piston-to-cylinder clearance

a. Measure cylinder bore "C" with the cylinder

bore gauge.

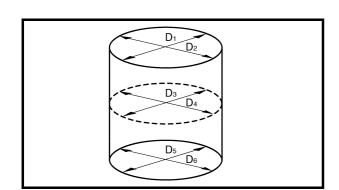
NOTE: _

Measure cylinder bore "C" by taking side-toside and front-to-back measurements of the cylinder. Then, find the average of the measurements.



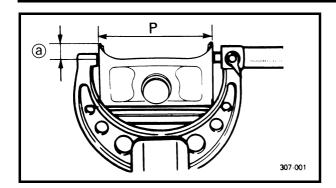
"C" = maximum of $D_1 \sim D_6$
"T" = maximum of D_1 , or D_2 – maximum of D_5 or D_6
"R" = maximum of D_1 , D_3 or D_5 – minimum of D_2 , D_4 or D_6

b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.









 c. Measure piston skirt diameter "P" with the micrometer.



Micrometers (50 ~ 75 mm) 90890-03008, YU-03008

ⓐ 9.0 mm (0.35 in) from the bottom edge of the piston

	Piston size "P"
Standard	65.965 ~ 65.980 mm (2.5970 ~ 2.5976 in)

- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance = Cylinder bore "C" – Piston skirt diameter "P"



Piston-to-cylinder clearance 0.020 ~ 0.045 mm (0.0008 ~ 0.0018 in) <Limit>: 0.15 mm (0.0059 in)

f. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.



CHECKING THE PISTON RINGS

- 1. Measure:
- piston ring side clearance
 Out of specification → Replace the piston and piston rings as a set.

NOTE: .

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.

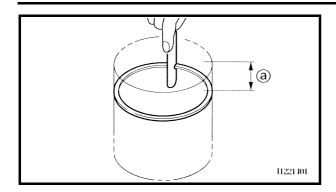


Piston ring side clearance
Top ring
0.030 ~ 0.065 mm
(0.0012 ~ 0.0026 in)
<Limit>: 0.10 mm (0.0039 in)
2nd ring
0.020 ~ 0.055 mm
(0.0008 ~ 0.0022 in)

11221402







- 2. Install:
- piston ring (into the cylinder)

NOTE:

Level the piston ring in the cylinder with the piston crown as shown.

@ 10 mm (0.39 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 end gap
Top ring
0.15 ~ 0.25 mm
(0.0059 ~ 0.0098 in)
<Limit>: 0.50 mm (0.0197 in)
2nd ring
0.40 ~ 0.50 mm
(0.0157 ~ 0.0197 in)
<Limit>: 0.75 mm (0.0295 in)
Oil ring
0.10 ~ 0.35 mm
(0.0039 ~ 0.0138 in)

EAS00266

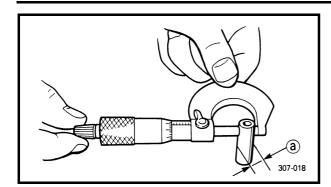
CHECKING THE PISTON PINS

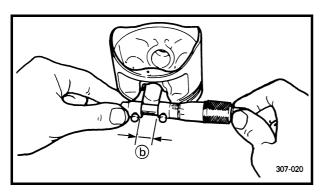
The following procedure applies to all of the piston pins.

- 1. Check:
 - piston pin Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.









2. Measure:

piston pin outside diameter ⓐ
 Out of specification → Replace the piston pin.



Piston pin outside diameter 14.991 ~ 15.000 mm

(0.5902 ~ 0.5906 in)

<Limit>: 14.971 mm (0.5894 in)

3. Measure:

piston pin bore diameter (b) (in the piston)
 Out of specification → Replace the piston pin.



Piston pin bore diameter 15.002 ~ 15.013 mm (0.5906 ~ 0.5911 in)

<Limit>: 15.043 mm (0.5922 in)

4. Calculate:

piston-pin-to-piston-pin-bore clearance
 Out of specification → Replace the piston pin.

Piston-pin-to-piston-pin-bore clearance = Piston pin bore diameter (in the piston) – Piston pin outside diameter



Piston-pin-to-piston-pin-bore clearance

0.002 ~ 0.022 mm (0.00008 ~ 0.00087 in) <Limit>: 0.072 mm (0.0028 in)



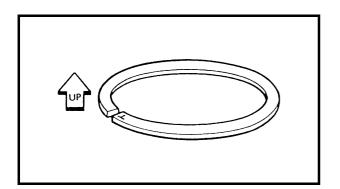
INSTALLING THE PISTONS AND CYLINDERS

The following procedure applies to all of the pistons and cylinders.

- 1. Install:
 - top ring
- 2nd ring
- oil ring

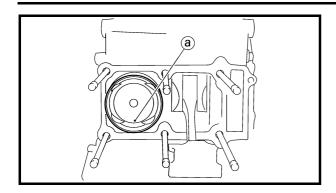
NOTE:

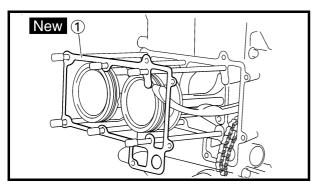
Be sure to install the top and 2nd rings so that the manufacturer's marks or numbers face up.











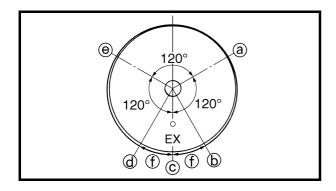
- 2. Install:
- piston
- piston pin
- piston pin clip New

NOTE:

- Apply engine oil onto the piston pin.
- Make sure that the punch mark (a) on the piston points towards the exhaust side of the cylinder.
- Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.
- 3. Install:
 - gasket ① New
- dowel pins
- 4. Lubricate:
- piston
- · piston rings
- cylinder (with the recommended lubricant)



Recommended lubricant Engine oil



- 5. Offset:
 - top ring
- 2nd ring
- oil ring

Offset the piston ring end gaps as shown.

- (a) Top ring end
- (b) Upper oil ring rail end
- © Oil ring expander end
- d Lower oil ring rail end
- @ 2nd ring end
- f) 20 mm (0.79 in)
- 6. Install:
- cylinder
- timing chain guide (exhaust side)

NOTE:

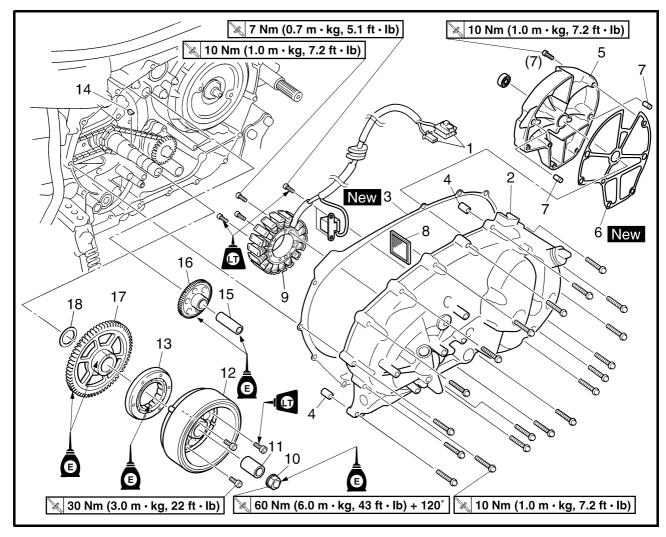
Pass the timing chain through the timing chain cavity.





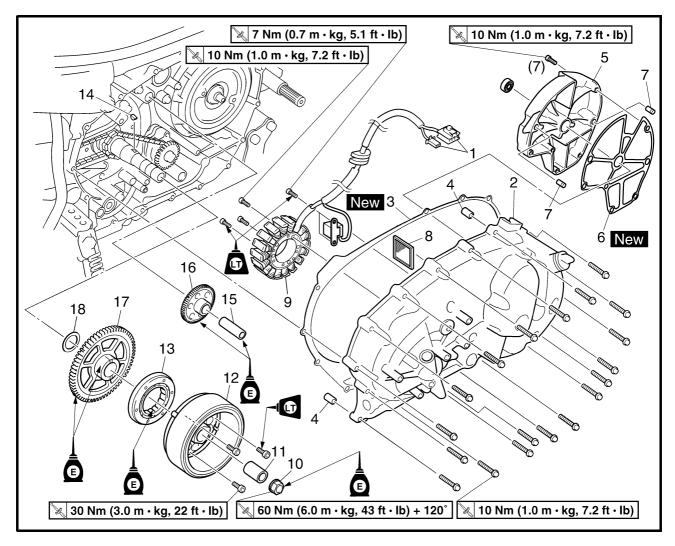
STARTER CLUTCH AND A.C. MAGNETO ROTOR





Order	Job/Part	Q'ty	Remarks
	Removing the starter clutch and		Remove the parts in the order listed.
	A.C. magneto rotor		
	Left side panel/lower side cover mould-		Refer to "COVER AND PANEL" in chap-
	ing/footrest board		ter 3.
	Coolant		Drain.
			Refer to "CHANGING THE COOLANT" in
			chapter 3.
	Engine oil		Drain.
			Refer to "CHANGING THE ENGINE OIL"
			in chapter 3.
	Water pump assembly		Refer to "WATER PUMP" in chapter 6.
1	Starter coil assembly coupler	2	Disconnect.
2	A.C. magneto cover	1	Refer to "INSTALLING THE A.C. MAG-
			NETO ROTOR".
3	A.C. magneto cover gasket	1	
4	Dowel pin	2	

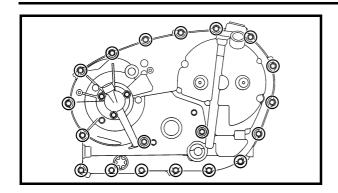




Order	Job/Part	Q'ty	Remarks
5	Oil tank	1	
6	Gasket	1	
7	Dowel pin	2	
8	Oil strainer	1	
9	Starter coil assembly	1	
10	A.C. magneto rotor nut	1	Refer to "REMOVING THE A.C. MAG-
11	Spacer	1	- NETO ROTOR" and "INSTALLING THE
12	A.C. magneto rotor	1	A.C. MAGNETO ROTOR".
13	Starter clutch	1	
14	Woodruff key	1	
15	Starter clutch idler gear shaft	1	
16	Starter clutch idler gear	1	
17	Starter clutch gear	1	
18	Washer	1	
			For installation, reverse the removal pro-
			cedure.







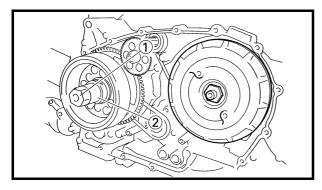
REMOVING THE A.C. MAGNETO ROTOR

- 1. Remove:
 - A.C. magneto rotor cover

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:

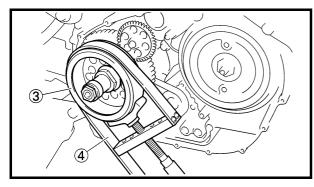
- A.C. magneto rotor nut 1
- spacer ②

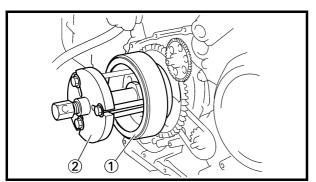
NOTE:

- While holding the A.C. magneto rotor ③ with the sheave holder ④, loosen the A.C. magneto rotor nut.
- Do not allow the sheave holder to touch the projection on the A.C. magneto rotor.



Sheave holder 90890-01701, YS-01880-A





3. Remove:

- A.C. magneto rotor ①
 (with the flywheel puller set ②)
- woodruff key

NOTE: _

- Remove the A.C. magneto rotor ① using the flywheel puller.
- Center the flywheel puller over the A.C. magneto rotor. Make sure after installing the holding bolts that the clearance between the flywheel puller and the A.C. magneto rotor is the same everywhere. If necessary, one holding bolt maybe turned out slightly to adjust the flywheel puller's position.

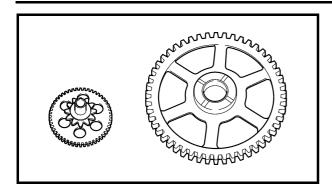
CAUTION:

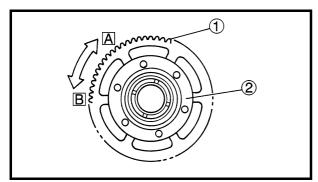
Cover the crankshaft end with the box wrench for protection.



Flywheel puller 90890-01362, YU-33270-B





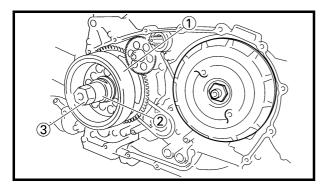




- 1. Check:
- starter clutch
 Damage/wear → Replace.
- 2. Check:
- starter clutch idle gear
- starter clutch idle gear shaft
- starter clutch gear
 Pitting/burrs/chips/roughness/wear →
 Replace the defective parts.
- 3. Check:
- starter clutch operation

a. Install the starter clutch drive gear ① onto the starter clutch ② and hold the starter clutch.

- b. When turning the starter clutch drive gear counterclockwise B, the starter clutch and the starter clutch drive gear should engage. If the starter clutch drive gear and starter clutch do not engage, the starter clutch is faulty and must be replaced.
- c. When turning the starter clutch drive gear clockwise A, it should turn freely. If the starter clutch drive gear does not turn freely, the starter clutch is faulty and must be replaced.



INSTALLING THE A.C. MAGNETO ROTOR

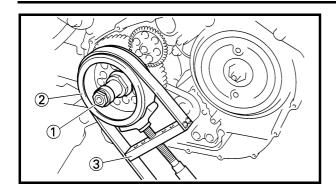
- 1. Install:
- woodruff key
- A.C. magneto rotor ①
- spacer ②
- A.C. magneto rotor nut ③

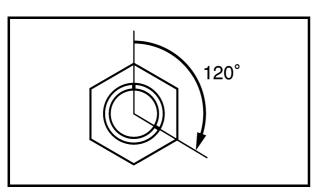
NOTE

- Clean the tapered portion of the crankshaft and the A.C. magneto rotor hub.
- When installing the A.C. magneto rotor, make sure the woodruff key is properly seated in the key way of the crankshaft.









2. Tighten:

• A.C. magneto rotor nut ①

№ 60 Nm (6.0 m · kg, 43 ft · lb) + 120°

NOTE:

 While holding the A.C. magneto rotor ② with the sheave holder ③, tighten the A.C. magneto rotor nut.

• Do not allow the sheave holder to touch the projection on the A.C. magneto rotor.

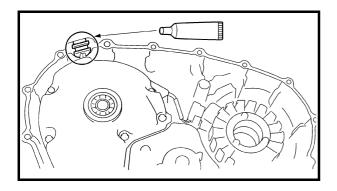


Sheave holder 90890-01701, YS-01880-A

CAUTION:

 When tightening the A.C. magneto rotor nut, be sure to use an F-type torque wrench.

 After tightening the A.C. magneto rotor nut, to the specified torque, turn the A.C. magneto rotor nut another + 120°.



3. Apply:

 sealant (onto the stator coil assembly lead grommet)



Yamaha bond No. 1215 90890-85505 Sealant (Quick Gasket®) ACC-11001-05-01

4. Install:

• A.C. magneto rotor cover

🗽 10 Nm (1.0 m · kg, 7.2 ft · lb)

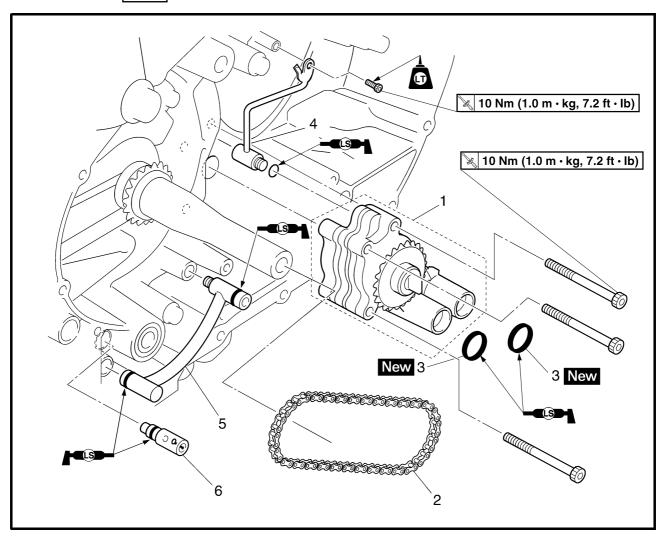
NOTE:

Tighten the A.C. magneto rotor cover bolts in stages and in a crisscross pattern.

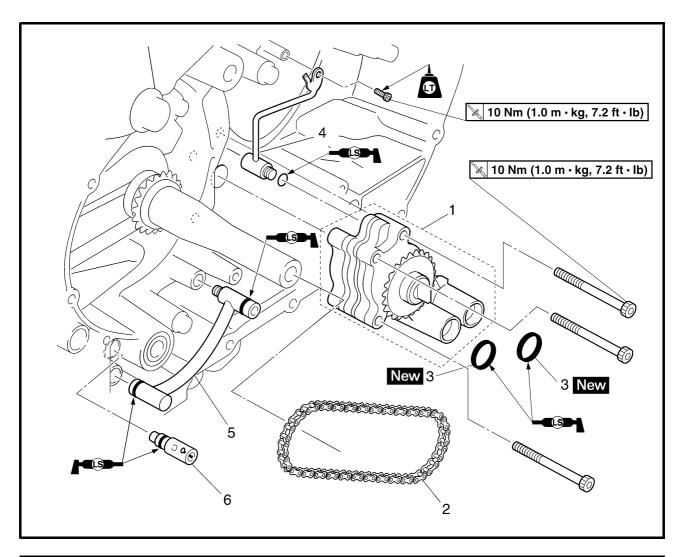


OIL PUMP



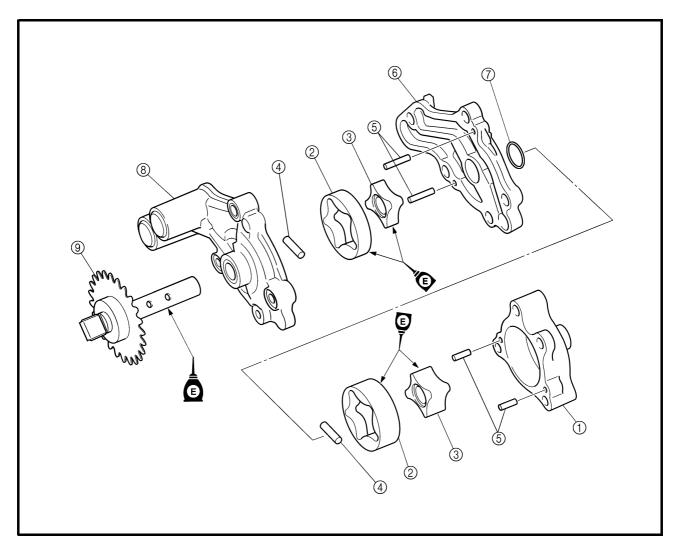


Order	Job/Part	Q'ty	Remarks
	Removing the oil pump		Removing the parts in the order listed.
	Left side panel/lower side cover mould-		Refer to "COVER AND PANEL" in chap-
	ing/footrest board		ter 3.
	Coolant		Drain.
			Refer to "CHANGING THE COOLANT" in
			chapter 3.
	Engine oil		Drain.
			Refer to "CHANGING THE ENGINE OIL" in chapter 3.
	A.C. magnata anyor/Startor alutah gaar		Refer to "STARTER CLUTCH AND A.C.
	A.C. magneto cover/Starter clutch gear		MAGNETO ROTOR".
1	Oil pump assembly	1	
2	Oil pump drive chain	1	
3	O-ring	2	
4	Oil delivery pipe	1	



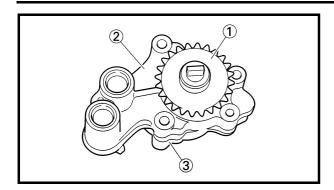
Order	Job/Part	Q'ty	Remarks
5	Oil delivery pipe	1	
6	Relief valve assembly	1	
			For installation, reverse the removal pro-
			cedure.





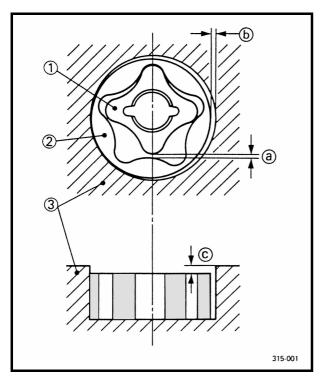
Order	Job/Part	Q'ty	Remarks
	Disassembling the oil pump		Remove the parts in the order listed.
1	Oil pump housing	1	
2	Oil pump outer rotor	2	
3	Oil pump inner rotor	2	Refer to "ASSEMBLING THE OIL
4	Pin	2	PUMP".
(5)	Dowel pin	4	
6	Oil pump housing center	1	
7	Washer	1	
8	Oil pump cover	1	
9	Oil pump driven gear	1	
			For assembly, reverse the disassembly procedure.





CHECKING THE OIL PUMP

- 1. Check:
 - oil pump driven gear ①
 - oil pump housing ②
 - oil pump cover ③
 Cracks/damage/wear → Replace the defective part(s).



2. Measure:

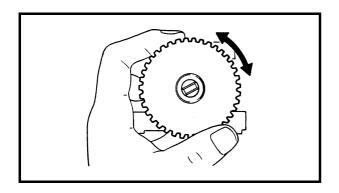
The following procedure applies to all of the inner rotor and outer rotor.

- inner-rotor-to-outer-rotor-tip clearance ⓐ
- outer-rotor-to-oil-pump-housing clearance
 b
- oil-pump-housing-to-inner-and-outer-rotor clearanace ©

Out of specification \rightarrow Replace the oil pump.

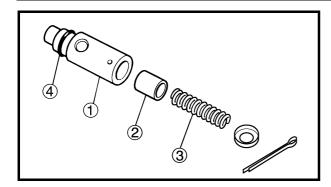
- 1) Inner rotor
- ② Outer rotor
- 3 Oil pump housing

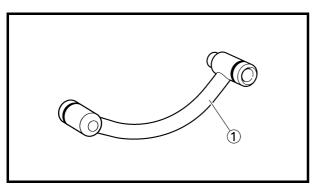




- 3. Check:
 - oil pump operation
 Unsmooth → Repair or replace the defective part(s).







EAS00365

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).

EAS00367

CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes.

- 1. Check:
- oil delivery pipe ①
 Damage → Replace.

Obstruction \rightarrow Wash and blow out with compressed air.

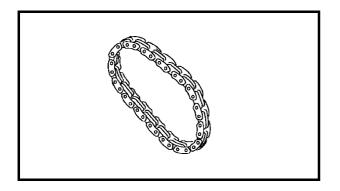
EAS00368

CHECKING THE OIL STRAINER

- 1. Check:
- oil strainer

Damage \rightarrow Replace.

Contaminants → Clean with engine oil.



CHECKING THE OIL PUMP DRIVE CHAIN

- 1. Check:
- oil pump drive chain Cracks/stiffness → Replace the oil pump chain, oil pump drive and driven sprocket as a set.

ASSEMBLING THE OIL PUMP

- 1. Lubricate:
- inner rotor
- outer rotor
- oil pump driven gear (with the recommended lubricant)

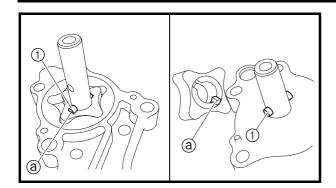


Recommended lubricant Engine oil

OIL PUMP







- 2. Install:
- pins
- inner rotors

NOTE: _

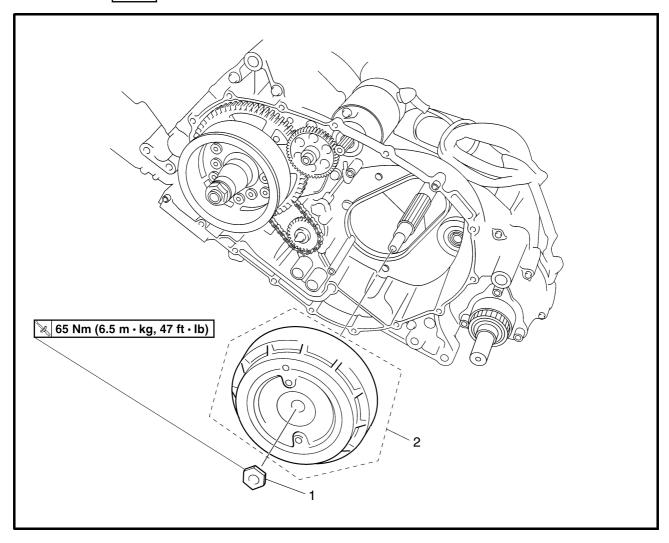
When installing the inner rotor, align the pin 1 in the oil pump shaft with the groove a on the inner rotor.

- 3. Check:
- oil pump operation Refer to "CHECKING THE OIL PUMP".



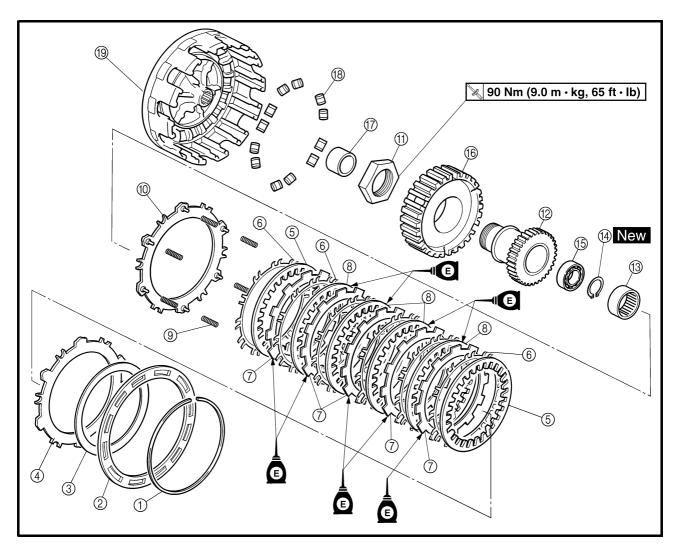
CLUTCH



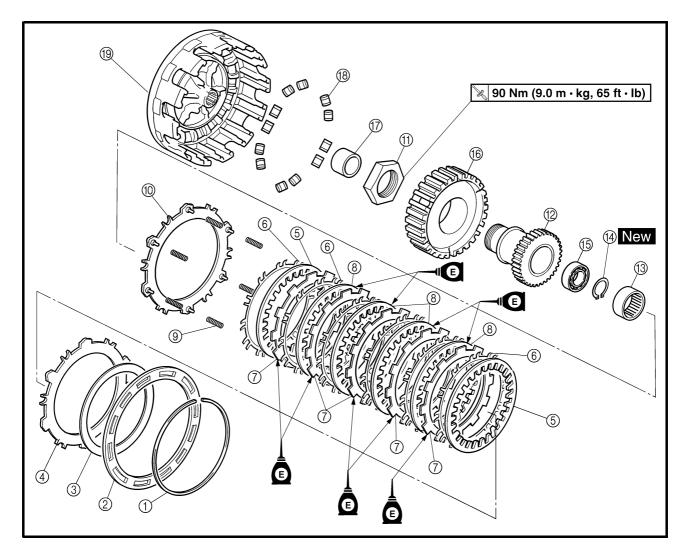


Order	Job/Part	Q'ty	Remarks
	Removing the clutch		Remove the parts in the order listed.
	A.C. magneto cover		Refer to "STARTER CLUTCH AND A.C. MAGNETO ROTOR".
1	Clutch assembly nut	1	Refer to "REMOVING THE CLUTCH"
2	Clutch assembly	1	and "INSTALLING THE CLUTCH".
			For installation, reverse the removal pro-
			cedure.





Order	Job/Part	Q'ty	Remarks
	Disassembling the clutch		Remove the parts in the order listed.
1	Circlip	1	
2	Spring stopper plate	1	
3	Clutch damper spring 2	1	
4	Pressure plate	1	
(5)	Clutch plate 2	2	Refer to "DISASSEMBLING THE
6	Clutch damper spring 1	6	-CLUTCH" and "ASSEMBLING THE
7	Friction plate	5	CLUTCH".
8	Clutch plate 1	4	
9	Clutch spring	6	
10	Thrust plate	1	
11)	Clutch boss nut	1	μ
12	Primary drive gear	1	
13	Bearing	1	

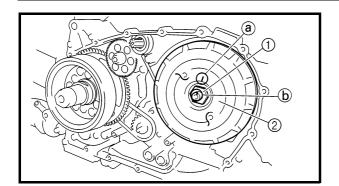


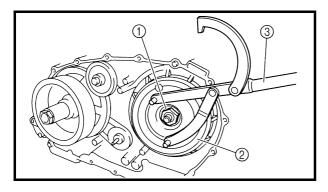
Order	Job/Part	Q'ty	Remarks
(14)	Circlip	1	
(15)	Bearing	1	
16	Clutch boss	1	
17	Collar	1	
(18)	Weight	12	
19	Clutch housing	1	
			For assembly, reverse the disassembly
			procedure.

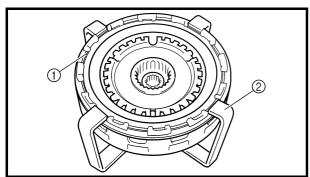
CLUTCH

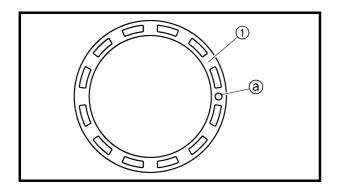












REMOVING THE CLUTCH

- 1. Remove:
- clutch assembly nut ①
- clutch assembly ②

NOTE: .

- Before removal, apply (a) and (b) alignment marks.
- While holding the clutch assembly with the rotor holding tool ③, loosen the clutch assembly nut.
- · Align these marks during reassembly.



Rotor holding tool 90890-01235, YU-01235

DISASSEMBLING THE CLUTCH

- 1. Remove:
- circlip 1

NOTE:

Install the clutch spring compressor ② onto the clutch assembly as shown. Then, compress the spring, and remove the circlip.



Clutch spring compressor 90890-01482

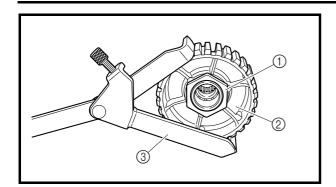
2. Remove:

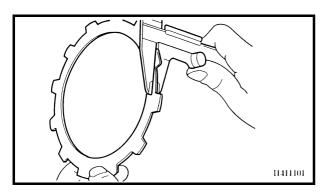
- spring stopper plate 1
- clutch damper spring 2
- · pressure plate
- clutch plate 2
- friction plate
- clutch plate 1
- clutch damper spring 1
- · thrust plate
- clutch springs

NOTE:

One to three holes ⓐ are drilled in the spring stopper plate to adjust the balance of the clutch assembly. Before removing the spring stopper plate, make alignment marks on both the plate and the clutch housing so that the plate can be reinstalled in its original position.









• clutch boss nut (1)

NOTE: .

While holding the clutch boss ② with the clutch holding tool ③, loosen the clutch boss nut.



Clutch holding tool 90890-04086, YM-91042

EAS00280

CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

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

NOTE:

Measure the friction plate at four places.



Friction plate thickness 2.75 ~ 3.05 mm (0.108 ~ 0.120 in) <Limit>: 2.65 mm (0.104 in)

EAS00281

CHECKING THE CLUTCH PLATES

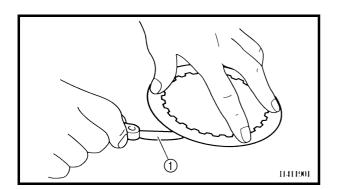
The following procedure applies to all of the clutch plates.

- 1. Check:
- clutch plate
 Damage → Replace the clutch plates as a set.
- 2. Measure:

Out of specification \rightarrow Replace the clutch plates as a set.



Maximum clutch plate warpage Clutch plate 1 0.10 mm (0.0039 in) Clutch plate 2 0.20 mm (0.0079 in)







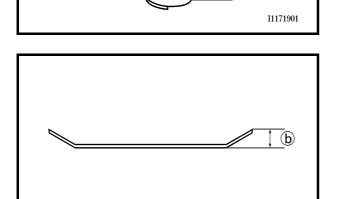
CHECKING THE CLUTCH SPRINGS AND CLUTCH DAMPER SPRINGS

The following procedure applies to all of the clutch springs.

- 1. Check:
 - clutch spring
 Damage → Replace the clutch springs as a set.
- 2. Measure:
- clutch spring free length ⓐ
 Out of specification → Replace the clutch spring.



Clutch spring limit 25.4 mm (1.00 in)

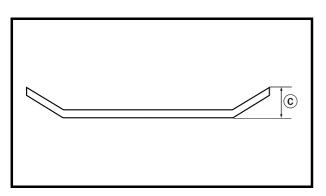


(a)

- 3. Measure:
- clutch damper spring 1 ⓑ
 Out of specification → Replace the clutch damper spring 1.



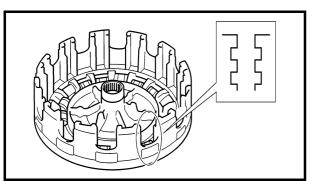
Clutch damper spring 1 limit 2.90 mm (0.11 in)



- 4. Measure:
- clutch damper spring 2 ©
 Out of specification → Replace the clutch damper spring 2.



Clutch damper spring 2 limit 4.40 mm (0.17 in)



EAS00284

CHECKING THE CLUTCH HOUSING

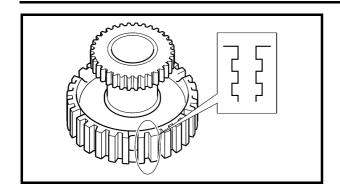
- 1. Check:
- clutch housing dogs
 Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

NOTE

Pitting on the clutch housing dogs will cause erratic clutch operation.







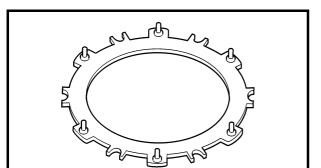
EAS00285

CHECKING THE CLUTCH BOSS

- 1. Check:
- clutch boss splines
 Damage/pitting/wear → Replace the clutch boss.

NOTE: _

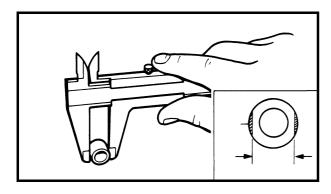
Pitting on the clutch boss splines will cause erratic clutch operation.



EAS00286

CHECKING THE PRESSURE PLATE AND THRUST PLATE

- 1. Check:
- pressure plate
- thrust plate $\text{Cracks/damage} \rightarrow \text{Replace}.$



CHECKING THE WEIGHT

- 1. Check:
- weight Cracks/wear/scaling/chipping → Replace.
 Out of specification → Replace.



Weight outside diameter 16.0 mm (0.63 in)

<Limit>: 15.5 mm (0.61 in)

ASSEMBLING THE CLUTCH

- 1. Lubricate:
- friction plates
- clutch plates (with the recommended lubricant)

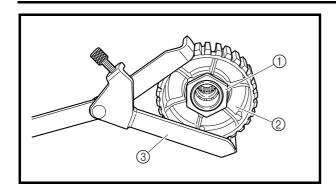


Recommended lubricant Engine oil

CLUTCH







- 2. Install:
- clutch boss
- primary drive gear
- clutch boss nut ①
- 3. Tighten:
- clutch boss nut

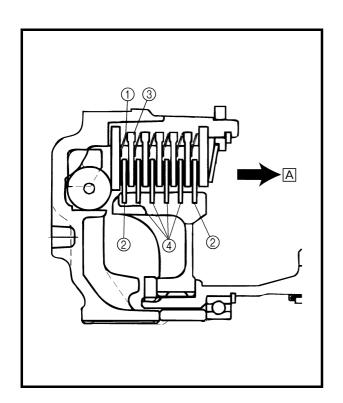
> 90 Nm (9.0 m ⋅ kg, 65 ft ⋅ lb)

NOTE:

While holding the clutch boss ② with the clutch holding tool ③, tighten the clutch boss nut.



Clutch holding tool 90890-04086, YM-91042

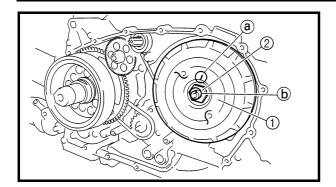


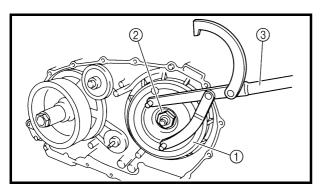
- 4. Install:
- clutch damper spring 1 ①
- clutch plate 2 ②
- friction plate ③
- clutch plate 1 ④
- A Engine side

CLUTCH









INSTALLING THE CLUTCH

- 1. Install:
- clutch assembly ①
- clutch assembly nut ②

% 65 Nm (6.5 m ⋅ kg, 47 ft ⋅ lb)

NOTE: _

- Align the ⓐ and ⓑ during reassembly.
- While holding the clutch assembly with the rotor holding tool ③, tighten the clutch assembly nut.



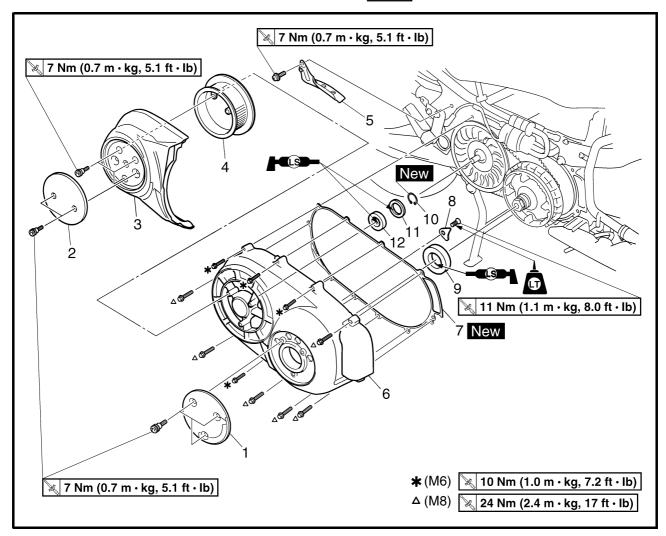
Rotor holding tool 90890-01235, YU-01235





V-BELT AUTOMATIC TRANSMISSION V-BELT CASE





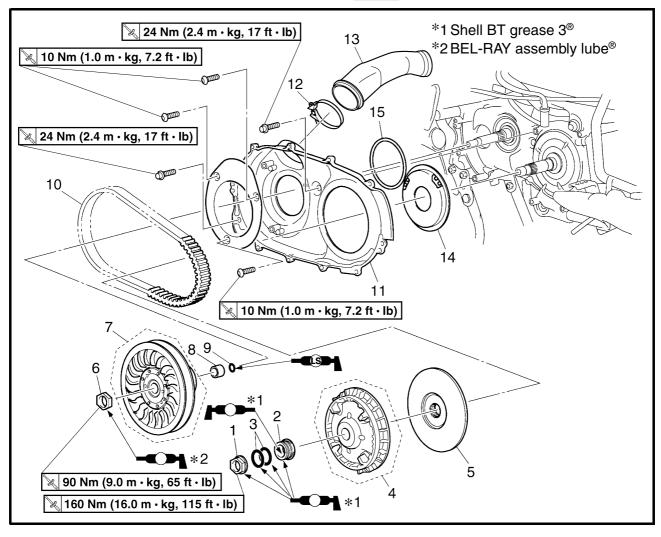
Order	Job/Part	Q'ty	Remarks
	Removing the V-belt case		Remove the parts in the order listed.
	Muffler		Refer to "ENGINE REMOVAL".
1	V-belt case cover 1	1	
2	V-belt case cover 2	1	
3	V-belt case air filter cover	1	
4	V-belt case air filter element	1	
5	Lead holder	1	
6	V-belt case	1	
7	V-belt case gasket	1	
8	Bearing retainer	1	
9	Bearing	1	
10	Circlip	1	
11	Oil seal	1	
12	Bearing	1	
			For installation, reverse the removal pro-
			cedure.



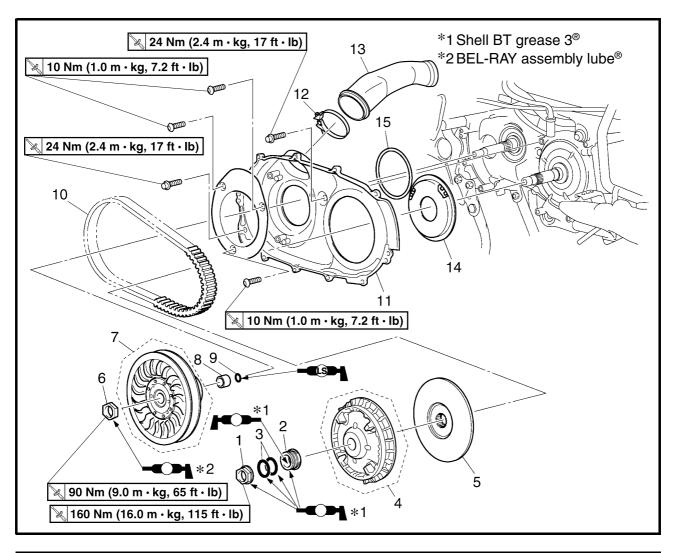


V-BELT AND PRIMARY/SECONDARY SHEAVE

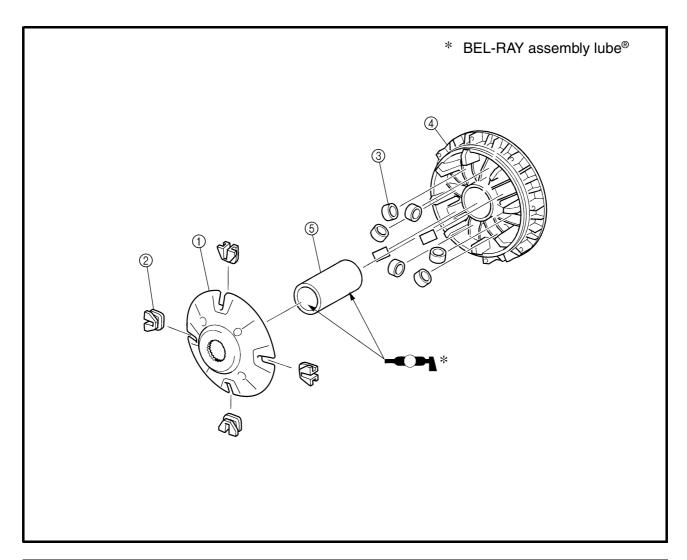




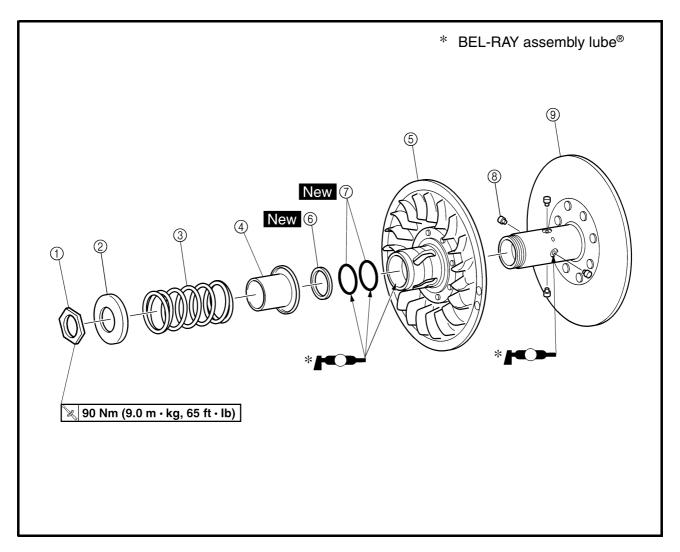
Order	Job/Part	Q'ty	Remarks
	Removing the V-belt and primary/		Remove the parts in the order listed.
	secondary sheave		
	V-belt case air filter element (left)		Refer to "WATER PUMP" in chapter 6.
1	Primary sheave nut	1	
2	Spacer	1	
3	O-ring	2	Refer to "REMOVING THE PRIMARY
4	Primary sheave assembly	1	SHEAVE ASSEMBLY, SECONDARY
5	Primary fixed sheave	1	SHEAVE ASSEMBLY AND V-BELT"
6	Secondary sheave nut	1	and "INSTALLING THE PRIMARY
7	Secondary sheave assembly	1	SHEAVE ASSEMBLY, SECONDARY
8	Collar	1	SHEAVE ASSEMBLY AND V-BELT".
9	O-ring	1	
10	V-belt	1	Ŭ
11	Right crankcase cover	1	



Order	Job/Part	Q'ty	Remarks
12	V-belt case air duct joint clamp	1	Loosen. 7 Refer to "INSTALLING
13	V-belt case air duct	1	∫THE PRIMARY SHEAVE ASSEMBLY, SECOND- ARY SHEAVE ASSEM- BLY AND V-BELT".
14	Plate	1	
15	V-belt case air duct seal	1	
			For installation, reverse the removal procedure.



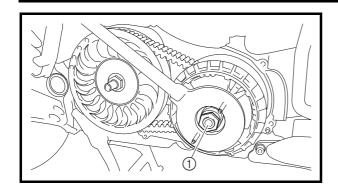
Order	Job/Part	Q'ty	Remarks
	Disassembling the primary sheave		Remove the parts in the order listed.
1	Cam	1	Refer to "DISASSEMBLING THE PRI-
2	Slider	4	- MARY SHEAVE" and "ASSEMBLING
3	Weight	8	THE PRIMARY SHEAVE".
4	Primary sliding sheave	1	
(5)	Collar	1	
			For assembly, reverse the disassembly
			procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembly the secondary sheave		Remove the parts in the order listed.
1	Secondary sheave spring seat nut	1	Refer to "DISASSEMBLING THE SEC-
			ONDARY SHEAVE" and "ASSEMBLING
			THE SECONDARY SHEAVE".
2	Upper spring seat	1	h
3	Compression spring	1	
4	Spring seat	1	
(5)	Secondary sliding sheave	1	Refer to "ASSEMBLING THE SECOND-
6	Oil seal	1	ARY SHEAVE".
7	O-ring	2	
8	Guide pin	4	
9	Secondary fixed sheave	1	Ц
			For assembly, reverse the disassembly
			procedure.





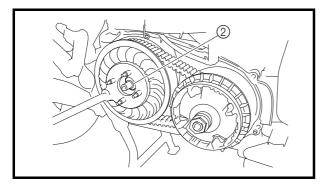


REMOVING THE PRIMARY SHEAVE ASSEMBLY, SECONDARY SHEAVE ASSEMBLY AND V-BELT

- 1. Remove:
- primary sheave nut ①
- secondary sheave nut ②

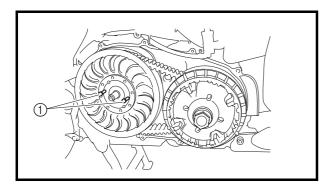
NOTE:

While holding the primary and secondary sheave with the sheave holder, loosen the nut.





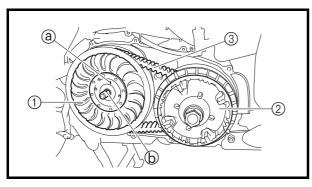
Sheave holder 90890-01481



- 2. Install:
 - bolts 1

NOTE:

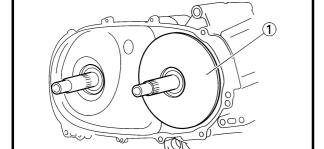
Insert M6 bolts (more than 45 mm (1.77 in)) into the holes of the secondary sheave assembly, and then tighten the bolts to open the secondary sheave assembly.



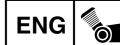
- 3. Remove:
- secondary sheave assembly ①
- primary sheave assembly ②
- V-belt (3)

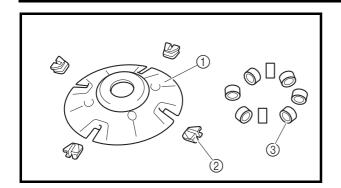
NOTE: _

- Before removal, apply (a) and (b) alignment marks.
- Align these marks during reassembly.
- Remove the primary sliding sheave, secondary sheave assembly and V-belt together.



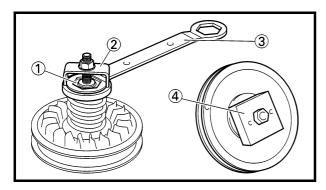
- 4. Remove:
- primary fixed sheave (1)





DISASSEMBLING THE PRIMARY SHEAVE

- 1. Remove:
 - cam (1)
 - slider ②
 - weight ③



DISASSEMBLING THE SECONDARY SHEAVE

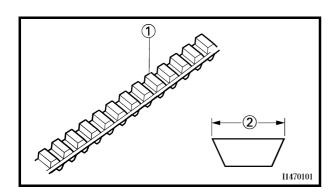
- 1. Remove:
- secondary sheave spring seat nut (1)

NOTE:

Install the sheave spring compressor ② onto the secondary sheave as shown. Then, compress the spring, and remove the secondary sheave spring seat nut ① with locknut wrench ③.



Sheave spring compressor ② 90890-04134, YM-04134 Locknut wrench ③ 90890-01348, YM-01348 Sheave fixed block ④ 90890-04135, YM-04135



CHECKING THE V-BELT

- 1. Check:
- V-belt ①
 Cracks/damage/wear → Replace.
 Grease/oil → Check the primary and secondary pulleys.
- 2. Measure:
- V-belt width ②
 Out of specification → Replace.

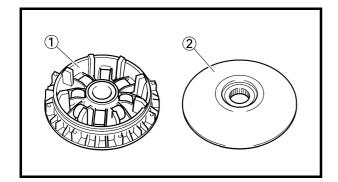


V-belt width 32 mm (1.26 in)

<Limit>: 30.5 mm (1.20 in)

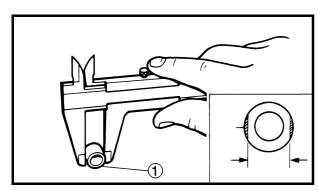
CHECKING THE V-BELT CASE AIR DUCT

- 1. Check
- V-belt case air duct $\text{Cracks/damage} \rightarrow \text{Replace}.$



CHECKING THE PRIMARY SHEAVE

- 1. Check:
- primary sliding sheave ①
- primary fixed sheave ②
 Cracks/damage/wear → Replace the primary sliding sheave and primary fixed sheave as a set.



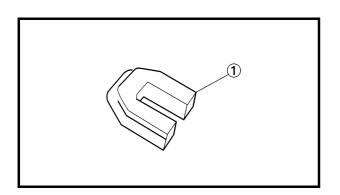
CHECKING THE WEIGHTS

The following procedure applies to all of the weights.

- 1. Check:
 - weights ①
 Cracks/wear/scaling/chipping → Replace.
 Out of specification → Replace.



Weight outside diameter 25.0 mm (0.98 in) <Limit>: 24.5 mm (0.96 in)



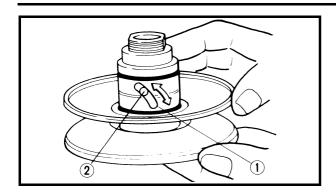
CHECKING THE SLIDERS

The following procedure applies to all of the sliders.

- 1. Check:
- sliders ①
 Cracks/damage/wear → Replace.







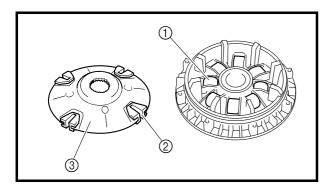
EAS00322

CHECKING THE SECONDARY SHEAVE

- 1. Check:
 - secondary fixed sheave
- secondary sliding sheave
 Cracks/damage/wear → Replace the secondary fixed and sliding sheaves as a set.
- 2. Check:
- torque cam groove ①
 Damage/wear → Replace the secondary fixed and sliding sheaves as a set.
- 3. Check:
- guide pin ②
 Damage/wear → Replace the secondary fixed and sliding sheaves as a set.

ASSEMBLING THE PRIMARY SHEAVE

- 1. Clean:
- primary fixed sheave
- primary sliding sheave
- collar
- · weights
- sliders
- cam



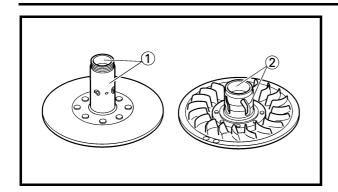
2. Install:

- weights 1
- sliders ②
- cam (3)

NOTE:

Do not apply the grease inside of the primary sheave.





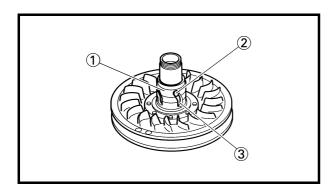
EAS00324

ASSEMBLING THE SECONDARY SHEAVE

- 1. Lubricate:
- secondary fixed sheave shaft's outer and inner surfaces (1)
- secondary sliding sheave's outer and inner surfaces ②
- grease nipple groove
- oil seals New (with the recommended lubricant)



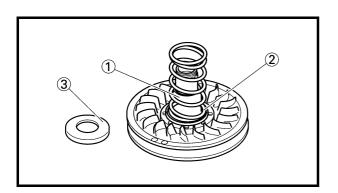
Recommended lubricant BEL-RAY assembly lube®



- 2. Install:
- secondary sliding sheave ①
- 3. Install:
- guide pin ②
- 4. Lubricate:
 - guide pin groove ③
- O-ring New (with the recommended lubricant)



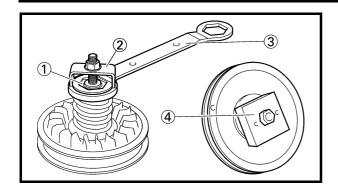
Recommended lubricant BEL-RAY assembly lube®



- 5. Install:
- spring seat ①
- compression spring ②
- upper spring seat ③







6. Tighten:

• secondary sheave spring seat nut

> 90 Nm (9.0 m ⋅ kg, 65 ft ⋅ lb)

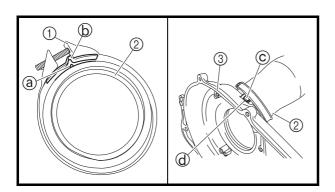
NOTE:

Attach the sheave spring compressor ② onto the secondary sheave as shown.

Then compress the spring, and tighten the secondary sheave spring seat nut ① with lock-nut wrench ③.



Sheave spring compressor ② 90890-04134, YM-04134 Locknut wrench ③ 90890-01348, YM-01348 Sheave fixed block ④ 90890-04135, YM-04135



INSTALLING THE PRIMARY SHEAVE ASSEMBLY, SECONDARY SHEAVE ASSEMBLY AND V-BELT

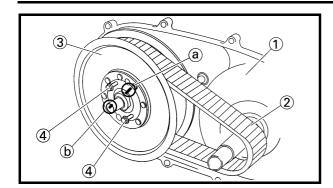
- 1. Install:
- V-belt case air duct joint clamp ①
- V-belt case air duct ②

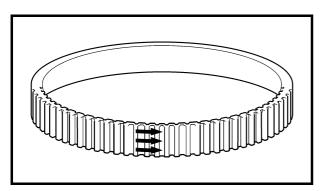
NOTE:

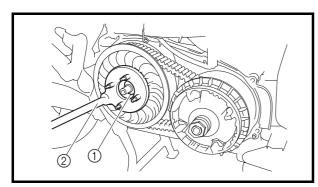
- Align the projection (a) in the V-belt case air duct (2) with the slot (b) on the V-belt case air duct joint clamp (1).
- Align the projection © in the V-belt case air duct joint clamp ① with the slot ⓓ in the right crankcase cover ③.











2. Install:

- primary fixed sheave ①
- V-belt ②
- secondary sheave assembly ③

CAUTION:

Do not allow grease to contact the V-belt, primary and secondary pulleys.

NOTE: _

- When installing the belt, screw M6 (more than 45 mm (1.77 in)) bolts 4 to spread apart the secondary sheave and then install the belt. Make sure the belt pullout direction is correct.
- Install the V-belt and secondary sheave assembly onto the primary sheave side.
- Align the (a) and (b) during reassembly.
- 3. Tighten:
 - secondary sheave nut ①

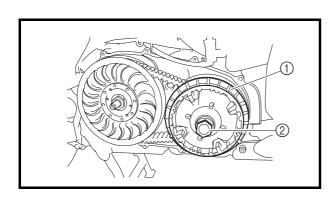
> 90 Nm (9.0 m ⋅ kg, 65 ft ⋅ lb)

NOTE: .

While holding the secondary sheave with the sheave holder ②, tighten the secondary sheave nut ①.



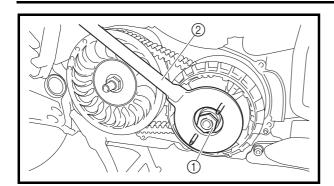
Sheave holder 90890-01481



- 4. Install:
- primary sliding sheave ①
- O-rings
- spacer
- primary sheave nut ②







- 5. Tighten:
- primary sheave nut ①

№ 160 Nm (16.0 m · kg, 115 ft · lb)

CAUTION:

 Before tightening the nut to remount the primary sheave, make sure that the serrations of the cam are fitted firmly into the serrations of the crankshaft.

Also, make sure that cam is properly seated.

 Apply grease to the thread and seat of the primary sheave nut.



Recommended lubricant Shell BT grease 3[®]

NOTE: .

While holding the primary sheave with the sheave holder ②, tighten the primary sheave nut ①.



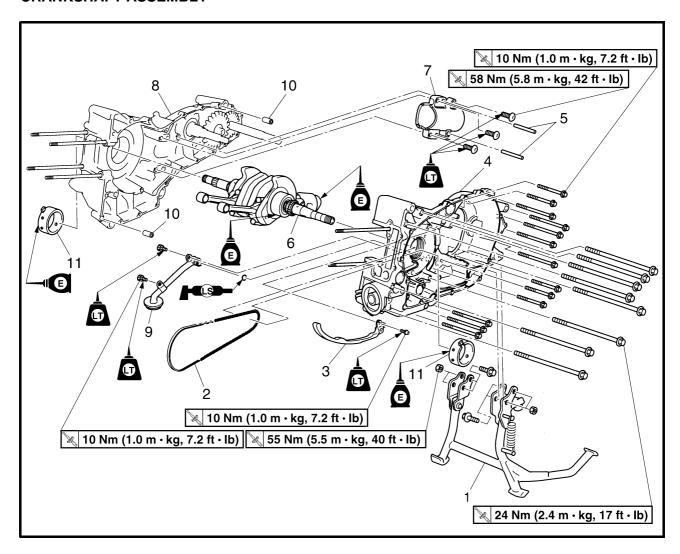
Sheave holder 90890-01481





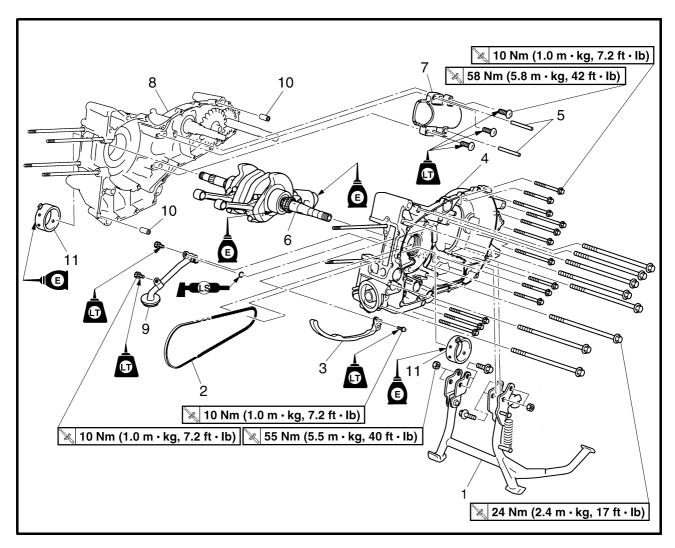
CRANKCASE AND CRANKSHAFT

CRANKSHAFT ASSEMBLY



Removing the crankshaft assembly Engine Cylinder head Cylinder/piston		Remove the parts in the order listed. Refer to "ENGINE REMOVAL". Refer to "CYLINDER HEAD".
Cylinder head		
_		Defer to "CVI INDED HEAD"
Cylinder/piston		NEIGH TO CILINDEN NEAD.
- y		Refer to "CYLINDER AND PISTON".
Starter clutch/A.C. magneto rotor		Refer to "STARTER CLUTCH AND A.C.
		MAGNETO ROTOR".
Clutch		Refer to "CLUTCH".
Oil pump		Refer to "OIL PUMP".
Right crankcase cover		Refer to "V-BELT AUTOMATIC TRANS-
		MISSION".
Centerstand assembly	1	
Timing chain	1	
Timing chain guide (intake side)	1	
Left crankcase	1	Refer to "DISASSEMBLING THE CRANKCASE" and "ASSEMBLING THE CRANKCASE".
S	Starter clutch/A.C. magneto rotor Clutch Dil pump Right crankcase cover Centerstand assembly Timing chain Timing chain guide (intake side)	Starter clutch/A.C. magneto rotor Clutch Dil pump Right crankcase cover Centerstand assembly 1 Timing chain 1 Timing chain guide (intake side) 1

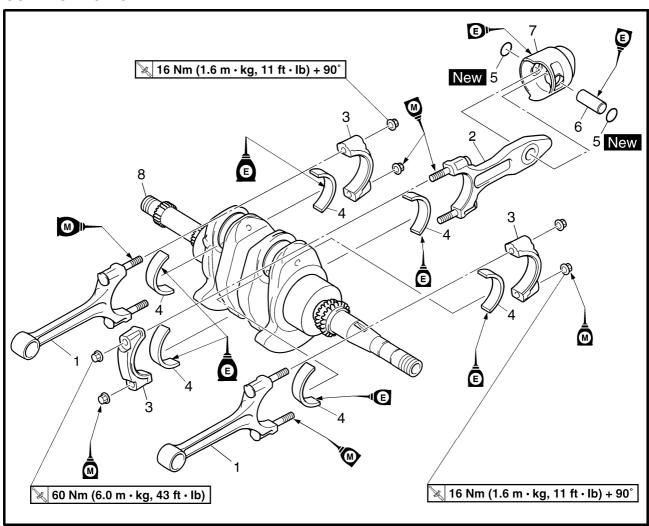




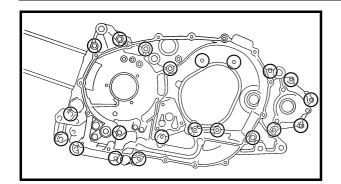
Order	Job/Part	Q'ty	Remarks
5	Dowel pin	2	
6	Crankshaft assembly	1	Refer to "INSTALLING THE CRANK-
7	Balancer cylinder	1	SHAFT".
8	Right crankcase	1	
9	Oil strainer	1	
10	Dowel pin	2	
11	Crankshaft main journal bearing	2	Refer to "REMOVING THE CRANK-
			SHAFT MAIN JOURNAL BEARINGS"
			and "INSTALLING THE CRANKSHAFT
			MAIN JOURNAL BEARINGS"
			For installation, reverse the removal pro-
			cedure.



CONNECTING ROD



Order	Job/Part	Q'ty	Remarks
	Removing the connecting rod		Remove the parts in the order listed.
1 2 3 4 5 6	Connecting rod Connecting rod (balancer) Connecting rod cap Big end bearing Circlip Piston pin	2 1 3 6 2	Refer to "REMOVING THE CONNECT-ING RODS" and "INSTALLING THE CONNECTING RODS".
6 7 8	Piston pin Balancer piston Crankshaft	1 1 1	
			For installation, reverse the removal procedure.



EAS00385

DISASSEMBLING THE CRANKCASE

- 1. Remove:
 - · crankcase bolts

NOTE:

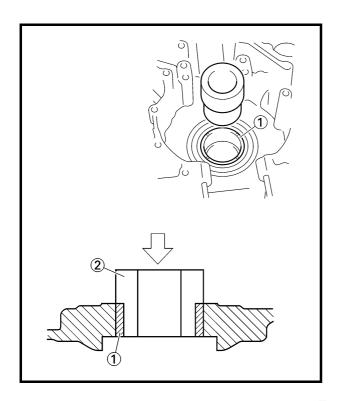
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

- 2. Remove:
 - left crankcase

CAUTION:

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure that the crankcase halves separate evenly.

- 3. Remove:
- dowel pins



EAS00387

REMOVING THE CRANKSHAFT MAIN JOURNAL BEARINGS

- 1. Remove:
- crankshaft assembly
- crankshaft main journal bearings (1)

NOTE:

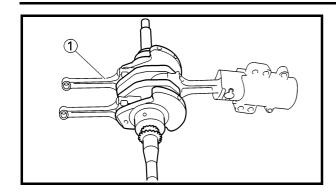
Remove the main journal bearing by the plane bearing installer ②.



Plane bearing installer 90890-04139

NOTE: .

Identify the position of each crankshaft main journal bearing so that it can be reinstalled in its original place.



EAS0039

REMOVING THE CONNECTING RODS

The following procedure applies to all of the connecting rods.

- 1. Remove:
 - connecting rod (1)
- big end bearings

NOTE:

Identify the position of each big end bearing so that it can be reinstalled in its original place.

EAS00399

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

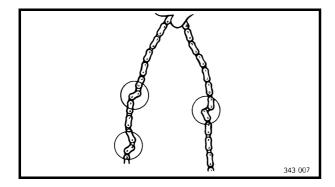
Cracks/damage \rightarrow Replace.

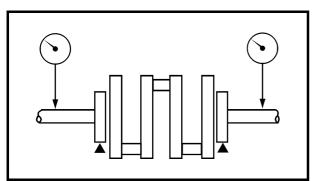
oil delivery passages
 Obstruction → Blow out with compressed air.



CHECKING THE TIMING CHAIN

- 1. Check:
- timing chain
 Damage/stiffness → Replace the timing chain and camshaft sprockets as a set.





CHECKING THE CRANKSHAFT AND CONNECTING RODS

- 1. Measure:
 - crankshaft runout
 Out of specification → Replace the crankshaft.



Crankshaft runout Less than 0.03 mm (0.0012 in)





- 2. Check:
- crankshaft journal surfaces
- crankshaft pin surfaces
- bearing surfaces
 Scratches/wear → Replace the crankshaft.
- 3. Measure:
- crankshaft-pin-to-big-end-bearing clearance

Out of specification \rightarrow Replace the big end bearings.



Crankshaft-pin-to-big-end-bearing clearance
0.026 ~ 0.050 mm
(0.0010 ~ 0.0020 in)

The following procedure applies to all of the connecting rods.

CAUTION:

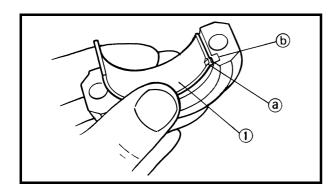
Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

- 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:

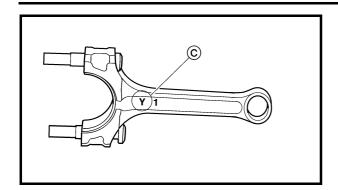
Align the projections (a) on the big end bearings (1) with the notches (b) in the connecting rod and connecting rod cap.

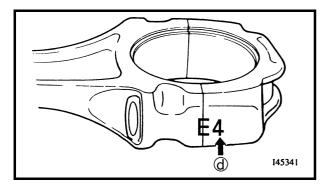
c. Put a piece of Plastigauge® on the crank-shaft pin.











d. Assemble the connecting rod halves.

NOTE:

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Apply molybdenum disulfide grease onto the bolts, threads, and nut seats.
- Make sure that the "Y" mark © on the connecting rod faces towards the left side of the crankshaft.
- Make sure that the characters (a) on both the connecting rod and connecting rod cap are aligned.
- e. Tighten the connecting rod nuts.

CAUTION:

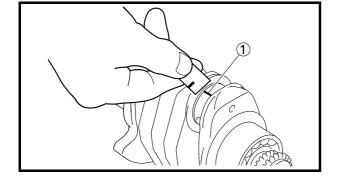
- When tightening the connecting rod nuts, be sure to use an F-type torque wrench.
- After tightening the connecting rod nut to the specified torque, turn the connecting rod nut another+90°.

Refer to "INSTALLING THE CONNECTING RODS".



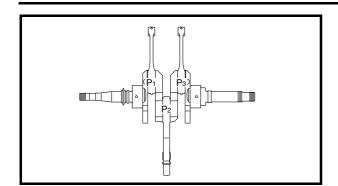
Connecting rod nut 16 Nm (1.6 m \cdot kg, 11 ft \cdot lb) + 90°

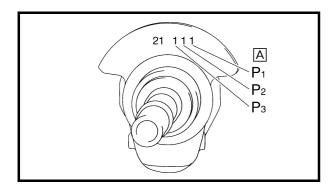
- f. Remove the connecting rod and big end bearings.
 - Refer to "REMOVING THE CONNECTING RODS".
- g. Measure the compressed Plastigauge® width ① on each crankshaft pin.
 - If the clearance is out of specification, select replacement big end bearings.

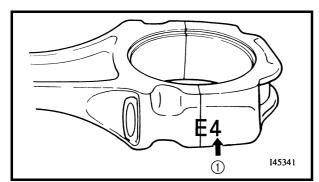












4. Select:

• big end bearings (P₁, P₂, P₃)

NOTE:

- The numbers A stamped into the crankshaft web and the numbers (1) on the connecting rods are used to determine the replacement big end bearing sizes.
- "P₁, P₂, P₃" refer to the bearings shown in the crankshaft illustration.

For example, if the connecting rod "P₁" and the

crankshaft web "P1" numbers are "4" and "1" respectively, then the bearing size for "P1" is:

Bearing size for "P₁":

"P₁" (connecting rod) -

"P₁" (crankshaft web) =

4-1=3 (brown)

BEARING COLOR CODE		
1	blue	
2	black	
3	brown	
4	green	

5. Measure:

· crankshaft-journal-to-crankshaft-journalbearing clearance.

Out of specification \rightarrow Replace the crankshaft journal bearings.



Crankshaft-journal-to-crankshaftjournal-bearing clearance 0.040 ~ 0.082 mm $(0.0016 \sim 0.0032 in)$

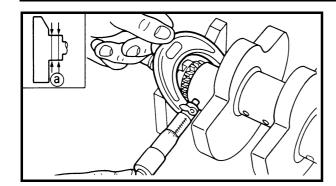
The following procedure applies to all of the journal bearing.

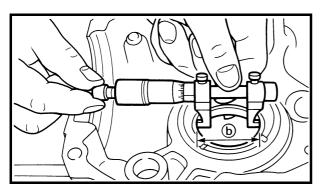
CAUTION:

On the journal, the larger value is used as a basis for calculation of the oil clearance, and on the journal bearing, the smaller value is used.









- a. Clean the surface of main journal and journal bearings.
- b. Check the bearing surface. If the bearing surface is worn or scratched, the bearings should be replace.

NOTE: .

If either of the right or left journal bearing is worn or scratched, both bearings should be replaced as a set.

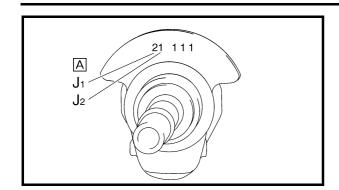
- c. Measure the outside diameter (a) of each main journal at two places. If it is out of specification, replace the crankshaft.
- d. Measure the inside diameter **(b)** of each journal bearing at two places.
- e. If journal bearing inside diameter is "45.03" and crankshaft journal outside diameter is "44.98", then the main journal oil clearance is:

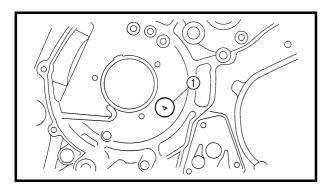
Main journal oil clearance:
Journal bearing inside diameter –
Main journal outside diameter =
45.03 – 44.98 = 0.05 mm

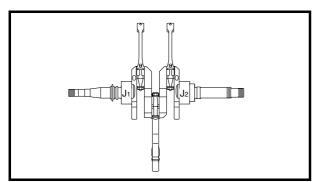
If the oil clearance is out of specification, select a replacement bearings.

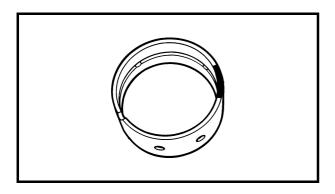












6. Select:

• crankshaft journal bearings (J₁, J₂)

NOTE: .

is:

• The numbers A stamped into the crankshaft web and the numbers 1 on the crankcase are used to determine the replacement crankshaft journal bearing size.

• "J₁, J₂" refer to the bearings shown in the crankshaft illustration.

For example, if the crankcase "J₁" and the crankshaft web "J₁" numbers are "4" and "2" respectively, then the bearing size for "J₁"

Bearing size for " J_1 ":

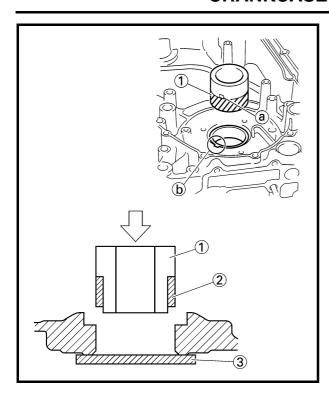
"J₁" (crankcase) -

"J₁" (crankshaft web) =

4-2=2 (black)

BEARING COLOR CODE		
1	blue	
2	black	
3	brown	
4	green	





INSTALLING THE CRANKSHAFT MAIN JOURNAL BEARINGS

- 1. Attach:
- · crankshaft main journal bearings

NOTE:

Attach the crankshaft main journal bearing to the plane bearing installer ①.

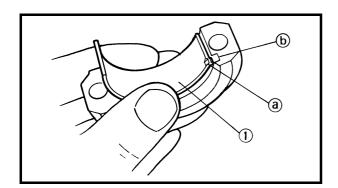


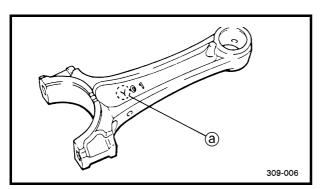
Plane bearing installer 90890-04139

- 2. Install:
- crankshaft main journal bearings ②

NOTE:

- Align the projection (a) on the bearing with the projection (b) on the crankcase.
- Place an iron ③ plate beneath the crankcase and press fit until the end of the plain bearing installer touches the iron plate.





INSTALLING THE CONNECTING RODS

- 1. Install:
- big end bearings (1)

NOTE:

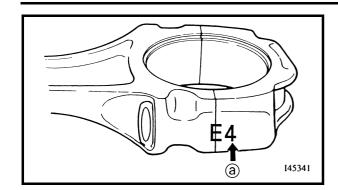
- Align the projection (a) of the big end bearings with the notches (b) in the connecting rod cap.
- Install each big end bearing in its original place.
- 2. Install:
- connecting rods

NOTE:

- The stamped "Y" mark (a) on the connecting rods should face towards the left side of the crankcase.
- Install each connecting rod in its original place.







3. Install:

connecting rod cap

NOTE: .

Be sure that the characters ⓐ on the side of the cap and connecting rod are aligned.

4. Tighten:

• nuts (connecting rod cap)

№ 16 Nm (1.6 m · kg, 11 ft · lb) + 90°

NOTE: .

Apply molybdenum disulfide grease to the rod cap bolt threads and nut surfaces.

a. Replace the connecting rod bolts and nuts with new ones.

CAUTION:

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts and nuts.

- b. Clean the connecting rod bolts and nuts.
- c. Tighten the connecting rod nuts with specified torque.
- d. Put a mark ① on the corner of the connecting rod nut ② and the connecting rod ③.
- e. Tighten the nut further to reach the specified angle (90°).

WARNING

When the nut is tightened more than the specified angle, do not loosen the nut and then retighten it.

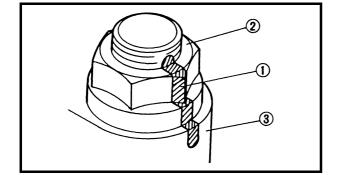
Replace the bolt with a new one and perform the procedure again.

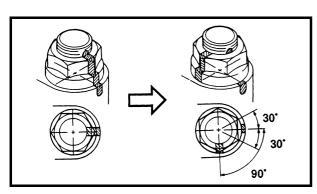
CAUTION:

- Do not use a torque wrench to tighten the nut to the specified angle.
- Tighten the nut until it is at the specified angles.

NOTF:

When using a hexagonal nut, note that the angle from one corner to another is 60°.



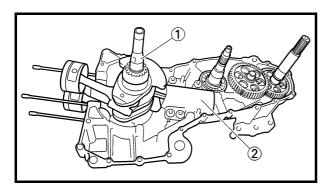


- 5. Install:
- balancer connecting rod
- connecting rod cap

№ 60 Nm (6.0 m · kg, 43 ft · lb)

CAUTION:

- When tightening the nuts be sure to use an F-type torque wrench.
- Without pausing, tighten to full torque specification. Apply continuous torque 57 ~ 63 Nm (5.7 ~ 6.3 m · kg, 41 ~ 45 ft · lb). Once you reach 57 Nm (5.7 m · kg, 41 ft · lb) DO NOT STOP TIGHTENING until final torque is reached. If the tightening is interrupted 57 ~ 63 Nm (5.7 ~ 6.3 m · kg, 41 ~ 45 ft · lb) loosen the nut to less than 57 Nm (5.7 m · kg, 41 ft · lb) and start again.



INSTALLING THE CRANKSHAFT

- 1. Install:
 - crankshaft assembly ①
 - balancer piston cylinder (2)

№ 58 Nm (5.8 m · kg, 42 ft · lb)

CAUTION:

To avoid scratching the crankshaft and to ease the installation procedure, apply grease onto the oil seal lips and apply engine oil onto each bearing.

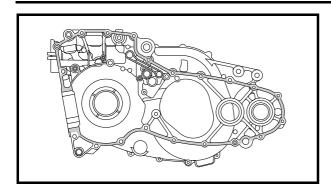
EAS00418

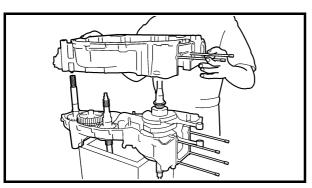
ASSEMBLING THE CRANKCASE

1. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.









- 2. Apply:
- sealant (onto the crankcase mating surfaces)



Yamaha bond No. 1215 90890-85505 Sealant (Quick Gasket®) ACC-11001-05-01

NOTE: _

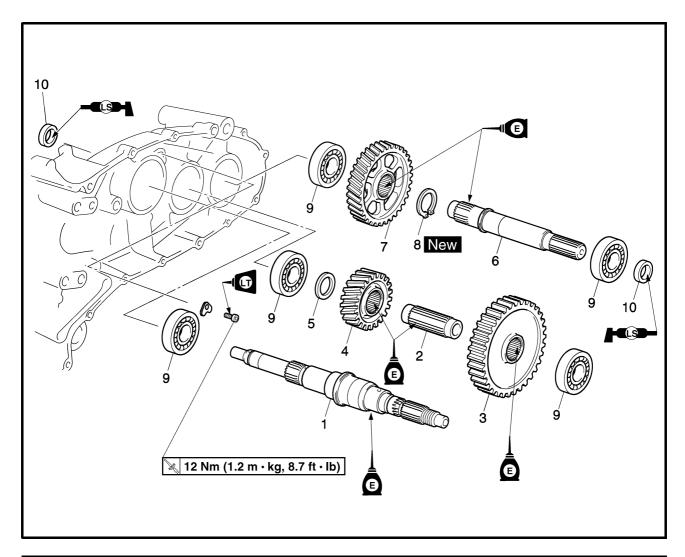
Do not allow any sealant to come into contact with the oil gallery.

- 3. Install:
- dowel pins
- left crankcase





TRANSMISSION



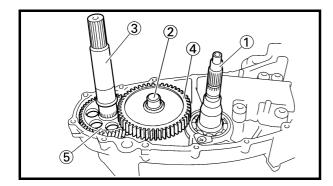
Order	Job/Part	Q'ty	Remarks
	Removing the transmission		Remove the parts in the order listed.
	Left crankcase		Refer to "CRANKCASE AND CRANK-
			SHAFT".
1	Secondary shaft	1	
2	Main axle	1	
3	Primary driven gear	1	
4	First pinion gear	1	
5	Washer	1	
6	Drive axle	1	
7	First wheel gear	1	
8	Circlip	1	
9	Bearing	5	
10	Oil seal	2	
			For installation, reverse the removal pro-
			cedure.





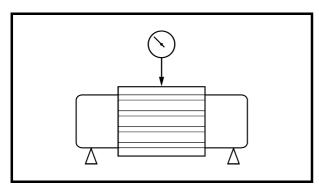
REMOVING THE TRANSMISSION

- 1. Remove:
- left crankcase
 Refer to "CRANKCASE AND CRANK-SHAFT".



2. Remove:

- secondary shaft 1
- main axle ②
- drive axle (3)
- primary driven gear 4
- first wheel gear ⑤
- · first pinion gear



EAS00425

CHECKING THE TRANSMISSION

- 1. Measure:
- main axle runout (with a centering device and dial gauge)
 Out of specification → Replace the main axle.



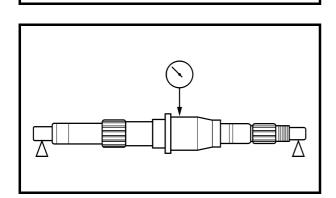
Maximum main axle runout 0.08 mm (0.0031 in)



drive axle runout
 (with a centering device and dial gauge)
 Out of specification → Replace the drive axle.



Maximum drive axle runout 0.08 mm (0.0031 in)



- 3. Measure:
 - secondary shaft runout (with a centering device and dial gauge)
 Out of specification → Replace the secondary shaft.

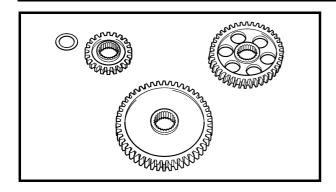


Maximum secondary shaft runout 0.08 mm (0.0031 in)

TRANSMISSION







- 4. Check:
- transmission gears
 Blue discoloration/pitting/wear → Replace the defective gear(s).
- 5. Check:
- transmission gear movement Rough movement → Replace the defective part(s).
- 6. Check:
- $\begin{tabular}{ll} \bullet & circlips \\ Damage/bends/looseness \to Replace. \\ \end{tabular}$

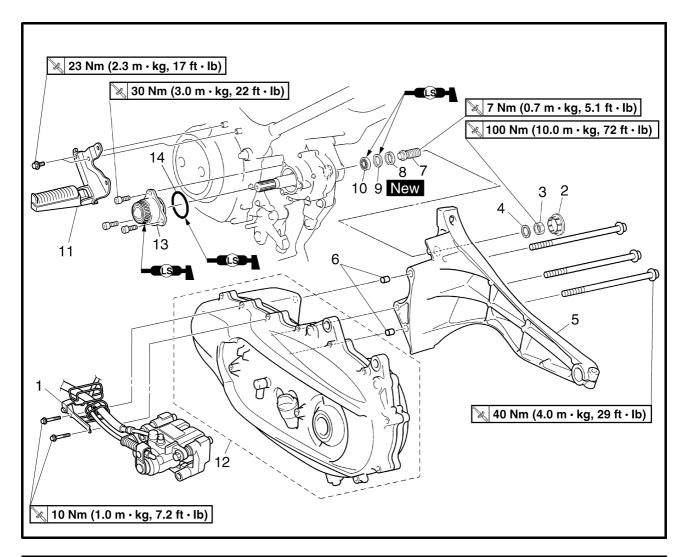
EAS00418

ASSEMBLING THE CRANKCASE

Refer to "CRANKCASE AND CRANKSHAFT".

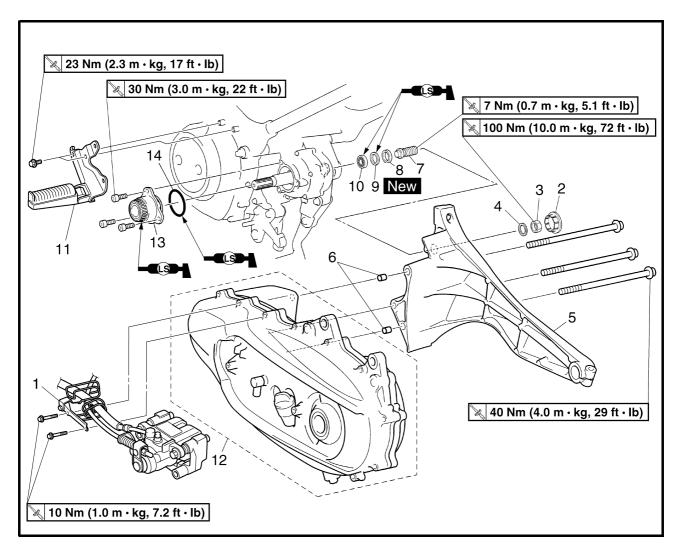


CHAIN DRIVE



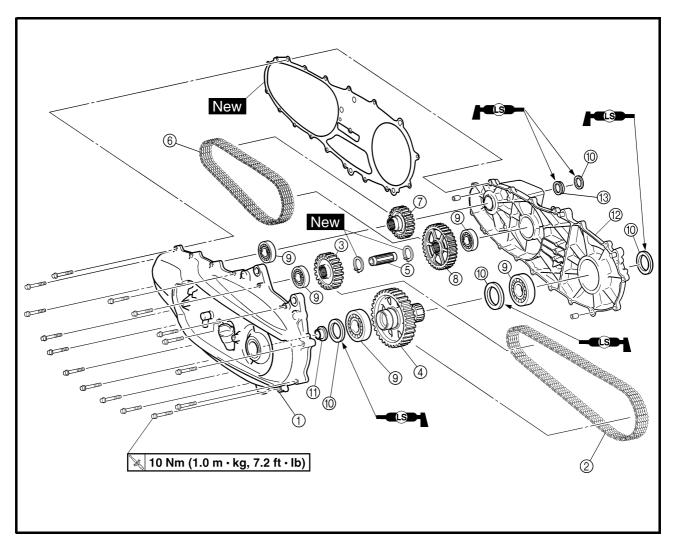
Order	Job/Part	Q'ty	Remarks
	Removing the chain drive assembly		Remove the parts in the order listed.
	Chain drive oil		Drain.
			Refer to "CHANGING THE CHAIN
			DRIVE OIL" in chapter 3.
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER" in chapter 4.
	Rear brake caliper/rear wheel		Refer to "REAR WHEEL AND BRAKE
	Treat brake camper/real writer		DISC" in chapter 4.
1	Rear brake hose/rear brake lock lever	1	
	cable holder	_	
2	Cover	1	
3	Nut	1	h
4	Washer	1	Defeate "INICIALLING THE CHAIN
5	Swingarm	1	Refer to "INSTALLING THE CHAIN DRIVE".
6	Dowel pin	2	DRIVE .
7	Pivot shaft	1	Ц



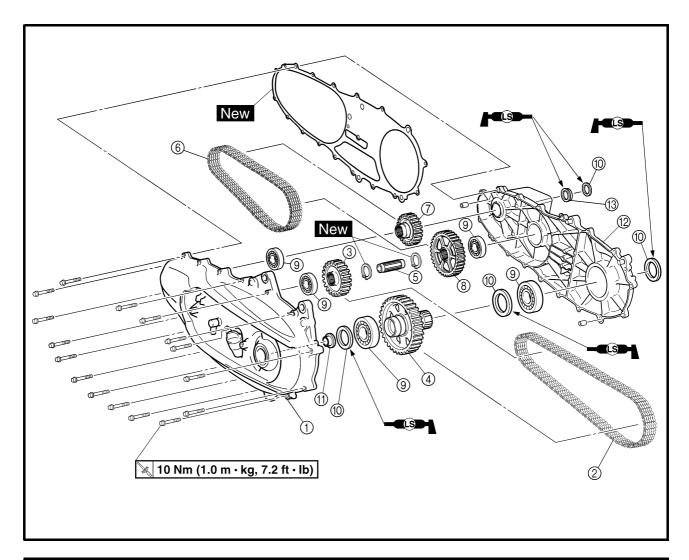


Order	Job/Part	Q'ty	Remarks
8	Collar	1	
9	Oil seal	1	
10	Bearing	1	
11	Left rear footrest	1	
12	Chain drive assembly	1	
13	Chain drive holder assembly	1	
14	O-ring	1	
			For installation, reverse the removal pro-
			cedure.





Order	Job/Part	Q'ty	Remarks
	Disassembling the chain drive		Remove the parts in the order listed.
	assembly		
1	Chain drive case (outer)	1	
2	Secondary drive chain	1	
3	Secondary drive gear	1	
4	Secondary driven gear	1	
(5)	Middle shaft	1	
6	Primary drive chain	1	
7	Primary drive gear	1	
8	Primary driven gear	1	
9	Bearing	5	
10	Oil seal	4	
11)	Collar	1	
12	Chain drive case (inner)	1	

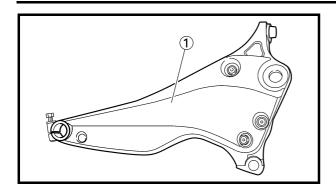


Order	Job/Part	Q'ty	Remarks
13	Retainer	1	
			For assembly, reverse the disassembly
			procedure.

CHAIN DRIVE

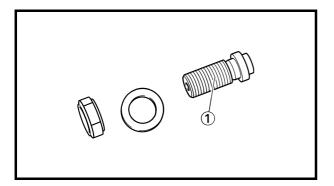






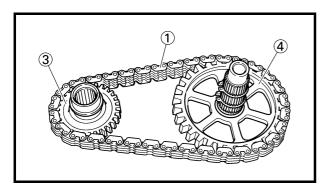
CHECKING THE SWINGARM

- 1. Check:



- 2. Check:
- pivot shaft ①
- collar
- bearing
- oil seal

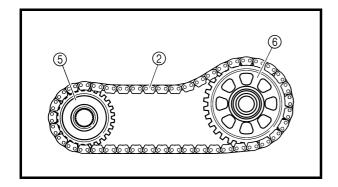
Damage/wear \rightarrow Replace.



CHECKING THE CHAIN DRIVE ASSEMBLY

- 1. Check:
- primary drive chain (1)
- secondary drive chain ②
 Damage/stiffness → Replace the drive chain and its respective gears as a set.
- 2. Check:
- primary drive gear ③
- primary driven gear ④
- secondary drive gear ⑤
- secondary driven gear ⑥

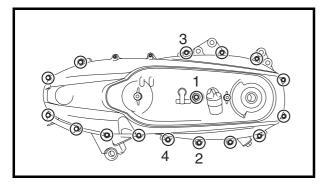
Damage/wear \rightarrow Replace the respective drive gears and respective drive chains as a set.



ASSEMBLING THE CHAIN DRIVE ASSEMBLY

- 1. Install:
- chain drive case (outer)

№ 10 Nm (1.0 m · kg, 7.2 ft · lb)



NOTE:

First, tighten the chain drive case bolts that are numbered in the illustration in the order shown, and then tighten the unnumbered bolts in a crisscross pattern.

CHAIN DRIVE





INSTALLING THE CHAIN DRIVE

- 1. Install:
- chain drive assembly
- swingarm
- pivot shaft
- washer
- nut
- 2. Tighten:
- swingarm bolt

¾ 40 Nm (4.0 m ⋅ kg, 29 ft ⋅ lb)

3. Tighten:

pivot shaft

№ 7 Nm (0.7 m · kg, 5.1 ft · lb) 🔀 100 Nm (10.0 m · kg, 72 ft · lb)

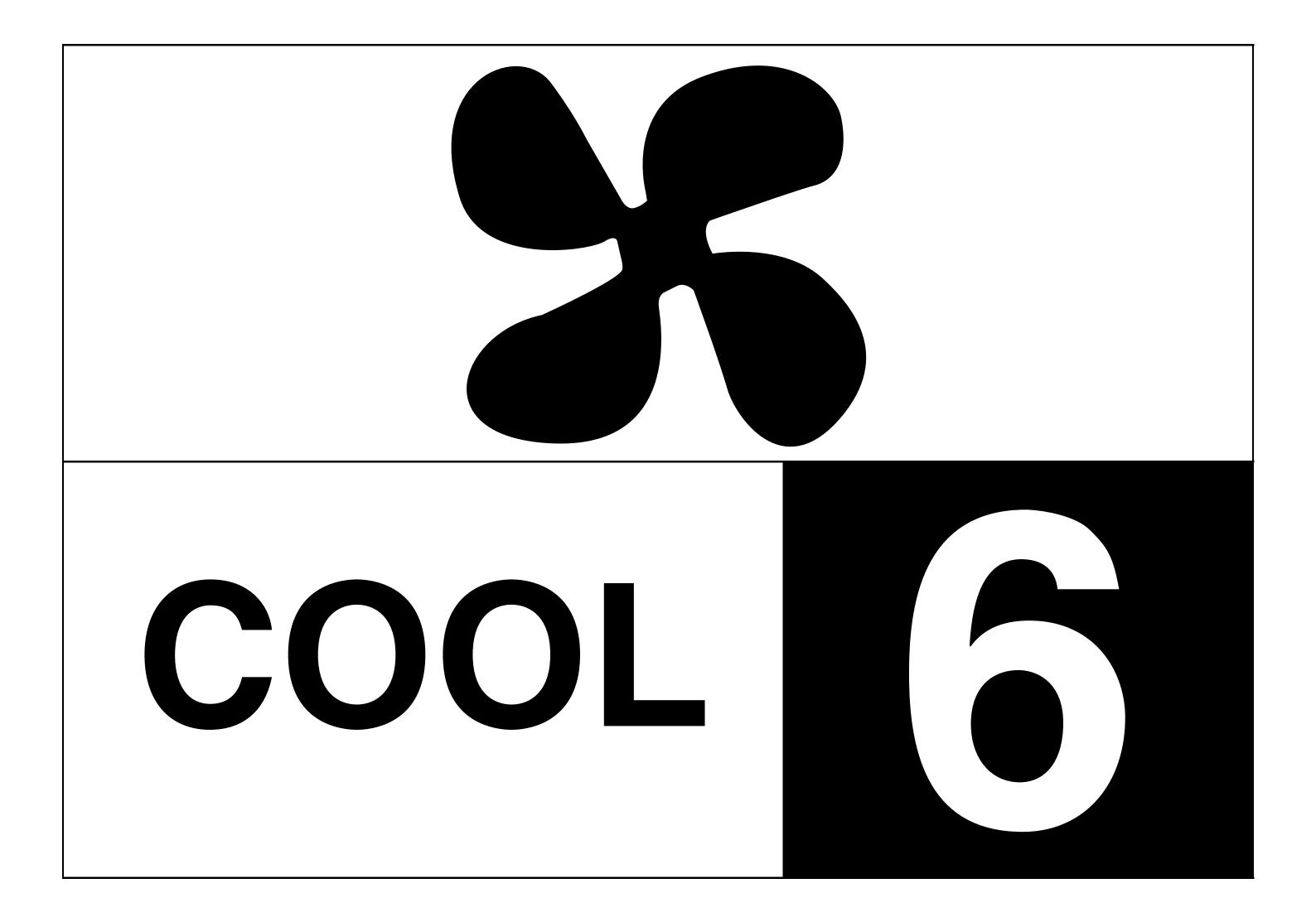
nut

NOTE: _

- With your fingers, screw in the pivot shaft until it touches the collar and then tighten the pivot shaft to the tightening torque.
- Tighten the nut to the tightening torque.
- Install the shock absorber and rear wheel after the swingarm is installed.

4. Fill:

- · chain drive oil Refer to "CHANGING THE CHAIN DRIVE OIL" in chapter 3.
- 5. Check:
 - chain drive oil level Refer to "CHECKING THE CHAIN DRIVE OIL LEVEL" in chapter 3.





CHAPTER 6 COOLING SYSTEM

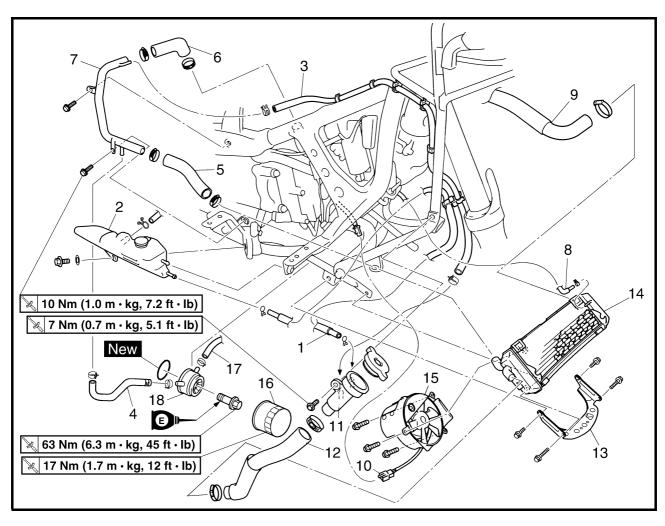
RADIATOR AND OIL COOLER	6-1
CHECKING THE RADIATOR	6-3
CHECKING THE OIL COOLER	6-4
INSTALLING THE OIL COOLER AND RADIATOR	
THERMOSTAT	6-6
CHECKING THE THERMOSTAT	6-7
INSTALLING THE THERMOSTAT	6-7
WATER PUMP	6-9
DISASSEMBLING THE WATER PUMP	
CHECKING THE WATER PUMP	6-13
ASSEMBLING THE WATER PUMP	6-13
INSTALLING THE WATER PUMP	6-15





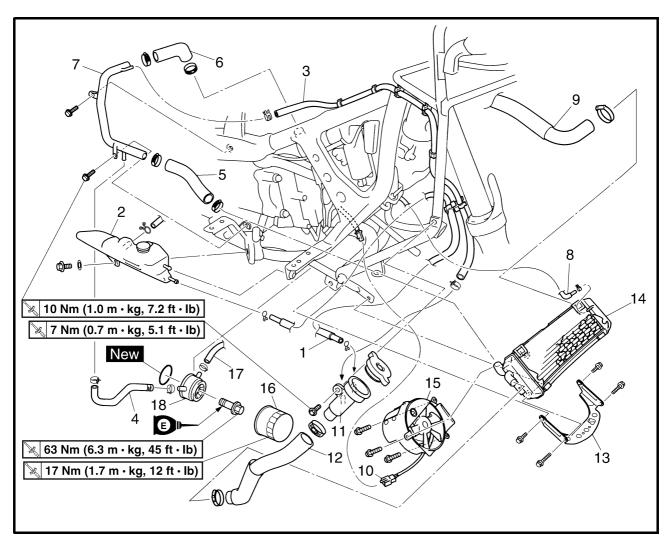
COOLING SYSTEM

RADIATOR AND OIL COOLER



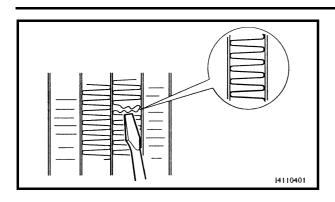
Order	Job/Part	Q'ty	Remarks
	Removing the radiator and oil cooler		Remove the parts in the order listed.
	Footrest board/leg shield/inner fender		Refer to "COVER AND PANEL" in chap-
			ter 3.
	Engine oil		Drain.
			Refer to "CHANGING THE ENGINE OIL"
			in chapter 3.
	Coolant		Drain.
			Refer to "CHANGING THE COOLANT" in
			chapter 3.
1	Coolant reservoir hose	1	
2	Coolant reservoir	1	
3	Cooling system air bleed hose	1	
4	Oil cooler outlet hose	1	
5	Radiator inlet hose	1	
6	Thermostat outlet hose	1	Disconnect.





Order	Job/Part	Q'ty	Remarks
7	Coolant pipe	1	
8	Fast idle outlet hose	1	Disconnect.
9	Radiator outlet hose	1	Disconnect.
10	Radiator fan motor coupler	1	Disconnect.
11	Radiator filler neck	1	
12	Radiator filler hose	1	
13	Stay	1	
14	Radiator	1	
15	Radiator fan	1	
16	Oil filter cartridge	1	
17	Oil cooler inlet hose	1	Disconnect.
18	Oil cooler	1	Refer to "INSTALLING THE OIL
			COOLER AND RADIATOR".
			For installation, reverse the removal pro-
			cedure.





EAS00455

CHECKING THE RADIATOR

- 1. Check:
- radiator fins

Obstruction \rightarrow Clean.

Apply compressed air to the rear of the radiator.

Damage \rightarrow Repair or replace.

NOTE:

Straighten any flattened fins with a thin, flathead screwdriver.

- 2. Check:
- radiator hoses
 Cracks/damage → Replace.
- 3. Measure:
- radiator cap opening pressure
 Below the specified pressure → Replace the radiator cap.



Radiator cap opening pressure 107.9 ~ 137.3 kPa (1.08 ~ 1.37 kg/cm², 15.6 ~ 19.9 psi)

a. Install the radiator cap tester ① and radiator cap tester adapter ② onto the radiator cap ③.



Radiator cap tester 90890-01325, YU-24460-01 Radiator cap tester adapter 90890-01352, YU-33984

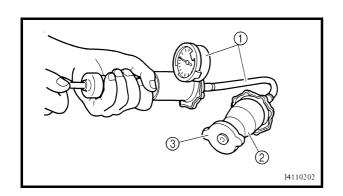
 Apply the specified pressure for ten seconds and make sure that there is no drop in pressure.

- 4. Check:
 - · radiator fan

Damage \rightarrow Replace.

Malfunction \rightarrow Check and repair.

Refer to "COOLING SYSTEM" in chapter 8.





EAS00458

CHECKING THE OIL COOLER

- 1. Check:
 - oil cooler
 Cracks/damage → Replace.
- 2. Check:
- oil cooler inlet hose
- oil cooler outlet hose
 Cracks/damage/wear → Replace.

EAS00459

INSTALLING THE OIL COOLER AND RADIATOR

- 1. Clean:
- mating surfaces of the oil cooler and the crankcase

(with a cloth dampened with lacquer thinner)

- 2. Install:
- O-ring New
- oil cooler 1
- oil cooler bolt ②

№ 63 Nm (6.3 m · kg, 45 ft · lb)

· oil filter cartridge

17 Nm (1.7 m · kg, 12 ft · lb)



Oil filter wrench 90890-01469

NOTE: _

- Before installing the oil cooler, lubricate the oil cooler bolt with engine oil.
- Make sure that the O-ring is positioned properly.
- Align the projection ⓐ on the oil cooler with the slot ⓑ in the crankcase.
- 3. Fill:
- cooling system

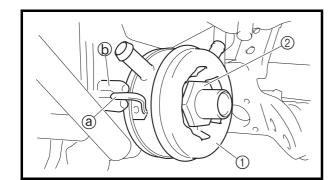
(with the specified amount of the recommended coolant)

Refer to "CHANGING THE COOLANT" in chapter 3.

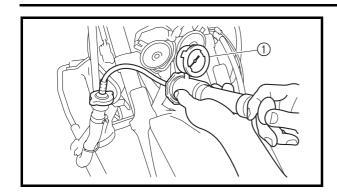
crankcase

(with the specified amount of the recommended engine oil)

Refer to "CHANGING THE ENGINE OIL" in chapter 3.







- 4. Check:
 - cooling system
 Leaks → Repair or replace any faulty part.

a. Attach the radiator cap tester ① to the radiator.



Radiator cap tester 90890-01325, YU-24460-01 Radiator cap tester adapter 90890-01352, YU-33984

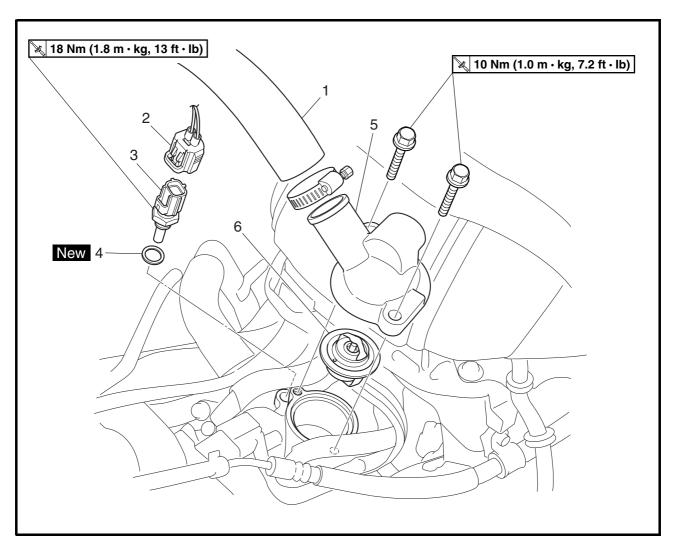
- b. Apply 100 kPa (1.0 kg/cm², 14.22 psi) of pressure.
- c. Measure the indicated pressure with the gauge.

5. Measure:

 \bullet radiator cap opening pressure Below the specified pressure \to Replace the radiator cap.

Refer to "CHECKING THE RADIATOR".

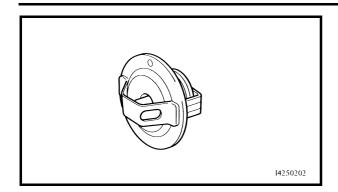
THERMOSTAT

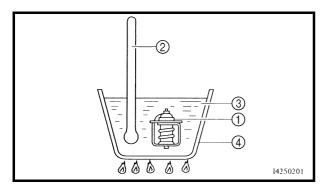


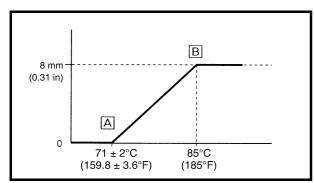
Order	Job/Part	Q'ty	Remarks
	Removing the thermostat		Remove the parts in the order listed.
	Center cover/side cover		Refer to "COVER AND PANEL" in chap-
			ter 3.
	Coolant		Drain.
			Refer to "CHANGING THE COOLANT" in
			chapter 3.
1	Thermostat outlet hose	1	Disconnect.
2	Coolant temperature sensor coupler	1	Disconnect.
3	Coolant temperature sensor	1	
4	Copper washer	1	
5	Thermostat cover	1	
6	Thermostat	1	Refer to "INSTALLING THE THERMO-STAT".
			For installation, reverse the removal procedure.

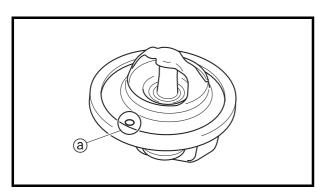
THERMOSTAT











FAS00462

CHECKING THE THERMOSTAT

- 1. Check:
 - thermostat
 Does not open at 69 ~ 73 °C (156.2 ~ 163.4 °F) → Replace.

- a. Suspend the thermostat in a container filled with water.
- b. Slowly heat the water.
- c. Place a thermometer in the water.
- d. While stirring the water, observe the thermostat and thermometer's indicated temperature.

- 1 Thermostat
- (2) Thermometer
- ③ Water
- (4) Container
- A Fully closed
- **B** Fully opens

NOTE: _

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

- 2. Check:
- thermostat cover
- thermostat housing (cylinder head)
 Cracks/damage → Replace.

EAS00467

INSTALLING THE THERMOSTAT

- 1. Install:
- thermostat
- thermostat cover

№ 10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

Install the thermostat with its breather hole ⓐ facing forward.

- 2. Install:
 - copper washer New
- coolant temperature sensor

18 Nm (1.8 m ⋅ kg, 13 ft ⋅ lb)

THERMOSTAT

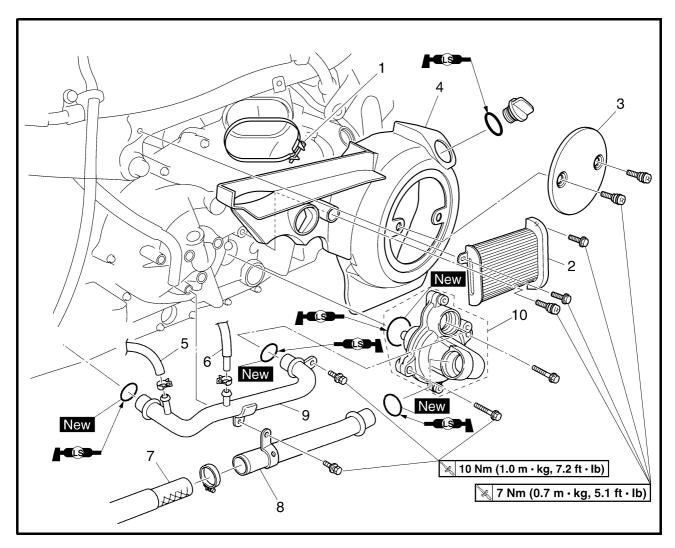


- 3. Fill:
- cooling system
 (with the specified amount of the recommended coolant)

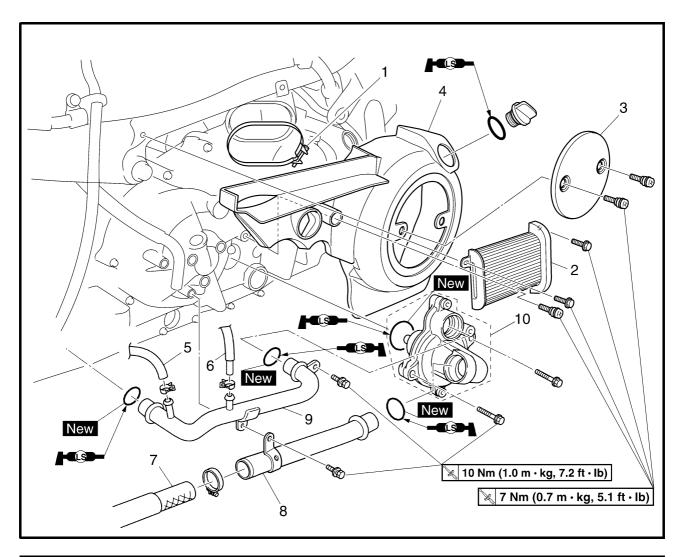
 Refer to "CHANGING THE COOLANT" in chapter 3.
- 4. Check:
- cooling system
 Leaks → Repair or replace any faulty part.
- 5. Measure:
- radiator cap opening pressure
 Below the specified pressure → Replace
 the radiator cap.

 Refer to "CHECKING THE RADIATOR".

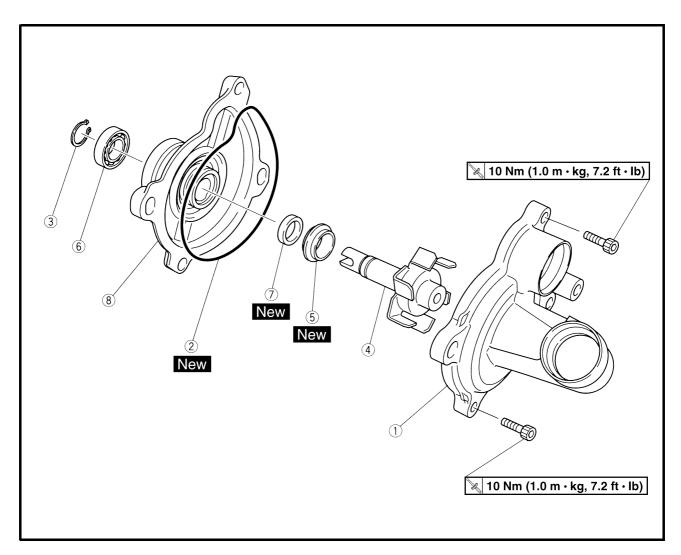




Order	Job/Part	Q'ty	Remarks
	Removing the water pump		Remove the parts in the order listed.
	Left upper side cover moulding/left		Refer to "COVER AND PANEL" in chap-
	footrest board		ter 3.
	Coolant		Drain.
			Refer to "CHANGING THE COOLANT" in
			chapter 3.
1	V-belt case air filter element clamp joint	1	Loosen.
2	V-belt case air filter element (left)	1	
3	Generator cover protector cover	1	
4	Generator cover protector	1	
5	Oil cooler inlet hose	1	Disconnect.
6	Coolant hose	1	Disconnect.
7	Radiator outlet hose	1	Disconnect.
8	Water pump inlet pipe	1	
9	Water pump outlet pipe	1	

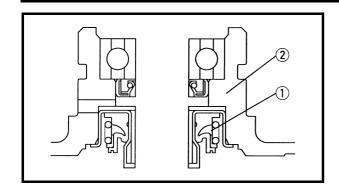


Order	Job/Part	Q'ty	Remarks
10	Water pump assembly	1	Refer to "INSTALLING THE WATER
			PUMP".
			For installation, reverse the removal pro-
			cedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the water pump		Remove the parts in the order listed.
			NOTE: It is not necessary to remove the impeller shaft, unless the coolant level is extremely low or coolant contains engine oil.
① ② ③ ④ ⑤ ⑥ ⑦ ⑧	Water pump housing cover O-ring Circlip Impeller shaft Water pump seal Bearing Oil seal Water pump housing	1 1 1 1 1 1 1	Refer to "DISASSEMBLING THE -WATER PUMP" and "ASSEMBLING THE WATER PUMP". For assembly, reverse the disassembly
_		1	





EAS00471

DISASSEMBLING THE WATER PUMP

- 1. Remove:
- water pump seal ①

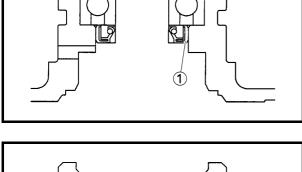
NOTE: _

Remove the water pump seal from the outside of the water pump housing.

- ② Water pump housing
- 2. Remove:
- oil seal ①
 (with a thin, flat-head screwdriver)

NOTE:

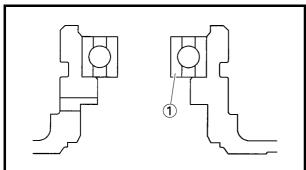
Remove the oil seal from the outside of the water pump housing.



- 3. Remove:
- bearing ①

NOTE: _

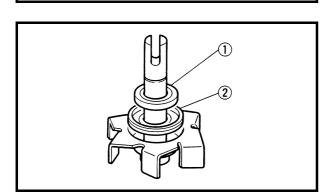
Remove the bearing from inside of the water pump housing.



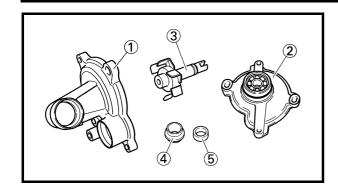
- 4. Remove:
- rubber damper holder ①
- rubber damper ②
 (from the impeller, with a thin, flat-head screwdriver)

NOTE: _

Do not scratch the impeller shaft.



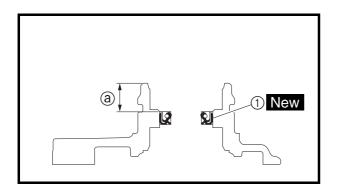




EAS00474

CHECKING THE WATER PUMP

- 1. Check:
- water pump housing cover ①
- water pump housing (2)
- impeller shaft ③
- water pump seal 4
- oil seal ⑤
- rubber damper
- rubber damper holder ${\it Cracks/damage/wear} \to {\it Replace}.$
- 2. Check:
- bearing Rough movement → Replace.



FAS00475

ASSEMBLING THE WATER PUMP

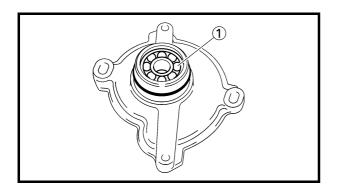
- 1. Install:
- oil seal ① New (to the water pump housing)



Installed depth of oil seal ⓐ 11.5 mm (0.45 in)

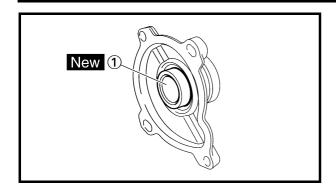
NOTE: .

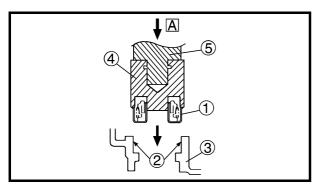
- Install the oil seal with a socket that matches its outside diameter.
- Before installing the oil seal, apply tap water or coolant onto its outer surface.



- 2. Install:
- bearing ①







3. Install:

water pump seal ① New

CAUTION:

Never apply oil or grease onto the water pump seal surface.

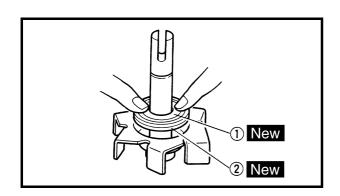
NOTE: _

- Install the water pump seal with the special tools.
- Before installing the water pump seal, apply Yamaha bond No.1215 or Sealant (Quick Gasket®) ② to the water pump housing ③.



Mechanical seal installer 90890-04078, YM-33221-A 4 Middle driven shaft bearing driver 90890-04058, YM-04058 (5) Yamaha bond No.1215 90890-85505 Sealant (Quick Gasket®) ACC-11001-05-01

A Push down

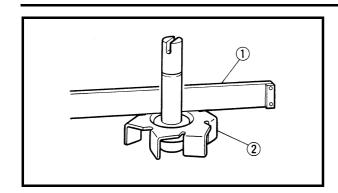


- 4. Install:
- rubber damper ① New
- rubber damper holder ② New

NOTE:

Before installing the rubber damper, apply tap water or coolant onto its outer surface.





5. Measure:

tilt
 Out of specification → Repeat steps (3) and
 (4).

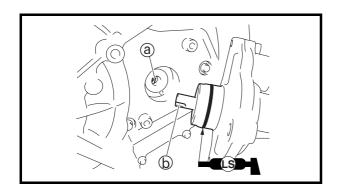
CAUTION:

Make sure that the rubber damper and rubber damper holder are flush with the impeller.



Maximum impeller shaft tilt 0.15 mm (0.006 in)

- 1) Straightedge
- ② Impeller



INSTALLING THE WATER PUMP

- 1. Install:
- water pump assembly

№ 10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE: _

Align the projection ⓐ at the oil pump shaft and water pump shaft groove ⓑ.

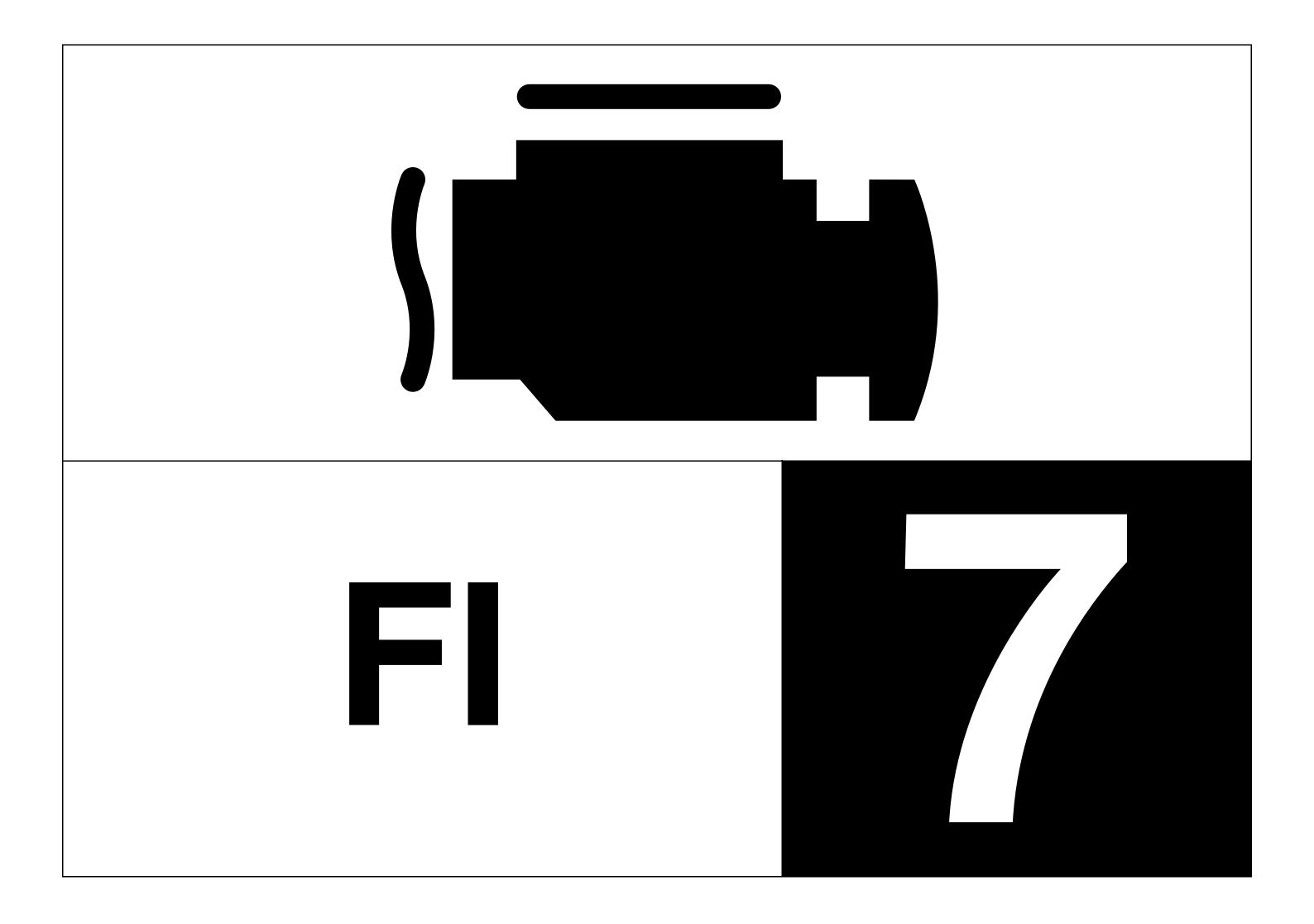
- 2. Fill:
- cooling system

(with the specified amount of the recommended coolant)

Refer to "CHANGING THE COOLANT" in chapter 3.

- 3. Check:
- cooling system
 Leaks → Repair or replace any faulty part.
- 4. Measure:
- \bullet radiator cap opening pressure Below the specified pressure \to Replace the radiator cap.

Refer to "CHECKING THE RADIATOR".





CHAPTER 7 FUEL INJECTION SYSTEM

FUEL INJECTION SYSTEM	7-1
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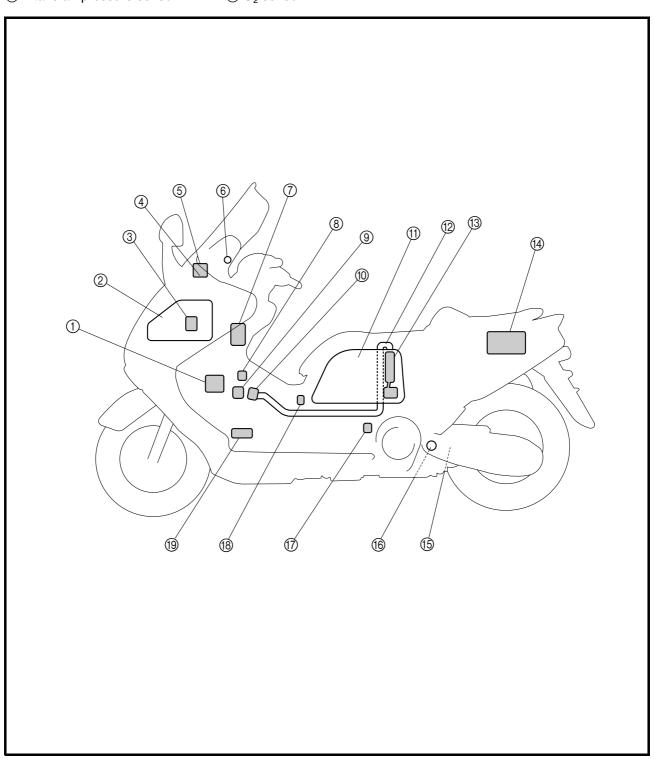




FUEL INJECTION SYSTEM

- ① Ignition coil
- ② Air filter case
- ③ Intake air temperature sensor
- 4 Fuel injection system relay
- ⑤ Lean angle cut-off switch
- 6 Engine trouble warning light
- ⑦ ECU (engine)
- ® Intake air pressure sensor
- Throttle position sensor
- 10 Fuel injector
- 1) Fuel tank
- 12 Fuel delivery hose
- (13) Fuel pump
- (14) Battery
- (5) Catalyst
- 16 O₂ sensor

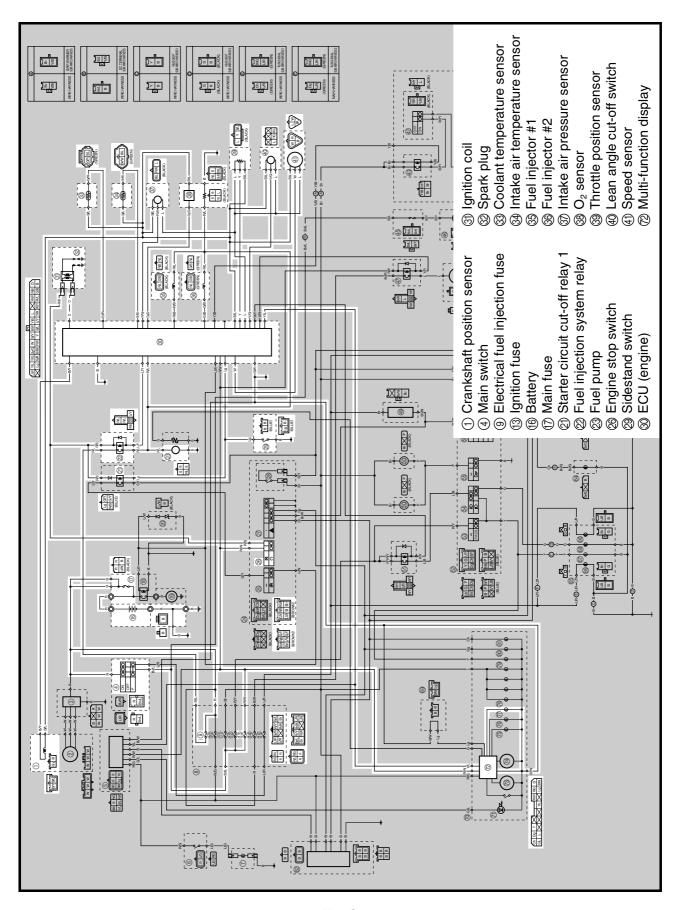
- ① Crankshaft position sensor
- ® Coolant temperature sensor
- 19 Spark plug







WIRING DIAGRAM







EAS00899

ECU (engine) SELF-DIAGNOSTIC FUNCTION

The ECU (engine) 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 (engine).

- 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 (engine) 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 clock LCD.
 Once a fault code has been displayed, it remains stored in the memory of the ECU (engine) until it is deleted.

EAS00900

Engine trouble warning light indication and FI system operation

Warning light indication	ECU (engine) opera- tion	FI operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Can not be operated
Remains ON	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction.	Can or cannot be operated depending on the fault code

- * The warning light flashes when any one of the conditions listed below is present and the start switch is pushed:
- 12: Crankshaft position sensor
- 19: Sidestand switch (open circuit in the wire to the ECU (engine))
- 30: Lean angle cut-off switch (latch up detected)

- 41: Lean angle cut-off switch (open or short-circuit)
- 50: ECU (engine) internal malfunction (faulty ECU (engine) memory)

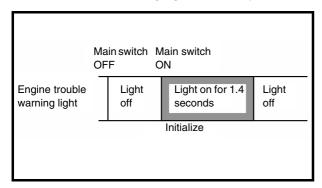




EAS00901

Checking for a defective engine trouble warning light bulb

The engine trouble warning light comes on for 1.4 seconds after the main switch has been turned to "ON" and when the start switch is being pushed. If the warning light does not come on under these conditions, the warning light bulb may be defective.



EAS00902

ALTERNATE INSTRUCTIONS OPERATION CONTROL (FAIL-SAFE ACTION)

If the ECU (engine) detects an abnormal signal from a sensor while the vehicle is being driven, the ECU (engine) 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 (engine) 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.

The ECU (engine) takes fail-safe actions in two ways: one in which the sensor output is set to a prescribed value, and the other in which the ECU (engine) directly operates an actuator. Details on the fail-safe actions are given in the table below.

EAS00903

FAIL-SAFE ACTION TABLE

Fault code No.	Item	Symptom	Fail-safe action	Engine start- ability	Vehicle drive- ability
12	Crankshaft position sensor	No normal signals are received from the crankshaft position sensor.	-	Unable	Unable
13 14	Intake air pressure sensor (open or short circuit) (pipe system)	Intake air pressure sensor- open or short circuit detected. Faulty intake air pressure sen- sor system.	Fixes the intake air pressure to 101.12 kPa (1.01 kgf/cm², 14.4 psi).	Able	Able
15 16	Throttle position sensor (open or short circuit) (stuck)	Throttle position sensor-open or short circuit detected.	Fixes the throttle position sensor to fully open.	Able	Able
19	Sidestand switch (open circuit in wire to ECU (engine))	Open circuit is detected in the input line from the sidestand switch to the ECU (engine).	(No start)	Unable	Unable
21	Coolant temperature sensor	Coolant temperature sensor- open or short circuit detected.	Fixes the coolant temperature to 80 °C (176 °F).	Able	Able
22	Intake temperature sensor	Intake temperature sensor- open or short circuit detected.	Fixes the intake temperature to 20 °C (68 °F).	Able	Able
24	O ₂ sensor (inactive)	No normal signals are received from the O ₂ sensor.		Able	Able
33	Faulty ignition	Open circuit detected in the primary lead of the ignition coil.		Unable	Unable





Fault code No.	Item	Symptom	Fail-safe action	Engine start- ability	Vehicle drive- ability
37	Faulty the FID valve	Stuck FID valve. (when fully open)		Able	Able
30 41	Lean angle cut-off switch (latch up detected) (open or short circuit)	The scooter has over turned. Lean angle cut-off switch-open or short circuit detected.		Unable	Unable
43	Fuel system voltage (monitor voltage)	Supply power to the fuel injector and fuel pump is not normal.	Fixes the battery voltage to 12 V.	Able	Able
44	Error in writing the amount of CO adjustment on EEPROM	An error is detected while reading or writing on EEPROM (CO adjustment value).		Able	Able
46	Vehicle system power supply (monitor voltage)	Power supply to the FI system relay is not normal		Able	Able
50	ECU (engine) internal malfunction (memory check error)	Faulty ECU (engine) memory. When this malfunction is detected, the code number might not appear on the meter.		Unable	Unable

Communication error with the meter

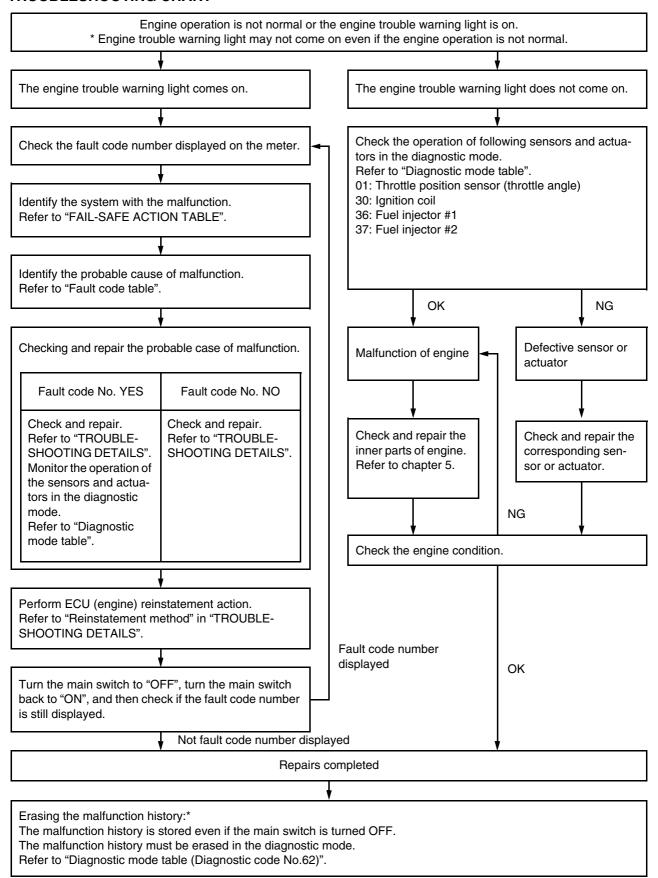
Fault code No.	Item	Symptom	Fail-safe action	Engine start- ability	Vehicle drive- ability
Er-1	ECU (engine) internal malfunction (output signal error)	No signals are received from the ECU (engine).	-	Unable	Unable
Er-2	ECU (engine) internal malfunction (output sig- nal error)	No signals are received from the ECU (engine) within the specified duration.		Unable	Unable
Er-3	ECU (engine) internal malfunction (output sig- nal error)	Data from the ECU (engine) cannot be received correctly.		Unable	Unable
Er-4	ECU (engine) internal malfunction (input sig- nal error)	Non-registered data has been received from the meter.		Unable	Unable

FI



EAS00904

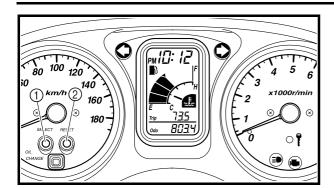
TROUBLESHOOTING CHART

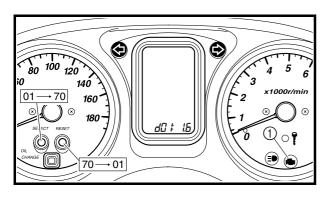


^{*} Operated when the engine trouble warning light is on.









EAS00905

DIAGNOSTIC MODE

Setting the diagnostic mode

- 1. Turn the main switch to "OFF" and set the engine stop switch to "\(\cap{"}\).
- 2. Disconnect the wire harness coupler from the fuel pump.
- 3. Simultaneously press and hold the "SELECT" ① and "RESET" ② 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 clock and tripmeter displays.
- "dIAG" appears on the tripmeter LCD.
- 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 execute the selection.
- 6. Set the engine stop switch to "♥.".
- 7. Select the diagnostic code number that applies to the item that was verified with the fault code number by pressing the "SELECT" and "RESET" buttons.

NOTE

The diagnostic code number appears on the tripmeter LCD (01-70).

- To decrease the selected diagnostic code number, press the "RESET" button. Press the "RESET" button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the "SELECT" button. Press the "SELECT" button for 1 second or longer to automatically increase the diagnostic code numbers.





- 8. Verify the operation of the sensor or actuator.
- Sensor operation
 The data representing the operating conditions of the sensor appears on the trip LCD.
- Actuator operation
 Set the engine stop switch to "()" to operate the actuator.

NOTE: .

If the engine stop switch is set to " \bigcirc ", set it to " \boxtimes ", and then set it to " \bigcirc " again.

9. Turn the main switch to "OFF" to cancel the diagnostic mode.

FI



EAS00906

Fault code table

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code
12	No normal signals are received from the crankshaft position sensor.	 Open or short circuit in wiring harness. Defective crankshaft position sensor. Malfunction in pickup rotor. Malfunction in ECU (engine). Improperly installed sensor. 	_
13	Intake air pressure sensor-open or short circuit detected.	 Open or short circuit in wiring harness. Defective intake air pressure sensor. Malfunction in ECU (engine). 	03
14	Faulty intake air pressure sensor hose system; a hose is detached, causing constant application of the atmospheric pressure to the sensor; or, the hose is clogged.	Intake air pressure sensor hose is detached, clogged, kinked, or pinched. Malfunction in ECU (engine).	03
15	Throttle position sensor-open or short circuit detected.	 Open or short circuit in wiring harness. Defective throttle position sensor. Malfunction in ECU (engine). Improperly installed throttle position sensor. 	01
16	A stuck throttle position sensor is detected.	Stuck throttle position sensor. Malfunction in ECU (engine).	01
19	Open circuit in the input line from the sidestand switch to the ECU (engine) is detected when the start switch is pressed.	Open circuit in wiring harness. Malfunction in ECU (engine).	20
21	Coolant temperature sensor-open or short circuit detected.	 Open or short circuit in wiring harness. Defective coolant temperature sensor. Malfunction in ECU (engine). Improperly installed sensor. 	06
22	Intake air temperature sensor-open or short circuit detected.	 Open or short circuit in wiring harness. Defective intake air temperature sensor. Malfunction in ECU (engine). Improperly installed sensor. 	05
24	No normal signals are received from the O_2 sensor.	 Open or short circuit in wiring harness. Defective O₂ sensor. Malfunction in ECU (engine). Improperly installed sensor. 	_
30	The scooter has overturned.	Overturned. Malfunction in ECU (engine).	08
33	Open circuit is detected in the primary lead of the ignition coil.	 Open circuit in wiring harness. Malfunction in ignition coil. Malfunction in ECU (engine). Malfunction in a component of ignition cut-off circuit system. 	30
37	Faulty the FID valve.	Stuck the FID valve (when fully open). Malfunction in ECU (engine).	01
41	Lean angle cut-off switch-open or short circuit detected.	 Open or short circuit in wiring harness. Defective lean angle cut-off switch. Malfunction in ECU (engine). 	08
43	Supply power to the fuel injector and fuel pump is not normal.	 Open circuit in wiring harness. (red/blue line) Malfunction in ECU (engine). Defective fuel injection system relay. 	09
44	An error is detected while reading or writing on EEPROM.	Malfunction in ECU (engine). (The CO adjustment value is not properly written on or read from the internal memory.)	60





Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code
46	Power supply to the fuel injection system relay is not normal.	Open circuit in wiring harness. (blue/yellow – red/black line) Malfunction in "CHARGING SYSTEM" in chapter 8.	-
50	Faulty ECU (engine) memory. When this malfunction is detected, the code number might not appear on the meter.	Malfunction in ECU (engine). (The program and data are not properly written on or read from the internal memory.)	_
Er-1	No signals are received from the ECU (engine).	 Open or short circuit in wiring sub lead. Malfunction in meter. Malfunction in ECU (engine). 	_
Er-2	No signals are received from the ECU (engine) within the specified duration.	 Improper connection in wiring sub lead. Malfunction in meter. Malfunction in ECU (engine). 	_
Er-3	Data from the ECU (engine) cannot be received correctly.	 Improper connection in wiring sub lead. Malfunction in meter. Malfunction in ECU (engine). 	_
Er-4	Non-registered data has been received from the meter.	Improper connection in wiring sub lead. Malfunction in meter. Malfunction in ECU (engine).	_

EAS00907

Diagnostic mode table

Switch the meter display from the regular mode to the diagnostic mode. To switch the display, refer to "DIAGNOSTIC MODE".

NOTE:

- Check the intake temperature and coolant temperature as close as possible to the intake temperature sensor and the coolant temperature sensor respectively.
- If it is not possible to check the atmospheric pressure with an atmospheric pressure gauge, determine the atmospheric pressure by using 101.12 kPa (1.01 kgf/cm², 14.4 psi) as the standard.
- If it is not possible to check the intake temperature, use the ambient temperature as reference.

Diagnostic code	Item	Description of action	Data displayed on meter (reference value)
01	Throttle angle	Displays the throttle angle. • Check with throttle fully closed. • Check with throttle fully open.	0 ~ 125 degrees Fully closed position (15 ~ 16) Fully open position (97 ~ 102)
03	Pressure difference (atmospheric pressure- intake air pressure)	Displays the pressure difference (atmospheric pressure-intake air pressure). Engine stop switch is "()". Generate the pressure difference by cranking the engine with the starter, without actually starting the engine.	0 ~ 126 kPa (1.26 kgf/cm², 17.9 psi)
05	Intake air temperature	Displays the intake air temperature. • Check the temperature in the air cleaner case.	Compare it to the value displayed on the meter.
06	Coolant temperature	Displays the coolant temperature. • Check the temperature of the coolant.	Compare it to the value displayed on the meter.
07	Vehicle speed pulse	Displays the accumulation of the vehicle pulses that are generated when the front tire is spun.	(0 ~ 999; resets to 0 after 999) OK if the numbers appear on the meter.
08	Lean angle cut-off switch	Displays the lean angle cut-off switch values.	Upright: 0.4 ~ 1.4 V Overturned: 3.8 ~ 4.2 V





Diagnostic code	Item	Description of action	Data displayed on meter (reference value)
09	Fuel system voltage (battery voltage)	Displays the fuel system voltage (battery voltage). Engine stop switch is "\(\cap \)".	0 ~ 18.7 V Normally, approximately 12.0 V
20	Sidestand switch	Displays that the switch is ON or OFF.	Stand retracted: ON Stand extended: OFF
30	Ignition coil	After 1 second has elapsed from the time the engine stop switch has been turned from "※" to "○", it actuates ignition coil for five times every second and illuminates the engine trouble warning light. • Connect an ignition checker. • If the engine stop switch is "○", turn it "※" once, and then turn it back "○".	Check that spark is generated, 5 times with the engine stop switch "\(\cap \)".
36	Fuel injector #1	After 1 second has elapsed from the time the engine stop switch has been turned from "※" to "○", it actuates the fuel injector five times every second and illuminates the engine trouble warning light. • If the engine stop switch is "○", turn it "※" once, and then turn it back "○".	Check the operating sound of the fuel injector 5 times with engine stop switch "()".
37	Fuel injector #2	After 1 second has elapsed from the time the engine stop switch has been turned from "⋈" to "∩", it actuates the fuel injector five times every second and illuminates the engine trouble warning light. • If the engine stop switch is "∩", turn it "⋈" once, and then turn it back "∩".	Check the operating sound of the fuel injector 5 times with engine stop switch "()".
50	Fuel injection system relay	After 1 second has elapsed from the time the engine stop switch has been turned from "⋈" to "∩", it actuates the fuel injection system relay five times every second and illuminates the engine trouble warning light. (the light is off when the relay is on, and the light is on when the relay is off) • If the engine stop switch is "∩", turn it "⋈" once, and then turn it back "∩".	Check the fuel injection system relay operating sound 5 times with the engine stop switch "()".
51	Radiator fan motor relay	After 1 second has elapsed from the time the engine stop switch has been turned from "\otime" "to "\cap", it actuates the radiator fan motor relay five times every 5 seconds and illuminates the engine trouble warning light. (ON 2 seconds, OFF 3 seconds) • If the engine stop switch is "\cap", turn it "\otime" once, and then turn it back "\cap".	Check the radiator fan motor relay operating sound 5 times with the engine stop switch "()". (At that time, the fan motor rotates.)
52	Headlight relay	After 1 second has elapsed from the time the engine stop switch has been turned from "⋈" to "∩", it actuates the headlight relay five times every 5 seconds and illuminates the engine trouble warning light. (ON 2 seconds, OFF 3 seconds) • If the engine stop switch is "∩", turn it "⋈" once, and then turn it back "∩".	Check the headlight relay operating sound 5 times with the engine stop switch "()". (At that time, the headlight turns ON.)
57	Grip warmer relay	After 1 second has elapsed from the time the engine stop switch has been turned from "⋈" to "○", it actuates the grip warmer relay and illuminates the engine trouble warning light. (the light is off when the relay is off, and the light is on when the relay is on) • If the engine stop switch is "○", turn it "⋈" once, and then turn it back "○".	Check the grip warmer relay operating sound 1 time with the engine stop switch "()".
60	EEPROM fault code display	 Transmits the abnormal portion of the data in the EEPROM that has been detected as a fault code 44. If multiple malfunctions have been detected, different codes are displayed at 2-second intervals, and this process is repeated. 	(01 ~ 02) Displays the cylinder number. (00) Displays when there is no malfunction.



Diagnostic code	Item	Description of action	Data displayed on meter (reference value)
61	Malfunction history code display	 Displays the codes of the history of the self-diagnosis malfunctions (i.e., a code of a malfunction that occurred once and which has been corrected). If multiple malfunctions have been detected, different codes are displayed at 2-second intervals, and this process is repeated. 	12 ~ 50 (00) Displays when there is no malfunction.
62	Malfunction history code erasure	 Displays the total number of codes that are being detected through self diagnosis and the fault codes in the past history. Erases only the history codes when the engine stop switch is turned from "⋈" to "∩". If the engine stop switch is "∩", turn it "⋈" once, and then turn it back "∩". 	00 ~ 17 (00) Displays when there is no malfunction.
70	Control number	Displays the program control number.	00 ~ 255

EAS00908

TROUBLESHOOTING DETAILS

This section describes the countermeasures 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 in the "TROUBLESHOOTING CHART".

After the check and service of the malfunctioned part has been completed, reset the meter display according to the "Reinstatement method".

Fault code No.:

Fault code number displayed on the meter when the engine failed to work normally. Refer to "Fault code table".

Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "DIAGNOS-TIC MODE".





Jsed d	iagnostic code No. – –		
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Installed condition of sensor	Check the installed area for looseness or pinching.	Reinstated by
2	Defective crankshaft position sensor.	 Replace if defective. Disconnect the crankshaft position sensor coupler from the wire harness. Connect the pocket tester (Ω × 100) to the crankshaft position sensor coupler as shown. 	cranking the engine.
		Positive tester probe → gray ① Negative tester probe → black ②	
		3. Measure the crankshaft position sensor resis-	
		tance. Crankshaft position sensor resistance 189 ~ 231 Ω at 20 °C (68 °F) (between gray and black)	
3	Open or short circuit in wiring harness.	4. Is the crankshaft position sensor OK? Repair or replace if there is an open or short circuit between the main wiring harnesses. Between sensor coupler and ECU (engine) coupler black/yellow – black/yellow black/blue – black/blue	
4	Connected condition of connector Inspect the coupler for any pins that may have pulled cut. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Crankshaft position sensor coupler Main wiring harness ECU (engine) coupler	





	Fault code No. 13 Symptom Intake air pressure sensor - open or short circuit detected.			
Order	iagnostic code No. 03 (intake air pres Inspection operation item and	Operation item and countermeasure	Reinstatement	
	probable cause		method	
1	Defective intake air pressure sensor	Replace if defective. 1. Connect the pocket tester (DC 20 V) to the intake air pressure sensor coupler terminal as shown.	Reinstated by turning the main switch ON.	
		Positive tester probe → pink/white ① Negative tester probe → black/blue ②		
		L PWB/L		
		 Set the main switch to "ON". Measure the intake air pressure sensor output voltage. 		
		Intake air pressure sensor output voltage 13.3 kPa (0.13 kgf/cm², 1.85 psi): 1.0 V 120.0 kPa (1.2 kgf/cm², 17.1 psi): 4.2 V		
		4. Is the intake air pressure sensor OK?		
2	Open or short circuit in wiring harness and/or sub lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU (engine) coupler black/blue – black/blue pink/white – pink/white blue – blue		
3	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Intake air pressure sensor coupler Main wiring harness ECU (engine) coupler		





	Fault code No. 14 Symptom Intake air pressure sensor - hose system malfunction (clogged or detached hose). Used diagnostic code No. 03 (intake air pressure sensor)				
Order	Order Inspection operation item and probable cause Operation item and countermeasure Reinstatement method				
1	Intake air pressure sensor hose is detached, clogged, kinked, or pinched. Intake air pressure sensor malfunction at intermediate electrical potential.	Repair or replace the sensor hose. Inspect and repair the connection.	Reinstated by starting the engine and operating it at idle.		
2	Defective intake air pressure sensor.	Replace if defective. Refer to "Fault code No. 13".			

Fault co	Fault code No. 15 Symptom Throttle position sensor - open or short circuit detected.			
Used di	iagnostic code No. 01 (throttle positio	n sensor)		
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method	
1	Defective throttle position sensor.	Replace if defective. Refer to "THROTTLE BODY".	Reinstated by turn- ing the main switch	
2	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU (engine) coupler black/blue – black/blue yellow – yellow blue – blue	ON.	
3	Installed condition of throttle position sensor.	Check the installed area for looseness or pinching. Check that it is installed in the specified position. Refer to "THROTTLE BODY".		
4	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Throttle position sensor coupler Main wiring harness ECU (engine) coupler		

Fault code No. 16 Symptom Stuck throttle position sensor detected.					
usea a	iagnostic code No. 01 (throttle position	on sensor)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method		
1	Defective throttle position sensor	Replace if defective. Refer to "THROTTLE BODY".	Reinstated by starting the engine, operating it at idle, and then racing it.		
2	Installed condition of throttle position sensor.	Check the installed area for looseness or pinching. Check that it is installed in the specified position. Refer to "THROTTLE BODY".			





	Fault code No. 19 Symptom Open circuit is detected in the input line from the sidestand switch to the ECU (engine). Used diagnostic code No. 20 (sidestand switch)				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method		
1	Defective sidestand switch	Replace if defective. Refer to "CHECKING THE SWITCHES" in chapter 8.	Reinstated by retracting the sidestand.		
2	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. Between sidestand switch coupler and ECU (engine) coupler light green – light green black – black	Reinstated by reconnecting the wiring.		

Fault co	Fault code No. 21 Symptom Open or short circuit is detected from the coolant temperature sensor.			
Used d	iagnostic code No. 06 (coolant tempe	rature sensor)		
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method	
1	Installed condition of sensor	Check the installed area for looseness or pinching.	Reinstated by turn-	
2	Defective coolant temperature sensor.	Replace if defective. Refer to "COOLING SYSTEM" in chapter 8.	ing the main switch ON.	
3	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU (engine) coupler black/blue – black/blue green/red – green/red		
4	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Coolant temperature sensor coupler Main wiring harness ECU (engine) coupler		





Fault co	ode No. 22 Symptom Open	or short circuit detected from the intake air temperatur	e sensor.	
Used di	Used diagnostic code No. 05 (intake air temperature sensor)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method	
1	Installed condition of sensor	Check the installed area for looseness or pinching.	Reinstated by turn-	
2	Defective intake air temperature sensor.	 Replace if defective. Remove the intake air temperature sensor from the air filter case. Connect the pocket tester (Ω × 100) to the intake air temperature sensor terminal as shown. Positive tester probe → brown/white ①	ing the main switch ON.	
		Negative tester probe → black/blue ② Br/W B/L 2 1		
		3. Measure the intake air temperature sensor resistance. Intake air temperature sensor resistance resistance 2.21 ~ 2.69 kΩ at 20 °C (68 °F)		
		 • 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. 		
		4. Is the intake air temperature sensor OK?		
3	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU (engine) coupler black/blue – black/blue brown/white – brown/white		
4	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Intake air temperature sensor coupler Main wiring harness ECU (engine) coupler		





Fault co	Fault code No. 24 Symptom No normal signal is received from the O ₂ sensor.			
Used d	iagnostic code No			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method	
1	Installed state of O ₂ sensor	Check the installed area for looseness or pinching.	As the returning	
2	Connected state of connector O ₂ sensor coupler Main wiring harness ECU (engine) coupler	Check the coupler for any pins that may have pulled out. Check the locking condition of the coupler. If there is a malfunction, repair it and connect it securely.	method start method, start and warm up the engine until the coolant tempera-	
3	Open or short circuit in wiring harness	Repair or replace if there is an open or short circuit. Between O ₂ sensor coupler and ECU (engine) coupler black/blue – black/blue gray/green – gray/green red/blue – red/blue black – black	ture rises over 60 °C (140 °F). Then, maintain the engine speed at 2,000 r/min to 3,000 r/min until the warning light goes off. When the warning light goes off, the reset oper- ation is finished.	
4	Check fuel pressure	Refer to "CHECKING THE FUEL PUMP OPERATION".		
5	Defective O ₂ sensor	Replace if defective.		





Fault co	Fault code No. 30 Symptom The scooter has overturned.			
Used d	Used diagnostic code No. 08 (lean angle cut-off switch)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method	
1	Defective lean angle cut-off switch	 Replace if defective. Remove the lean angle cut-off switch from the scooter. Connect the lean angle cut-off switch coupler to the wire harness. Connect the pocket tester (DC 20 V) to the lean angle cut-off switch coupler as shown. Positive tester probe → blue ① Negative tester probe → yellow/green ②	Reinstated by turning the main switch ON (however, the engine cannot be restarted unless the main switch is first turned OFF).	
		4. When turn the lean angle cut-off switch approx. 45°, the voltage reading change from 0.9 V to 4.1 V. 5. Is the emergency stop switch OK?		
2	The scooter has overturned.	Raise the scooter upright.		
3	Installed condition of the lean angle cut-off switch	Check the installed area for looseness or pinching.		
4	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Lean angle cut-off switch coupler Main wiring harness ECU (engine) coupler		

Fault co	Fault code No. 33 Symptom Malfunction detected in the primary lead of the ignition coil.				
Used d	Used diagnostic code No. 30 (ignition coil)				
Order Inspection operation item and probable cause		ation item and	Operation item and countermeasure	Reinstatement method	
1		n coil (test the pri- dary coils for conti-	Replace if defective. Refer to "IGNITION SYSTEM" in chapter 8.	Reinstated by starting the engine and operating it at	
2	Open or short ci	rcuit in lead.	Repair or replace if there is an open or short circuit. Between ignition coil coupler and ECU (engine) coupler/ main harness orange – orange red/black – red/black	idle. In case of multiple cylinder open or short circuit in lead, make sure to turn ON and OFF the main switch after each time of cranking.	
3	Inspect the cou	lition of connector upler for any pins pulled out. ing condition of the	If there is a malfunction, repair it and connect it securely. Ignition coil primary side coupler – orange Main wiring harness ECU (engine) coupler		





	Fault code No. 37 Symptom Engine idling speed is too high.				
Used d	iagnostic code No. 01 (throttle positio	n sensor)			
Order Inspection operation item and probable cause Operation item and countermeasure Reinstatement method					
1	Stuck FID valve detected.	Inspect the throttle body. Replace if defective. Refer to "THROTTLE BODY".	Reinstated by starting the engine and operating it at		
2	Defective throttle fully closed.	Inspect the throttle body. Replace if defective. Refer to "THROTTLE BODY".	idle for about 5 minutes. Do not turn the throttle grip.		

Fault co	Fault code No. 41 Symptom Open or short circuit detected in the lean angle cut-off switch.				
Used d	Used diagnostic code No. 08 (lean angle cut-off switch)				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method		
1	Defective lean angle cut-off switch	Replace if defective. Refer to "Fault code No. 30".	Reinstated by turning the main switch		
2	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. Between switch coupler and ECU (engine) coupler black/blue – black/blue yellow/green – yellow/green blue – blue	ON.		
3	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Lean angle cut-off switch coupler Main wiring harness ECU (engine) coupler			





Fault code No. 43 Symptom The ECU (engine) is unable to monitor the battery voltage.					
Used di	Used diagnostic code No. 09 (fuel system voltage)				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method		
1	Malfunction in ECU (engine)				
2	Open or short circuit in the wiring harness. Repair or replace if there is an open or short circuit. Between starting circuit cut-off relay (fuel injection system relay), fuel pump, fuel injector (#1, #2) red/blue – red/blue		starting the engine and operating it at idle.		
3	Malfunction or open circuit in fuel injection system relay	 Replace if defective. Disconnect the fuel injection system relay from the wire harness. Connect the pocket tester (Ω × 1) and battery (12 V) to the fuel injection system relay terminals as shown. 			
		Positive battery terminal → red/black ① Negative battery terminal → blue/yellow ②			
		Positive tester probe → red/blue ③ Negative tester probe → red/blue ④			
		4 R/L R/B R/B R/B R/B R/B R/L L/Y			
		Does the fuel injection system relay have continuity between red/blue and red/blue?			
4	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Fuel injection system relay coupler ECU (engine) coupler			





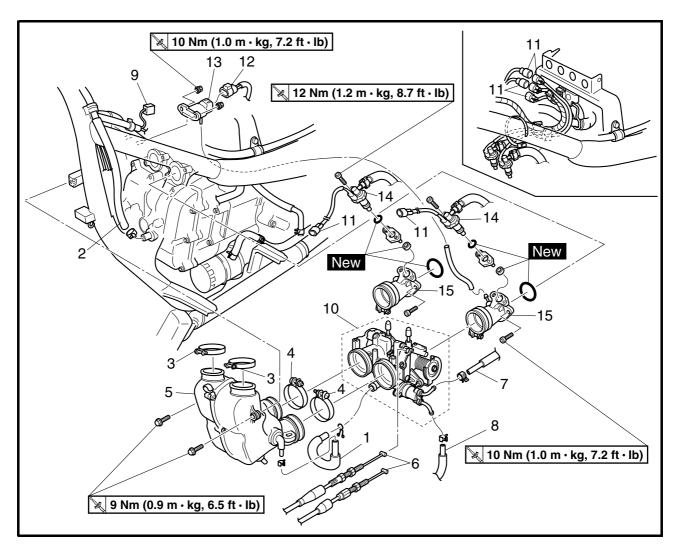
	Fault code No. 44 Symptom Error is detected while reading or writing on EEPROM (CO adjustment value). Used diagnostic No. 60 (EEPROM improper cylinder indication)				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method		
1	Malfunction in ECU (engine)	Execute diagnostic code 60 Check the faulty cylinder. (If there are multiple cylinders, the number of the faulty cylinders appear alternately at 2-second intervals.) Readjust the CO of the displayed cylinder. Refer to "ADJUSTING THE EXHAUST GAS VOLUME" in chapter 3. Replace ECU (engine) if defective.	Reinstated by turning the main switch ON.		

	Fault code No. 46 Symptom Power supply to the fuel pump relay is not normal. Used diagnostic code No. —				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method		
1	Faulty battery	Replace or change the battery Refer to "CHECKING AND CHARGING THE BAT- TERY" in chapter 3.	Reinstated by starting the engine and operating it at		
2	Open or short circuit in wiring harness.	Repair or replace if there is an open circuit. • Between battery and main switch red – red • Between main switch and fuse (ignition) brown/blue – brown/blue • Between fuse (ignition) and ECU (engine) red/white – red/white	idle.		
3	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. ECU (engine) coupler			

Fault code No. 50 Symptom Faulty ECU (engine) memory. (When this malfunction is detected in the (engine), the fault code number might not appear on the meter.)					
Used d	Used diagnostic code No. – –				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method		
1	Malfunction in ECU (engine)	Replace the ECU (engine)	Reinstated by turning the main switch ON.		

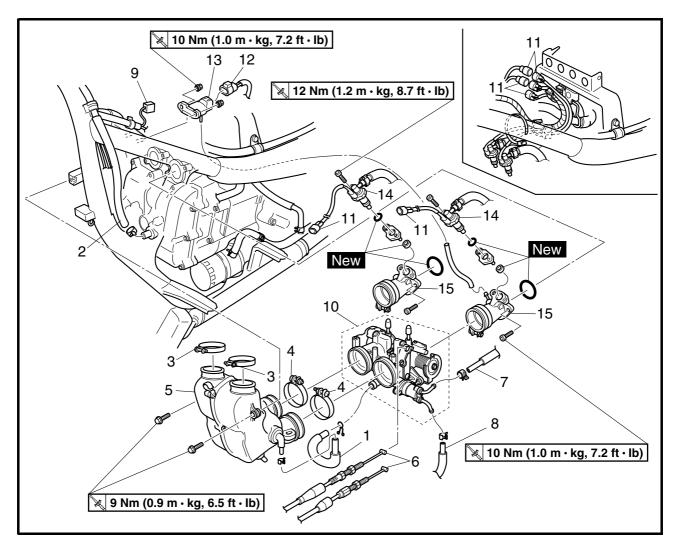


THROTTLE BODY



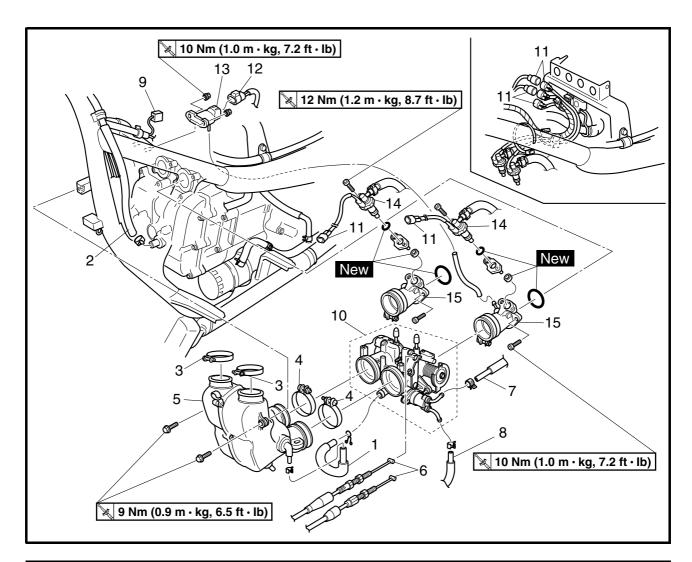
Order	Job/Part	Q'ty	Remarks
	Removing the throttle body		Remove the parts in the order listed.
	Footrest board Leg shield Inner fender		Refer to "COVER AND PANEL" in chapter 3.
1	Air vent hose	1	
2	Crankcase breather hose	1	Disconnect.
3	Silencer joint clamp	2	Loosen.
4	Throttle body joint clamp	2	Loosen.
5	Silencer	1	
6	Throttle cable	2	Disconnect.
7	Fast idle inlet hose	1	Disconnect.
8	Fast idle outlet hose	1	Disconnect.
9	Throttle position sensor coupler	1	Disconnect.
10	Throttle body assembly	1	
11	Fuel injector coupler	2	Disconnect.





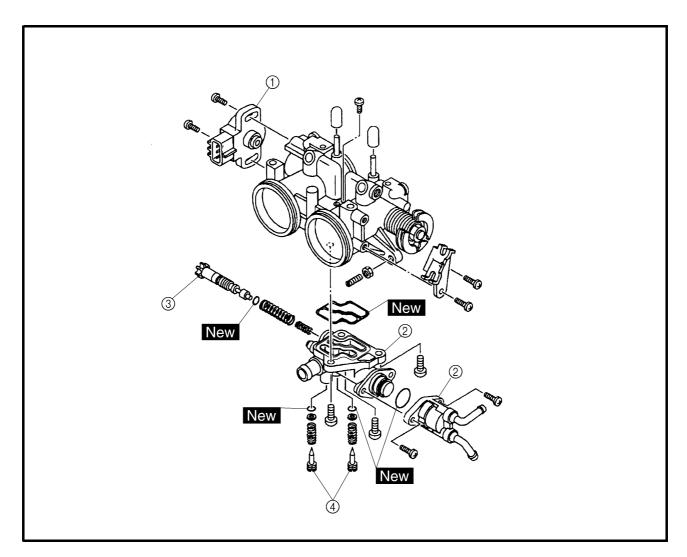
Order	Job/Part	Q'ty	Remarks
12	Intake air pressure sensor coupler	1	Disconnect.
13	Intake air pressure sensor	1	
14	Fuel injector (with fuel hose)	2	CAUTION:
			 Although the fuel has been removed from the fuel tank, be careful when removing the fuel hoses, since there may be fuel remaining in it. Do not disconnect the fuel hose except the fuel hose connector of the fuel pump feeding side.
			NOTE:





Order	Job/Part	Q'ty	Remarks
15	Intake manifold	2	For installation, reverse the removal procedure.





Order	Job/Part	Q'ty	Remarks
	Disassembling the throttle body		Remove the parts in the order listed.
			NOTE: Before disassembling the throttle body, make sure to note the number of times the air screw is turned out from the seated position to its set position.
1	Throttle position sensor	1	
2	Fast idle plunger	1	
3	Idle adjust screw	1	
4	Air screw	2	
			For assembly, reverse the disassembly procedure.

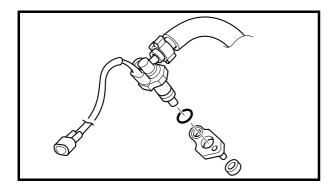
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CAUTION:

The throttle body should not be disassembled.



EAS00912

CHECKING THE FUEL INJECTORS

- 1. Check:
- fuel injectors
 Damage → Replace.

EAS00913

CHECKING THE THROTTLE BODY

- 1. Check:
- 2. Check:
- fuel passages
 Obstructions → Clean.
- a. Wash the throttle body in a petroleum-based solvent.
 - Do not use any caustic carburetor cleaning solution.
- b. Blow out all of the passages with compressed air.

AS00915

CHECKING THE FUEL PUMP OPERATION

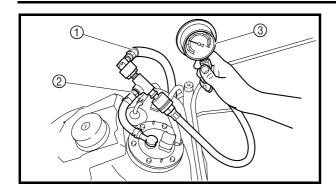
- 1. Check:
- fuel pump operation

a. Remove the seat, fuel tank cover and fuel hose connector cover.

Refer to "SEAT" and "FUEL TANK" in chapter 3.







b. Disconnect the fuel hose ① from the fuel pump.

CAUTION:

Although the fuel has been removed from the fuel tank, be careful when removing the fuel hoses, since there may be fuel remaining in it.

NOTE: _

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

c. Connect and the fuel pressure adapter ② and the pressure gauge ③ to the fuel pump and fuel hose.



Pressure gauge 90890-03153 Fuel pressure adapter 90890-03181

- d. Set the main switch to "ON" and the engine stop switch to "()".
- e. Start the engine.
- f. Measure the fuel pressure.
 Out of specification → Check the fuel hose connection or replace the fuel pump.



Fuel pressure 240 ~ 260 kPa (2.40 ~ 2.60 kgf/cm², 34.2 ~ 37.0 psi)

- g. Turn the main switch to "OFF".
- h. Remove the pressure gauge and fuel pressure adapter.

NOTE:

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

- i. Install the fuel hose.
- j. Install the fuel hose connector cover, fuel tank cover and seat.

Refer to "SEAT" and "FUEL TANK" in chapter 3.

FI

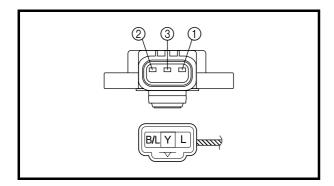


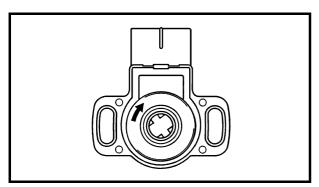
EAS0091

CHECKING AND 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
- a. Disconnect the throttle position sensor coupler from the throttle position sensor.
- b. Remove the throttle position sensor from the throttle body.
- c. Connect the pocket tester ($\Omega \times 1k$) to the terminals of the throttle position sensor.

Positive tester probe \rightarrow blue terminal ① Negative tester probe \rightarrow black/blue terminal ②

d. Measure the maximum throttle position sensor resistance.

Out of specification \rightarrow Replace the throttle position sensor.



Maximum throttle position sensor resistance

4.0 ~ 6.0 k Ω at 20 °C (68 °F) (blue – black/blue)

e. Connect the pocket tester ($\Omega \times 1k$) to the terminals of the throttle position sensor.

Positive tester probe →
yellow terminal ③
Negative tester probe →
black/blue terminal ②

f. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.

Resistance does not change or it changes abruptly \rightarrow Replace the throttle position sensor.

The slot is worn or broken \rightarrow Replace the throttle position sensor.

FI



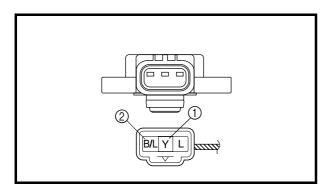
NOTE: _

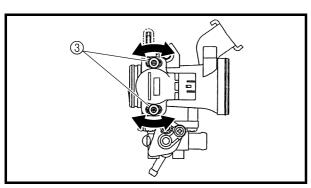
Check mainly that the resistance changes gradually when turning the throttle, since the readings (from closed to wide-open throttle) may differ slightly from those specified.



Throttle position sensor resistance

(0.52 ~ 0.9) ~ (4.0 ~ 6.0) kΩ at 20 °C (68 °F) (yellow – black/blue)





- 2. Adjust:
- throttle position sensor angle
- a. Connect the throttle position sensor coupler to the wire harness.
- b. Connect the digital circuit tester to the throttle position sensor.

Positive tester probe → yellow terminal ①
Negative tester probe → black/blue terminal ②



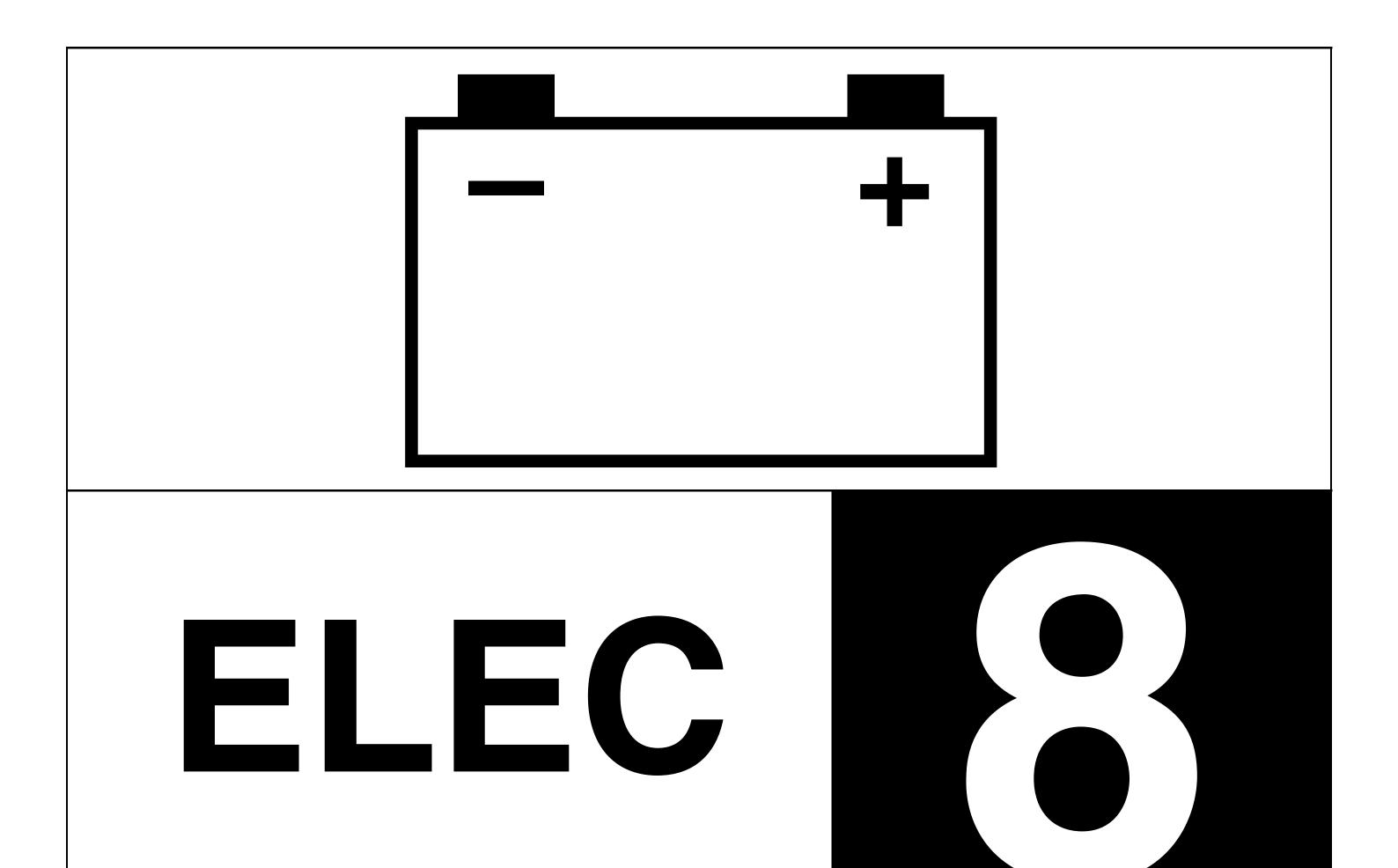
Digital circuit tester 90890-03174

- c. Measure the throttle position sensor voltage.
- d. Adjust the throttle position sensor angle so that the voltage is within the specified range.



Throttle position sensor voltage 0.63 ~ 0.73 V (yellow – black/blue)

e. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws ③.



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ELECTRICAL COMPONENTS

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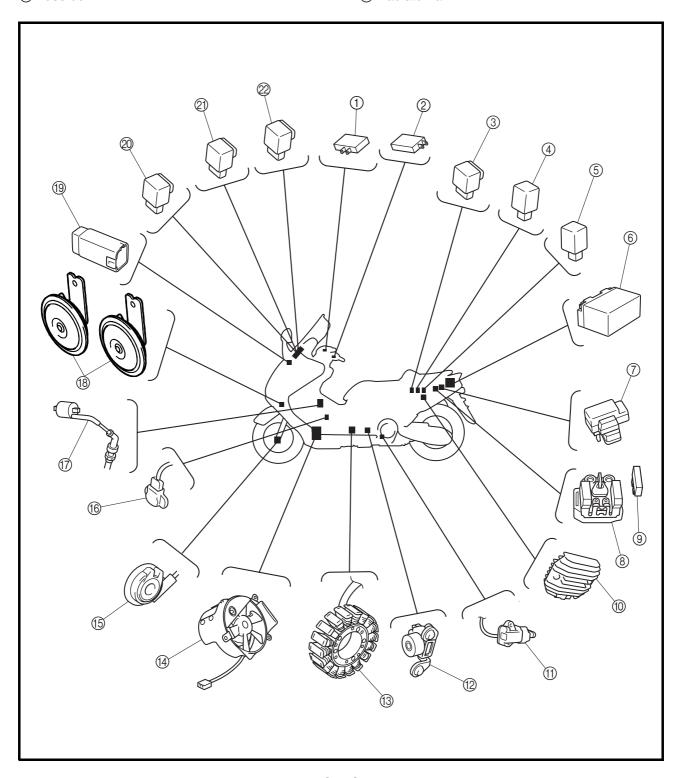
EAS00729

ELECTRICAL SYSTEM

ELECTRICAL COMPONENTS

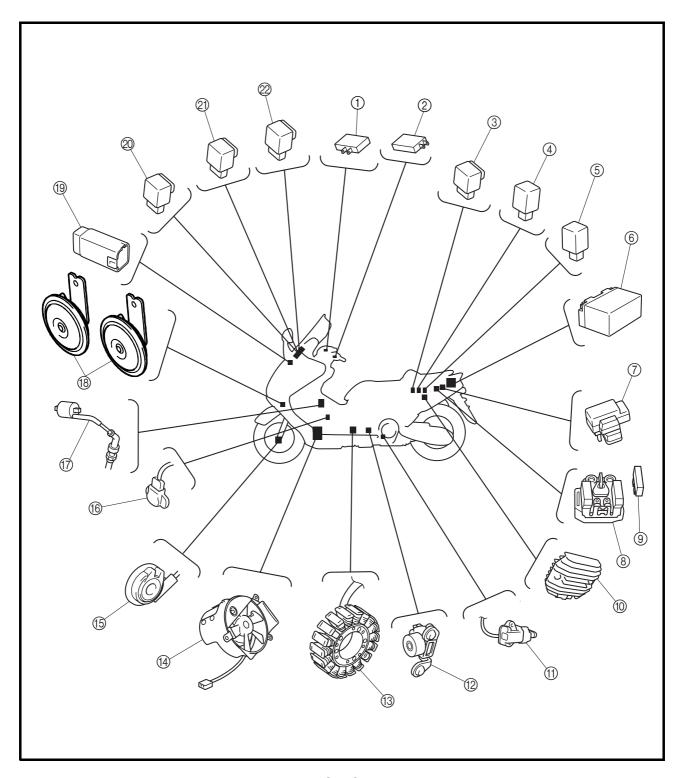
- ① Front brake light switch
- ② Rear brake light switch
- ③ Turn signal/hazard relay
- 4 Starting circuit cut-off relay 1
- (5) Starting circuit cut-off relay 2 (XP500A)
- (6) Battery
- (7) Fuse box

- Starter relay
- Main fuse
- ® Rectifier/regulator
- 1 Sidestand switch
- ① Crankshaft position sensor
- (3) Stator coil
- (14) Radiator fan



ELECTRICAL COMPONENTS

- (5) Speed sensor (XP500)
- (6) Throttle position sensor
- (7) Ignition coil
- ® Horn
- (9) Lean angle cut-off switch(2) Fuel injection system relay
- ② Headlight relay
- Radiator fan motor relay

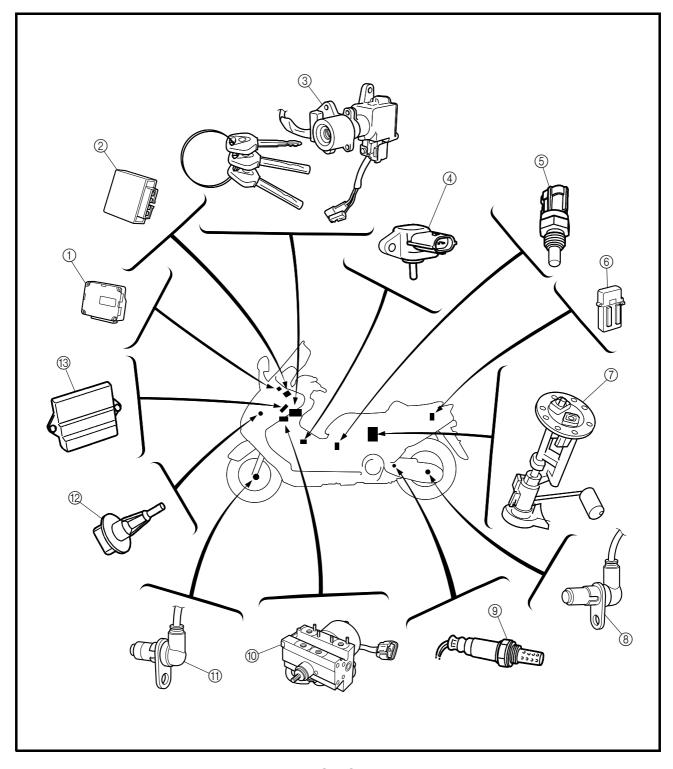


ELECTRICAL COMPONENTS



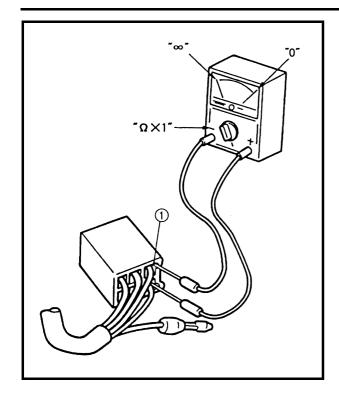
- ① ECU (ABS) (XP500A)
- ② Fail-safe relay (XP500A)
- 3 Main switch/immobilizer unit
- ④ Intake air pressure sensor
- **⑤** Coolant temperature sensor
- 6 ABS motor fuse
- 7) Fuel pump
- ® Rear wheel sensor (XP500A)
- 9 O₂ sensor
- (iii) Hydraulic unit (XP500A)
- (1) Front wheel sensor (XP500A)

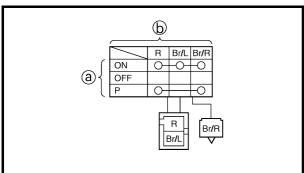
- 12 Intake air temperature sensor
- (13) ECU (engine)



CHECKING SWITCH CONTINUITY







EAS00730

CHECKING SWITCH CONTINUITY

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

CAUTION:

Never insert the tester probes into the coupler terminal slots ①. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



Pocket tester 90890-03112, 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 terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left.

The switch positions (a) are shown in the far left column and the switch lead colors (b) are shown in the top row in the switch illustration.

NOTE:

"O—O" indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

The example illustration on the left shows that:

There is continuity between red, brown/blue, and brown/red when the switch is set to "ON". There is continuity between red and brown/red when the switch is set to "P≤".

CHECKING THE SWITCHES

EAS00731

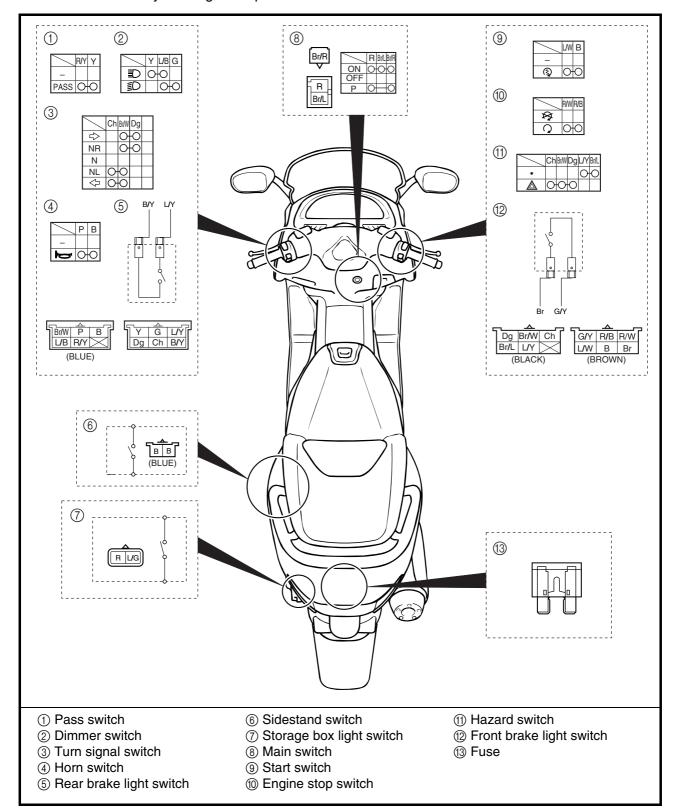
CHECKING THE SWITCHES

Check each switch for damage or wear, proper connections, and also for continuity between the terminals. Refer to "CHECKING SWITCH CONTINUITY".

 ${\sf Damage/wear} \to {\sf Repair} \ {\sf or} \ {\sf replace}.$

Improperly connected \rightarrow Properly connect.

Incorrect continuity reading → Replace the switch.



CHECKING THE BULBS AND BULB SOCKETS



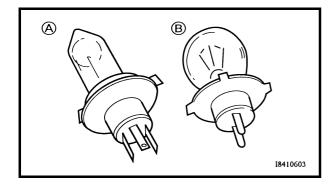
EAS00733

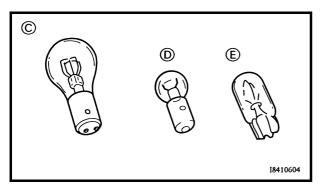
CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

Damage/wear \rightarrow Repair or replace the bulb, bulb socket or both.

Improperly connected \rightarrow Properly connect. No continuity \rightarrow Repair or replace the bulb, bulb socket or both.





TYPES OF BULBS

The bulbs used on this scooter are shown in the illustration on the left.

- 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 © is used for turn signal and tail/ brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.

CHECKING THE BULBS AND BULB SOCKETS



CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

- 1. Remove:
- bulb

WARNING

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

CAUTION:

- Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.
- Avoid touching the glass part of 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.
- 2. Check:
- bulb (for continuity)
 (with the pocket tester)
 No continuity → Replace.

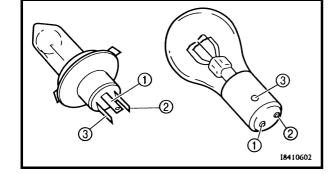


Pocket tester 90890-03112, YU-03112-C

NOTF:

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 BULBS AND BULB SOCKETS



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, 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.

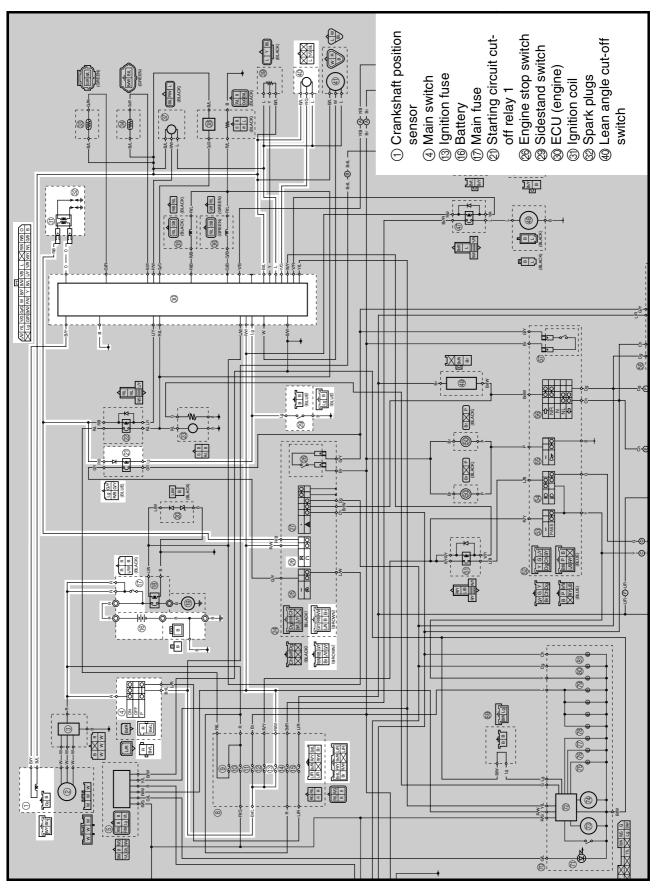
c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.



EAS00734

IGNITION SYSTEM

CIRCUIT DIAGRAM





EAS00737

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

Check:

- 1. main and ignition fuses
- 2. battery
- 3. spark plug
- 4. ignition spark gap
- 5. spark plug cap resistance
- 6. ignition coil resistance
- 7. crankshaft position sensor resistance
- 8. main switch
- 9. engine stop switch
- 10.sidestand switch
- 11.starting circuit cut-off relay 1
- 12.lean angle cut-off switch
- 13.wiring connections (of the entire ignition system)

NOTE:

- Before troubleshooting, remove the following part(s):
- 1. battery cover
- 2. rear cover
- 3. front cowling
- 4. leg shield
- 5. footrest board
- 6. inner fender
- Troubleshoot with the following special tool(s).



Ignition checker 90890-06754, YM-34487 Pocket tester 90890-03112, YU-03112-C

EAS00738

- 1. Main and ignition fuses
- Check the main and ignition fuses for continuity.

Refer to "CHECKING THE FUSES" in chapter 3.

• Are the main and ignition fuses OK?





Replace the fuse(s).

EAS00739

2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20 °C (68 °F)

• Is the battery OK?





- Clean the battery terminals.
- Recharge or replace the battery.

EAS00741

3. Spark plug

The following procedure applies to all of the spark plugs.

- Check the condition of the spark plug.
- Check the spark plug type.
- Measure the spark plug gap.
 Refer to "CHECKING THE SPARK PLUGS" in chapter 3.



Standard spark plug CR7E (NGK) Spark plug gap 0.7 ~ 0.8 mm (0.028 ~ 0.031 in)

 Is the spark plug in good condition, is it of the correct type, and is its gap within specification?





Re-gap or replace the spark plug.



the spark

Replace

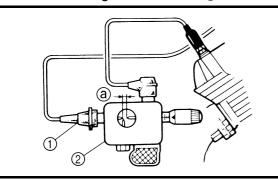
plug cap.

EAS00743

4. Ignition spark gap

The following procedure applies to all of the spark plugs.

- Disconnect the spark plug cap ① from the spark plug.
- Connect the ignition checker ② as shown.



- Set the main switch to "ON".
- Measure the ignition spark gap @.
- Crank the engine by pushing the starter switch and gradually increase the spark gap until a misfire occurs.



Minimum ignition spark gap 6 mm (0.24 in)

• Is there a spark and is the spark gap within specification?





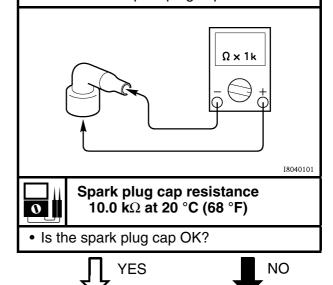
The ignition system is OK.

EAS00745

5. Spark plug cap resistance

The following procedure applies to all of the spark plug caps.

- Remove the spark plug cap from the spark plug lead.
- Connect the pocket tester ($\Omega \times 1k$) to the spark plug cap as shown.
- Measure the spark plug cap resistance.



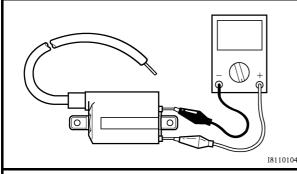


EAS00746

6. Ignition coil resistance

- Disconnect the ignition coil connectors from the ignition coil terminals.
- Connect the pocket tester ($\Omega \times$ 1) to the ignition coil as shown.

Positive tester probe \rightarrow red/black Negative tester probe \rightarrow orange



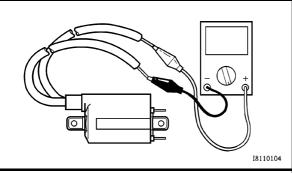
· Measure the primary coil resistance.



Primary coil resistance 1.87 ~ 2.53 Ω at 20 °C (68 °F)

• Connect the pocket tester ($\Omega \times 1k$) to the ignition coil as shown.

Negative tester probe → spark plug lead ①
Positive tester probe → spark plug lead ②



· Measure the secondary coil resistance.



Secondary coil resistance 12 ~ 18 k Ω at 20 °C (68 °F)

• Is the ignition coil OK?



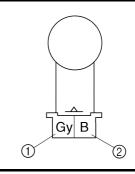


Replace the ignition coil.

EAS00748

- 7. Crankshaft position sensor resistance
- Disconnect the crankshaft position sensor coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 100$) to the crankshaft position sensor terminal as shown.

Positive tester probe → gray ① Negative tester probe → black ②



Measure the crankshaft position sensor resistance.



Crankshaft position sensor resistance

189 ~ 231 Ω at 20 °C (68 °F) (between gray and black)

• Is the crankshaft position sensor OK?





Replace the crankshaft position sensor/ stator assembly.

EAS00749

8. Main switch

- Check the main switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?





Replace the main switch/immobilizer unit.



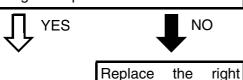
EAS00750

9. Engine stop switch

Check the engine stop switch for continuity.

Refer to "CHECKING THE SWITCHES".

• Is the engine stop switch OK?

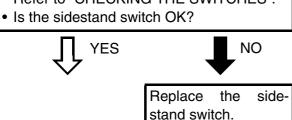


handlebar switch.

EAS00752

10.Sidestand switch

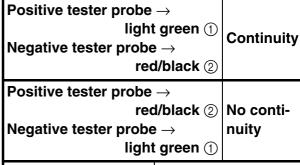
Check the sidestand switch for continuity.
 Refer to "CHECKING THE SWITCHES".

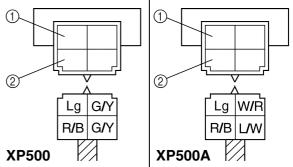


EAS00753

11. Starting circuit cut-off relay 1

- Remove the starting circuit cut-off relay 1.
- Connect the pocket tester ($\Omega \times$ 1) to the starting circuit cut-off relay 1 terminals as shown.
- Check the starting circuit cut-off relay 1 for continuity.

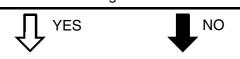




NOTE:

When you switch the positive and negative tester probes, the readings in the above chart will be reversed.

Are the tester readings correct?



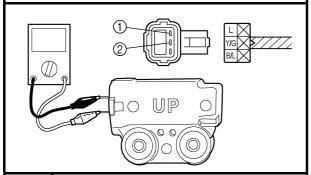
Replace the starting circuit cut-off relay 1.



12.Lean angle cut-off switch

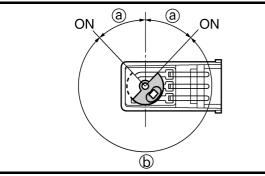
- Remove the lean angle cut-off switch.
- Connect the pocket tester ($\Omega \times$ 1) to the lean angle cut-off switch terminals as shown.

Positive tester probe \rightarrow blue ① Negative tester probe \rightarrow yellow/green ②



O L

Lean angle cut-off switch voltage Less than 45 $^{\circ}$ $\textcircled{a} \rightarrow$ Approximately 1 V More than 45 $^{\circ}$ $\textcircled{b} \rightarrow$ Approximately 4 V



• Is the lean angle cut-off switch OK?





Replace the lean angle cut-off switch.

EAS00754

13.Wiring

- Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the ignition system's wiring properly connected and without defects?





Replace the ECU (engine).

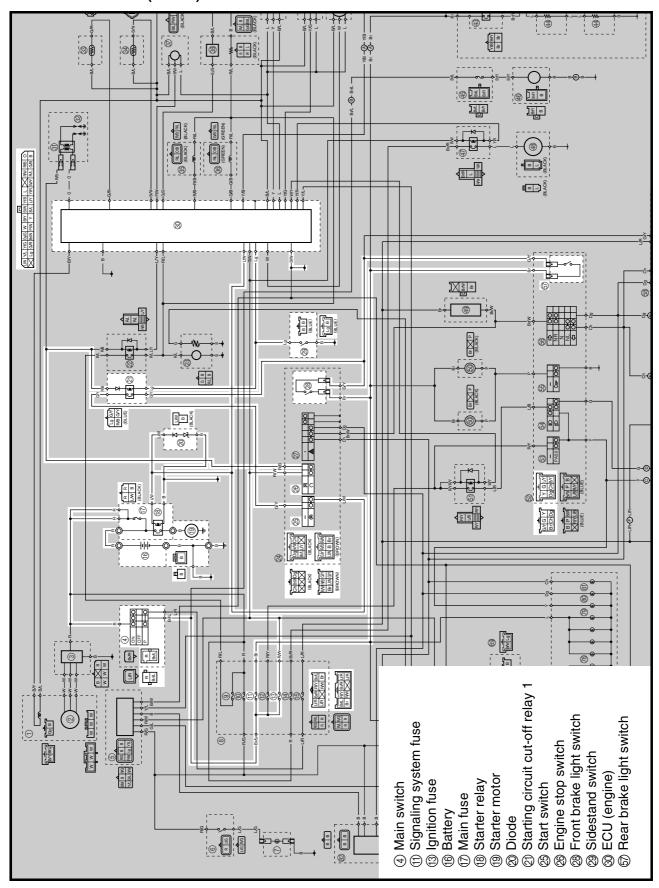
Properly connect or repair the ignition system's wiring.



EAS00755

ELECTRIC STARTING SYSTEM

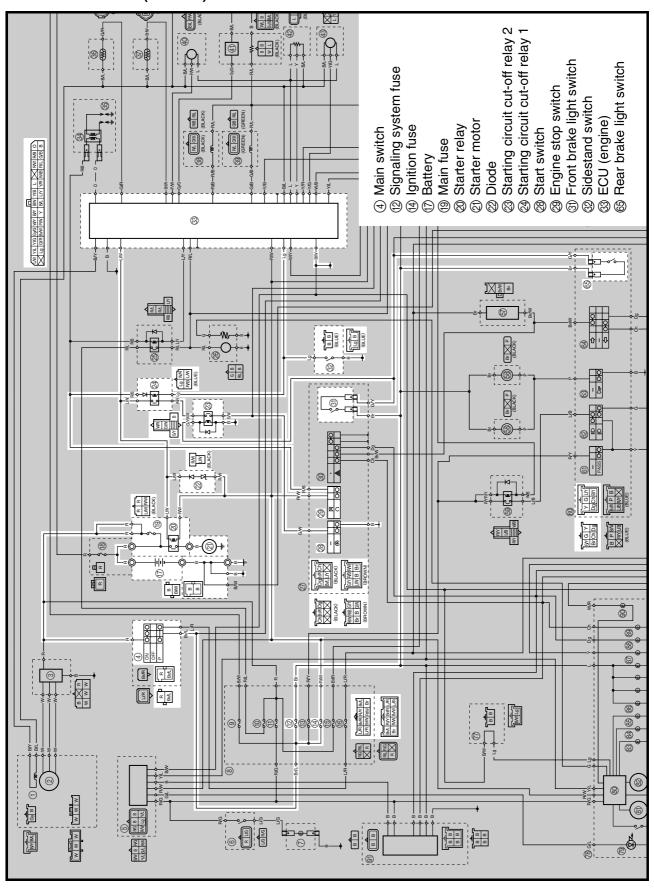
CIRCUIT DIAGRAM (XP500)



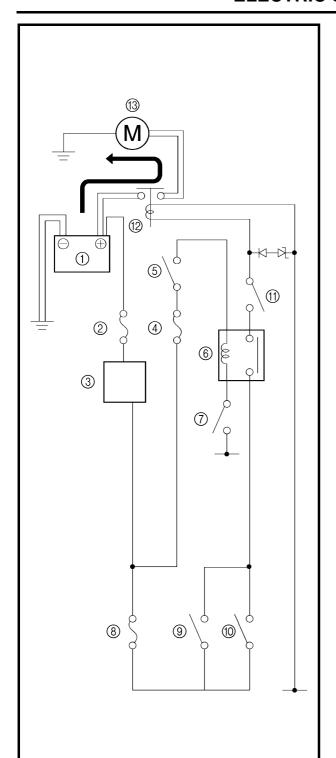


EAS00755

CIRCUIT DIAGRAM (XP500A)







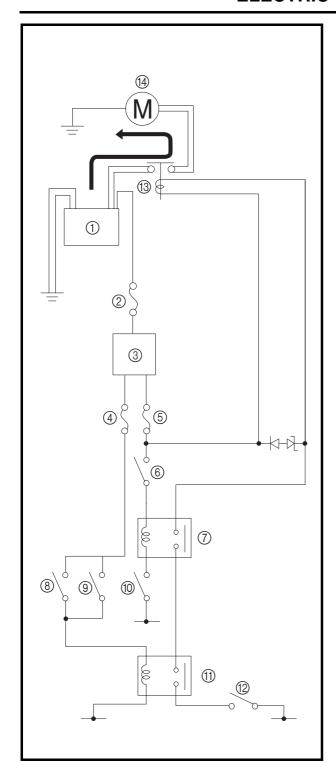
EAS00756

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION (XP500)

If the engine stop switch is set to "\(\cap\)" and the main switch is set to "ON" (both switches are closed), the starter motor can only operate if the following conditions are met:

- A brake lever is pulled to the handlebar (the brake light switch is closed) and the sidestand is up (the sidestand switch is closed).
- 1 Battery
- ② Main fuse
- (3) Main switch
- (4) Ignition fuse
- (5) Engine stop switch
- ⑤ Starting circuit cut-off relay 1
- (7) Sidestand switch
- ® Signaling system fuse
- (9) Front brake light switch
- n Rear brake light switch
- (1) Start switch
- (2) Starter relay
- Starter motor





EAS00756

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION (XP500A)

If the engine stop switch is set to "\(\cap \)" and the main switch is set to "ON" (both switches are closed), the starter motor can only operate if the following conditions are met:

- A brake lever is pulled to the handlebar (the brake light switch is closed) and the sidestand is up (the sidestand switch is closed).
- ① Battery
- ② Main fuse
- (3) Main switch
- 4 Signaling system fuse
- (5) Ignition fuse
- ⑤ Engine stop switch
- 7 Starting circuit cut-off relay 1
- ® Front brake light switch
- (9) Rear brake light switch
- 10 Sidestand switch
- 1) Starting circuit cut-off relay 2
- Start switch
- (13) Starter relay
- (4) Starter motor



EAS00757

TROUBLESHOOTING

The starter motor fails to turn.

Check:

- 1. main, ignition and signaling system fuses
- 2. battery
- 3. starter motor
- 4. starting circuit cut-off relay 1
- 5. starting circuit cut-off relay 2 (XP500A)
- 6. starter relay
- 7. main switch
- 8. engine stop switch
- 9. sidestand switch
- 10.brake light switch (front and rear)
- 11.start switch
- 12.wiring connections (of the entire starting system)

NOTE:

- Before troubleshooting, remove the following part(s):
- 1. front cowling
- 2. leg shield
- 3. footrest board
- 4. fuel tank
- Troubleshoot with the following special tool(s).



Pocket tester 90890-03112, YU-03112-C

EAS00738

- 1. Main, ignition and signaling system fuses
- Check the main, ignition and signaling system fuses for continuity.

Refer to "CHECKING THE FUSES" in chapter 3.

Are the main, ignition and signaling system fuses OK?





Replace the fuse(s).

EAS00739

2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20 °C (68 °F)

· Is the battery OK?



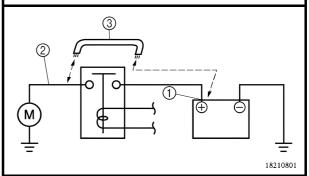


- Clean the battery terminals.
- Recharge or replace the battery.

EAS00758

Starter motor

 Connect the positive battery terminal ① and starter motor lead ② with a jumper lead ③.



WARNING

- A wire that is used as a jumper lead must have at least the same capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.
 - · Does the starter motor turn?





Repair or replace the starter motor.



EAS00759

- 4. Starting circuit cut-off relay 1
- Remove the starting circuit cut-off relay 1.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the starting circuit cut-off relay 1 terminals as shown.

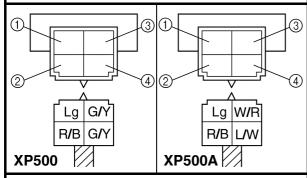
Positive battery terminal → red/black ①
Negative battery terminal → light green ②

XP500

Positive tester probe → green/yellow ③ Negative tester probe → green/yellow ④

XP500A

Positive tester probe → blue/white ③ Negative tester probe → white/red ④



 Does the starting circuit cut-off relay 1 have continuity between green/yellow and green/yellow?





Replace the starting circuit cut-off relay 1.

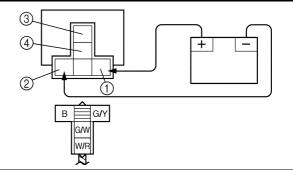
- 5. Starting circuit cut-off relay 2 (XP500A)
- Remove the starting circuit cut-off relay 2.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the starting circuit cut-off relay 2 terminals as shown.
- Check the starting circuit cut-off relay 2 for continuity.

Positive battery terminal \rightarrow

green/yellow (1)

Negative battery terminal → **black** ②

Positive tester probe → white/red ③ Negative tester probe → green/white ④



 Does the starting circuit cut-off relay 2 have continuity between white/red and green/white?





Replace the starting circuit cut-off relay 2.



EAS00761

6. Starter relay

- Remove the starter relay.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the starter relay terminals as shown.

XP500

Positive battery terminal \rightarrow black ① Negative battery terminal \rightarrow

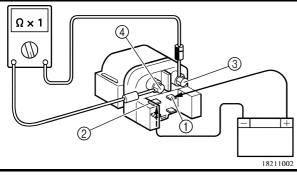
blue/white ②

XP500A

Positive battery terminal \rightarrow red/white \circlearrowleft Negative battery terminal \rightarrow

blue/white ②

Positive tester probe \rightarrow red 3Negative tester probe \rightarrow black 4



 Does the starter relay have continuity between red and black?

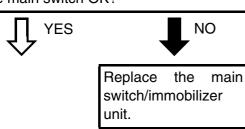


relay.

FAS00749

7. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?



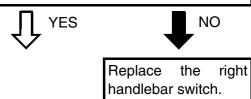
EAS00750

8. Engine stop switch

Check the engine stop switch for continuity.

Refer to "CHECKING THE SWITCHES".

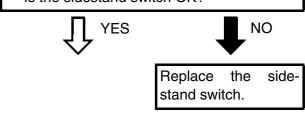
Is the engine stop switch OK?



EAS00752

9. Sidestand switch

- Check the sidestand switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the sidestand switch OK?



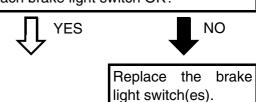
EAS00751

10.Brake light switch (front and rear)

Check the brake light switches for continuity.

Refer to "CHECKING THE SWITCHES".

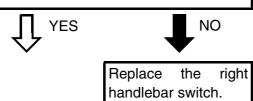
• Is each brake light switch OK?



EAS00764

11.Start switch

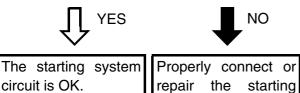
- Check the start switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the start switch OK?



EAS00766

12.Wiring

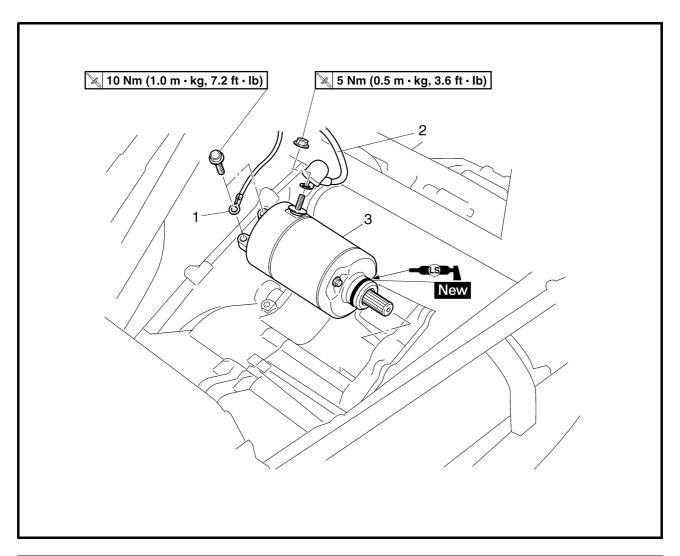
- Check the entire starting system's wiring.
 Refer to "CIRCUIT DIAGRAM (XP500)" or "CIRCUIT DIAGRAM (XP500A)".
- Is the starting system's wiring properly connected and without defects?



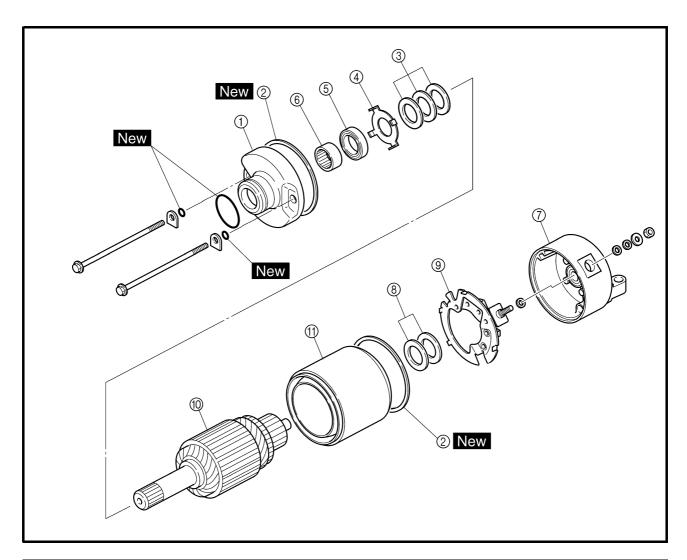
system's wiring.



STARTER MOTOR



Order	Job/Part	Q'ty	Remarks
	Removing the starter motor		Remove the parts in the order listed.
	Fuel tank		Refer to "FUEL TANK" in chapter 3.
1	Negative battery lead	1	Disconnect.
2	Starter motor lead	1	Disconnect.
3	Starter motor	1	
			For installation, reverse the removal pro-
			cedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the starter motor		Remove the parts in the order listed.
1	Front bracket	1	
2	O-ring	2	
3	Shims		
4	Lock washer	1	
(5)	Oil seal	1	
6	Bearing	1	
7	Rear bracket	1	
8	Shims		
9	Brush holder set	1	
10	Armature assembly	1	
11)	Starter motor yoke	1	
			For assembly reverse the disassembly
			procedure.

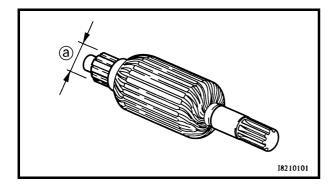
STARTER MOTOR



EAS00770

CHECKING THE STARTER MOTOR

- 1. Check:
- commutator
 Dirt → Clean with 600 grit sandpaper.

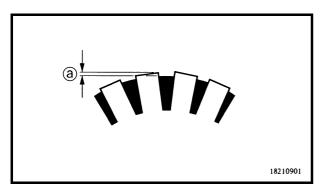




commutator diameter ⓐ
 Out of specification → Replace the starter motor.



Commutator wear limit 27 mm (1.06 in)



3. Measure:

mica undercut @

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 0.7 mm (0.03 in)

NOTE: _

The mica of the commutator must be undercut to ensure proper operation of the commutator.

4. Measure:

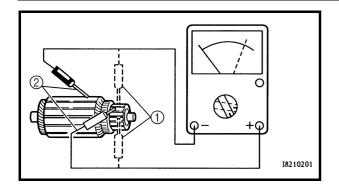
armature assembly resistances (commutator and insulation)

Out of specification \rightarrow Replace the starter motor

a. Measure the armature assembly resistances with the pocket tester.

STARTER MOTOR





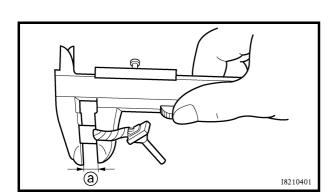


Pocket tester 90890-03112, YU-03112-C



Armature coil Commutator resistance ① 0.0015 ~ 0.0025 Ω at 20 °C (68 °F) Insulation resistance ② Above 1 M Ω at 20 °C (68 °F)

b. If any resistance is out of specification, replace the starter motor.



- 5. Measure:
- brush length ⓐ
 Out of specification → Replace the brushes
 as a set



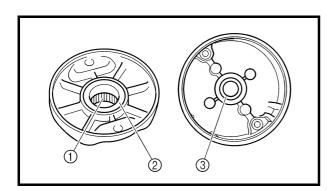
Brush length wear limit 4.0 mm (0.16 in)

- 6. Measure:
- brush spring force
 Out of specification → Replace the brush springs as a set.



Brush spring force 7.65 ~ 10.01 N (780 ~ 1,021 gf, 27.53 ~ 36.04 oz)

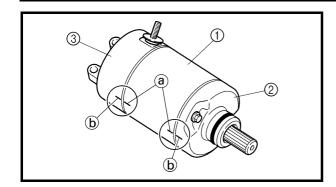
- 7. Check:
 - gear teeth
 Damage/wear → Replace the gear.



- 8. Check:
- bearing ①
- oil seal ②
- bushing $\ \ \,$ Damage/wear $\ \ \, \rightarrow \ \,$ Replace the defective part(s).

STARTER MOTOR





EAS00772

ASSEMBLING THE STARTER MOTOR

- 1. Install:
- starter motor yoke ①
- front bracket ②
- rear bracket ③

NOTE: _

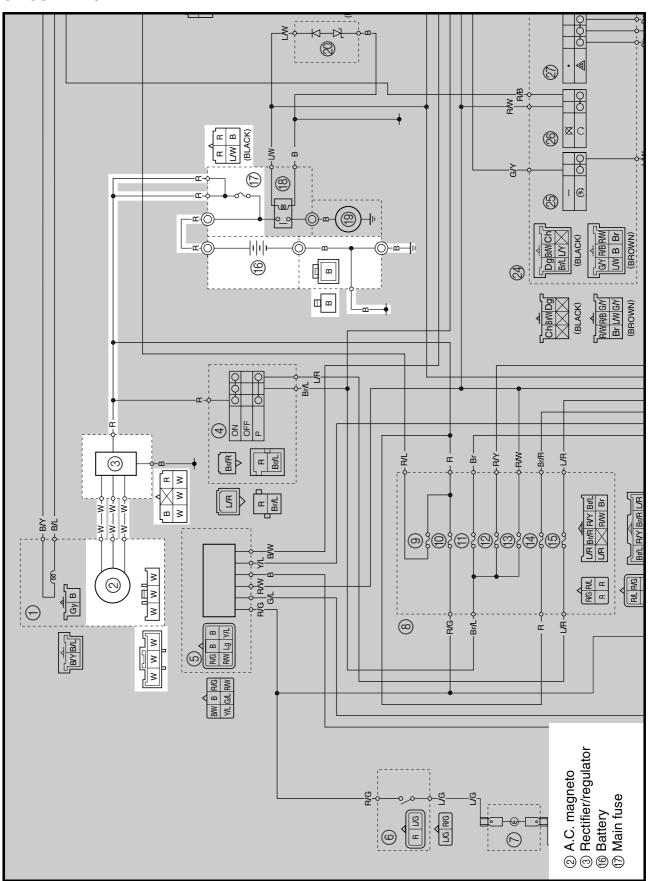
Align the match marks ⓐ on the starter motor yoke with the match marks ⓑ on the front and rear bracket.



EAS00773

CHARGING SYSTEM

CIRCUIT DIAGRAM



CHARGING SYSTEM



EAS00774

TROUBLESHOOTING

The battery is not being charged.

Check:

- 1. main fuse
- 2. battery
- 3. charging voltage
- 4. stator coil resistance
- 5. wiring connections (of the entire charging system)

NOTE:

- Before troubleshooting, remove the following part(s):
- 1. rear cover
- 2. battery cover
- 3. left side cover moulding
- 4. left side cover
- Troubleshoot with the following special tool(s).



Pocket tester 90890-03112, YU-03112-C EAS00738

- 1. Main fuse
- Check the main fuse for continuity.
 Refer to "CHECKING THE FUSES" in chapter 3.
- Is the main fuse OK?



Replace the fuse(s).

EAS00739

- 2. Battery
- Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20 °C (68 °F)

• Is the battery OK?





- Clean the battery terminals.
- Recharge or replace the battery.

CHARGING SYSTEM



EAS00775

3. Charging voltage

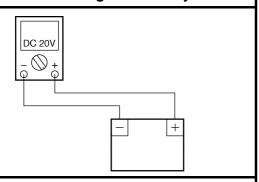
 Connect the pocket tester (DC 20 V) to the battery as shown.

Positive tester probe \rightarrow

positive battery terminal

Negative tester probe →

negative battery terminal



- Start the engine and let it run at approximately 5,000 r/min.
- Measure the charging voltage.



Charging voltage 14.0 V at 5,000 r/min

NOTE: .

Make sure the battery is fully charged.

 Is the charging voltage within specification?





The charging circuit is OK.

EAS00776

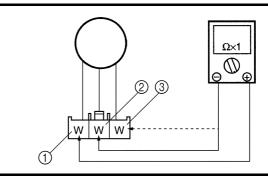
- 4. Stator coil resistance
- Remove the generator cover.
- Connect the pocket tester ($\Omega \times 1$) to the stator coils as shown.

Positive tester probe \rightarrow white 1

Negative tester probe → white ②

Positive tester probe \rightarrow white ①

Negative tester probe → white ③



• Measure the stator coil resistances.



Stator coil resistance 0.22 ~ 0.26 Ω at 20 °C (68 °F) (between white and white)

• Is the stator coil OK?





Replace the crankshaft position sensor/ stator coil assembly.

EAS00779

5. Wiring

• Check the wiring connections of the entire charging system.

Refer to "CIRCUIT DIAGRAM".

• Is the charging system's wiring properly connected and without defects?





Replace the rectifier/ regulator.

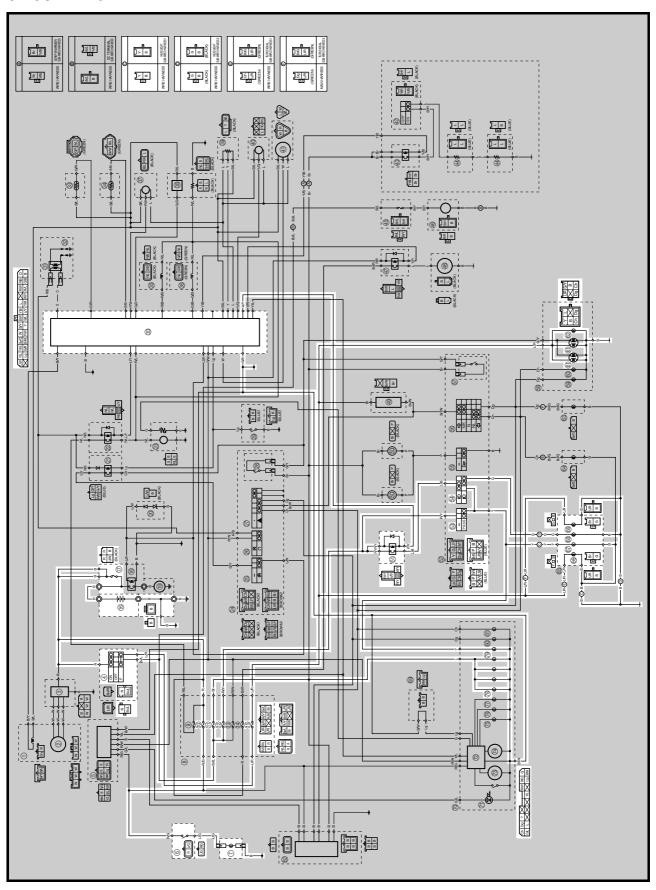
Properly connect or repair the charging system's wiring.



EAS00780

LIGHTING SYSTEM

CIRCUIT DIAGRAM





- (4) Main switch
- ⑥ Storage box light switch
- Storage box light
- (1) Backup fuse (storage box light, immobilizer unit and meter assembly)
- (1) Signaling system fuse
- 12 Headlight fuse
- (5) Lighting system fuse
- (6) Battery
- Main fuse
- ③ ECU (engine)
- 61 Headlight relay
- **3** Pass switch
- Dimmer switch
- (6) Tail/brake light
- © Licence plate light
- 66 Auxiliary light
- (i) Headlight (high beam)
- ® Headlight (low beam)
- Meter light
- ⁷⁹ High beam indicator light



EAS00781

TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, licence plate light, storage box light, auxiliary lights or meter light.

Check:

- 1. main, headlight, signaling system, lighting system and backup fuses
- 2. battery
- 3. main switch
- 4. dimmer switch
- 5. pass switch
- 6. storage box light switch
- 7. headlight relay
- 8. wiring connections (of the entire lighting system)

NOTE:

- Before troubleshooting, remove the following part(s):
- 1. battery cover
- 2. rear cover
- 3. front cowling
- 4. handlebar cover
- 5. leg shield
- Troubleshoot with the following special tool(s).



Pocket tester 90890-03112, YU-03112-C

EAS00738

- 1. Main, headlight, signaling system, lighting system and backup fuses
- Check the main, headlight, signaling system, lighting system and backup fuses for continuity.
 - Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main, headlight, signaling system, lighting system and backup fuses OK?





Replace the fuse(s).

EAS00739

2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20 °C (68 °F)

• Is the battery OK?





- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?





Replace the main switch/immobilizer unit.

EAS00784

4. Dimmer switch

- Check the dimmer switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the dimmer switch OK?





The dimmer switch is faulty. Replace the left handlebar switch.



EAS00786

5. Pass switch

- Check the pass switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the pass switch OK?





The pass switch is faulty. Replace the left handlebar switch.

6. Storage box light switch

Check the storage box light switch for continuity.

Refer to "CHECKING THE SWITCHES".

• Is the storage box light switch OK?





The storage box light switch is faulty. Replace the storage box light switch.

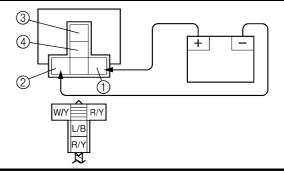
7. Headlight relay

- Remove the headlight relay.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the headlight relay terminals as shown.
- Check the headlight relay for continuity.

Positive battery terminal \rightarrow red/yellow ① Negative battery terminal \rightarrow

white/yellow ②

Positive tester probe → red/yellow ③ Negative tester probe → blue/black ④



 Does the headlight relay have continuity between red/yellow and blue/black?





Replace the headlight relay.

EAS00787

8. Wiring

- Check the entire lighting system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the lighting system's wiring properly connected and without defects?





Check the condition of each of the lighting system's circuits.

Refer to "CHECK-ING THE LIGHTING SYSTEM".

Properly connect or repair the lighting system's wiring.



FAS00788

CHECKING THE LIGHTING SYSTEM

- 1. The headlight and the high beam indicator light fail to come on.
- 1. Headlight bulb and socket
- Check the headlight bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

Are the headlight bulb and socket OK?





Replace the headlight bulb, socket or both.

- 2. High beam indicator light bulb and socket
- Check the high beam indicator light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

 Is the high beam indicator light bulb and socket OK?





Replace the high beam indicator light bulb, socket or both.

- 3. Voltage
- Connect the pocket tester (DC 20 V) to the headlights and meter assembly couplers as shown.
- A When the dimmer switch is set to "≣⊜"
- B When the dimmer switch is set to "₹○"

Headlight

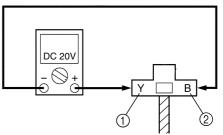
Positive tester probe \rightarrow

yellow ① or green ③

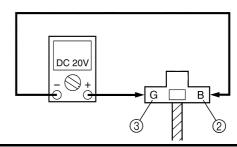
Negative tester probe → black ②

Headlight coupler (wire harness side)

A high beam



B low beam

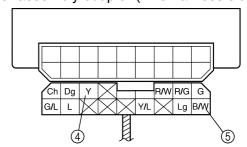


High beam indicator light

Positive tester probe → yellow ④

Negative tester probe → black/white ⑤

Meter assembly coupler (wire harness side)



- Set the main switch to "ON".
- Start the engine.
- Set the dimmer switch to "\(\exists \omega\)" or "\(\exists \omega\)".
- Measure the voltage (DC 12 V) of yellow
 ① or green ③ at the headlight coupler (wire harness side) and yellow at the meter assembly coupler (wire harness side).
- Is the voltage within specification?





This circuit is OK.

The wiring circuit from the main switch to the headlight coupler or meter assembly coupler is faulty and must be repaired.



FAS0078

2. The meter light fails to come on.

- 1. Meter light bulb and socket
- Check the meter light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

Are the meter light bulb and socket OK?



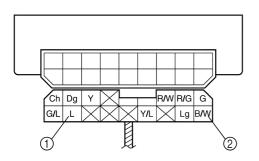


Replace the meter light bulb, socket or both.

2. Voltage

 Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Positive tester probe \rightarrow blue ① Negative tester probe \rightarrow black/white ②



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of blue ①
 on the meter assembly coupler (wire harness side).
- · Is the voltage within specification?





This circuit is OK.

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

FAS00790

3. The tail/brake light fails to come on.

- 1. Tail/brake light bulb and socket
- Check the tail/brake light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

 Are the tail/brake light bulb and socket OK?



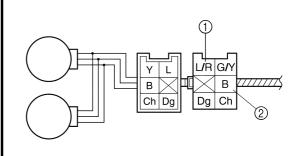


Replace the tail/ brake light bulb, socket or both.

2. Voltage

 Connect the pocket tester (DC 20 V) to the tail/brake light assembly coupler (wire harness side) as shown.

Positive tester probe \rightarrow blue/red ① Negative tester probe \rightarrow black ②



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of blue/red
 ① on the tail/brake light assembly coupler (wire harness side).
- Is the voltage within specification?





This circuit is OK.

The wiring circuit from the main switch to the tail/brake light assembly coupler is faulty and must be repaired.



EAS0079

4. The auxiliary light fails to come on.

- 1. Auxiliary light bulb and socket
- Check the auxiliary light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

Are the auxiliary light bulb and socket OK?



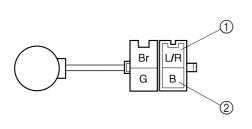


Replace the auxiliary light bulb, socket or both.

2. Voltage

 Connect the pocket tester (DC 20 V) to the auxiliary light coupler (wire harness side) as shown.

Positive tester probe \rightarrow blue/red ① Negative tester probe \rightarrow black ②



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of blue/red
 ① on the auxiliary light coupler (wire harness side).
- Is the voltage within specification?





This circuit is OK.

The wiring circuit from the main switch to the auxiliary light coupler is faulty and must be repaired.

FAS00792

5. The license plate light fails to come on.

- 1. License plate light bulb and socket
- Check the license plate light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

 Are the license plate light bulb and socket OK?



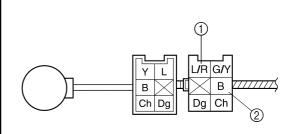


Replace the license plate light bulb, socket or both.

2. Voltage

 Connect the pocket tester (DC 20 V) to the tail/brake light assembly coupler (wire harness side) as shown.

Positive tester probe \rightarrow blue/red ① Negative tester probe \rightarrow black ②



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of blue ①
 on the tail/brake light assembly coupler
 (wire harness side).
- Is the voltage within specification?





This circuit is OK.

The wiring circuit from the main switch to the tail/brake light assembly coupler is faulty and must be repaired.

EAS00792

- 6. The storage box light fails to come on.
- 1. Storage box light bulb and socket
- Check the storage box light bulb and socket for continuity.
 - Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the storage box light bulb and socket OK?



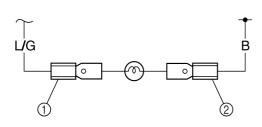


Replace the storage box light bulb, socket or both.

2. Voltage

 Connect the pocket tester (DC 20 V) to the storage box light connectors (wire harness side) as shown.

Positive tester probe \rightarrow blue/green ① Negative tester probe \rightarrow black ②



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of blue/ green ① on the storage box light connector (wire harness side).
- Is the voltage within specification?





This circuit is OK.

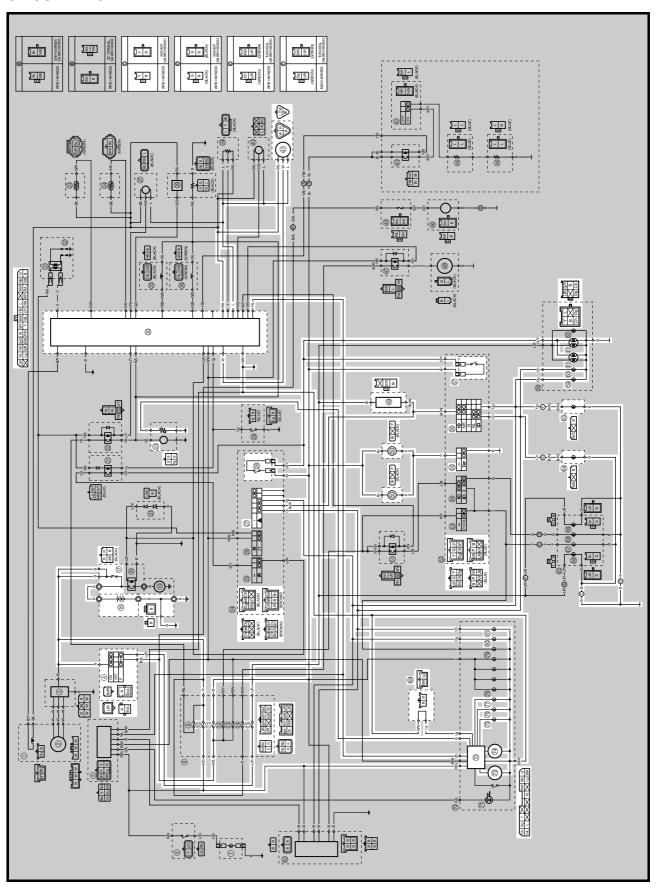
The wiring circuit from the main switch to the storage box light connector is faulty and must be repaired.



EAS00793

SIGNALING SYSTEM

CIRCUIT DIAGRAM



- 4 Main switch
- (1) Backup fuse (storage box light, immobilizer unit and meter assembly)
- (1) Signaling system fuse
- 15 Lighting system fuse
- **®** Battery
- 17 Main fuse
- 23 Fuel pump
- ② Hazard switch
- Front brake light switch
- ECU (engine)
- (1) Speed sensor
- (9) Turn signal/hazard relay
- 60 Horn
- 65 Horn switch
- 66 Turn signal switch
- © Rear brake light switch
- Sear turn signal light (right)
- @ Rear turn signal light (left)
- (6) Tail/brake light
- 63 Front turn signal light (right)
- @ Front turn signal light (left)
- 69 V-belt replacement reset coupler
- Multi-function display
- Speedometer
- Tachometer
- (3) Engine oil change indicator light
- 76 V-belt replacement indicator light
- 77 Engine trouble warning light
- ® Right turn signal indicator light
- (8) Left turn signal indicator light



EAS00794

TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- · The horn fails to sound.

Check:

- main, signaling system, lighting system and backup fuses
- 2. battery
- 3. main switch
- wiring connections (of the entire signaling system)

NOTE:

- Before troubleshooting, remove the following part(s):
- 1. battery cover
- 2. rear cover
- 3. front cowling
- 4. handlebar cover
- Troubleshoot with the following special tool(s).



Pocket tester 90890-03112, YU-03112-C

EAS00738

- 1. Main, signaling system, lighting system and backup fuses
- Check the main, signaling system, lighting system and backup fuses for continuity.
 Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main, signaling system, lighting system and backup fuses OK?





Replace the fuse(s).

EAS00739

2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20 °C (68 °F)

• Is the battery OK?





- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?





Replace the main switch/immobilizer unit.

EAS00795

4. Wiring

- Check the entire signal system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the signaling system's wiring properly connected and without defects?





Check the condition of each of the signaling system's circuits. Refer to "CHECK-ING THE SIGNAL-ING SYSTEM". Properly connect or repair the signaling system's wiring.

EAS00796

CHECKING THE SIGNALING SYSTEM

1. The horn fails to sound.

1. Horn switch

- Check the horn switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the horn switch OK?



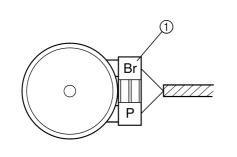


Replace the left handlebar switch.

2. Voltage

• Connect the pocket tester (DC 20 V) to the horn coupler as shown.

Positive tester probe \rightarrow brown ① Negative tester probe \rightarrow ground



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of brown at the horn coupler.
- Is the voltage within specification?

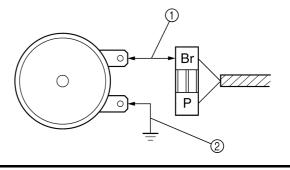




The wiring circuit from the main switch to the horn coupler is faulty and must be repaired.

3. Horn

- Disconnect the horn coupler at the horn.
- Connect a jumper lead ① to the brown terminal in the horn coupler and the horn terminal.
- Connect a jumper lead ② to the horn terminal and ground.
- Set the main switch to "ON".
- Does the horn sound?







The wiring circuit from the horn coupler to the horn switch coupler and/or horn switch to ground are faulty and must be repaired.

The horn is OK.

EAS00798

- 2. The tail/brake light fails to come on.
- 1. Tail/brake light bulb and socket
- Check the tail/brake light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

 Are the tail/brake light bulb and socket OK?





Replace the tail/ brake light bulb, socket or both.

- 2. Brake light switches
- Check the brake light switches for continuity.

Refer to "CHECKING THE SWITCHES".

• Is the brake light switch OK?



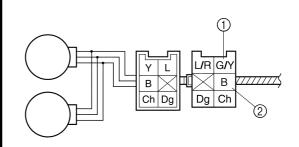


Replace the brake light switch(es).

3. Voltage

 Connect the pocket tester (DC 20 V) to the tail/brake light assembly coupler (wire harness side) as shown.

Positive tester probe \rightarrow green/yellow ① Negative tester probe \rightarrow black ②



- Set the main switch to "ON".
- Pull in the brake levers.
- Measure the voltage (DC 12 V) of green/ yellow ① on the tail/brake light assembly coupler (wire harness side).
- Is the voltage within specification?





This circuit is OK.

The wiring circuit from the main switch to the tail/brake light assembly coupler is faulty and must be repaired.



EAS00799

- 3. The turn signal light, turn signal indicator light or both fail to blink.
- 1. Turn signal light bulb and socket
- Check the turn signal light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

 Are the turn signal light bulb and socket OK?





Replace the turn signal light bulb, socket or both.

- 2. Turn signal indicator light bulb and socket
- Check the turn signal indicator light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

 Are the turn signal indicator light bulb and socket OK?





Replace the turn signal indicator light bulb, socket or both.

- 3. Turn signal switch
- Check the turn signal switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the turn signal switch OK?





Replace the left handlebar switch.

- 4. Hazard switch
- Check the hazard switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- · Is the hazard switch OK?

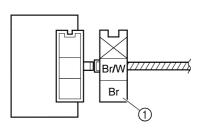




Replace the right handlebar switch.

- 5. Voltage
- Connect the pocket tester (DC 20 V) to the turn signal/hazard relay coupler (wire harness side) as shown.

Positive tester probe \rightarrow brown ① Negative tester probe \rightarrow ground



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) on brown

 at the turn signal/hazard relay coupler (wire harness side).
- · Is the voltage within specification?





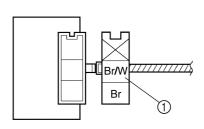
The wiring circuit from the main switch to the turn signal/ hazard relay coupler is faulty and must be repaired.



6. Voltage

 Connect the pocket tester (DC 20 V) to the turn signal/hazard relay coupler (wire harness side) as shown.

Positive tester probe \rightarrow brown/white 1Negative tester probe \rightarrow ground



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) on brown/ white ① at the turn signal/hazard relay coupler (wire harness side).
- · Is the voltage within specification?





The turn signal/hazard relay is faulty and must be replaced.

7. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal light coupler, tail/brake light assembly coupler or meter assembly coupler (wire harness side) as shown.
- A Front turn signal light assembly (left)
- B Front turn signal light assembly (right)
- C Tail/brake light assembly
- D Meter assembly (turn signal indicator light)

Left turn signal light

Positive tester probe →

chocolate (1) or brown/green (2)

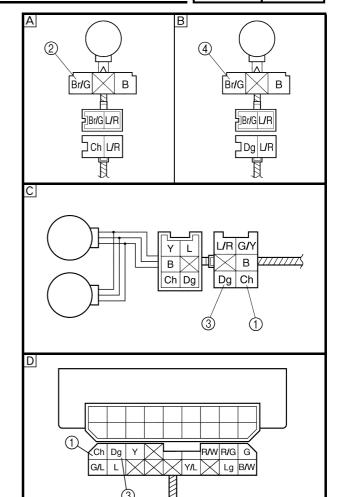
Negative tester probe → ground

Right turn signal light

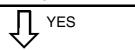
Positive tester probe \rightarrow

dark green ③ or brown/green ④

Negative tester probe → **ground**



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of the chocolate ① or dark green ③ at the tail/ brake light assembly coupler or meter assembly coupler (wire harness side) and brown/green ②, ④ at the turn signal light coupler (wire harness side).
- Is the voltage within specification?





This circuit is OK.

The wiring circuit from the turn signal switch to the turn signal light coupler, tail/brake light assembly coupler or meter assembly coupler is faulty and must be repaired.

- 4. The V-belt replacement indicator fails to come on.
- 1. V-belt replacement indicator bulb and socket
- Check the V-belt replacement indicator bulb and socket for continuity.
- Are the V-belt replacement indicator bulb and socket OK?

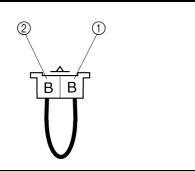




Replace the V-belt replacement indicator bulb, socket or both.

- 2. V-belt replacement indicator reset coupler
- Connect the pocket tester (Ω × 1) to the Vbelt replacement indicator reset coupler as shown.
- Check the V-belt replacement indicator reset coupler for continuity.

Positive tester probe → black ①
Negative tester probe → black ②



 Is the V-belt replacement indicator reset coupler OK?

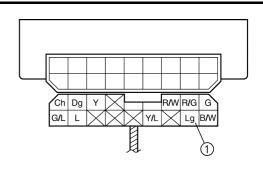




Replace the V-belt replacement indicator reset coupler.

- 3. Voltage
- Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Positive tester probe \rightarrow light green ① Negative tester probe \rightarrow ground



- Set the main switch to "ON".
- Measure the voltage (12 V) of light green
 (1) at the meter assembly coupler.
- Is the voltage within specification?





Replace the meter assembly.

The wiring circuit from the V-belt replacement indicator reset coupler to the meter assembly coupler (wire harness side) is faulty and must be repaired.



EAS00803

- 5. The engine oil change indicator fails to come on.
- 1. Engine oil change indicator bulb and socket
- Check the engine oil change indicator bulb and socket for continuity.
 Refer to "CHECKING THE BULBS AND
- Are the engine oil change indicator bulb and socket OK?



BULB SOCKETS".



Replace the meter assembly.

Replace the engine oil change indicator bulb, socket or both.

- 6. The engine trouble warning light fails to come on.
- Engine trouble warning light bulb and socket
- Check the engine trouble warning light bulb and socket for continuity.
 - Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the engine trouble warning light bulb and socket OK?





Replace the meter assembly.

Replace the engine trouble warning light bulb, socket or both.

FAS00804

- 7. The fuel meter fails to come on.
 - 1. Fuel sender
 - Drain the fuel from the fuel tank and then remove the fuel pump (fuel sender) from the fuel tank.
 - Connect the fuel pump coupler to the fuel pump.
 - Connect the pocket tester to the fuel pump coupler (wire harness side) as shown.

Positive tester probe → green ①
Negative tester probe → black ②

Measure the fuel sender resistances.



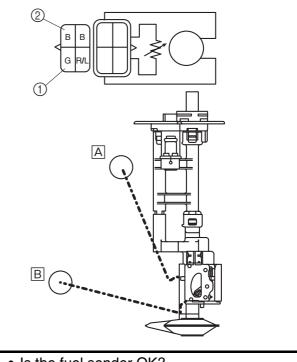
Fuel sender resistance (up position "F" A)

 $(\Omega \times 1)$

19 ~ 21 Ω at 20 °C (68 °F) Fuel sender resistance (down position "E" \square)

 $(\Omega \times 10)$

137 ~ 143 Ω at 20 °C (68 °F)



• Is the fuel sender OK?

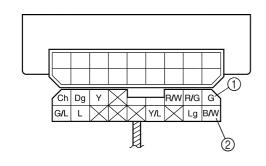


Replace the fuel pump.

2. Voltage

 Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Positive tester probe \rightarrow green ① Negative tester probe \rightarrow black/white ②



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of green ①
 on the meter assembly coupler (wire harness side).
- Is the voltage within specification?

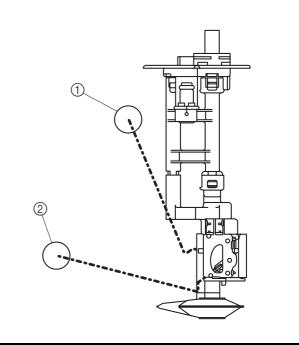




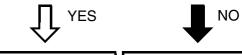
Check the wiring connections of the entire signaling system.

3. Fuel meter

- Set the main switch to "ON".
- Move the float up ① or down ②.
- Check that the fuel meter appear to "E" or "F"



• Does the fuel meter appear appropriately?



This circuit is OK.

Replace the meter assembly.

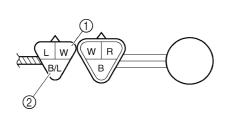
EAS00806

8. The speedometer fails to operate.

1. Speed sensor

 Connect the pocket tester (DC 20 V) to the speed sensor coupler (wire harness side) as shown.

Positive tester probe → white ①
Negative tester probe → black/blue ②



- Set the main switch to "ON".
- · Start the engine.
- Elevate the front wheel and slowly rotate it.
- Measure the voltage (DC 5 V) of white and black/blue. With each full rotation of the front wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.
- Does the voltage reading cycle correctly?



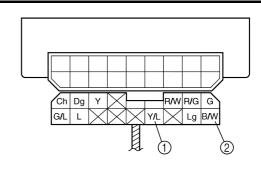
Replace the speed sensor.

NO

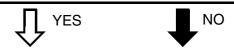
2. Voltage

 Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Positive tester probe → yellow/blue ① Negative tester probe → black/white ②



- Set the main switch to "ON".
- Measure the voltage (DC 5 V) yellow/blue
 ① on the meter assembly coupler (wire harness side).
- Is the voltage within specification?



This circuit is OK.

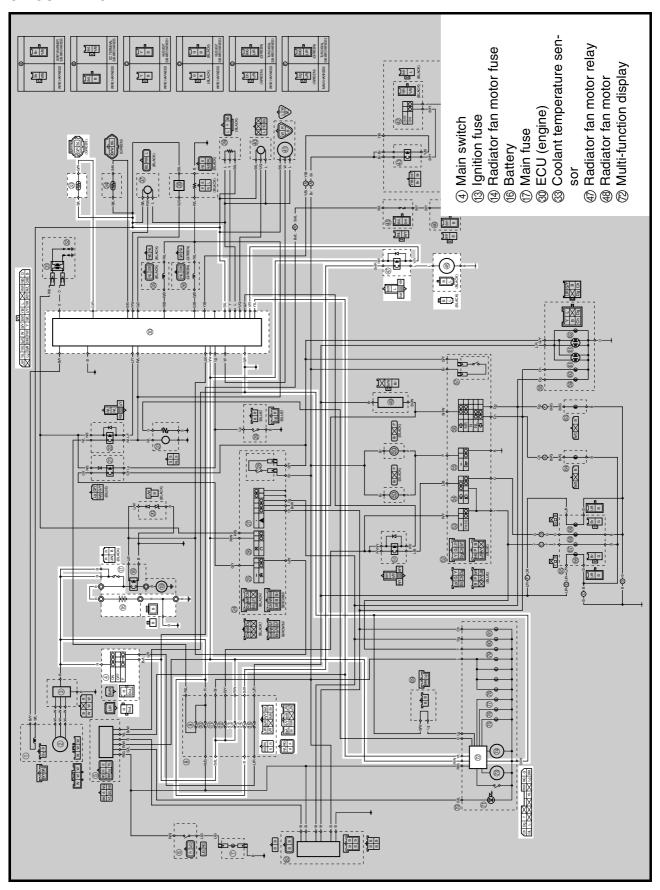
Replace the meter assembly.



EAS00807

COOLING SYSTEM

CIRCUIT DIAGRAM



COOLING SYSTEM



EAS00808

TROUBLESHOOTING

- The radiator fan motor fails to turn.
- The coolant temperature meter (meter assembly) fails to indicate.

Check:

- 1. main, ignition, and radiator fan motor fuses
- 2. battery
- 3. main switch
- 4. radiator fan motor
- 5. radiator fan motor relay
- 6. coolant temperature sensor
- 7. wiring connections (the entire cooling system)

NOTE:

- Before troubleshooting, remove the following part(s):
- 1. battery cover
- 2. rear cover
- 3. footrest board
- 4. leg shield
- 5. inner fender
- Troubleshoot with the following special tool(s).



Pocket tester 90890-03112, YU-03112-C

EAS00738

- 1. Main, ignition, radiator fan motor fuses
- Check the main, ignition, radiator fan motor fuses for continuity.
 - Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main, ignition, radiator fan motor fuses OK?





Replace the fuse(s).

EAS00739

2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20 °C (68 °F)

• Is the battery OK?





- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?





Replace the main switch/immobilizer unit.

COOLING SYSTEM

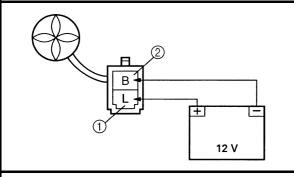


EAS00809

4. Radiator fan motor

- Disconnect the radiator fan motor coupler from the wire harness.
- Connect the battery (DC 12 V) as shown.

Positive battery lead → blue ①
Negative battery lead → black ②



· Does the radiator fan motor turn?





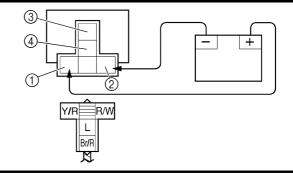
The radiator fan motor is faulty and must be replaced.

5. Radiator fan motor relay

- Remove the radiator fan motor relay from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the radiator fan motor relay terminal as shown.
- Check the radiator fan motor relay of continuity.

Positive battery lead → yellow/red ① Negative battery lead → red/white ②

Positive tester probe \rightarrow brown/red $\ 3$ Negative tester probe \rightarrow blue $\ 4$



• Does the radiator fan motor relay have continuity between brown/red and blue?





Replace the radiator fan motor relay.

COOLING SYSTEM



EAS00812

6. Coolant temperature sensor

- Remove the coolant temperature sensor from the cylinder head.
- Connect the pocket tester ($\Omega \times 10$) to the coolant temperature sensor ① as shown.
- Immerse the coolant temperature sensor in a container filled with coolant ②.

NOTE:

Make sure the coolant temperature sensor terminals do not get wet.

- Place a thermometer (3) in the coolant.
- Slowly heat the coolant, and then let it cool to the specified temperature indicated in the table.
- Check the coolant temperature sensor for continuity at the temperatures indicated in the table.

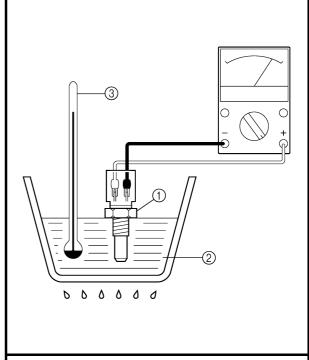
Test step	Coolant temperature	Resistance
1	20 °C (68 °F)	2.32 ~ 2.59 k Ω
2	80 °C (176 °F)	0.310 ~ 0.326 k Ω
3	110 °C (230 °F)	0.140 ~ 0.144 kΩ

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.



Coolant temperature sensor 18 Nm (1.8 m · kg, 13 ft · lb)



 Does the coolant temperature sensor operate properly?





Replace the coolant temperature sensor.

EAS00813

7. Wiring

- Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the cooling system's wiring properly connected and without defects?





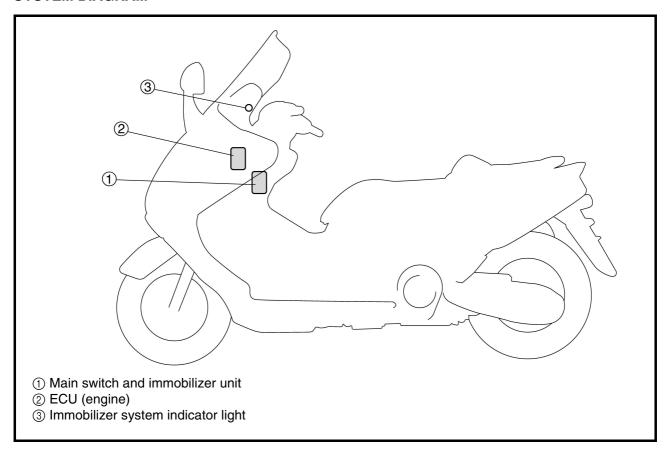
Replace the ECU (engine) or meter assembly.

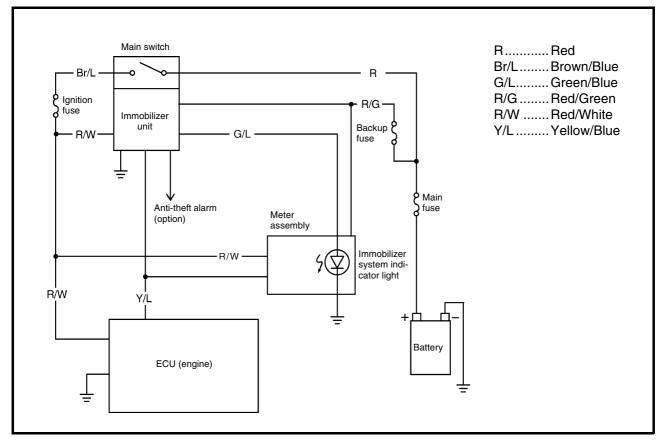
Properly connect or repair the cooling system's wiring.



IMMOBILIZER SYSTEM

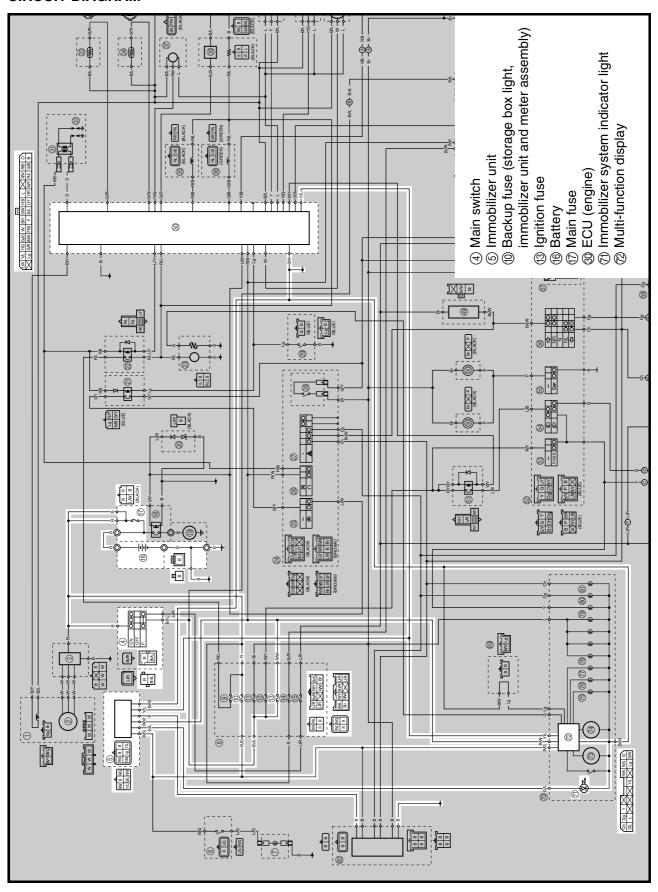
SYSTEM DIAGRAM







CIRCUIT DIAGRAM





GENERAL INFORMATION

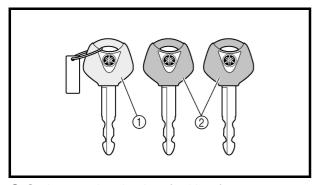
This scooter is equipped with an immobilizer system to help prevent theft by registering codes in standard keys. This system consists of the following:

- a code re-registering key (with a red bow)
- two standard keys (with black bows) that can be re-registered with new codes
- transponders (one installed in each key bow)
- an immobilizer unit
- an ECU (engine)
- an immobilizer system indicator light

The key with the red bow is used to register codes in each standard key. Do not use the key with the red bow for driving. It should only be used for registering new codes in the standard keys. The immobilizer system cannot be operated with a new standard key until a code is registered in the key. If you lose the code re-registering key, the ECU (engine), main switch, and immobilizer unit must be replaced. Therefore, always use a standard key for driving.

NOTE:

Each standard key is registered during production, therefore, registering the keys at purchase is not necessary.



- ① Code re-registering key (red bow)
- ② Standard keys (black bow)

CAUTION:

- DO NOT LOSE THE CODE RE-REGISTERING KEY! If the code re-registering key is lost, registering new codes in the standard keys is impossible. The standard keys can still be used to start the scooter, however, if code re-registering is required (i.e., if a new standard key is made or all keys are lost) the entire immobilizer system must be replaced. Therefore, it is highly recommended to use either standard key and keep the code re-registering key in a safe place.
- Do not submerse the keys in water.
- Do not expose the keys to excessively high temperatures.
- Do not place the keys close to magnets (this includes, but not limited to, products such as speakers, etc.).
- Do not place heavy items on the keys.
- Do not grind the keys or alter their shape.
- Do not disassemble the key bows.
- Do not put two keys of any immobilizer system on the same key ring.
- Keep the standard keys as well as other immobilizer system keys away from the code reregistering key.
- Keep other immobilizer system keys away from the main switch as they may cause signal interference.

KEY CODE REGISTRATION

Code registration of the code re-registering key or standard keys may be required when parts are replaced or a standard key is lost.

NOTE:

Each standard key is registered during production, therefore, registering the keys at purchase is not necessary.

Code re-registering key registration:

When the immobilizer unit or ECU (engine) is replaced, the code re-registering key must be re-registered.

To register a code re-registering key:

1. Turn the main switch to "ON" with the code re-registering key.

NOTE:

Check that the immobilizer system indicator light comes on for 1 second, then goes off. When the indicator light goes off, the code re-registering key has been registered.

- 2. Check that the engine can be started.
- 3. Register the standard keys. Refer to "Standard key registration:".

Standard key registration:

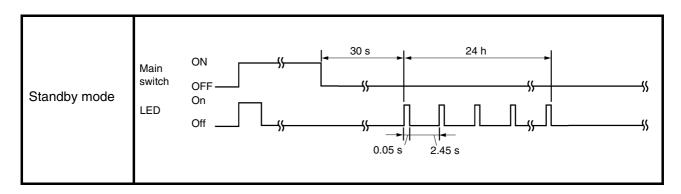
A standard key should be registered or the other standard key should be re-registered when a registered standard key has been lost. The standard keys must be re-registered when the immobilizer unit or ECU (engine) has been replaced and the code re-registering key has been re-registered.

NOTE:

Do not start the engine with a standard key that has not been registered.

If the main switch is turned to "ON" with a standard key that has not been registered, the immobilizer system indicator light flashes to indicate malfunction code 52. (Refer to "SELF-DIAGNOSIS MALFUNCTION CODES".)

Check that the immobilizer system indicator light flashes to indicate the standby mode. To activate the standby mode, turn the main switch to "OFF". The standby mode will be activated after 30 seconds. The indicator light stops flashing after 24 hours and the standby mode is deactivated.



2. Using the code re-registering key, turn the main switch to "ON", then to "OFF", and then remove the key within 5 seconds.



3. Insert the standard key to be registered into the main switch, and then turn the main switch to "ON" within 5 seconds to activate the key registration mode.

NOTE:

All existing standard key codes will be erased from the memory when the key registration mode is activated. When the key registration mode is activated, the immobilizer system indicator light flashes rapidly (i.e., off for 0.5 second and on for 0.5 second).

4. While the indicator light is flashing, turn the main switch to "OFF", remove the key, and then insert the second standard key to be registered into the main switch within 5 seconds.

NOTE:

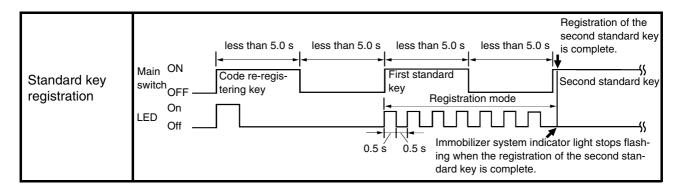
If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the registration mode is deactivated. If this occurs, the second standard key cannot be registered, therefore, repeat steps 2 to 4 to register both standard keys.

5. Turn the main switch to "ON".

NOTE:

When the indicator light goes off, registration is complete.

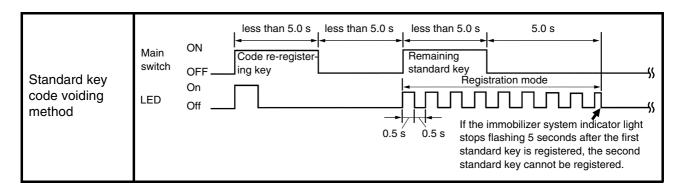
6. Check that the engine can be started with the two registered standard keys.



Voiding a standard key code:

If a registered standard key has been lost and you want to disable its use, register a new standard key or re-register the other standard key. For registration of a standard key, refer to "Standard key registration:".

Standard key registration erases the stored standard key codes from memory, therefore, the lost standard key is disabled.





SELF-DIAGNOSIS MALFUNCTION CODES

When a system malfunction occurs, the malfunction code number is displayed on the LCD display of the meter assembly and is indicated by the immobilizer system indicator light flash patterns.

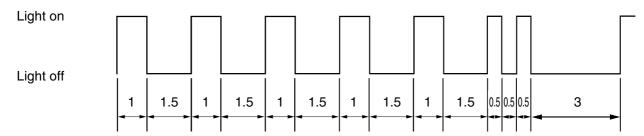
Malfunction code	Part	Symptom	Cause	Action
51	Immobilizer unit	Code cannot be transmitted between the key and immobilizer unit.	Radio wave interference caused by objects around the keys and antennas. Immobilizer unit malfunction Key malfunction	1) Keep magnets, metal objects, and other immobilizer system keys away from the keys and antennas. 2) Replace the main switch/immobilizer unit. 3) Replace the key.
52	Immobilizer unit	Codes transmitted between the key and immobilizer unit do not match.	 Signal received from other transponder (failed to recognize code after ten consecutive attempts). Signal received from unregistered standard key. 	Place the immobilizer unit at least 50 mm away from the transponder of other scooters. Register the standard key.
53	Immobilizer unit	Code cannot be transmitted between the ECU (engine) and immobilizer unit.	Noise interference or disconnected lead/cable. 1) Interference due to radio wave noise. 2) Disconnected communication harness. 3) Immobilizer unit malfunction 4) ECU (engine) malfunction	1) Check the wire harness and connector. 2) Replace the main switch/immobilizer unit. 3) Replace the ECU (engine).
54	Immobilizer unit	Codes transmitted between ECU (engine) and immobilizer unit do not match.	Noise interference or disconnected lead/cable. 1) Interference due to radio wave noise. 2) Disconnected communication harness. 3) Immobilizer unit malfunction (The ECU (engine) malfunction (The ECU (engine) or immobilizer unit has been replaced with a used unit from another scooter.)	 Register the code reregistering key. Check the wire harness and connector. Replace the main switch/immobilizer unit. Replace the ECU (engine).
55	Immobilizer unit	Key code registration mal- function	Same standard key was attempted to be registered two consecutive times.	Register a new standard key.
56	ECU (engine)	Unidentified code is received.	Noise interference or disconnected lead/cable. 1) Interference due to radio wave noise. 2) Disconnected communication harness. 3) Immobilizer unit malfunction 4) ECU (engine) malfunction	1) Check the wire harness and connector. 2) Replace the main switch/immobilizer unit. 3) Replace the ECU (engine).

Immobilizer system indicator light malfunction code indication

Units of 10: on for 1 second and off for 1.5 seconds.

Units of 1: on for 0.5 second and off for 0.5 second.

<Example> malfunction code 52





EAS00794

TROUBLESHOOTING

When the main switch is turned "ON", the immobilizer system indicator light does not come on or flash.

Check:

- 1. main, ignition, and backup fuses
- 2. battery
- 3. main switch
- 4. wiring connections (of the entire immobilizer system)

NOTE:

- Before troubleshooting, remove the following part(s):
- 1. battery cover
- 2. rear cover
- 3. front cowling
- 4. leg shield
- Troubleshoot with the following special tool(s).



Pocket tester 90890-03112, YU-03112-C

EAS00738

- 1. Main, ignition and backup fuses
- Check the main, ignition and backup fuses for continuity.

Refer to "CHECKING THE FUSES" in chapter 3.

 Are the main, ignition and backup fuses OK?





Replace the fuse(s).

EAS00739

2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20 °C (68 °F)

Is the battery OK?





- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity.
 Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?





Replace the main switch/immobilizer unit.

EAS00787

4. Wiring

Check the entire immobilizer system wiring.

Refer to "CIRCUIT DIAGRAM".

 Is the immobilizer system wiring properly connected and without defects?





Check the condition of each of the immobilizer system circuits.

Refer to "CHECK-ING THE IMMOBI-LIZER SYSTEM". Properly connect or repair the immobilizer system wiring.

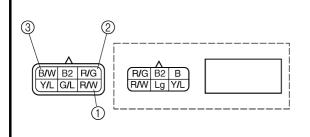


CHECKING THE IMMOBILIZER SYSTEM

1. The immobilizer system indicator light does not come on.

1. Voltage

 Connect the pocket tester (DC 20 V) to the immobilizer unit coupler as shown.



Positive tester probe → red/white ① or red/green ② Negative tester probe → black/white ③

- Turn the main switch to "ON".
- Measure the voltage (DC 12 V) on the immobilizer unit coupler (wire harness side).
- Is the voltage within specification?





The wiring circuit from the main switch to the immobilizer unit coupler is faulty and must be repaired.

2. Wiring

- Disconnect the meter assembly coupler and immobilizer unit coupler.
- Check the immobilizer system indicator light lead (green/blue) continuity.
 (meter assembly coupler – immobilizer unit coupler).
- Is the immobilizer system indicator light lead OK?





Replace the main switch/immobilizer unit.

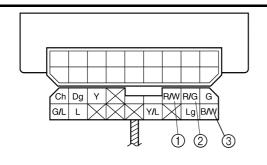
The wiring circuit from the meter assembly to immobilizer unit is faulty and must be repaired.

IMMOBILIZER SYSTEM

2. No malfunction code is displayed on the LCD display of the meter assembly.

1. Voltage

• Connect the pocket tester (DC 20 V) to the meter assembly coupler as shown.



LCD display

Positive tester probe \rightarrow

red/white ① or red/green ②

- Turn the main switch to "ON".
- Measure the voltage (DC 12 V) at the meter assembly coupler (wire harness side).
- Is the voltage within specification?





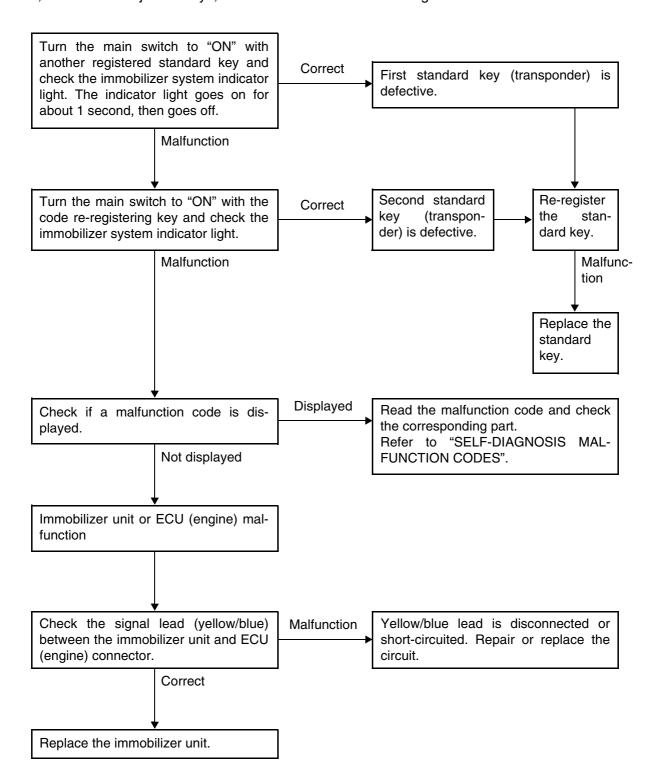
Replace the meter assembly.

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

IMMOBILIZER SYSTEM



- 3. When the main switch is turned to "ON", the immobilizer system indicator light flashes.
 - Check if a metal object or other immobilizer system keys are placed near the immobilizer unit. If so, remove the object or keys, and then check the condition again.



IMMOBILIZER SYSTEM



PART REPLACEMENT KEY REGISTRATION REQUIREMENTS

	Parts to be replaced					
	Main switch	Immobilizer unit	Standard key	ECU (engine)	Accessory lock ^{*2} and key	Required key registration
Standard key is lost			0			New standard key
All keys have been lost (including code re-reg- istering key)	0	O *1	0	0	0	Code re-registering key and standard keys
ECU (engine) is defective				0		Code re-registering key and standard keys
Immobilizer unit is defective		0				Code re-registering key and standard keys
Main switch is defective	0	O *1	0	0	0	Code re-registering key and standard keys
Accessory lock*2 is defective					0	Not required

If the ECU (engine) or the immobilizer unit is replaced, both the code re-registering key and the standard keys need to be registered with the new unit(s).

^{*1} Replace as a set with the main switch.
*2 Accessory locks include the fuel tank cap lock and storage compartment lock.

TRBL SHTG



CHAPTER 9 TROUBLESHOOTING

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TRBL ?

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TURN SIGNAL BLINKS QUICKLY	
HORN DOES NOT SOUND	

STARTING FAILURE/HARD STARTING

EAS00845

TROUBLESHOOTING

NOTE: .

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

STARTING FAILURE/HARD STARTING

ENGINE

Cylinder(s) and cylinder head

- · Loose spark plug
- Loose cylinder head or cylinder
- Damaged cylinder head gasket
- · Damaged cylinder gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- · Improperly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- · Seized valve

Piston(s) and piston ring(s)

- · Improperly installed piston ring
- · Damaged, worn or fatigued piston ring
- · Seized piston ring
- · Seized or damaged piston

Air filter

- Improperly installed air filter
- · Clogged air filter element

Crankcase and crankshaft

- · Improperly assembled crankcase
- Seized crankshaft

FUEL SYSTEM

Fuel tank

- · Empty fuel tank
- Clogged fuel tank cap breather hole
- Deteriorated or contaminated fuel
- · Clogged or damaged fuel hose

Fuel pump

- · Faulty fuel pump
- · Faulty fuel pump relay

Throttle body

- · Deteriorated or contaminated fuel
- Sucked-in air

ELECTRICAL SYSTEMS

Battery

- Discharged battery
- Faulty battery

Fuse(s)

- Blown, damaged or incorrect fuse
- Improperly installed fuse

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

Ignition coil

- Cracked or broken ignition coil body
- Broken or shorted primary or secondary coils
- · Faulty spark plug lead

Ignition system

- Faulty ECU (engine)
- Faulty crankshaft position sensor

Switches and wiring

- Faulty main switch
- Faulty engine stop switch
- · Broken or shorted wiring
- Faulty front, rear or both brake light switches
- · Faulty start switch
- · Faulty sidestand switch
- · Improperly grounded circuit
- Loose connections

Starting system

- Faulty starter motor
- Faulty starter relay
- · Faulty starting circuit cut-off relay
- · Faulty starter clutch

INCORRECT ENGINE IDLING SPEED/POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE/FAULTY CLUTCH



EAS00847

INCORRECT ENGINE IDLING SPEED

ENGINE

Cylinder(s) and cylinder head

- Incorrect valve clearance
- Damaged valve train components

Air filter

· Clogged air filter element

FUEL SYSTEM

Throttle body

- · Damaged or loose throttle body joint
- Improperly synchronized throttle bodies
- Improperly adjusted engine idling speed (idle adjusting screw)
- Improper throttle cable free play
- Flooded throttle body
- Faulty air induction system

ELECTRICAL SYSTEMS

Battery

- Discharged battery
- · Faulty battery

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

Ignition coil(s)

· Faulty spark plug lead

Ignition system

- Faulty ECU (engine)
- Faulty crankshaft position sensor

FAS00849

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURE/HARD STARTING".

FNGINE

Air filter

• Clogged air filter element

Air intake system

· Clogged or leaking air duct

FUEL SYSTEM Fuel pump

Faulty fuel pump

EAS00853

FAULTY CLUTCH

ENGINE OPERATES BUT SCOOTER WILL NOT MOVE

V-belt

- Bent, damaged or worn V-belt
- Slipping V-belt

Primary pulley cam and primary pulley slider

- Damaged or worn primary pulley cam
- Damaged or worn primary pulley slider

Clutch spring(s)

· Damaged clutch spring

Transmission gear(s)

• Damaged transmission gear

CLUTCH SLIPS

Clutch shoe spring(s)

• Damaged, loose or worn clutch shoe spring

Clutch shoe(s)

• Damaged or worn clutch shoe

Primary sliding sheave

• Seized primary sliding sheave

POOR STARTING PERFORMANCE

V-belt

- V-belt slips
- Oil or grease on the V-belt

Primary sliding sheave

- Faulty operation
- Worn pin groove
- Worn pin

Clutch shoe(s)

· Bent, damaged or worn clutch shoe

FAULTY CLUTCH/OVERHEATING/OVERCOOLING



POOR SPEED PERFORMANCE

V-belt

• Oil or grease on the V-belt

Primary pulley weight(s)

- Faulty operation
- · Worn primary pulley weight

Primary fixed sheave

· Worn primary fixed sheave

EAS00855

OVERHEATING

ENGINE

Clogged coolant passages

- Cylinder head(s) and piston(s)
- · Heavy carbon buildup

Engine oil

- Incorrect oil level
- · Incorrect oil viscosity
- Inferior oil quality

COOLING SYSTEM

Coolant

Low coolant level

Radiator

- · Damaged or leaking radiator
- Faulty radiator cap
- · Bent or damaged radiator fin

Water pump

- · Damaged or faulty water pump
- Thermostat
- Thermostat stays closed
- Oil cooler
- · Clogged or damaged oil cooler
- Hose(s) and pipe(s)
- Damaged hose
- Improperly connected hose
- · Damaged pipe
- Improperly connected pipe

EAS00856

OVERCOOLING

COOLING SYSTEM

Thermostat

Thermostat stays open

Primary sliding sheave

· Worn primary sliding sheave

Secondary fixed sheave

• Worn secondary fixed sheave

Secondary sliding sheave

• Worn secondary sliding sheave

FUEL SYSTEM

Throttle body

Damaged or loose throttle body joint

Air filter

• Clogged air filter element

CHASSIS

Brake(s)

· Dragging brake

ELECTRICAL SYSTEMS

Spark plug(s)

- Incorrect spark plug gap
- · Incorrect spark plug heat range

Ignition system

• Faulty ECU (engine)

POOR BRAKING PERFORMANCE/ FAULTY FRONT FORK LEGS/UNSTABLE HANDLING

EAS00857

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

EAS00861

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

EAS00862

UNSTABLE HANDLING

Handlebar

• Bent or improperly installed handlebar

Steering head components

- Improperly installed upper bracket
- Improperly installed lower bracket (improperly tightened ring nut)
- · Bent steering stem
- · Damaged ball bearing or bearing race

Front fork leg(s)

- Uneven oil levels (both front fork legs)
- Unevenly tensioned fork spring (both front fork legs)
- · Broken fork spring
- · Bent or damaged inner tube
- Bent or damaged outer tube

Swingarm

- Worn bearing or bushing
- Bent or damaged swingarm

Rear shock absorber assembly

- · Faulty rear shock absorber spring
- · Leaking oil or gas

Tire(s)

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

Wheel(s)

- Incorrect wheel balance
- · Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame

- Bent frame
- · Damaged steering head pipe
- Improperly installed bearing race

FAULTY LIGHTING OR SIGNALING SYSTEM



FAS00866

FAULTY LIGHTING OR SIGNALING SYSTEM

HEADLIGHT DOES NOT COME ON

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main or light switch)
- · Burnt-out headlight bulb

HEADLIGHT BULB BURNT OUT

- Wrong headlight bulb
- · Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- · Faulty light switch
- · Headlight bulb life expired

TAIL/BRAKE LIGHT DOES NOT COME ON

- · Wrong tail/brake light bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

TAIL/BRAKE LIGHT BULB BURNT OUT

- Wrong tail/brake light bulb
- · Faulty battery
- · Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

TURN SIGNAL DOES NOT COME ON

- Faulty turn signal switch
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- · Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

TURN SIGNAL BLINKS SLOWLY

- Faulty turn signal/hazard relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

TURN SIGNAL REMAINS LIT

- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

TURN SIGNAL BLINKS QUICKLY

- · Incorrect turn signal bulb
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

HORN DOES NOT SOUND

- Improperly adjusted horn
- · Damaged or faulty horn
- · Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

XP500 2005 WIRING DIAGRAM

- (1) Crankshaft position sensor
- 2 A.C. magneto
- ③ Rectifier/regulator
- (4) Main switch
- (5) Immobilizer unit
- 6 Storage box light switch
- (7) Storage box light
- ® Fuse box
- Fuel injection system fuse
- Backup fuse (storage box light, immobilizer unit and meter assembly)
- (1) Signaling system fuse
- (12) Headlight fuse
- (3) Ignition fuse
- (4) Radiator fan motor fuse
- (5) Lighting system fuse
- (6) Battery
- (7) Main fuse
- (8) Starter relay
- (9) Starter motor
- 20 Diode
- ② Starting circuit cut-off relay 1
- 22 Fuel injection system relay
- 23 Fuel pump
- 24 Right handlebar switch
- 25 Start switch
- 26 Engine stop switch
- ② Hazard switch
- Front brake light switch
- Sidestand switch
- 30 ECU (engine)
- ③ Ignition coil
- 32 Spark plug
- 3 Coolant temperature sensor
- ③ Intake air temperature sensor
- 35 Fuel injector #1
- 36 Fuel injector #2
- ③ Intake air pressure sensor
- ⊗ O₂ sensor
- 39 Throttle position sensor
- 40 Lean angle cut-off switch
- (4) Speed sensor
- 42 Grip warmer switch (optional)
- (43) Grip warmer relay (optional)
- 44 Grip warmer (optional)
- 45 Auxiliary DC jack fuse
- Auxiliary DC jack
- 47 Radiator fan motor relay
- Radiator fan motor
- 49 Turn signal/hazard relay
- 60 Horn
- (51) Headlight relay
- **52** Left handlebar switch
- S Pass switch
- 54 Dimmer switch

- 65 Horn switch
- 6 Turn signal switch
- (57) Rear brake light switch
- Tail/brake light assembly
- Sear turn signal light (right)
- @ Rear turn signal light (left)
- 6 Tail/brake light
- @ Licence plate light
- (3) Front turn signal light (right)
- @ Front turn signal light (left)
- 65 Headlight assembly
- 66 Auxiliary light
- @ Headlight (high beam)
- (8) Headlight (low beam)
- V-belt replacement indicator reset coupler
- **70** Meter assembly
- (7) Immobilizer system indicator light
- Multi-function display
- Speedometer
- **7** Tachometer
- (5) Engine oil change indicator light
- V-belt replacement indicator light
- (7) Engine trouble warning light
- ® Meter light
- (79) High beam indicator light
- ® Right turn signal indicator light
- (8) Left turn signal indicator light
- Anti-theft alarm (optional)

COLOR CODE

В	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green

O Orange
P..... Pink
R Red
W.... White
Y.... Yellow

B/L...... Black/Blue B/W Black/White B/Y Black/Yellow

Br/G...... Brown/Green Br/L Brown/Blue

Br/R...... Brown/Red Br/W..... Brown/White

Br/Y Brown/Yellow G/B...... Green/Black

G/L Green/Blue G/R..... Green/Red

G/Y...... Green/Yellow Gy/G..... Gray/Green L/B...... Blue/Black

L/G Blue/Green L/R Blue/Red

L/W...... Blue/White L/Y...... Blue/Yellow O/B...... Orange/Black

P/W Pink/White R/B Red/Black

R/G...... Red/Green R/L..... Red/Blue R/W..... Red/White

R/Y Red/Yellow W/Y White/Yellow Y/B Yellow/Black

Y/G...... Yellow/Green Y/L..... Yellow/Blue

Y/R...... Yellow/Red

XP500A 2005 WIRING DIAGRAM

- (1) Crankshaft position sensor
- 2 A.C. magneto
- ③ Rectifier/regulator
- (4) Main switch
- (5) Immobilizer unit
- (6) Storage box light switch
- (7) Storage box light
- (8) Fuse box
- (9) ABS control unit fuse
- 1 Fuel injection system fuse
- Backup fuse (storage box light, immobilizer unit and meter assembly)
- 12 Signaling system fuse
- (3) Headlight fuse
- (14) Ignition fuse
- (5) Radiator fan motor fuse
- (6) Lighting system fuse
- (7) Battery
- (8) ABS motor fuse
- (19) Main fuse
- Starter relay
- 21) Starter motor
- 2 Diode
- 23 Starting circuit cut-off relay 2
- 24 Starting circuit cut-off relay 1
- 25 Fuel injection system relay
- ② Fuel pump
- @ Right handlebar switch
- 28 Start switch
- (2) Engine stop switch
- 3 Hazard switch
- 3 Front brake light switch
- 32 Sidestand switch
- 3 ECU (engine)
- ③ Ignition coil
- 35 Spark plug
- 36 Coolant temperature sensor
- (3) Intake air temperature sensor
- Section 41
- 39 Fuel injector #2
- 40 Intake air pressure sensor
- 4 O₂ sensor
- Throttle position sensor
- 43 Lean angle cut-off switch
- ABS test coupler
- 45 ECU (ABS)
- (46) Front wheel sensor
- Rear wheel sensor
- (48) Fail-safe relay
- 49 Hydraulic unit
- (optional)
- 6) Grip warmer relay (optional)
- 62 Grip warmer (optional)
- Auxiliary DC jack fuse
- Auxiliary DC jack

- 63 Radiator fan motor relay
- 6 Radiator fan motor
- (57) Turn signal/hazard relay
- ⊕ Horn
- 69 Headlight relay
- @ Left handlebar switch
- @ Pass switch
- @ Dimmer switch
- 63 Horn switch
- @ Turn signal switch
- 65 Rear brake light switch
- 66 Tail/brake light assembly
- (i) Rear turn signal light (right)
- ® Rear turn signal light (left)
- 69 Tail/brake light
- 10 Licence plate light
- 7) Front turn signal light (right)
- (2) Front turn signal light (left)
- (7) Headlight assembly
- (4) Auxiliary light
- 7 Headlight (high beam)
- (6) Headlight (low beam)
- V-belt replacement indicator reset coupler
- 78 Meter assembly
- (9) Immobilizer system indicator light
- Multi-function display
- ® Speedometer
- **®** Tachometer
- Engine oil change indicator light
- V-belt replacement indicator light
- ® Engine trouble warning light
- **86** Meter light
- (87) High beam indicator light
- ® Right turn signal indicator light
- 89 Left turn signal indicator light
- @ ABS warning light
- (optional)

COLOR CODE

В	віаск
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue

Lg Light green
O Orange
P..... Pink

R Red Sb..... Sky blue

W..... White Y..... Yellow

B/L...... Black/Blue B/W Black/White

B/Y Black/Yellow Br/G..... Brown/Green

Br/R 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/G..... Gray/Green L/B...... Blue/Black

L/G Blue/Green L/R Blue/Red

L/W...... Blue/White L/Y..... Blue/Yellow

O/B...... Orange/Black P/W Pink/White

R/B Red/Black R/G...... Red/Green

R/L Red/Blue R/W Red/White

R/Y Red/Yellow W/B White/Black

W/R White/Red

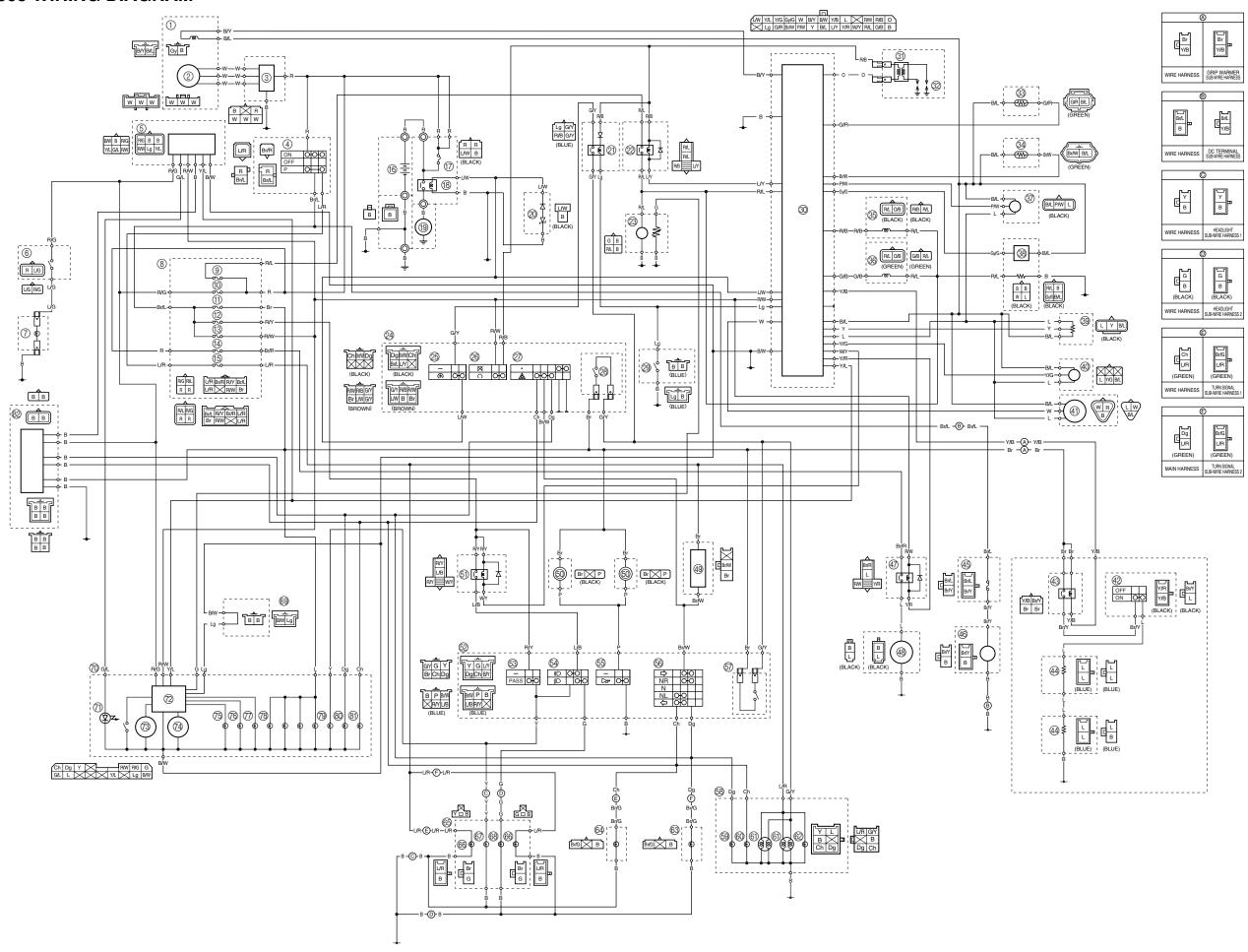
W/Y White/Yellow Y/B Yellow/Black

Y/G...... Yellow/Green Y/L..... Yellow/Blue

Y/R Yellow/Red



XP500 2005 WIRING DIAGRAM



XP500A 2005 WIRING DIAGRAM

