



**YAMAHA**

**2006**

**FZ1-N(V)  
FZ1-S(V)**

**SERVICE MANUAL**

**2D1-28197-E0**

---

EAS20040

**FZ1-N (V)/FZ1-S (V)  
SERVICE MANUAL  
©2005 by Yamaha Motor Co., Ltd.  
First edition, December 2005  
All rights reserved.  
Any reproduction or unauthorized use without  
the written permission of Yamaha Motor Co.,  
Ltd. is expressly prohibited.**

## NOTICE

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

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

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

### NOTE:

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

## IMPORTANT MANUAL INFORMATION

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



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



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



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

### NOTE:

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

# HOW TO USE THIS MANUAL

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

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

1  
↓  
**CLUTCH**

**EAS20090**  
**CLUTCH**

**Removing the clutch cover**

3  
4  
5

6 →

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

5-42

**CLUTCH**

10. Remove:

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

**EAS2010**  
**CHECKING THE CLUTCH PLATES**

The following procedure applies to all of the clutch plates.

1. Check:
  - Clutch plate
  - Damage → Replace the clutch plates as a set.
2. Measure:
  - Clutch plate warpage (with a surface plate and thickness gauge "1")
  - Out of specification → Replace the clutch plates as a set.

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

**EAS2010**  
**CHECKING THE FRICTION PLATES**

The following procedure applies to all of the friction plates.

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

**NOTE:**

Measure the friction plate at four places.

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

**EAS2010**  
**CHECKING THE CLUTCH SPRINGS**

The following procedure applies to all of the clutch springs.

1. Check:
  - Clutch spring
  - Damage → Replace the clutch springs as a set.
2. Measure:
  - Clutch spring free length "a"
  - Out of specification → Replace the clutch springs as a set.

7

2

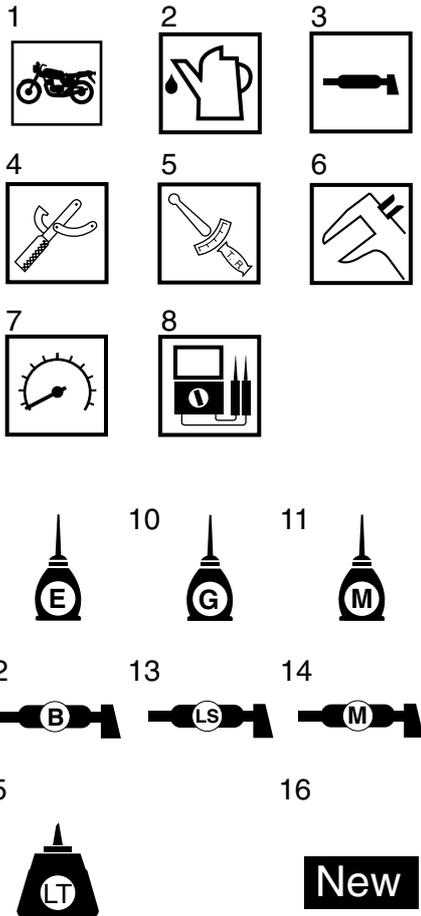
5-47

## SYMBOLS

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

**NOTE:**

The following symbols are not relevant to every vehicle.



## 16. Replace the part

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

---

---

# TABLE OF CONTENTS

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

---

---

## GENERAL INFORMATION

<b>IDENTIFICATION</b> .....	1-1
VEHICLE IDENTIFICATION NUMBER.....	1-1
MODEL LABEL.....	1-1
<b>FEATURES</b> .....	1-2
<b>FI SYSTEM</b> .....	1-3
<b>INSTRUMENT FUNCTIONS</b> .....	1-4
<b>IMPORTANT INFORMATION</b> .....	1-8
PREPARATION FOR REMOVAL AND DISASSEMBLY .....	1-8
REPLACEMENT PARTS .....	1-8
GASKETS, OIL SEALS AND O-RINGS.....	1-8
LOCK WASHERS/PLATES AND COTTER PINS .....	1-8
BEARINGS AND OIL SEALS .....	1-9
CIRCLIPS .....	1-9
<b>CHECKING THE CONNECTIONS</b> .....	1-10
<b>SPECIAL TOOLS</b> .....	1-11

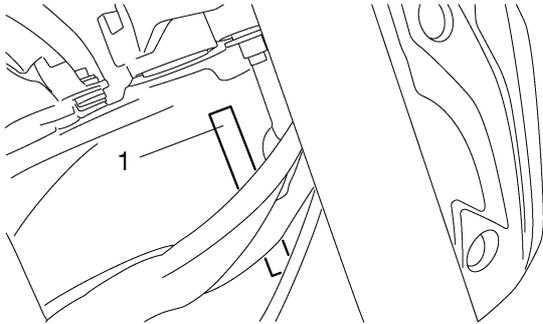
EAS20130

## IDENTIFICATION

EAS20140

### VEHICLE IDENTIFICATION NUMBER

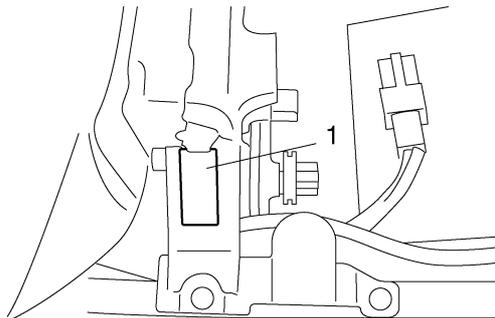
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



EAS20150

### MODEL LABEL

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



EAS20170

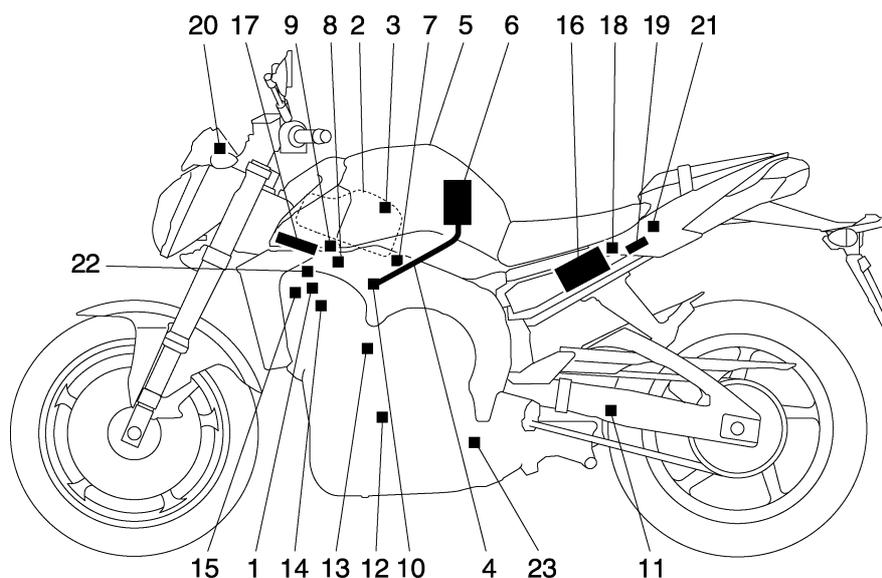
## FEATURES

### OUTLINE OF THE FI SYSTEM

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

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

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



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

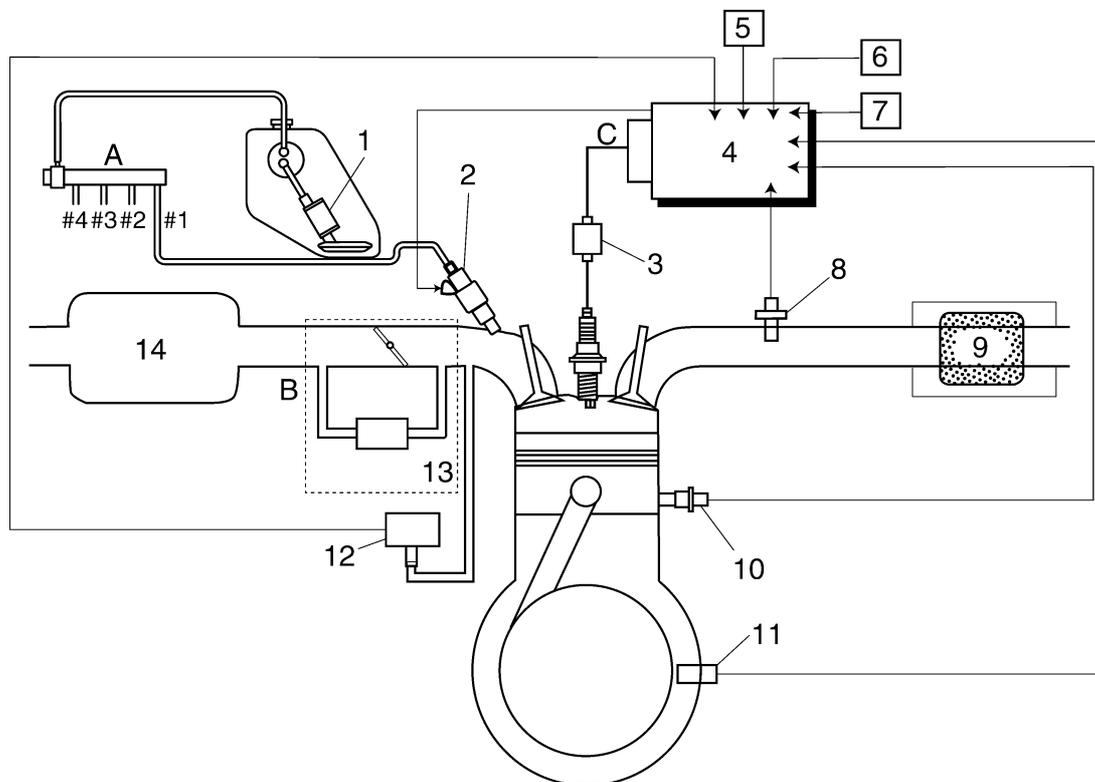
ET2D1001

## FI SYSTEM

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

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

**Illustration is for reference only.**



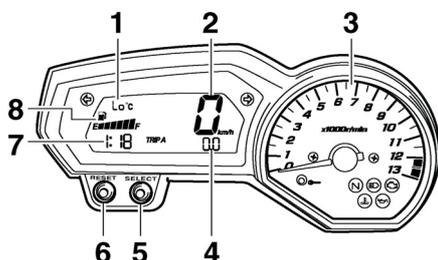
- |                                  |                     |
|----------------------------------|---------------------|
| 1. Fuel pump                     | 13. Throttle body   |
| 2. Fuel injector                 | 14. Air filter case |
| 3. Ignition coil                 | A. Fuel system      |
| 4.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

# INSTRUMENT FUNCTIONS

ET2D1002

## INSTRUMENT FUNCTIONS

### Multi-function meter unit



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

EW2D1005



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

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

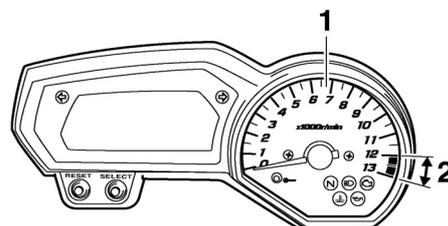
- a speedometer (which shows the riding speed)
- a tachometer (which shows engine speed)
- an odometer (which shows the total distance traveled)
- two tripmeters (which show the distance traveled since they were last set to zero)
- a fuel reserve tripmeter (which shows the distance traveled since the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

#### NOTE:

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

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

### Tachometer



1. Tachometer
2. Tachometer red zone

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

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

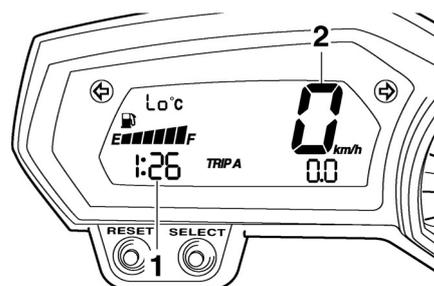
EC2D1007

#### CAUTION:

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

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

### Clock mode



1. Clock
2. Speedometer

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

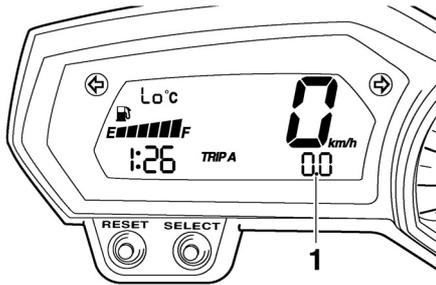
To set the clock

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

# INSTRUMENT FUNCTIONS

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

## Odometer and tripmeter modes



1. Odometer/tripmeter/fuel reserve tripmeter  
Push the “SELECT” button to switch the display between the odometer mode “ODO” and the tripmeter modes “TRIP A” and “TRIP B” in the following order:

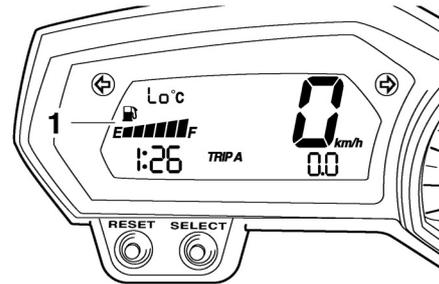
TRIP A → TRIP B → ODO → TRIP A

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

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

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

## Fuel meter



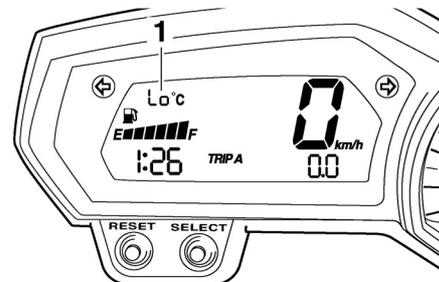
### 1. Fuel meter

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

#### NOTE:

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

## Coolant temperature mode



### 1. Coolant temperature display

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

#### NOTE:

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

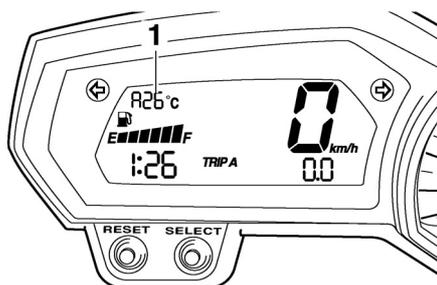
EC2D1011

#### CAUTION:

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

# INSTRUMENT FUNCTIONS

## Air intake temperature mode



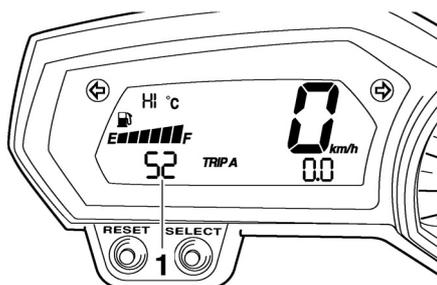
### 1. Air intake temperature display

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

#### NOTE:

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

## Self-diagnosis device



### 1. Error code display

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

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

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

If any of the immobilizer system circuits are defective, the immobilizer system indicator

light will flash, and then the display will indicate a two-digit error code (e.g., 51, 52, 53).

#### NOTE:

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

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

#### NOTE:

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

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

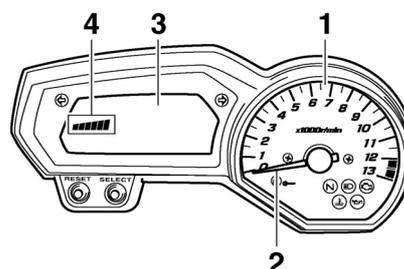
If the display indicates any error codes, note the code number, and then have a Yamaha dealer check the vehicle.

EC2D1012

#### CAUTION:

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

## LCD and tachometer brightness control mode



1. Tachometer panel
2. Tachometer needle
3. LCD
4. Brightness level

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

## INSTRUMENT FUNCTIONS

---

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

# IMPORTANT INFORMATION

EAS20180

## IMPORTANT INFORMATION

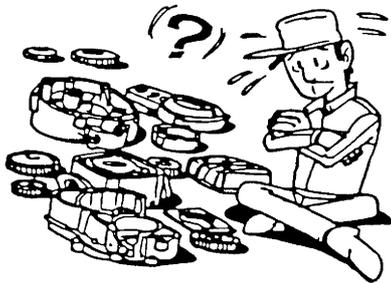
EAS20190

### PREPARATION FOR REMOVAL AND DISASSEMBLY

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



2. Use only the proper tools and cleaning equipment. Refer to "SPECIAL TOOLS" on page 1-11.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.

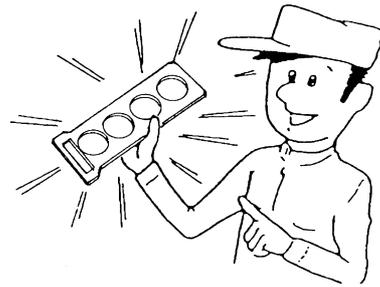


4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EAS20200

### REPLACEMENT PARTS

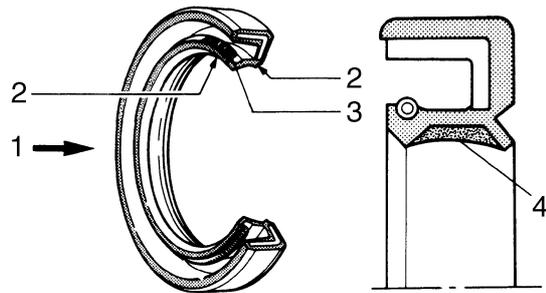
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



EAS20210

### GASKETS, OIL SEALS AND O-RINGS

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

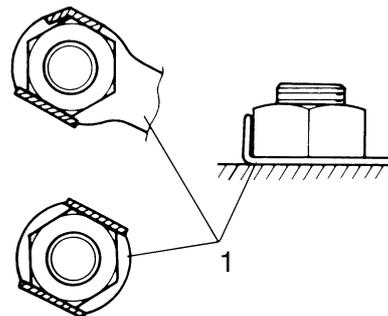


1. Oil
2. Lip
3. Spring
4. Grease

EAS20220

### LOCK WASHERS/PLATES AND COTTER PINS

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



EAS20230

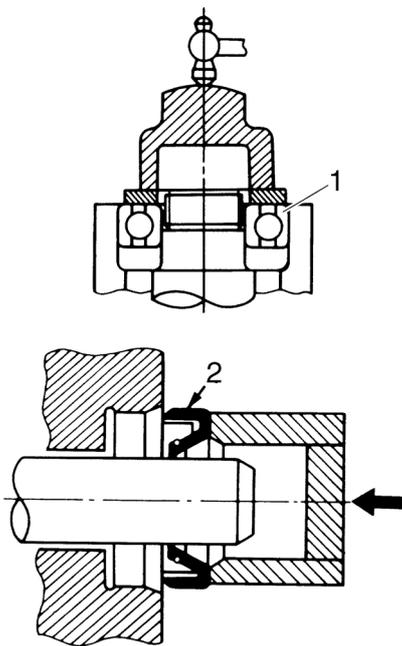
## BEARINGS AND OIL SEALS

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

ECA13300

### CAUTION:

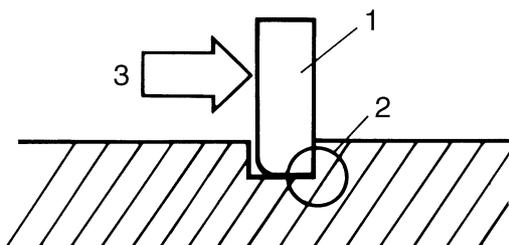
**Do not spin the bearing with compressed air because this will damage the bearing surfaces.**



EAS20240

## CIRCLIPS

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



# CHECKING THE CONNECTIONS

EAS20250

## CHECKING THE CONNECTIONS

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

1. Disconnect:

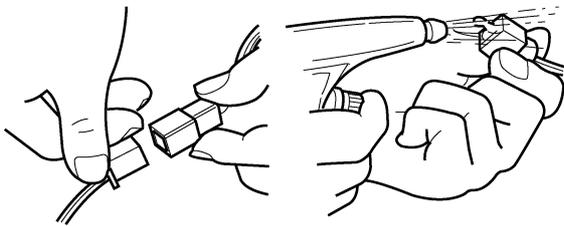
- Lead
- Coupler
- Connector

2. Check:

- Lead
- Coupler
- Connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.



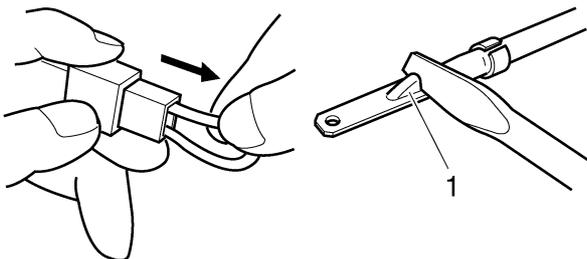
3. Check:

- All connections

Loose connection → Connect properly.

**NOTE:**

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



4. Connect:

- Lead
- Coupler
- Connector

**NOTE:**

Make sure all connections are tight.

5. Check:

- Continuity  
(with the pocket tester)



Pocket tester

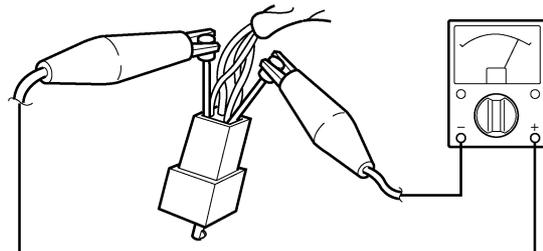
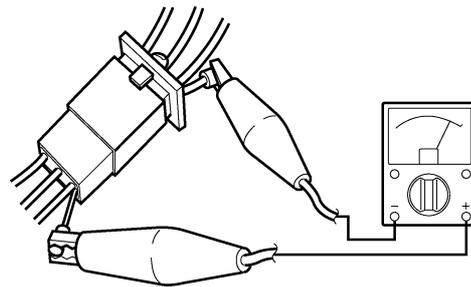
90890-03112

Analog Pocket tester

YU-03112-C

**NOTE:**

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



## SPECIAL TOOLS

EAS20260

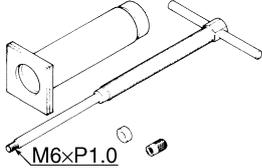
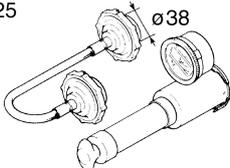
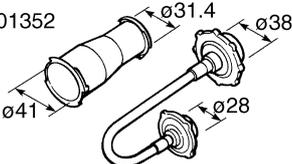
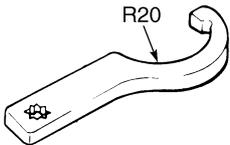
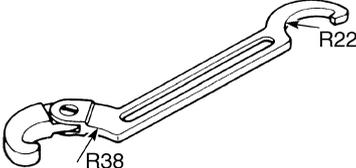
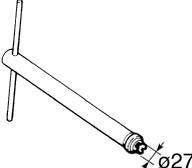
### SPECIAL TOOLS

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

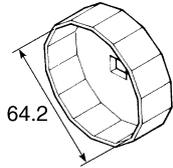
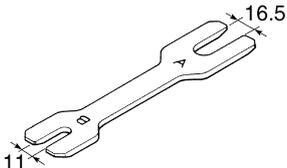
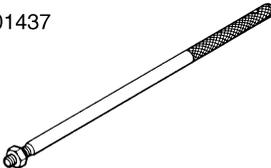
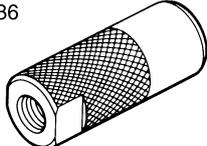
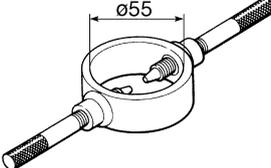
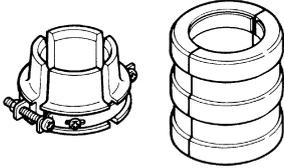
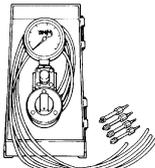
When placing an order, refer to the list provided below to avoid any mistakes.

**NOTE:**

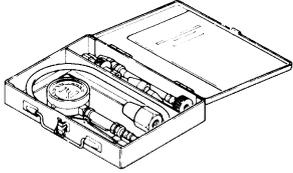
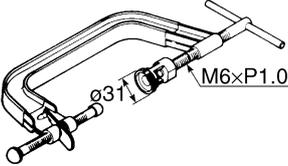
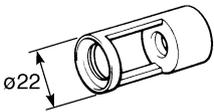
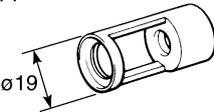
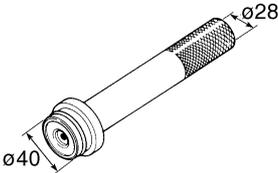
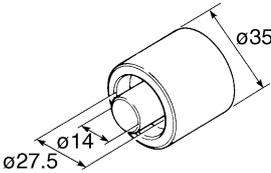
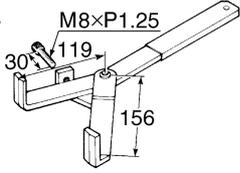
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

Tool name/Tool No.	Illustration	Reference pages
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304 	5-71
Radiator cap tester 90890-01325 Radiator pressure tester YU-24460-01	90890-01325 	6-3
Radiator cap tester adapter 90890-01352 Radiator pressure tester adapter YU-33984	90890-01352 	6-3
Steering nut wrench 90890-01403 Spanner wrench YU-33975		3-27, 4-59
Ring nut wrench 90890-01268 Spanner wrench YU-01268		4-59
Damper rod holder 90890-01423 Damping rod holder YM-01423		4-51, 4-52

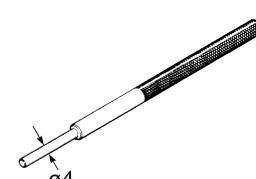
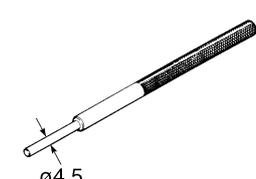
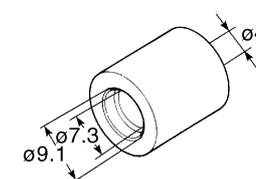
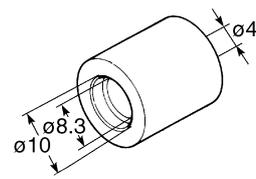
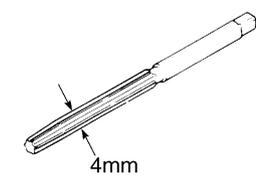
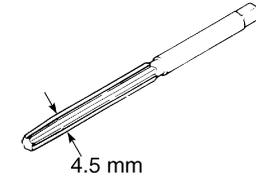
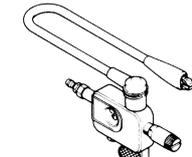
## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Oil filter wrench 90890-01426 YU-38411		3-13
Rod holder 90890-01434 Damper rod holder double ended YM-01434		4-50, 4-55
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703	90890-01437 	4-54
Rod puller attachment (M10) 90890-01436 Universal damping rod bleeding tool set YM-A8703	90890-01436 	4-54
Fork spring compressor 90890-01441 YM-01441		4-50, 4-55
Fork seal driver 90890-01442 Adjust table fork seal driver (36-46 mm) YM-01442		4-53
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456	90890-03094 	3-7

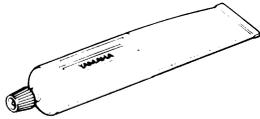
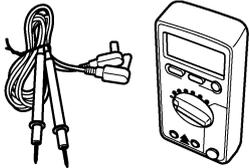
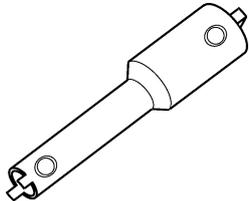
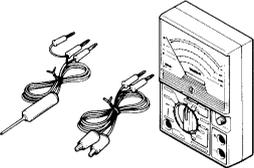
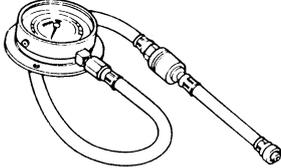
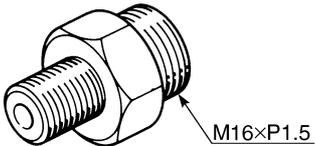
## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Compression gauge 90890-03081 Engine compression tester YU-33223		3-11
Valve spring compressor 90890-04019 YM-04019		5-23, 5-29
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter (22 mm) YM-04108		5-23, 5-29
Valve spring compressor attachment 90890-04114 Valve spring compressor adapter YM-04114	90890-04114 	5-23, 5-29
Middle driven shaft bearing driver 90890-04058 Bearing driver (40 mm) YM-04058		6-12
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A		6-12
Universal clutch holder 90890-04086 YM-91042	90890-04086 	5-47, 5-51

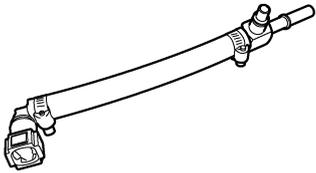
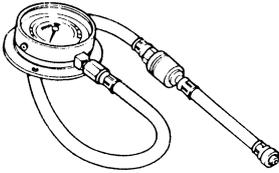
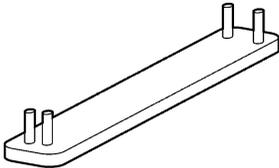
## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Valve guide remover (ø4) 90890-04111 Valve guide remover (4.0 mm) YM-04111		5-25
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-25
Valve guide installer (ø4) 90890-04112 Valve guide installer (4.0 mm) YM-04112		5-25
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117		5-25
Valve guide reamer (ø4) 90890-04113 Valve guide reamer (4.0 mm) YM-04113		5-25
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-25
Ignition checker 90890-06754 Opama pet-4000 spark checker YU-34487		8-104

## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Yamaha bond No.1215 (Three Bond No.1215®) 90890-85505		5-67, 6-12
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		7-9, 7-10
Pivot shaft wrench 90890-01518 Frame spanner socket YM-01518		5-7
Pivot shaft wrench adapter 90890-01476		5-7
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-10, 5-41, 8-95, 8-96, 8-97, 8-100, 8-102, 8-103, 8-104, 8-105, 8-106, 8-107, 8-108, 8-109, 8-110, 8-111, 8-112
Oil pressure gauge 90890-03153 Pressure gauge YU-03153		3-14
Oil pressure gauge adapter 90890-03139		3-14

## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Vacuum/pressure pump gauge set 90890-06756		7-8
Valve lapper 90890-04101 Valve lapping tool YM-A8998		3-5
Fuel pressure adapter 90890-03176 YM-03176		7-8
Pressure gauge 90890-03153 YU-03153		3-14, 7-8
Camshaft wrench 90890-04143 YM-04143		5-11, 5-16



---

## SPECIFICATIONS

<b>GENERAL SPECIFICATIONS</b> .....	2-1
<b>ENGINE SPECIFICATIONS</b> .....	2-1
<b>CHASSIS SPECIFICATIONS</b> .....	2-8
<b>ELECTRICAL SPECIFICATIONS</b> .....	2-10
<b>TIGHTENING TORQUES</b> .....	2-12
GENERAL TIGHTENING TORQUE SPECIFICATIONS .....	2-12
ENGINE TIGHTENING TORQUES .....	2-13
CHASSIS TIGHTENING TORQUES .....	2-17
<b>LUBRICATION POINTS AND LUBRICANT TYPES</b> .....	2-20
ENGINE .....	2-20
CHASSIS .....	2-22
<b>LUBRICATION SYSTEM CHART AND DIAGRAMS</b> .....	2-23
ENGINE OIL LUBRICATION CHART .....	2-23
LUBRICATION DIAGRAMS .....	2-25
<b>COOLING SYSTEM DIAGRAMS</b> .....	2-35
<b>CABLE ROUTING</b> .....	2-39

# GENERAL SPECIFICATIONS

EAS20280

## GENERAL SPECIFICATIONS

### Model

Model	2D11 (EUR) 2D13 (AUS) 3C31 (EUR) 3C33 (AUS) 3C37 (EUR) 3C39 (AUS)
-------	--

### Dimensions

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

### Weight

With oil and fuel	214.0 kg (472 lb) (FZ1-N) 220.0 kg (485 lb) (FZ1-S)
Maximum load	196 kg (432 lb) (FZ1-N) 190 kg (419 lb) (FZ1-S)

EAS20290

## ENGINE SPECIFICATIONS

### Engine

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

### Fuel

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

### Engine oil

Lubrication system	Wet sump
Type	SAE10W30 or SAE10W40 or SAE15W40 or SAE20W40 or SAE20W50
Recommended engine oil grade	API service SE, SF, SG type or higher
Engine oil quantity	
Total amount	3.80 L (4.02 US qt) (3.34 Imp.qt)
Without oil filter cartridge replacement	2.90 L (3.07 US qt) (2.55 Imp.qt)
With oil filter cartridge replacement	3.10 L (3.28 US qt) (2.73 Imp.qt)

### Oil filter

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

### Oil pump

Oil pump type	Trochoid
---------------	----------

## ENGINE SPECIFICATIONS

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

### Cooling system

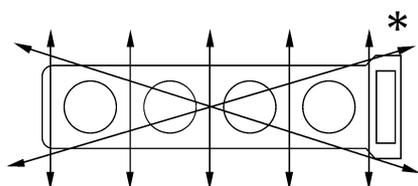
Radiator capacity (including all routes)	2.25 L (2.38 US qt) (1.98 Imp.qt)
Coolant reservoir capacity (up to the maximum level mark)	0.25 L (0.26 US qt) (0.22 Imp.qt)
Radiator cap opening pressure	93.3–122.7 kPa (13.5–17.8 psi) (0.93–1.23 kgf/cm <sup>2</sup> )
Radiator core	
Width	222.6 mm (8.76 in)
Height	360.0 mm (14.17 in)
Depth	22.0 mm (0.87 in)
Water pump	
Water pump type	Single suction centrifugal pump
Reduction ratio	65/43 × 25/32 (1.181)
Max impeller shaft tilt limit	0.15 mm (0.0059 in)

### Spark plug (s)

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

### Cylinder head

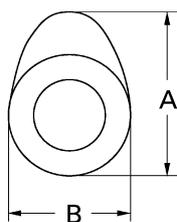
Volume	12.20–13.00 cm <sup>3</sup> (0.74–0.79 cu.in)
Warpage limit*	0.10 mm (0.0039 in)



### Camshaft

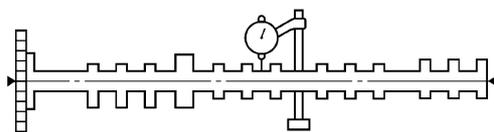
Drive system	Chain drive (right)
Camshaft cap inside diameter	22.500–22.521 mm (0.8858–0.8867 in)
Camshaft journal diameter	22.459–22.472 mm (0.8842–0.8847 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Camshaft lobe dimensions	
Intake A	32.500–32.600 mm (1.2795–1.2835 in)
Limit	32.400 mm (1.2756 in)
Intake B	24.950–25.050 mm (0.9823–0.9862 in)
Limit	24.850 mm (0.9783 in)
Exhaust A	30.699–30.799 mm (1.2086–1.2126 in)
Limit	30.599 mm (1.2047 in)
Exhaust B	22.950–23.050 mm (0.9035–0.9075 in)
Limit	22.850 mm (0.8996 in)

# ENGINE SPECIFICATIONS



Camshaft runout limit

0.030 mm (0.0012 in)



## Timing chain

Model/number of links  
Tensioning system

RH2020/122  
Automatic

## Valve, valve seat, valve guide

Valve clearance (cold)

Intake

0.11–0.20 mm (0.0043–0.0079 in)

Exhaust

0.21–0.25 mm (0.0083–0.0098 in)

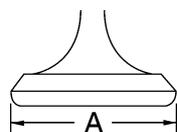
Valve dimensions

Valve head diameter A (intake)

23.40–23.60 mm (0.9213–0.9291 in)

Valve head diameter A (exhaust)

24.90–25.10 mm (0.9803–0.9882 in)

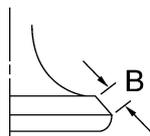


Valve face width B (intake)

1.760–2.900 mm (0.0693–0.1142 in)

Valve face width B (exhaust)

1.760–2.900 mm (0.0693–0.1142 in)

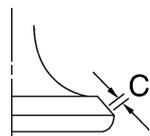


Valve seat width C (intake)

0.90–1.10 mm (0.0354–0.0433 in)

Valve seat width C (exhaust)

0.90–1.10 mm (0.0354–0.0433 in)

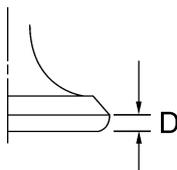


Valve margin thickness D (intake)

0.50–0.90 mm (0.0197–0.0354 in)

Valve margin thickness D (exhaust)

0.50–0.90 mm (0.0197–0.0354 in)



Valve stem diameter (intake)

3.975–3.990 mm (0.1565–0.1571 in)

Limit

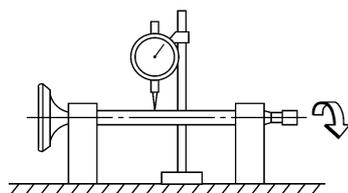
3.945 mm (0.1553 in)

Valve stem diameter (exhaust)

4.460–4.475 mm (0.1756–0.1762 in)

## ENGINE SPECIFICATIONS

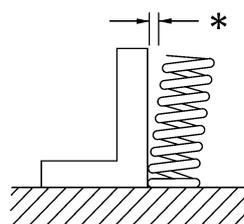
Limit	4.425 mm (0.1742 in)
Valve guide inside diameter (intake)	4.000–4.012 mm (0.1575–0.1580 in)
Limit	4.050 mm (0.1594 in)
Valve guide inside diameter (exhaust)	4.500–4.512 mm (0.1772–0.1776 in)
Limit	4.550 mm (0.1791 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)	0.025–0.052 mm (0.0010–0.0020 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)



Cylinder head valve seat width (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Cylinder head valve seat width (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)

### Valve spring

Inner spring	
Free length (intake)	40.47 mm (1.59 in)
Free length (exhaust)	40.53 mm (1.60 in)
Installed length (intake)	32.66 mm (1.29 in)
Installed length (exhaust)	33.88 mm (1.33 in)
Spring rate K1 (intake)	17.53 N/mm (100.10 lb/in) (1.79 kgf/mm)
Spring rate K2 (intake)	22.86 N/mm (130.53 lb/in) (2.33 kgf/mm)
Spring rate K1 (exhaust)	21.52 N/mm (122.88 lb/in) (2.19 kgf/mm)
Spring rate K2 (exhaust)	27.99 N/mm (159.82 lb/in) (2.85 kgf/mm)
Installed compression spring force (intake)	127.40–144.60 N (28.64–32.51 lb) (12.99–14.74 kgf)
Installed compression spring force (exhaust)	133.00–153.00 N (29.90–34.39 lb) (13.56–15.60 kgf)
Spring tilt (intake)*	2.5 °/1.8 mm
Spring tilt (exhaust)*	2.5 °/1.8 mm



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

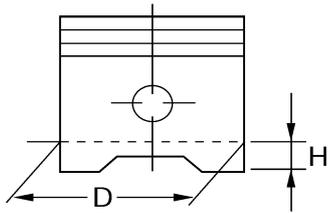
### Cylinder

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

### Piston

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

# ENGINE SPECIFICATIONS



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

## Piston ring

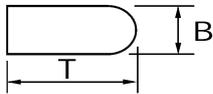
### Top ring

Ring type

Barrel

Dimensions (B × T)

0.90 × 2.75 mm (0.04 × 0.11 in)



End gap (installed)

0.15–0.25 mm (0.0059–0.0098 in)

Ring side clearance

0.030–0.065 mm (0.0012–0.0026 in)

### 2nd ring

Ring type

Taper

Dimensions (B × T)

0.80 × 2.75 mm (0.03 × 0.11 in)



End gap (installed)

0.30–0.45 mm (0.0118–0.0177 in)

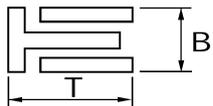
Ring side clearance

0.020–0.055 mm (0.0008–0.0022 in)

### Oil ring

Dimensions (B × T)

1.50 × 2.25 mm (0.06 × 0.09 in)



End gap (installed)

0.10–0.40 mm (0.0039–0.0157 in)

## Connecting rod

Oil clearance (using plastigauge®)

0.034–0.058 mm (0.0013–0.0023 in)

Bearing color code

1.Blue 2.Black 3.Brown 4.Green

## Crankshaft

Width A

55.20–56.60 mm (2.173–2.228 in)

Width B

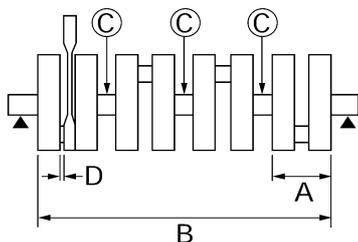
298.75–300.65 mm (11.76–11.84 in)

Runout limit C

0.030 mm (0.0012 in)

Big end side clearance D

0.160–0.262 mm (0.0063–0.0103 in)



## ENGINE SPECIFICATIONS

---

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

---

### Clutch

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

---

### Transmission

Transmission type	Constant mesh 6-speed
Primary reduction system	Spur gear
Primary reduction ratio	65/43 (1.512)
Secondary reduction system	Chain drive
Secondary reduction ratio	45/17 (2.647)
Operation	Left foot operation
Gear ratio	
1st	38/15 (2.533)
2nd	33/16 (2.063)
3rd	37/21 (1.762)
4th	35/23 (1.522)
5th	27/20 (1.350)
6th	29/24 (1.208)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)

---

### Shifting mechanism

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

---

### Air filter

Air filter element	Oil-coated paper element
--------------------	--------------------------

---

### Fuel pump

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

---

### Fuel injection

Model/quantity	297500-0300/4
Manufacturer	DENSO

---

### Throttle body

Type/quantity	SE 45E1DW-B10/1
Manufacturer	MIKUNI
ID mark	2D11 00
Throttle valve size	#100

---

### Throttle position sensor

Resistance	4.9–5.1 kΩ
Output voltage (at idle)	0.63–0.73 V

---

## ENGINE SPECIFICATIONS

---

### Idling condition

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

# CHASSIS SPECIFICATIONS

EAS20300

## CHASSIS SPECIFICATIONS

### Chassis

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

### Front wheel

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

### Rear wheel

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

### Front tire

Size	120/70 ZR17M/C (58W)
Manufacturer/model	MICHELIN/Pilot Road S
Manufacturer/model	DUNLOP/D221FA
Wear limit (front)	0.8 mm (0.03 in)

### Rear tire

Size	190/50 ZR17M/C (73W)
Manufacturer/model	MICHELIN/Pilot Road D
Manufacturer/model	DUNLOP/D221G
Wear limit (rear)	0.8 mm (0.03 in)

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

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

### Front brake

Type	Dual disc brake
Operation	Right hand operation
Front brake lever free play	2.3–11.5 mm (0.09–0.45 in)
Front disc brake	
Disc outside diameter × thickness	320.0 × 4.5 mm (12.60 × 0.18 in)
Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc deflection limit	0.10 mm (0.0039 in)
Brake pad lining thickness (inner)	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Brake pad lining thickness (outer)	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)

## CHASSIS SPECIFICATIONS

---

Master cylinder inside diameter	16.00 mm (0.63 in)
Caliper cylinder inside diameter	30.20 mm (1.19 in)
Caliper cylinder inside diameter	27.00 mm (1.06 in)
Recommended fluid	DOT 4

---

### Rear brake

Type	Single disc brake
Operation	Right foot operation
Brake pedal free play	4.3–9.3 mm (0.17–0.37 in)
Rear disc brake	
Disc outside diameter × thickness	245.0 × 5.0 mm (9.65 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Brake pad lining thickness (outer)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	38.20 mm (1.50 in)
Recommended fluid	DOT 4

---

### Steering

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

---

### Front suspension

Type	Telescopic fork
Spring/shock absorber type	Coil spring/oil damper
Front fork travel	130.0 mm (5.12 in)
Fork spring free length	243.5 mm (9.59 in)
Collar length	100.0 mm (3.94 in)
Installed length	239.0 mm (9.41 in)
Spring rate K1	9.32 N/mm (53.22 lb/in) (0.95 kgf/mm)
Spring stroke K1	0.0–130.0 mm (0.00–5.12 in)
Inner tube outer diameter	43.0 mm (1.69 in)
Inner tube bending limit	0.2 mm (0.01 in)
Optional spring available	No
Recommended oil	Suspension oil 01 or equivalent
Quantity	545.0 cm <sup>3</sup> (18.43 US oz) (19.18 Imp.oz)
Level	91.0 mm (3.58 in)

---

### Rear suspension

Type	Swingarm (link suspension)
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	60.0 mm (2.36 in)
Spring free length	191.3 mm (7.53 in)
Installed length	181.8 mm (7.16 in)
Spring rate K1	120.00 N/mm (685.20 lb/in) (12.24 kgf/mm)
Spring stroke K1	0.0–60.0 mm (0.00–2.36 in)
Optional spring available	No
Enclosed gas/air pressure (STD)	1000 kPa (142.2 psi) (10.0 kgf/cm <sup>2</sup> )

---

### Drive chain

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

# ELECTRICAL SPECIFICATIONS

EAS20310

## ELECTRICAL SPECIFICATIONS

### Voltage

System voltage 12 V

### Ignition system

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

### Engine control unit

Model/manufacture TBDF20/DENSO

### Transistorized coil ignition

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

### Ignition coil

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

### AC magneto

Model/manufacture STATOR:F074T85073/MITSUBISHI  
Standard output 14.0 V/40.0 A/6500 r/min  
Stator coil resistance 0.14–0.18  $\Omega$  at 20°C (68°F)

### Voltage regulator

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

### Battery

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

### Headlight

Bulb type Halogen bulb

### Bulb voltage, wattage × quantity

Headlight 12 V, 60 W/55.0 W × 1 (FZ1-N)  
12 V, 60 W/55.0 W × 2 (FZ1-S)  
Auxiliary light 12 V, 5.0 W × 2  
Tail/brake light 12 V, 5.0 W/21.0 W × 1  
Front turn signal light 12 V, 10.0 W × 2  
Rear turn signal light 12 V, 10.0 W × 2  
License plate light 12 V, 5.0 W × 1  
Meter lighting LED

### Indicator light

Neutral indicator light LED  
Turn signal indicator light LED  
Oil level warning light LED  
High beam indicator light LED

## ELECTRICAL SPECIFICATIONS

---

Coolant temperature warning light	LED
Engine trouble warning light	LED
Immobilizer system indicator light	LED

---

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

---

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

---

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

---

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

---

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

---

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

---

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

---

<b>Fuses</b>	
Main fuse	50.0 A
Headlight fuse	15.0 A (FZ1-N) 25.0 A (FZ1-S)
Taillight fuse	10.0 A
Signaling system fuse	10.0 A
Ignition fuse	15.0 A
Radiator fan fuse	10.0 A $\times$ 2
Fuel injection system fuse	15.0 A
Backup fuse	10.0 A
Reserve fuse	25.0 A (FZ1-S)
Reserve fuse	15.0 A
Reserve fuse	10.0 A

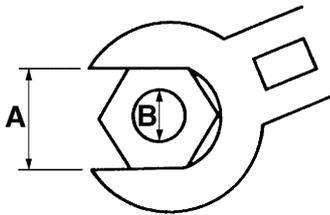
EAS20320

## TIGHTENING TORQUES

EAS20330

### GENERAL TIGHTENING TORQUE SPECIFICATIONS

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



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

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

## TIGHTENING TORQUES

EAS20340

### ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Spark plug	M10	4	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Cylinder head nut	M10	10	See NOTE	
Cylinder head bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Camshaft caps bolt	M6	28	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Cylinder head cover bolt	M6	6	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Cylinder head stud bolt (exhaust pipe)	M8	8	15 Nm (1.5 m·kg, 11 ft·lb)	
Air indication system cap bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Camshaft sprocket bolt	M7	4	24 Nm (2.4 m·kg, 17 ft·lb)	
Cylinder head and throttle body clamp	M5	4	3 Nm (0.3 m·kg, 2.2 ft·lb)	
Connecting rod cap bolt (1st)	M8	8	20 Nm (2.0 m·kg, 14 ft·lb)	
Connecting rod cap bolt (final)	M8	8	Specified angle 150°	
Generator rotor bolt	M10	1	60 Nm (6.0 m·kg, 43 ft·lb)	
Timing chain tensioner bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Water pump outlet pipe bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Water pump inlet pipe bolt (water pump side)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Water pump inlet pipe bolt (front side)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil/water pump drive sprocket bolt	M6	1	15 Nm (1.5 m·kg, 11 ft·lb)	
Water pump bolt	M6	5	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Thermostat cover nut	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Thermostat inlet pipe bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil cooler bolt	M20	1	63 Nm (6.3 m·kg, 46 ft·lb)	
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kg, 31 ft·lb)	
Oil pipe bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil strainer bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil delivery pipe bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil filter union bolt	M20	1	70 Nm (7.0 m·kg, 51 ft·lb)	
Oil filter	M20	1	17 Nm (1.7 m·kg, 12 ft·lb)	
Oil pan bolt	M6	14	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil pan bolt	M6	1	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Air filter case cover screw	M5	11	1.2 Nm (0.12 m·kg, 0.9 ft·lb)	
Throttle body and throttle body joint clamp	M5	4	3 Nm (0.3 m·kg, 2.2 ft·lb)	
Throttle body and funnel bolt	M5	6	4.2 Nm (0.42 m·kg, 3.0 ft·lb)	
Throttle cable adjusting bolt	M6	1	4.5 Nm (0.45 m·kg, 3.3 ft·lb)	

## TIGHTENING TORQUES

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

## TIGHTENING TORQUES

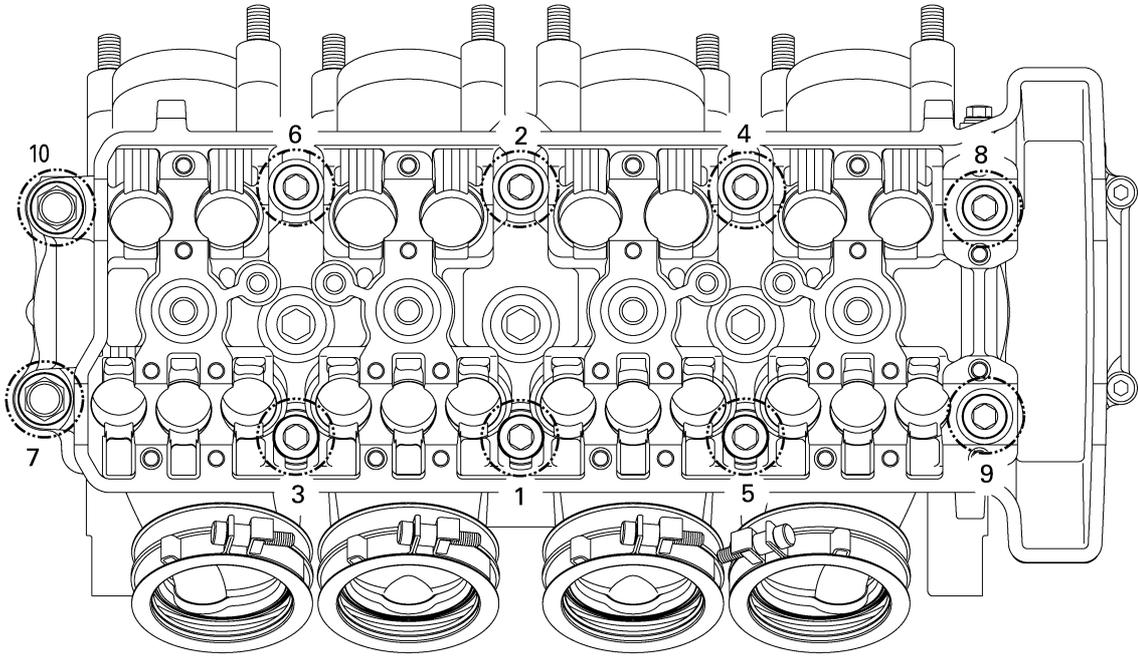
Item	Thread size	Q'ty	Tightening torque	Remarks
Clutch spring bolt	M6	6	10 Nm (1.0 m·kg, 7.2 ft·lb)	Use a lock washer
Drive sprocket nut	M22	1	85 Nm (8.5 m·kg, 61 ft·lb)	
Bearing plate bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Shift fork stopper plate bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Stopper screw	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	
Shift rod locknut (front)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Shift rod locknut (rear)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	Left thread
Shift rod joint bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Shift arm bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Neutral switch	M10	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Sub-throttle servo motor cover bolt	M4	3	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Coolant temperature sensor	M12	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Cylinder identification sensor bolt	M6	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Atmospheric pressure sensor bolt	M5	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Crankshaft position sensor bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Oil level switch bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Starter motor bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	

**NOTE:**

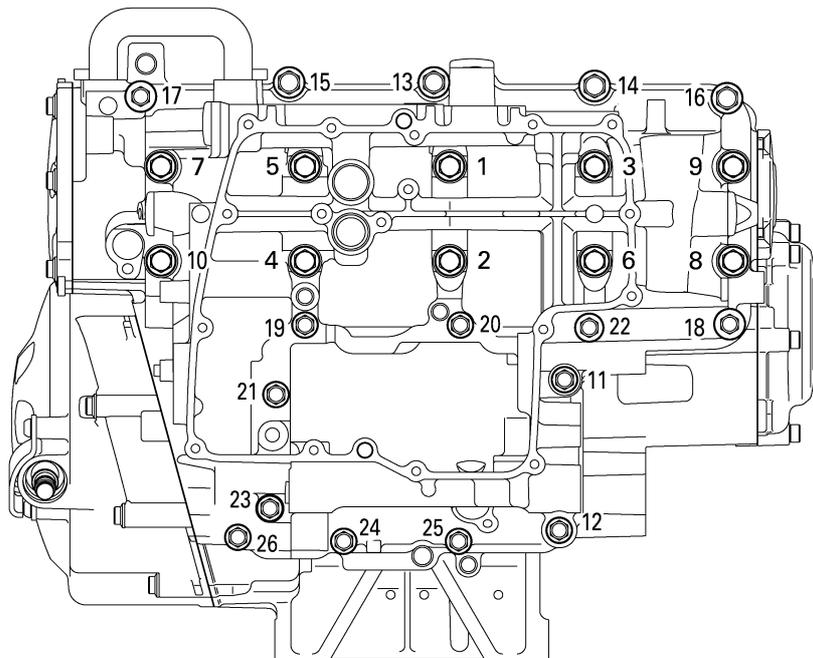
- Cylinder head nut
  - 1 First, tighten the bolts to approximately 19 Nm (1.9 m·kg, 14 ft·lb) with a torque wrench following the tightening order.
  - 2 Retighten the bolts 67 Nm (6.7 m·kg, 48 ft·lb) with a torque wrench.
- Connecting rod cap bolt
  - 1 Tighten the connecting rod bolts to 20 Nm (2.0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

# TIGHTENING TORQUES

Cylinder head tightening sequence:



Crankcase tightening sequence:



## TIGHTENING TORQUES

EAS20350

### CHASSIS TIGHTENING TORQUES

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

## TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Rear brake hose holder screw	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank bolt (front)	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank bolt (rear)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank bracket screw	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank cap bolt	M5	5	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Fuel pump bolt	M5	6	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Seat lock assembly nut	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Mud guard assembly bolt	M8	4	16 Nm (1.6 m·kg, 12 ft·lb)	
License plate light screw	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Rear reflector nut	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Mud guard assembly bracket screw	M5	6	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Tail/brake light bracket bolt	M8	3	16 Nm (1.6 m·kg, 12 ft·lb)	
Rear fender bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Seat bracket bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Exhaust pipe assembly bracket bolt	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Side cover screw	M6	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Lean angle sensor bolt	M4	2	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Coolant reserver tank bolt	M6	1	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Front wheel axle shaft	M18	1	72 Nm (7.2 m·kg, 52 ft·lb)	
Front wheel axle pinch bolt	M8	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Front brake caliper bolt	M10	4	40 Nm (4.0 m·kg, 29 ft·lb)	
Front brake disc screw	M6	10	18 Nm (1.8 m·kg, 13 ft·lb)	
Brake caliper bleed screw	M8	3	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Rear wheel axle nut	M24	1	150 Nm (15.0 m·kg, 108 ft·lb)	
Rear brake disc screw	M8	5	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear brake caliper bolt (front)	M12	1	27 Nm (2.7 m·kg, 20 ft·lb)	
Rear brake caliper bolt (rear)	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	
Rear wheel sprocket nut	M10	6	100 Nm (10.0 m·kg, 72 ft·lb)	
Drive chain adjusting locknut	M8	2	16 Nm (1.6 m·kg, 12 ft·lb)	
Rear brake hose union bolt	M10	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Sidestand nut	M10	1	48 Nm (4.8 m·kg, 35 ft·lb)	
Sidestand bracket bolt	M10	2	63 Nm (6.3 m·kg, 46 ft·lb)	
Sidestand switch bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Footrest bracket bolt	M8	4	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear brake fluid reserver tank bolt	M5	1	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Rear brake master cylinder bolt	M8	2	23 Nm (2.3 m·kg, 17 ft·lb)	
Centerstand nut (FZ1-S)	M10	2	56 Nm (5.6 m·kg, 41 ft·lb)	
Centerstand bracket nut (FZ1-S)	M10	4	55 Nm (5.5 m·kg, 40 ft·lb)	
Centerstand bracket adapter bolt (FZ1-S)	M10	2	73 Nm (7.3 m·kg, 53 ft·lb)	
Footrest bolt	M10	4	55 Nm (5.5 m·kg, 40 ft·lb)	
Throttle cable adjust nut	M6	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	

## TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Clutch cable adjust nut	M8	1	7 Nm (0.7 m•kg, 5.1 ft•lb)	

**NOTE:**

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

2 Retighten the lower ring nut 18 Nm (1.8 m•kg, 13 ft•lb).

# LUBRICATION POINTS AND LUBRICANT TYPES

EAS20360

## LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370

### ENGINE

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

## LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication point	Lubricant
Pickup rotor cover	Yamaha bond No. 1215

# LUBRICATION POINTS AND LUBRICANT TYPES

EAS20380

## CHASSIS

Lubrication point	Lubricant
Steering bearings and bearing races (upper and lower)	
Throttle grip inner surface	
Brake lever pivoting point and metal-to-metal moving parts	
Clutch lever pivoting point and metal-to-metal moving parts	
Engine mount bolts (rear upper and lower)	
Engine mount bolts (front left and right)	
Relay arm, connecting rod and rear shock absorber collar	
Pivot shaft	
Swingarm pivot bearing	
Swingarm head pipe end, oil seal and bush	
Oil seal (relay arm, connecting arm and rear shock absorber)	
Seat lock assembly moving parts	
Sidestand pivoting point and metal-to-metal moving parts	
Sidestand switch contact point	
Sidestand hook and spring contact point	
Shift shaft joint rod moving parts	
Shift pedal pivoting parts	
Rear footrest ball and metal-to-metal moving parts	
Centerstand metal-to-metal moving parts (FZ1-S)	
Front wheel oil seal (left and right)	
Rear wheel oil seal	
Rear wheel drive hub oil seal	
Rear wheel drive hub mating surface	

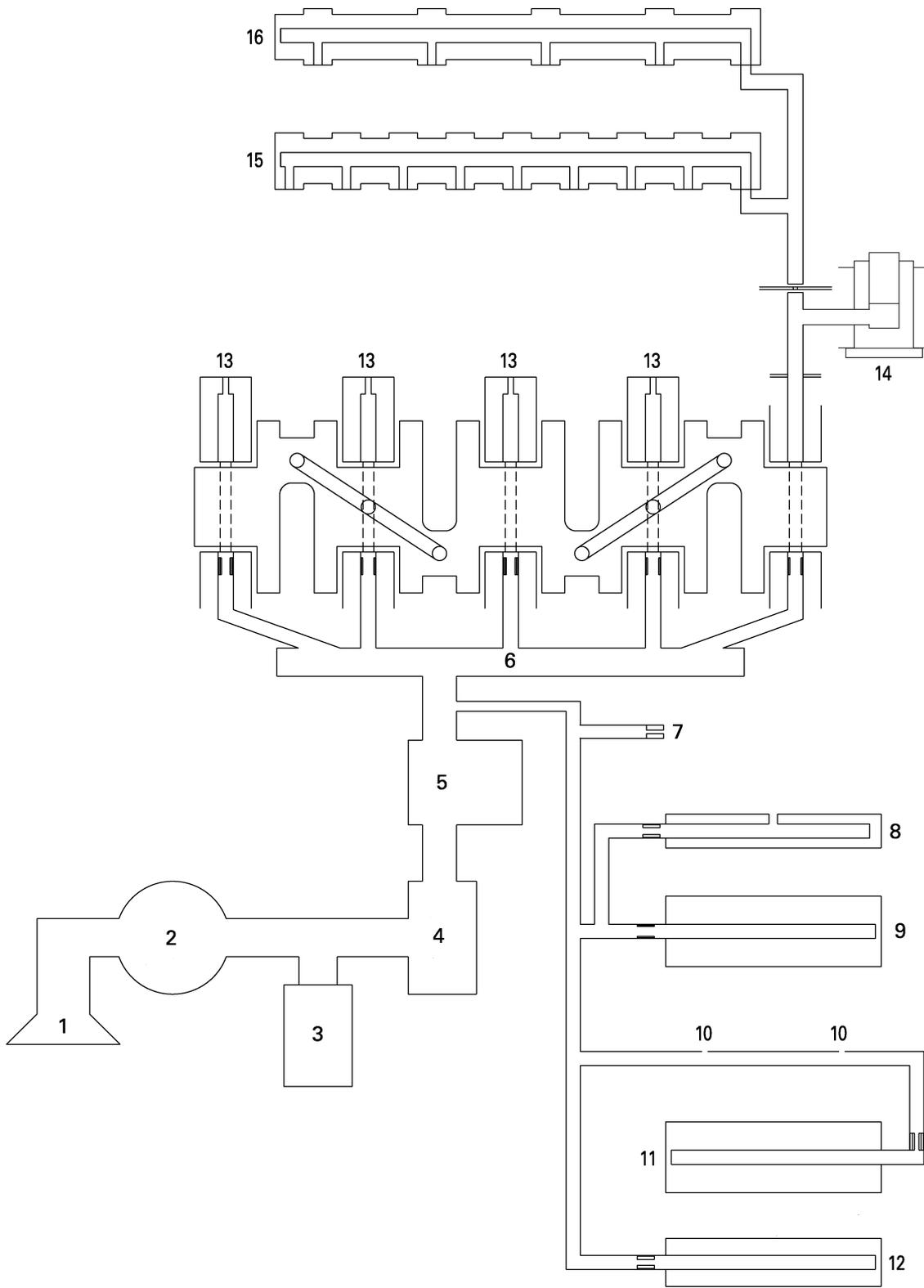
# LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20390

## LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20400

### ENGINE OIL LUBRICATION CHART



## LUBRICATION SYSTEM CHART AND DIAGRAMS

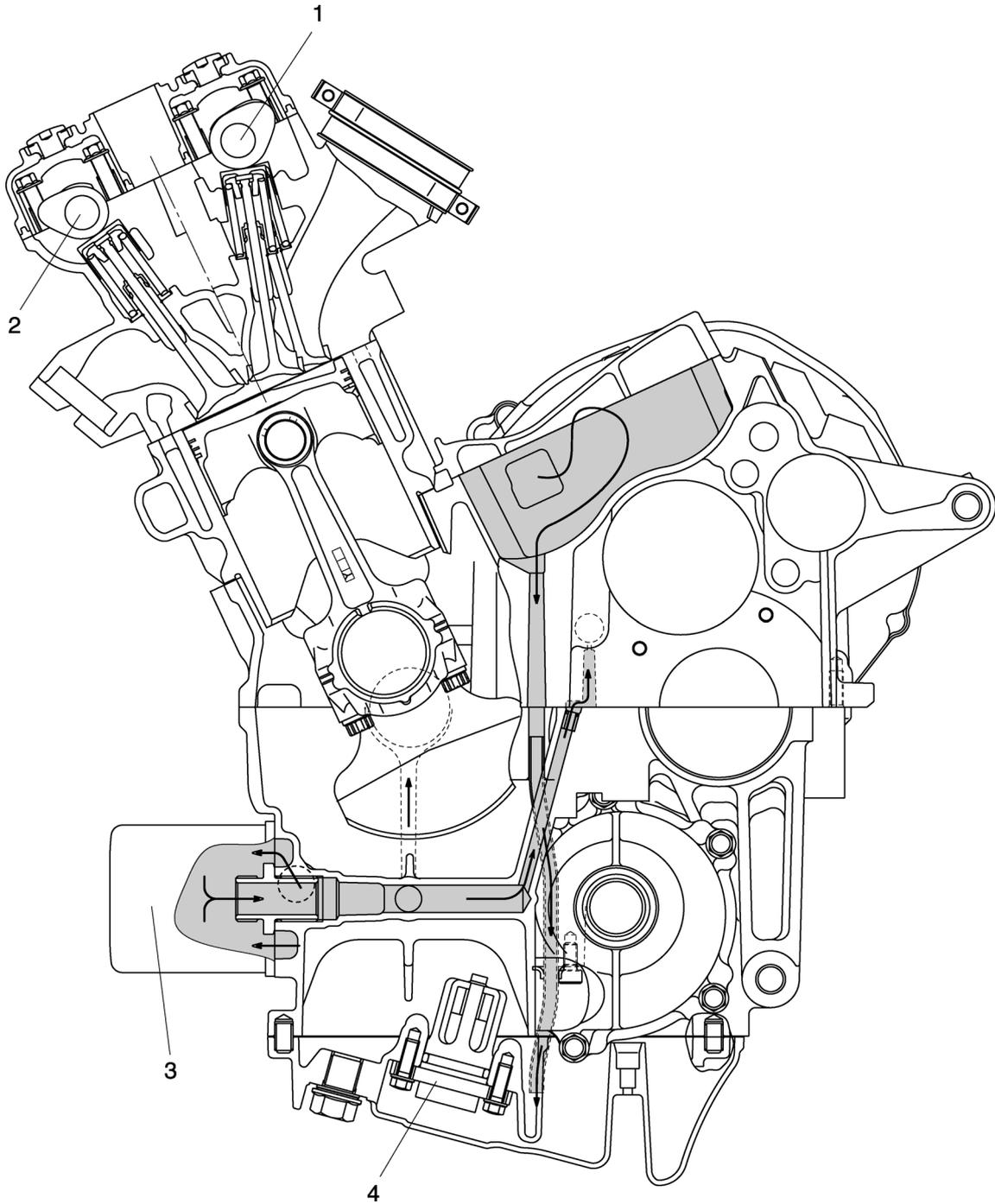
---

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20410

## LUBRICATION DIAGRAMS



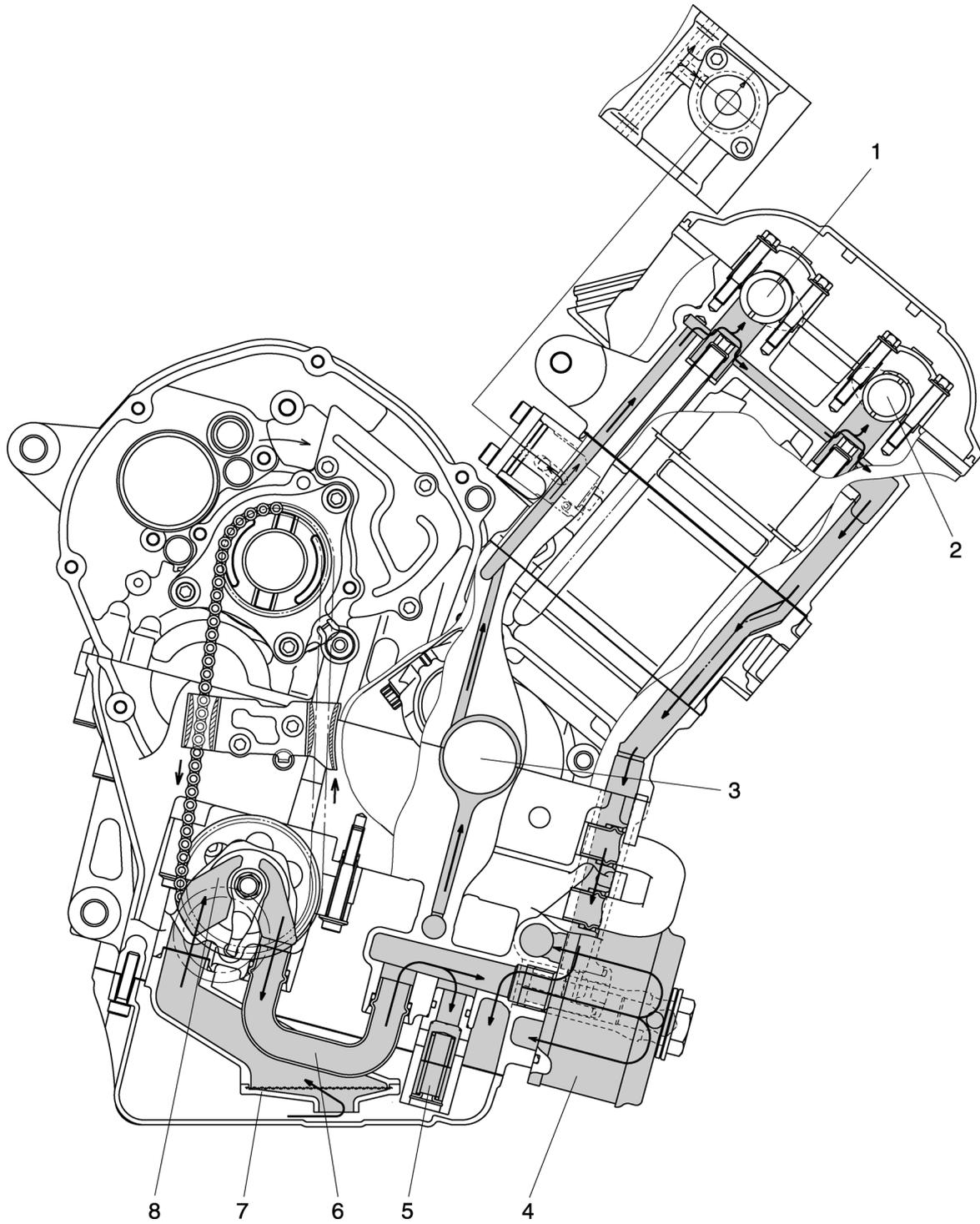
## LUBRICATION SYSTEM CHART AND DIAGRAMS

---

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

---



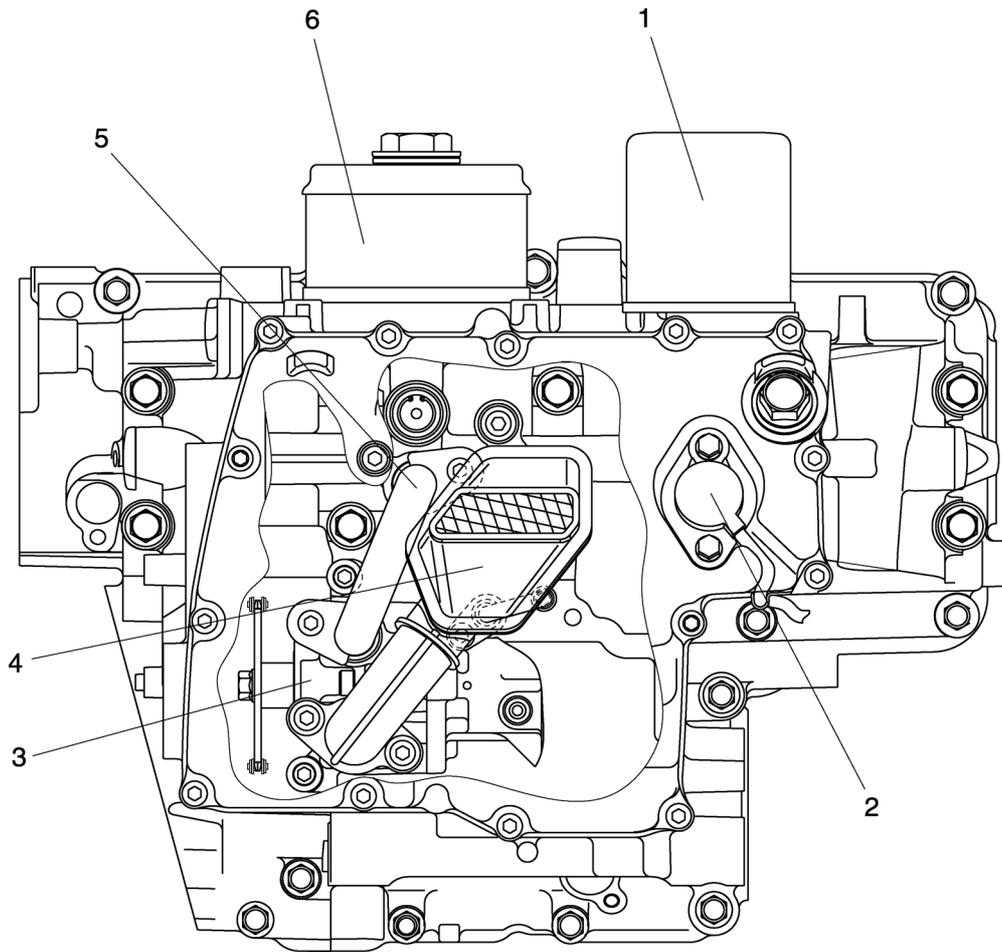
## LUBRICATION SYSTEM CHART AND DIAGRAMS

---

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

---



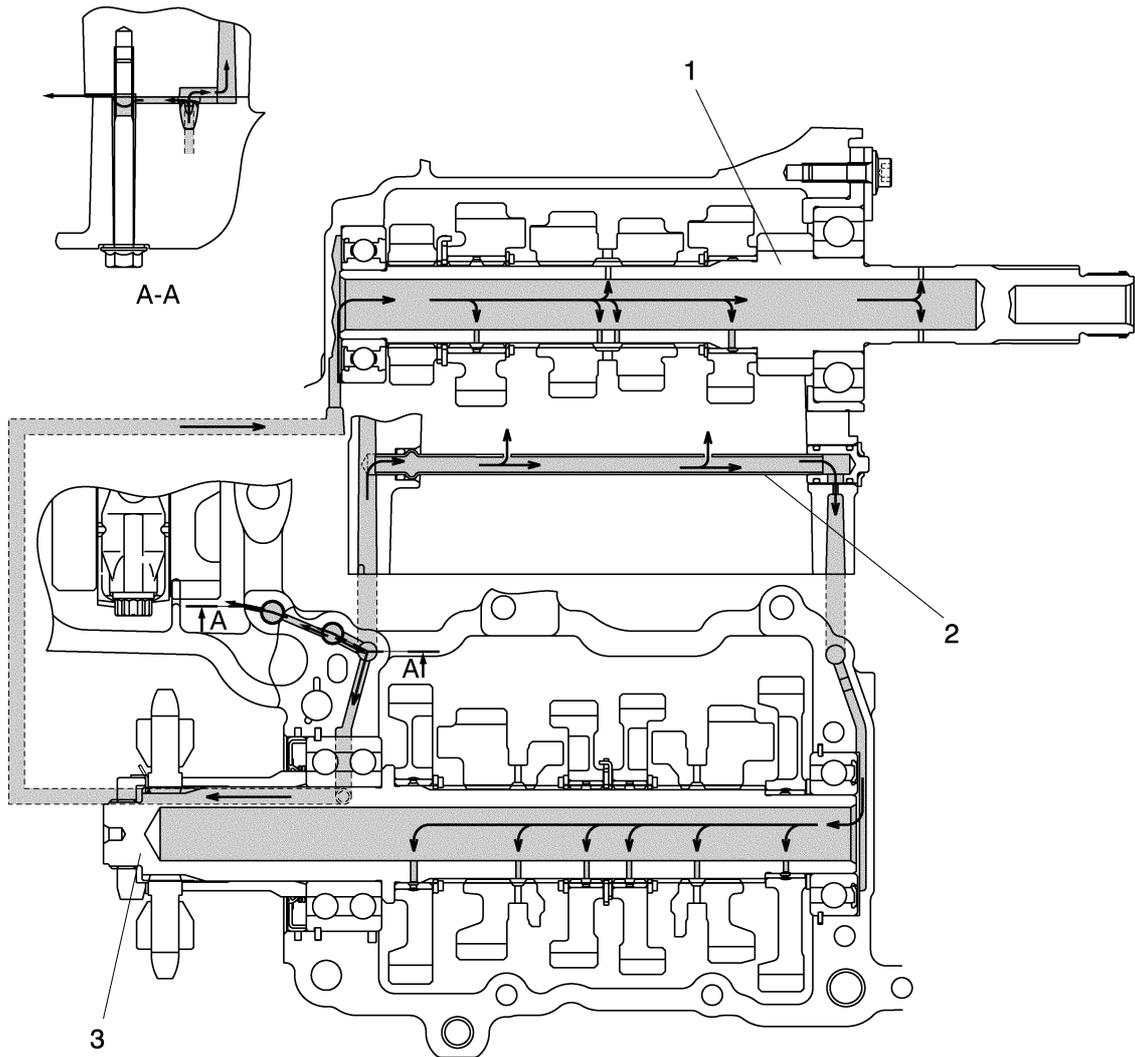
# LUBRICATION SYSTEM CHART AND DIAGRAMS

---

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

---



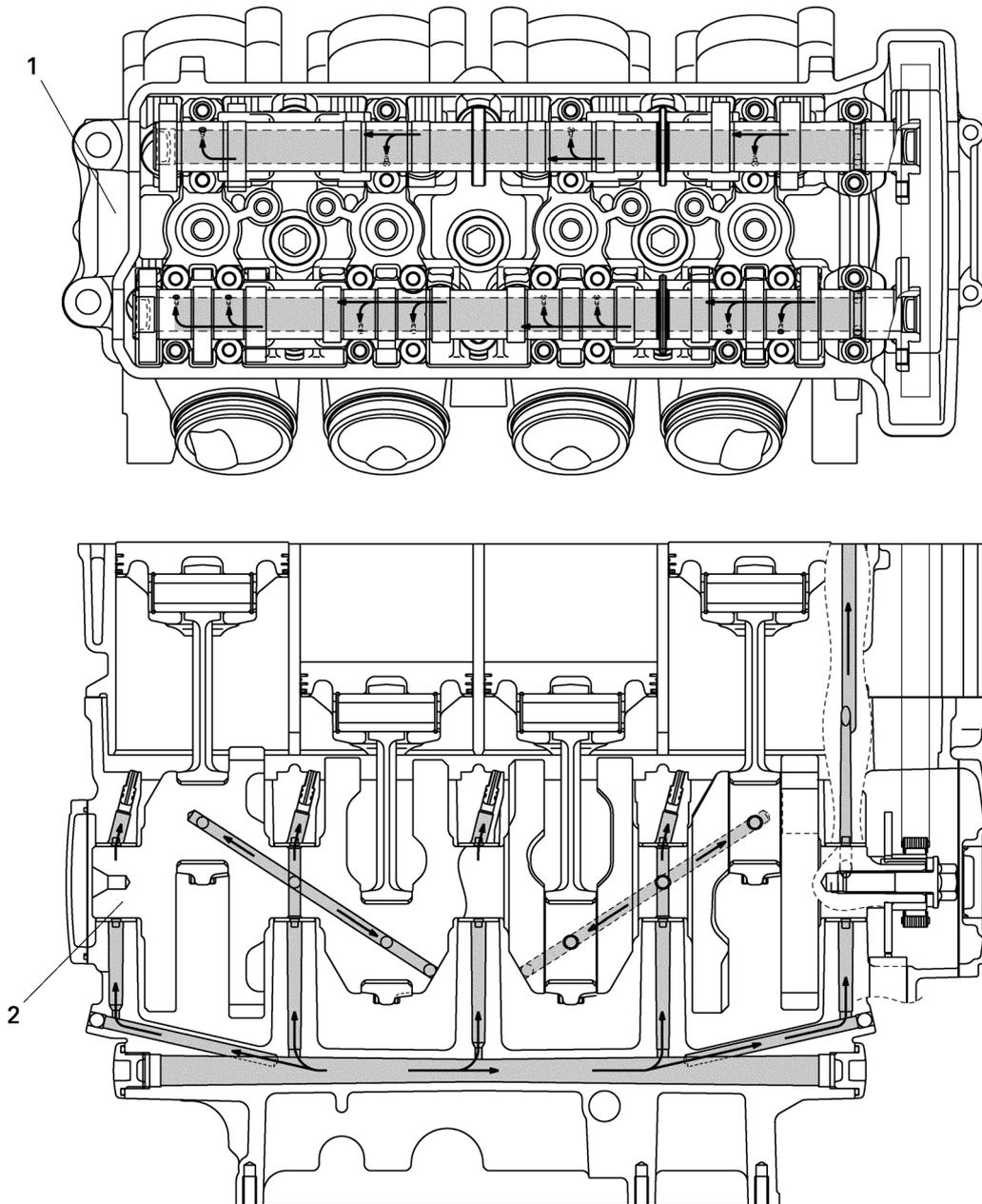
# LUBRICATION SYSTEM CHART AND DIAGRAMS

---

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

---



# LUBRICATION SYSTEM CHART AND DIAGRAMS

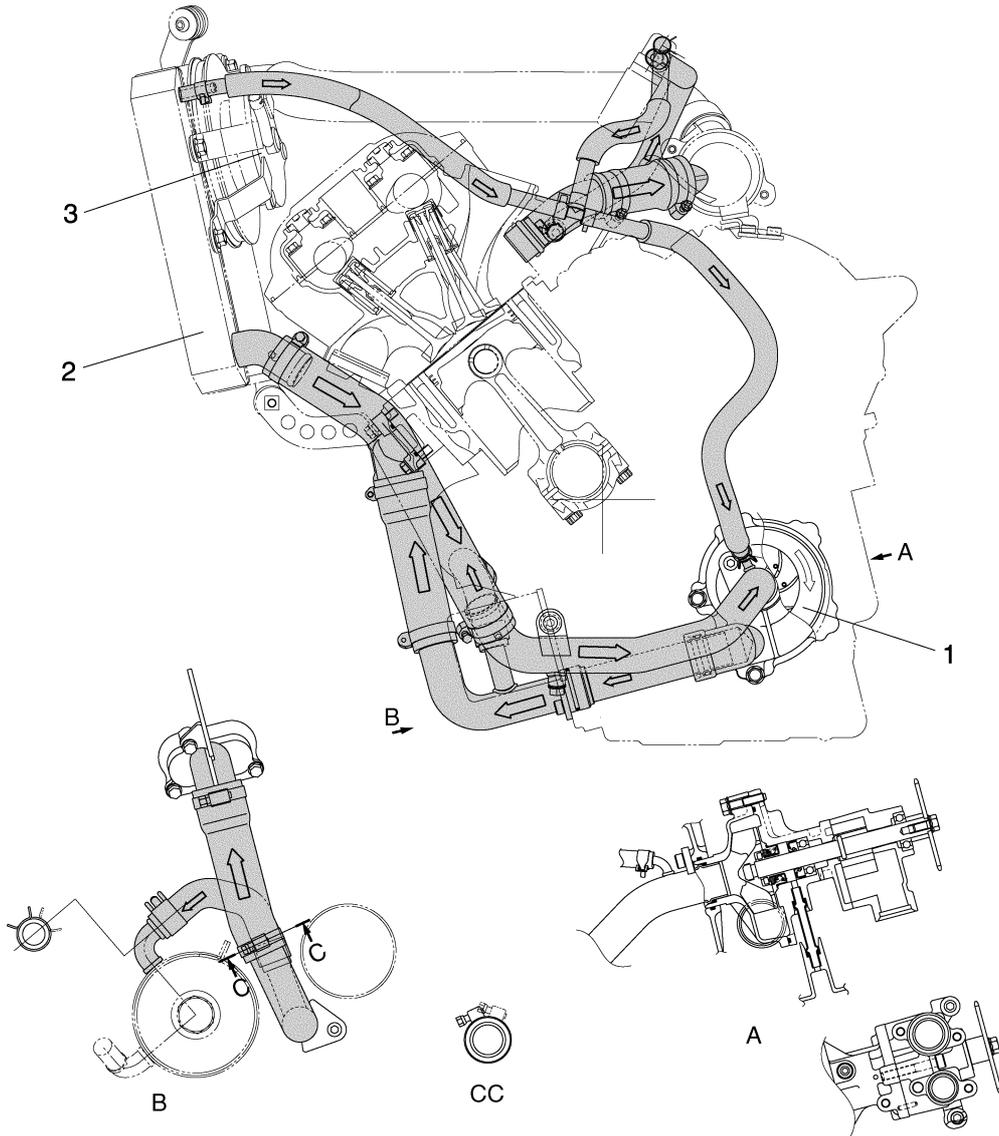
---

1. Cylinder head
2. Crankshaft

# COOLING SYSTEM DIAGRAMS

EAS20420

## COOLING SYSTEM DIAGRAMS



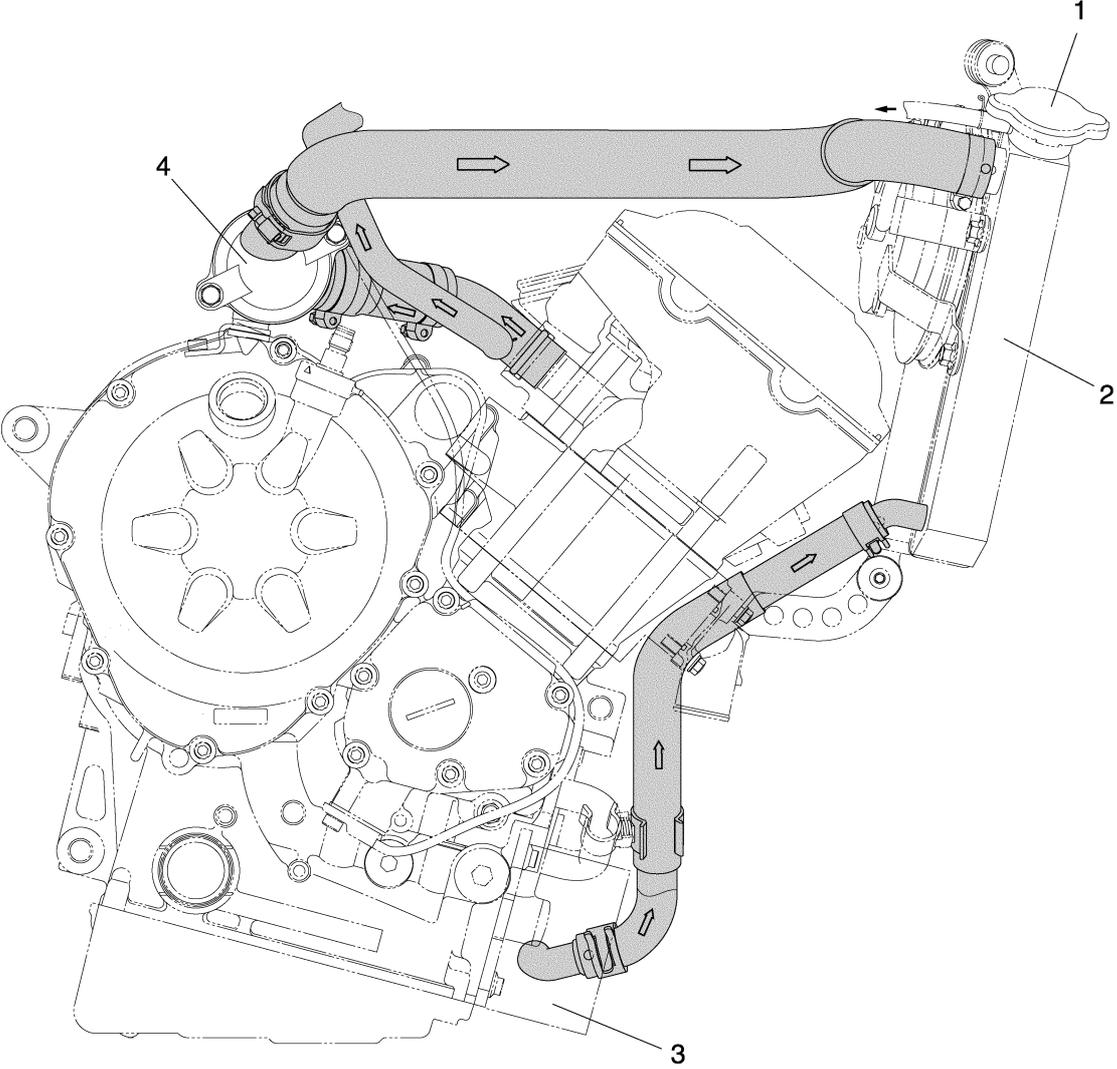
## COOLING SYSTEM DIAGRAMS

---

1. Water pump
2. Radiator
3. Radiator fan

# COOLING SYSTEM DIAGRAMS

---



## COOLING SYSTEM DIAGRAMS

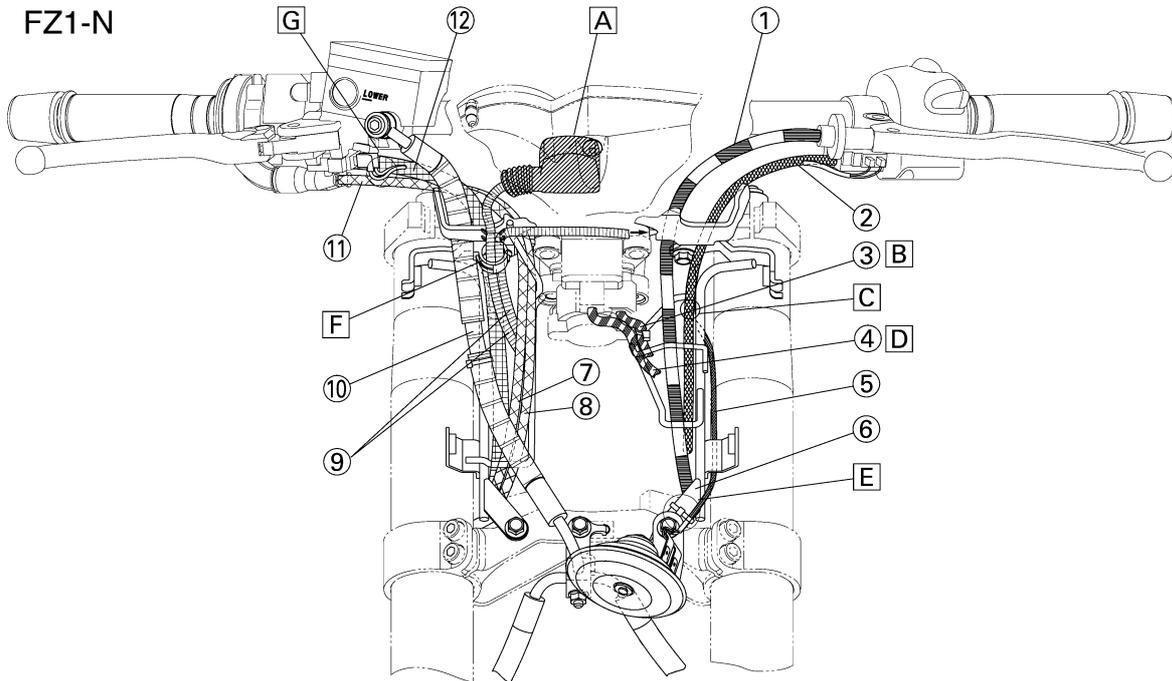
---

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

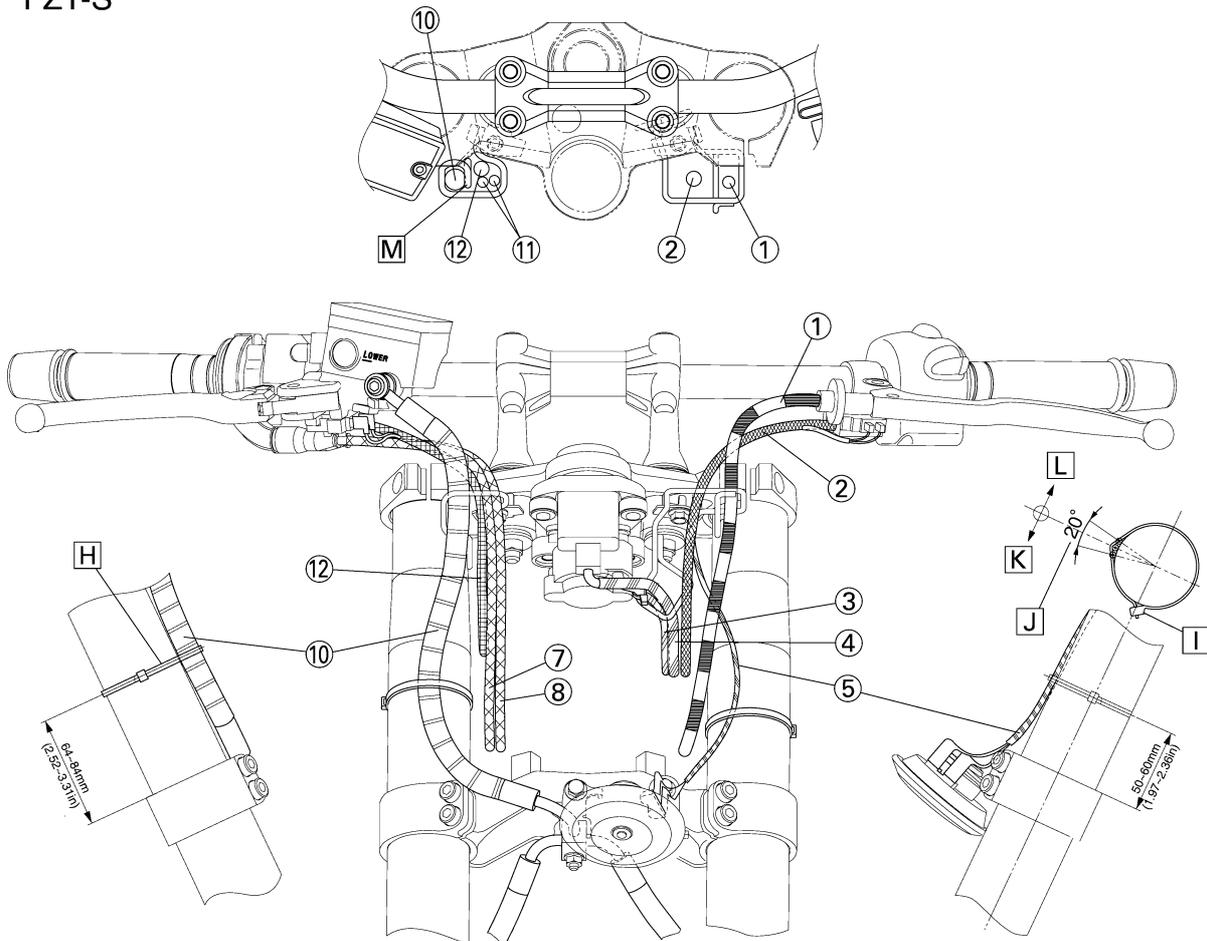
EAS20430

## CABLE ROUTING

FZ1-N

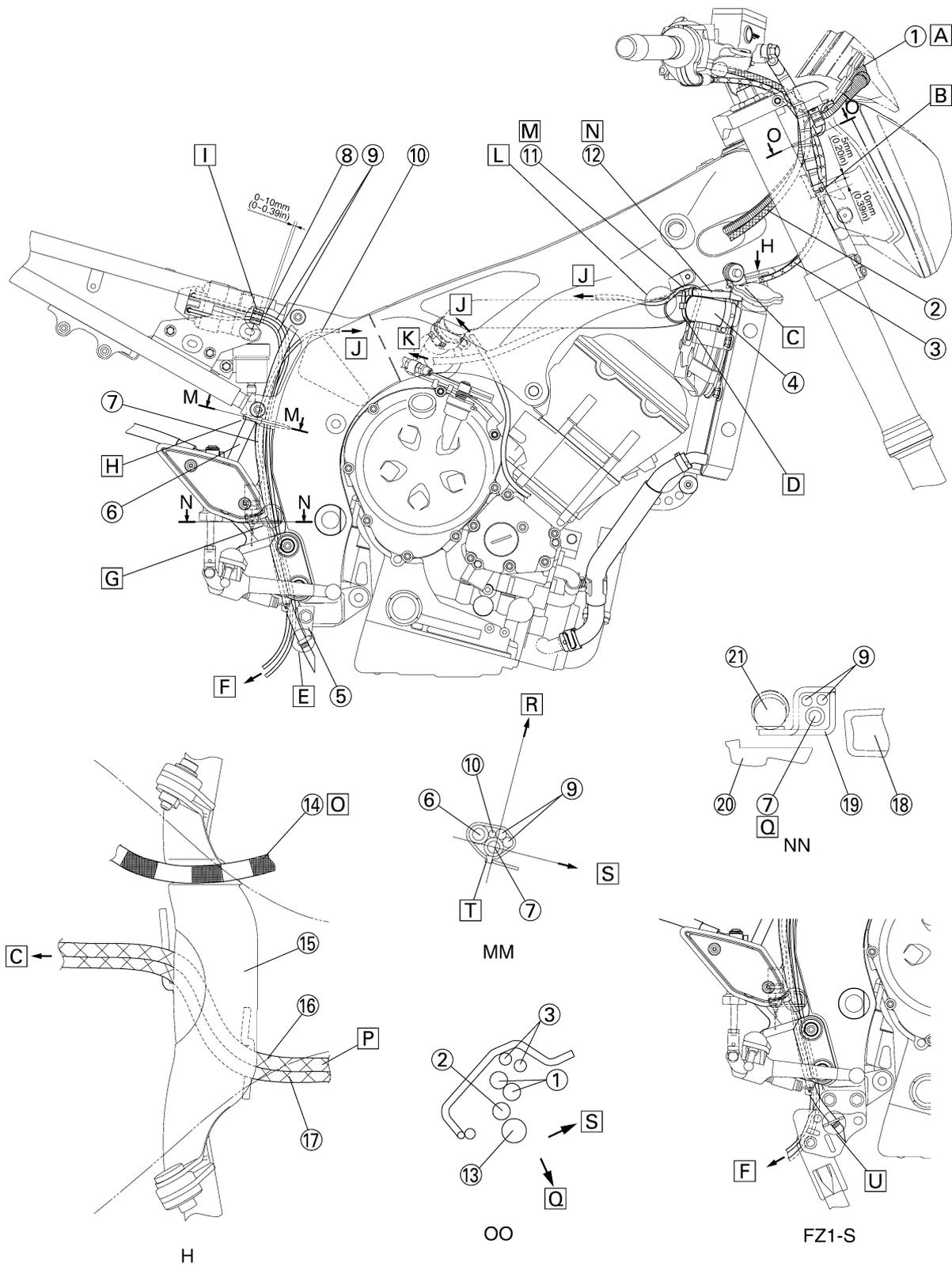


FZ1-S



1. Clutch cable
  2. Left handlebar switch lead
  3. Main switch lead
  4. Immobilizer lead
  5. Horn lead
  6. Horn stay assembly
  7. Throttle cable (pull side)
  8. Throttle cable (return side)
  9. Wire harness
  10. Brake hose
  11. Throttle cables
  12. Right handlebar switch lead
- A. Wire is connected to the meter.
  - B. Route the stay assembly above central cable guide.
  - C. After branching the lead from the left handlebar switch, route it under the stay assembly and upper guide wire (from the vehicle front side to the rear side).
  - D. Route the stay assembly below central cable guide.
  - E. Clamp the horn lead to the stay assembly. Position the binding section in front of the vehicle body and cut the tip to be between 2 to 4mm (0.08 to 0.16in).
  - F. Clamp the wire harness at the place of the white tape and insert it to the stay assembly. Point the clamp opening to the outside of the vehicle.
  - G. Lay on the front brake light switch lead above the throttle cables.
  - H. Secure the brake hose to the front fork.
  - I. Secure the horn lead to the front fork. Cut the tip of the clamp head leaving 2 to 4mm (0.08 to 0.16in) toward the outside of the vehicle.
  - J. The center position of the clamp shall be within this numeric range.
  - K. The outside of the vehicle.
  - L. The inside of the vehicle.
  - M. Pass the brake hose in the space by the right side of the vehicle from this wire and pass the throttle cables and right handlebar switch lead in the left side space. Next, route the right handlebar switch lead to the vehicle rear side where the throttle cables are routed.

# CABLE ROUTING

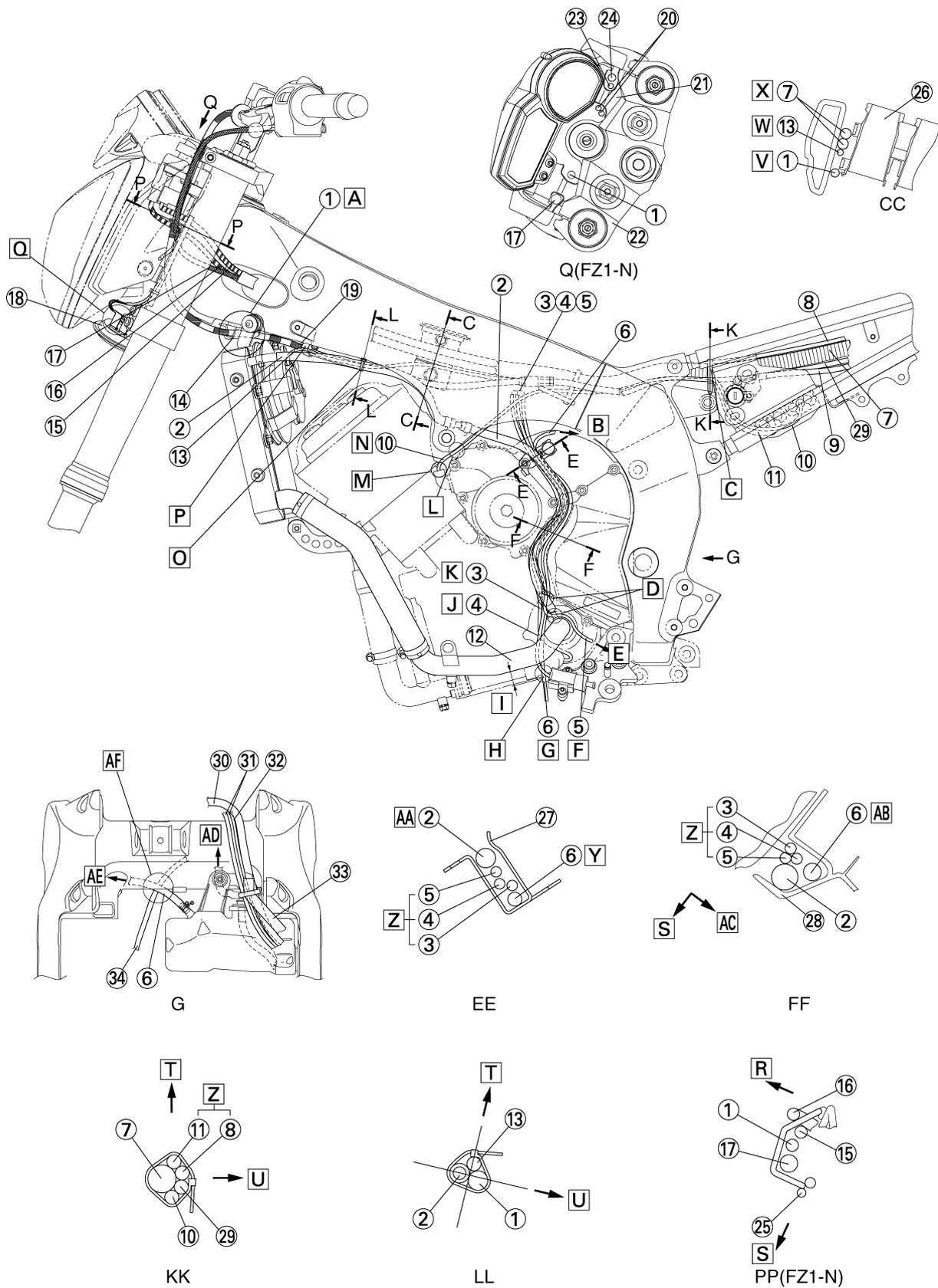


## CABLE ROUTING

---

1. Wire harness
  2. Right handlebar switch lead
  3. Throttle cable
  4. Radiator inlet hose
  5. Wire guide
  6. Brake fluid reservoir hose
  7. Fuel tank breather hose
  8. EXUP cable wire bending attachment
  9. EXUP cables
  10. Rear brake light switch lead
  11. Radiator fan motor lead (Right)
  12. Coolant reservoir tank hose
  13. Brake hose
  14. Clutch cable
  15. Radiator stay
  16. Throttle cable (return side)
  17. Throttle cable (pull side)
  18. Frame
  19. Rear brake light switch stay
  20. Footrest bracket (Right)
  21. Rear brake light switch
- A. Wire is connected to the meter.
  - B. Clamp the brake hose to the stay assembly. Clamping position should be 5 mm (0.20 in) or more away and less than 10 mm (0.39 in) from the top end of the brake hose protector. Cut the tip to be between 2 to 4 mm (0.08 to 0.16 in).
  - C. To the throttle bodies
  - D. Clamp the coolant reservoir hose and radiator inlet hose. Point the clamp opening to the outside of the vehicle and the tip of the clamp to the front upper side of the vehicle, and pay attention so that the tip does not protrude from the radiator cover.
  - E. Route the fuel tank breather hose by the wire guide. The white paint position of the hose shall be lower than the wire guide.
  - F. To the EXUP
  - G. Pass the fuel tank breather hose, and EXUP cable through the wire guide of the rear brake light switch stay.
  - H. The clamp position shall be at the center of bending section of the brake fluid reservoir hose as shown in the illustration.
  - I. Bind the two EXUP cables with the clamp. For the clamping position, a part of the clamp should be located within a range of 10 mm (0.39 in) from the end of wire bending attachment. Any direction of the clamp opening can be accepted.
  - J. To the wire harness
  - K. To the coolant reservoir tank
  - L. Route the radiator fan motor lead (right) so that there is no slack as much as possible in this section.
  - M. Pass the radiator fan motor lead (right) above the coolant reservoir hose and route it to the inside of the frame.
  - N. Pass the coolant reservoir hose to the vehicle inner side of the radiator inlet hose and route it to the lower outside of the vehicle of the thermostat assembly.
  - O. Route in the concavity section of the radiator stay.
  - P. Route the wire guide of the radiator stay as shown in the illustration. (Twisting not allowed)
  - Q. The outside of the vehicle.
  - R. The inside of the vehicle.
  - S. The front side of the vehicle.
  - T. Point the clamp head to the outside of the vehicle and fit it so that the band tip is positioned at the vehicle front side.
  - U. Pass the fuel tank breather hose through the guide wire of the sidestand bracket. Make sure to place the white paint position of the hose lower than the guide wire.

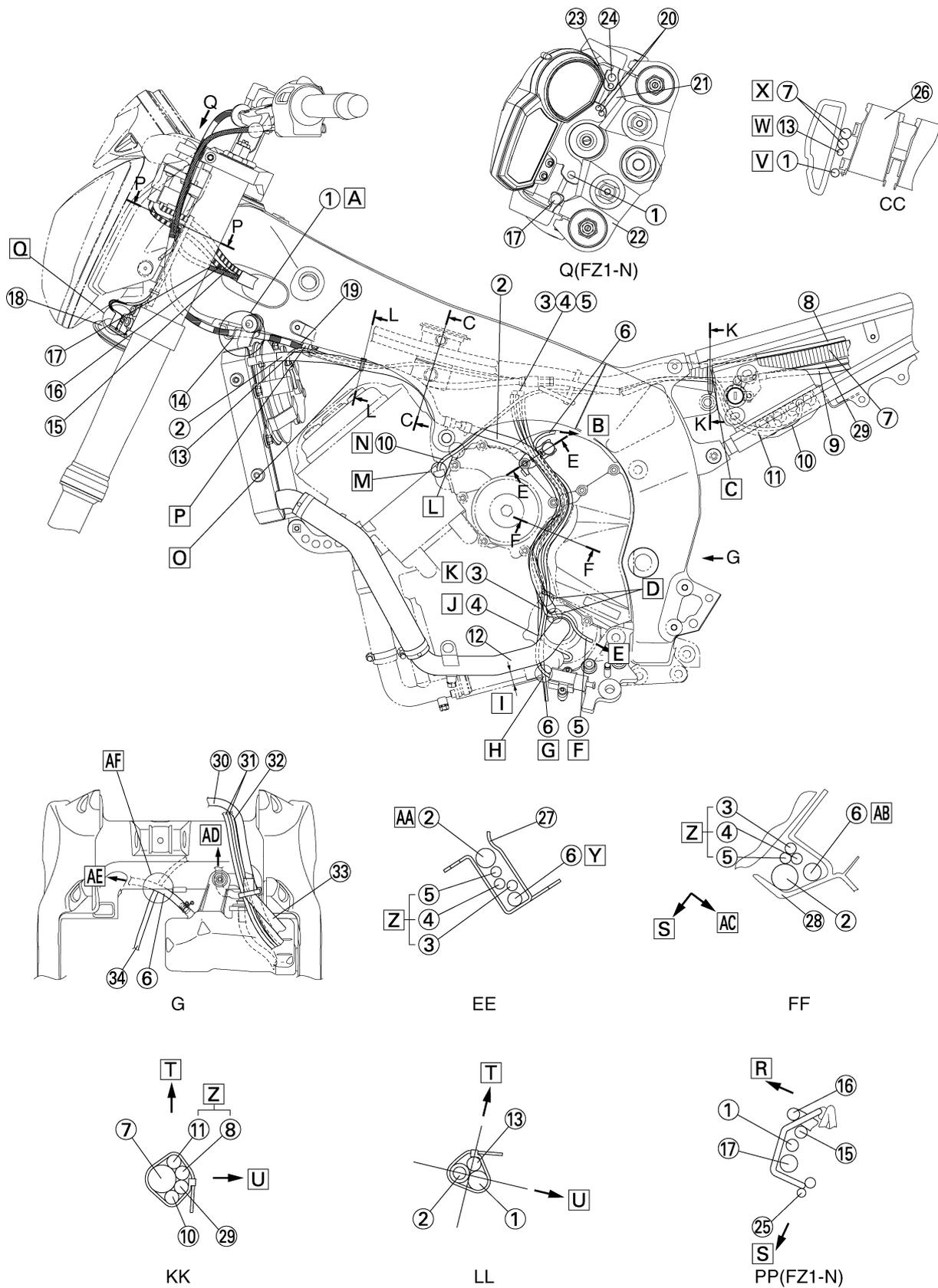
# CABLE ROUTING



## CABLE ROUTING

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

# CABLE ROUTING

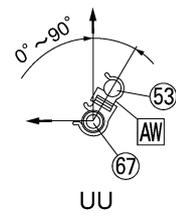
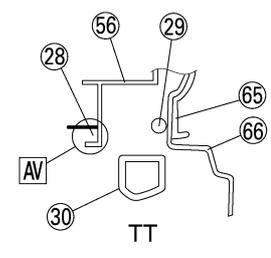
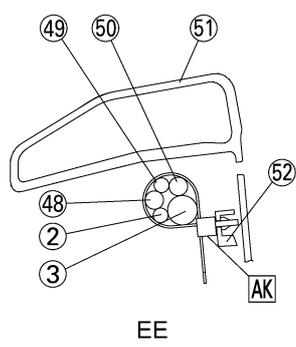
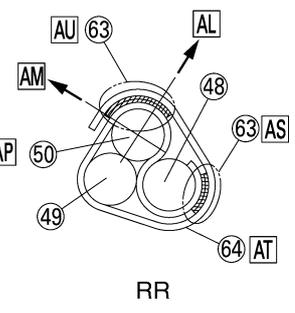
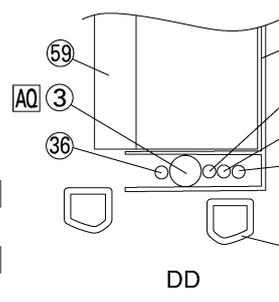
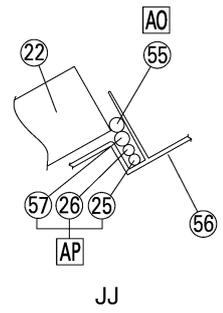
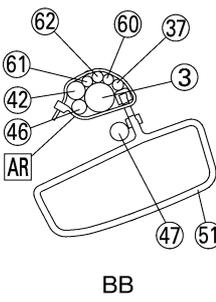
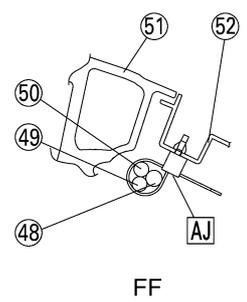
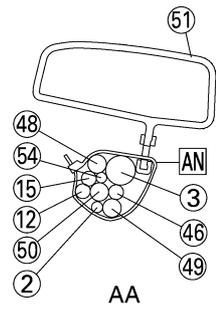
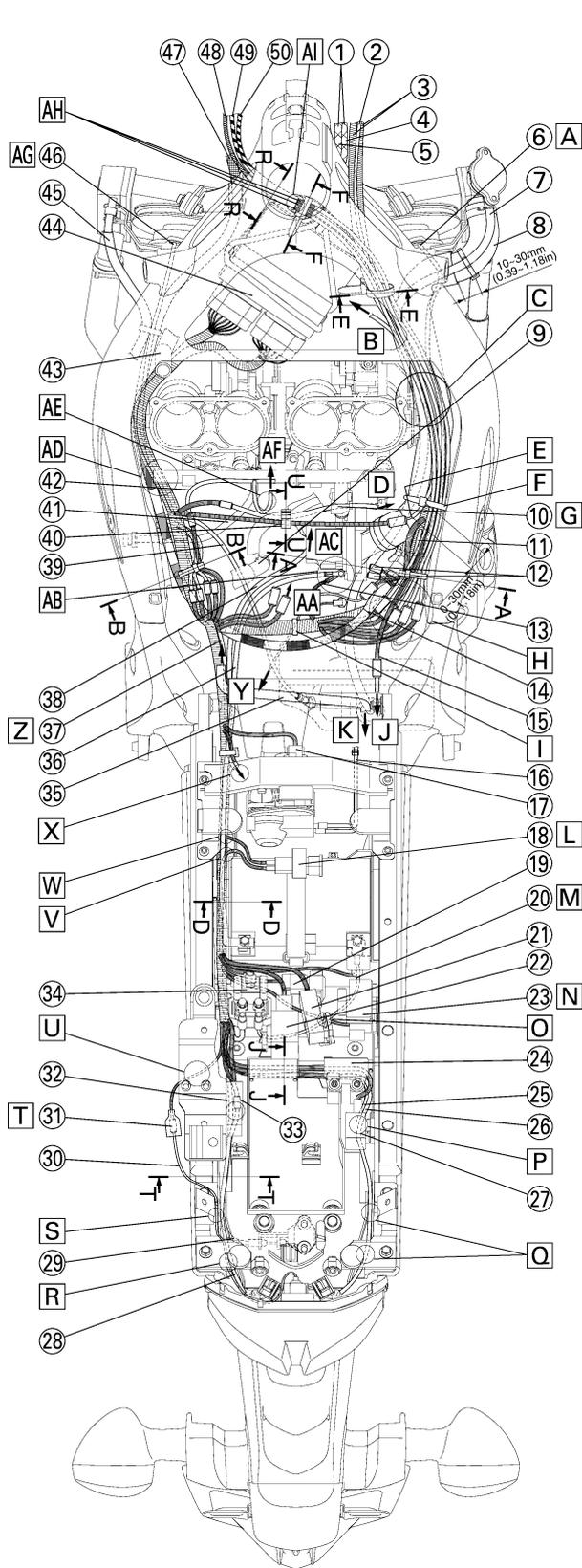


## CABLE ROUTING

---

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

# CABLE ROUTING

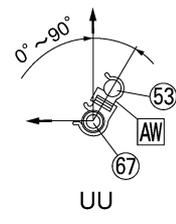
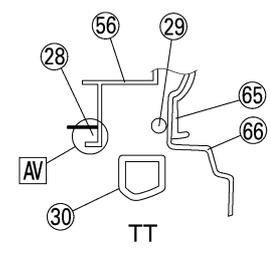
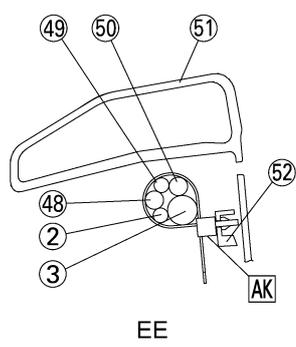
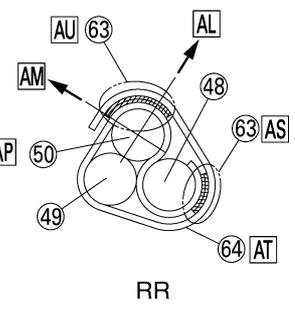
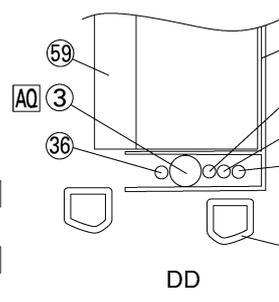
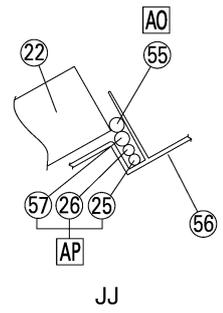
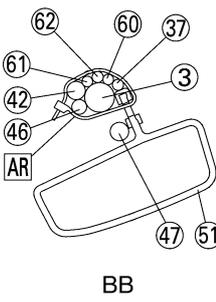
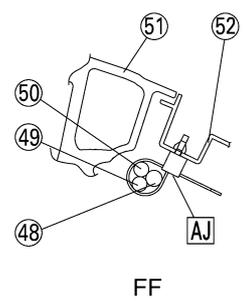
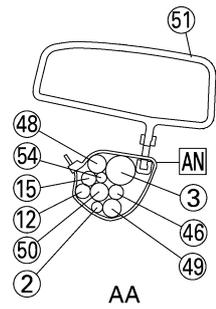
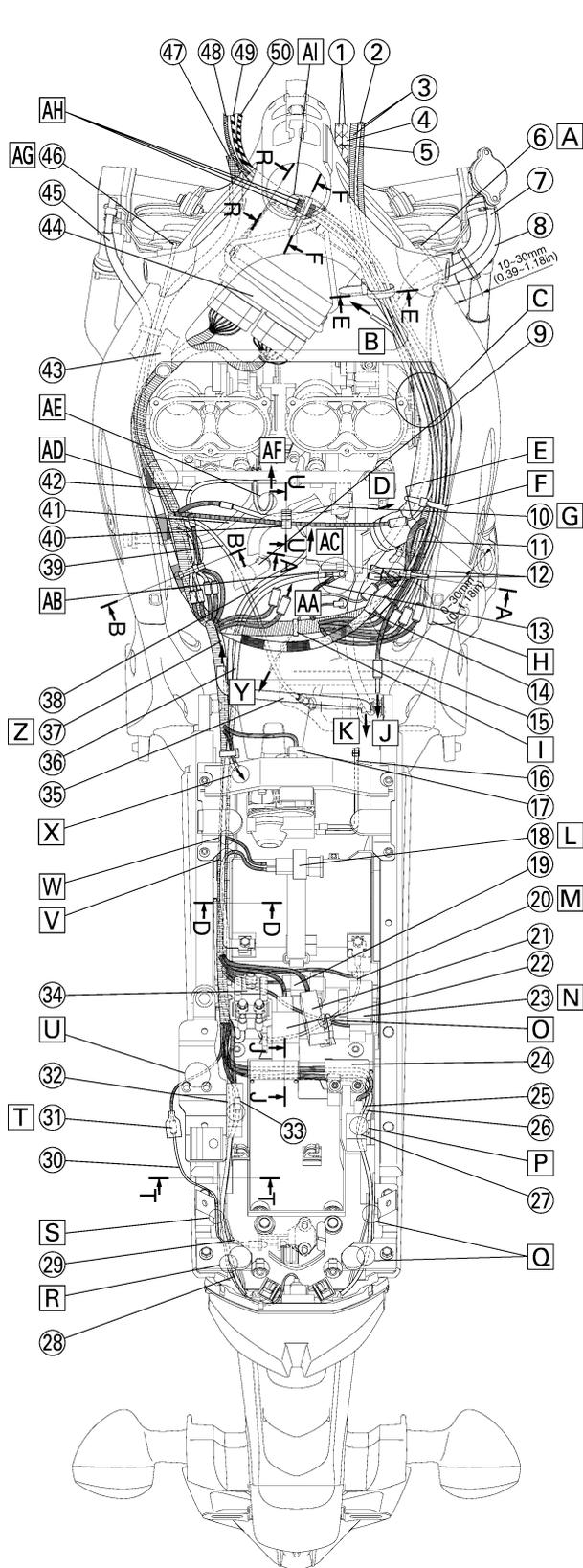


## CABLE ROUTING

---

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

# CABLE ROUTING



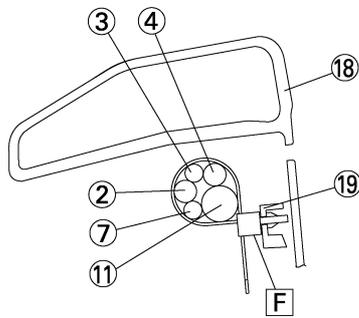
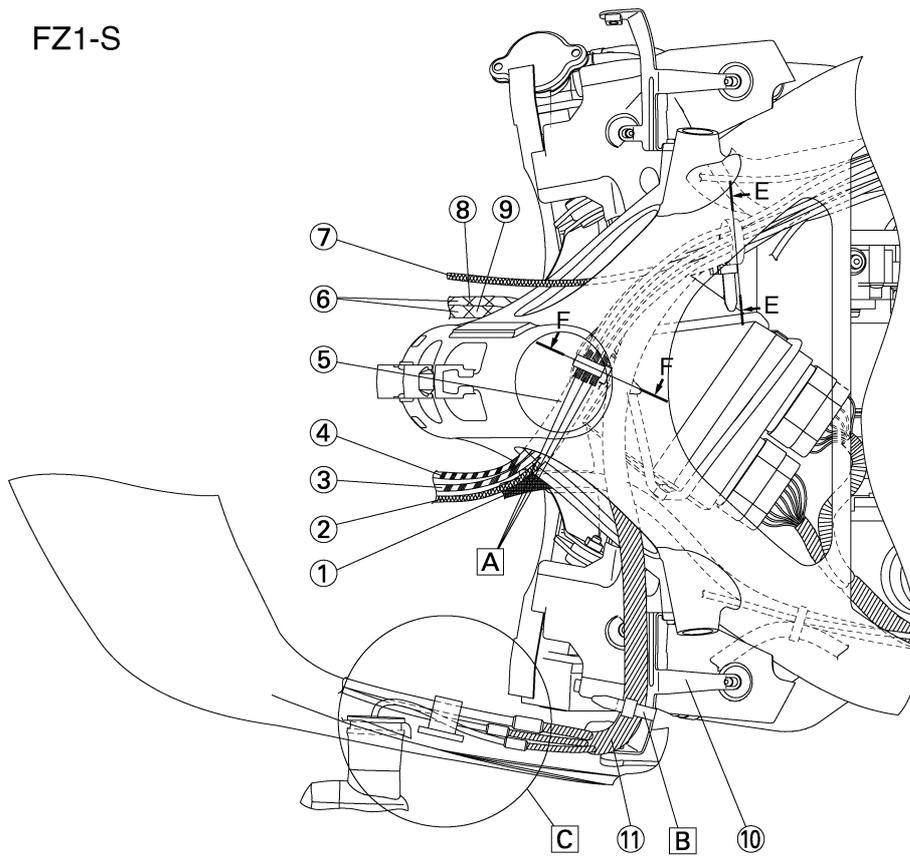
## CABLE ROUTING

---

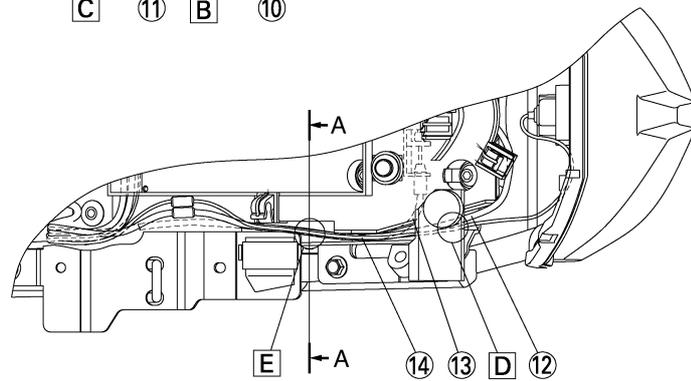
- Q. Pass the turn signal light lead (right) and license plate light lead under the rear fender bracket and route between the ribs of the battery box.
- R. Pass the turn signal light lead (left) and tail/brake light lead under the rear fender bracket and route between the ribs of the battery box.
- S.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

# CABLE ROUTING

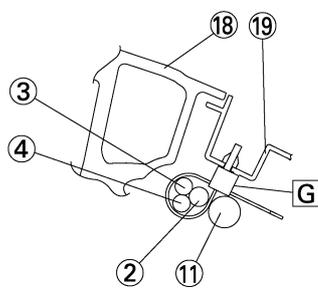
FZ1-S



EE



AA

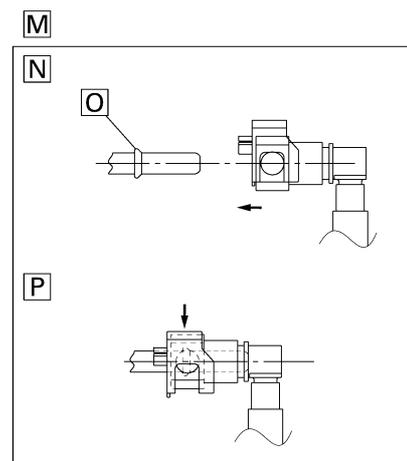
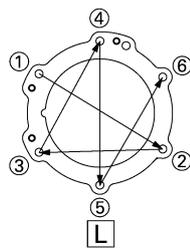
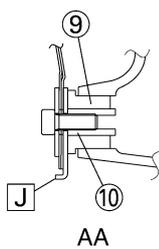
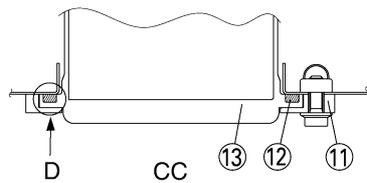
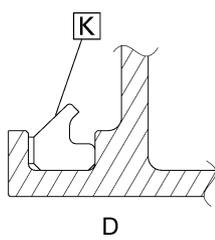
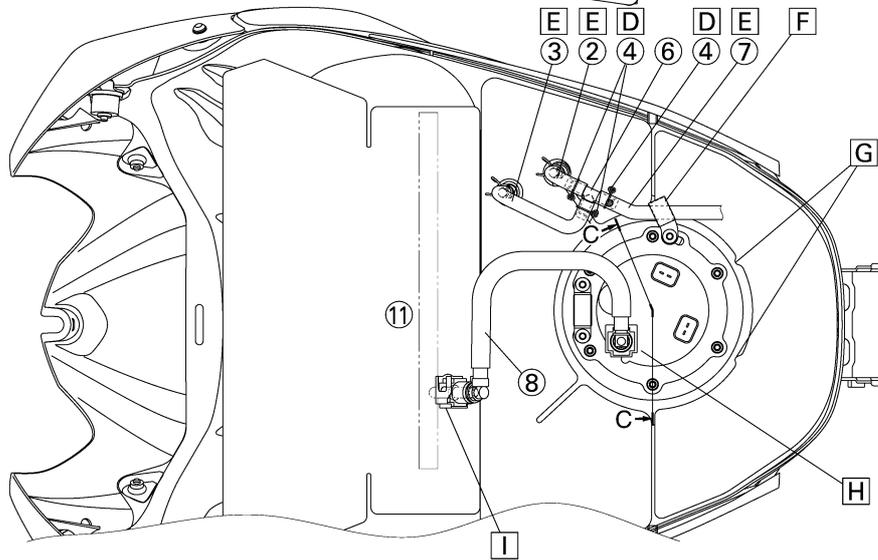
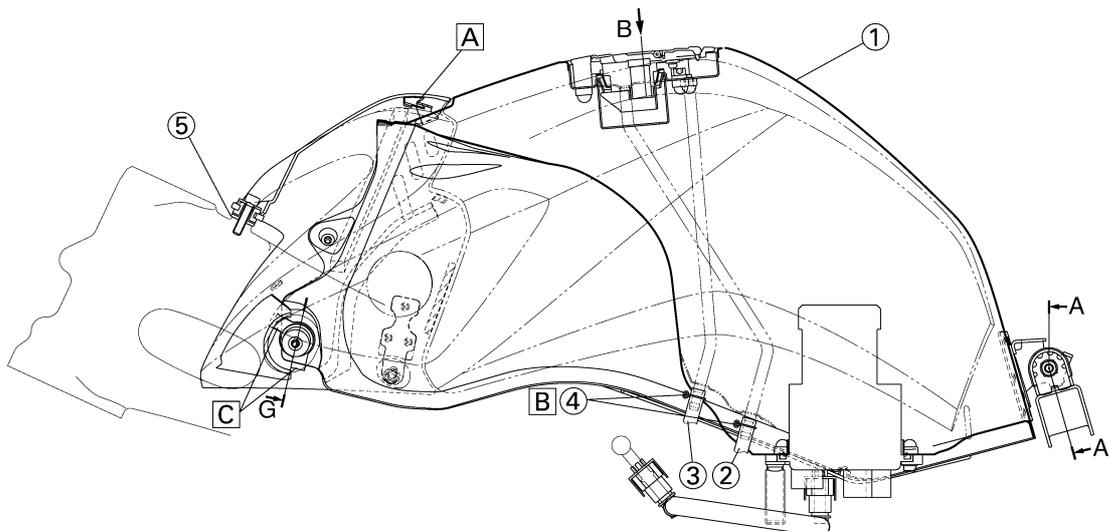


FF

### FZ1-S

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

# CABLE ROUTING



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



---

## PERIODIC CHECKS AND ADJUSTMENTS

<b>PERIODIC MAINTENANCE</b> .....	3-1
INTRODUCTION .....	3-1
<b>ENGINE</b> .....	3-4
ADJUSTING THE VALVE CLEARANCE .....	3-4
SYNCHRONIZING THE THROTTLE BODIES .....	3-6
ADJUSTING THE EXHAUST GAS VOLUME.....	3-8
ADJUSTING THE ENGINE IDLING SPEED .....	3-9
ADJUSTING THE THROTTLE CABLE FREE PLAY .....	3-9
CHECKING THE SPARK PLUGS.....	3-10
MEASURING THE COMPRESSION PRESSURE .....	3-10
CHECKING THE ENGINE OIL LEVEL.....	3-11
CHANGING THE ENGINE OIL.....	3-12
MEASURING THE ENGINE OIL PRESSURE .....	3-13
ADJUSTING THE CLUTCH CABLE FREE PLAY .....	3-14
REPLACING THE AIR FILTER ELEMENT .....	3-15
CHECKING THE THROTTLE BODY JOINTS .....	3-16
CHECKING THE FUEL LINE .....	3-16
CHECKING THE CRANKCASE BREATHER HOSE .....	3-16
CHECKING THE EXHAUST SYSTEM.....	3-17
ADJUSTING THE EXUP CABLES .....	3-17
CHECKING THE EXUP SERVO MOTOR .....	3-18
CHECKING THE COOLANT LEVEL.....	3-18
CHECKING THE COOLING SYSTEM .....	3-19
CHANGING THE COOLANT.....	3-19
<b>CHASSIS</b> .....	3-22
ADJUSTING THE FRONT DISC BRAKE .....	3-22
ADJUSTING THE REAR DISC BRAKE .....	3-22
CHECKING THE BRAKE FLUID LEVEL.....	3-23
CHECKING THE FRONT BRAKE PADS.....	3-23
CHECKING THE REAR BRAKE PADS .....	3-23
CHECKING THE FRONT BRAKE HOSES.....	3-24
CHECKING THE REAR BRAKE HOSE .....	3-24
ADJUSTING THE REAR BRAKE LIGHT SWITCH .....	3-24
BLEEDING THE HYDRAULIC BRAKE SYSTEM.....	3-25
ADJUSTING THE SHIFT PEDAL .....	3-26
ADJUSTING THE DRIVE CHAIN SLACK .....	3-26
LUBRICATING THE DRIVE CHAIN.....	3-27
CHECKING AND ADJUSTING THE STEERING HEAD .....	3-27
CHECKING THE FRONT FORK .....	3-28
ADJUSTING THE FRONT FORK LEGS .....	3-29
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY.....	3-31
CHECKING THE TIRES.....	3-32
CHECKING THE WHEELS .....	3-34
CHECKING AND LUBRICATING THE CABLES .....	3-34
LUBRICATING THE LEVERS.....	3-34
LUBRICATING THE PEDAL .....	3-34
LUBRICATING THE SIDESTAND.....	3-34

---

LUBRICATING THE CENTERSTAND (FZ1-S).....	3-34
LUBRICATING THE REAR SUSPENSION .....	3-34
<b>ELECTRICAL SYSTEM</b> .....	3-35
CHECKING AND CHARGING THE BATTERY.....	3-35
CHECKING THE FUSES.....	3-35
REPLACING THE HEADLIGHT BULBS.....	3-35
ADJUSTING THE HEADLIGHT BEAM .....	3-36

---

# PERIODIC MAINTENANCE

EAS20450

## PERIODIC MAINTENANCE

EAS20460

### INTRODUCTION

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

### Periodic maintenance and lubrication chart

#### NOTE:

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

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (X 1000 km)					Annual check
			1	10	20	30	40	
1	*	Fuel line		✓	✓	✓	✓	✓
2	*	Spark plugs		✓		✓		
					✓		✓	
3	*	Valves	Every 40000 km					
4	*	Air filter element					✓	
5		Clutch	✓	✓	✓	✓	✓	
6	*	Front brake	✓	✓	✓	✓	✓	✓
			Whenever worn to the limit					
7	*	Rear brake	✓	✓	✓	✓	✓	✓
			Whenever worn to the limit					
8	*	Brake hoses		✓	✓	✓	✓	✓
			Every 4 years					
9	*	Wheels		✓	✓	✓	✓	
10	*	Tires		✓	✓	✓	✓	✓
11	*	Wheel bearings		✓	✓	✓	✓	
12	*	Swingarm		✓	✓	✓	✓	

## PERIODIC MAINTENANCE

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

## PERIODIC MAINTENANCE

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (X 1000 km)					Annual check
			1	10	20	30	40	
28	*	<b>Air induction system</b>		✓	✓	✓	✓	✓
29	*	<b>Muffler and exhaust pipe</b>	✓	✓	✓	✓	✓	
30	*	<b>Lights, signals and switches</b>	✓	✓	✓	✓	✓	✓

**NOTE:**

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

EAS20470  
**ENGINE**

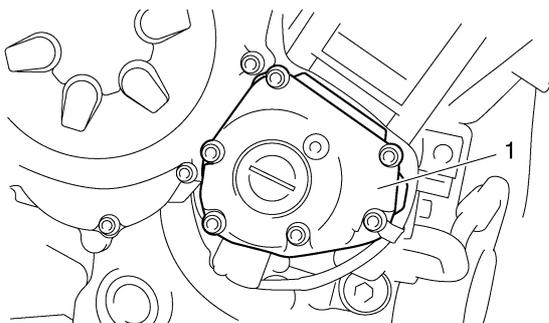
EAS20490  
**ADJUSTING THE VALVE CLEARANCE**

The following procedure applies to all of the valves.

**NOTE:**

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

1. Remove:
  - Rider and passenger seat  
Refer to "GENERAL CHASSIS" on page 4-1.
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
  - Air filter case  
Refer to "GENERAL CHASSIS" on page 4-1.
  - Throttle body assembly  
Refer to "THROTTLE BODIES" on page 7-4.
  - Air cut-off valve  
Refer to "AIR INDUCTION SYSTEM" on page 7-13.
  - Radiator
  - Radiator fan motor  
Refer to "RADIATOR" on page 6-1.
2. Remove:
  - Ignition coils
  - Spark plugs
  - Cylinder head cover
  - Cylinder head cover gasket  
Refer to "CAMSHAFTS" on page 5-10.
3. Remove:
  - Pickup rotor cover "1"



4. Measure:

- Valve clearance  
Out of specification → Adjust.



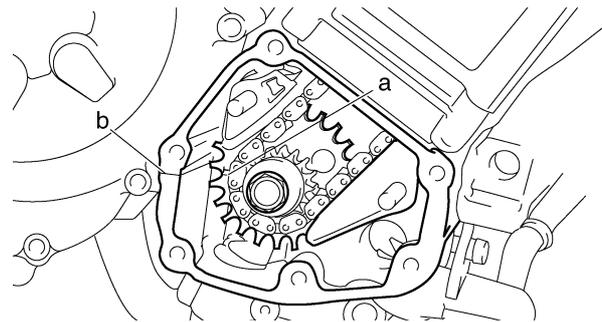
<b>Valve clearance (cold)</b>	
<b>Intake valve</b>	<b>0.11–0.20 mm (0.0043–0.0079 in)</b>
<b>Exhaust valve</b>	<b>0.21–0.25 mm (0.0083–0.0098 in)</b>



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

**NOTE:**

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

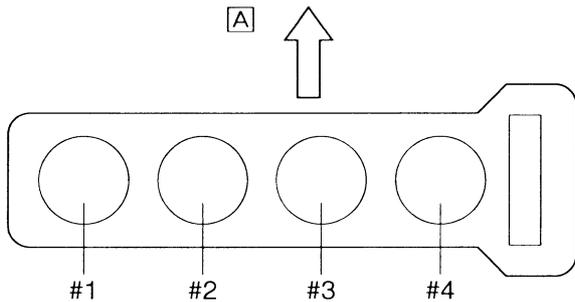
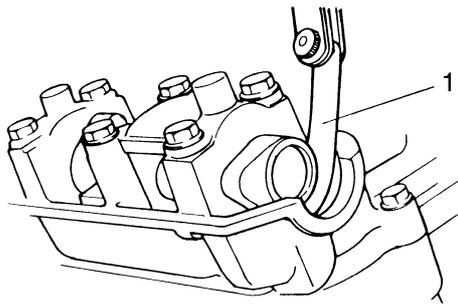


- c. Measure the valve clearance with a thickness gauge "1".

**NOTE:**

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

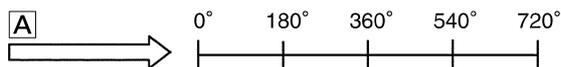
**Valve clearance measuring sequence**  
**Cylinder #1 → #2 → #4 → #3**



A. Front

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

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



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

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



5. Remove:
- Camshaft

**NOTE:**

- Refer to "CAMSHAFTS" on page 5-10.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

6. Adjust:
- Valve clearance

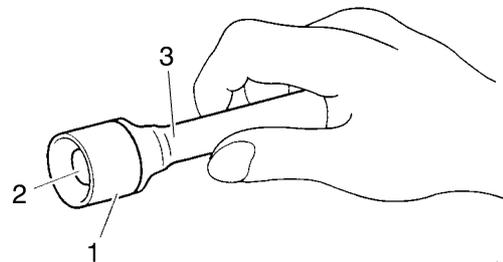


- a. Remove the valve lifter "1" and the valve pad "2" with a valve lapper "3".

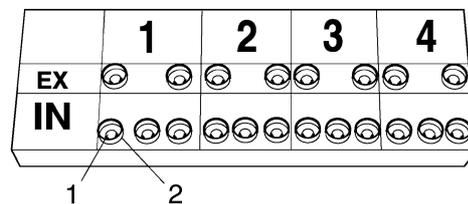
	<b>Valve lapper</b> <b>90890-04101</b>
---	---

**NOTE:**

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



11171102



11172202

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

Example:

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

Measure valve clearance = 0.25 mm (0.010 in)

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

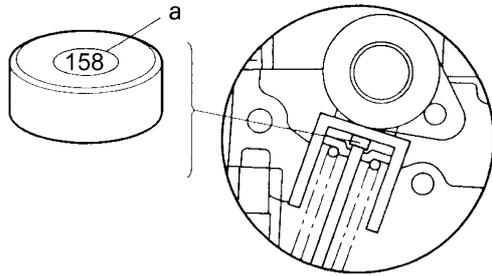
- c. Check the thickness of the current valve pad.

**NOTE:**

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

Example:

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



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

Example:

$$1.58 \text{ mm (0.062 in)} + 0.05 \text{ mm (0.002 in)} = 1.63 \text{ mm (0.064 in)}$$

The valve pad number is 163.

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

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

**NOTE:**

Refer to the following table for the available valve pads.

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

Example:

Valve pad number = 163

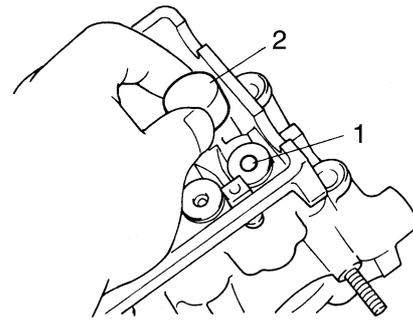
Rounded value = 165

New valve pad number = 165

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

**NOTE:**

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



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



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

**NOTE:**

- Refer to "CAMSHAFTS" on page 5-10.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshafts marks with the camshaft cap marks.
- Turn the crankshaft clockwise several full turns to seat the parts.

- h. Measure the valve clearance again.

- i. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.



7. Install:

- All removed parts

**NOTE:**

For installation, reverse the removal procedure.

EAS20570

## SYNCHRONIZING THE THROTTLE BODIES

**NOTE:**

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

1. Stand the vehicle on a level surface.

**NOTE:**

Place the vehicle on a suitable stand.

2. Remove:

- Rider and passenger seat

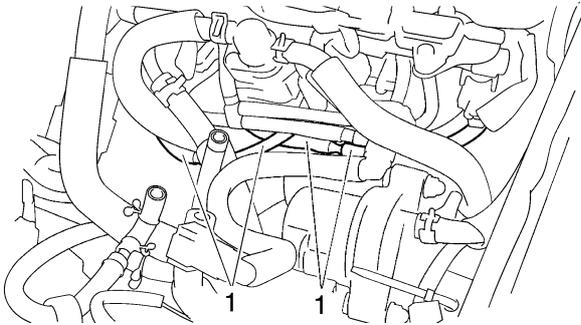
Refer to "GENERAL CHASSIS" on page 4-1.

- Fuel tank

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

3. Remove:

- Synchronizing hoses "1"

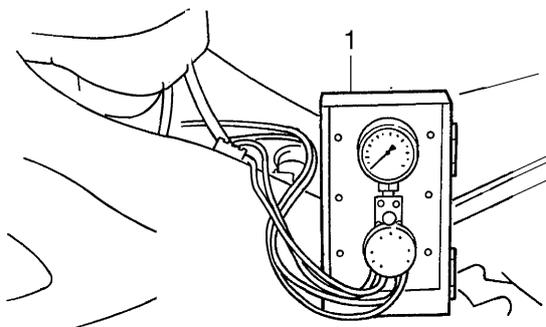


4. Install:

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



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



5. Install:

- Fuel tank

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

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

7. Check:

- Engine idling speed  
Out of specification → Adjust.  
Refer to "ADJUSTING THE ENGINE IDLING SPEED" on page 3-9.



**Engine idling speed**  
1.100–1.300 r/min

8. Adjust:

- Throttle body synchronization



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

**NOTE:**

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

EC2D1080

**CAUTION:**

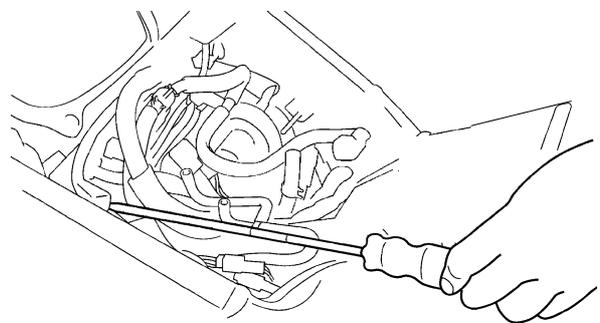
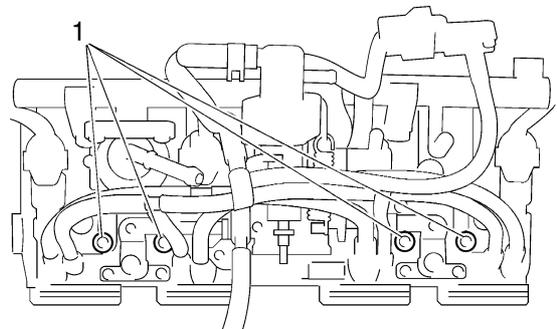
**Do not use the throttle valve adjusting screws to adjust the throttle body synchronization.**



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

**NOTE:**

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



9. Measure:

- Engine idling speed  
Out of specification → Adjust.

Make sure that the vacuum pressure is within specification.

10. Stop the engine and remove the measuring equipment.
11. Adjust:
  - Throttle cable free play  
Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" on page 3-9.



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

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

EAS20600

## ADJUSTING THE EXHAUST GAS VOLUME

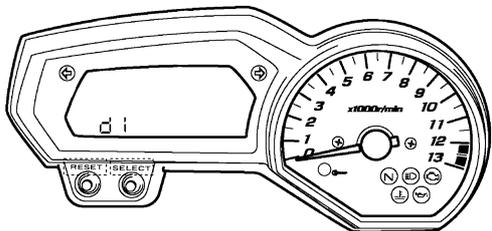
### NOTE:

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

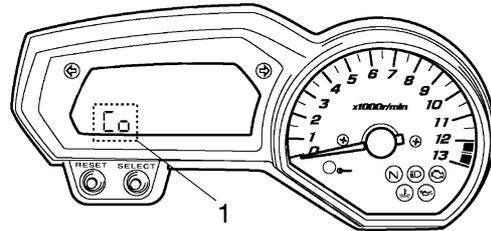
1. Turn the main switch to "OFF" and set the engine stop switch to "ON".
2. Simultaneously press and hold the "SELECT" and "RESET" buttons, turn the main switch to "ON", and continue to press the buttons for 8 seconds or more.

### NOTE:

"dl" appears on the clock LCD.



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

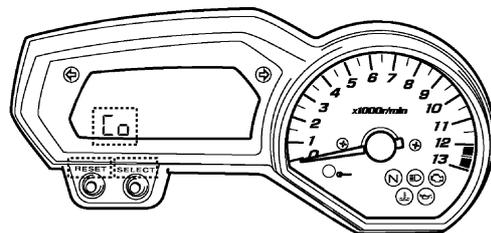


4. After selecting "Co", simultaneously press the "SELECT" and "RESET" buttons for 2 seconds or more to execute the selection.

### NOTE:

The selected cylinder number appears on the clock LCD.

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



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

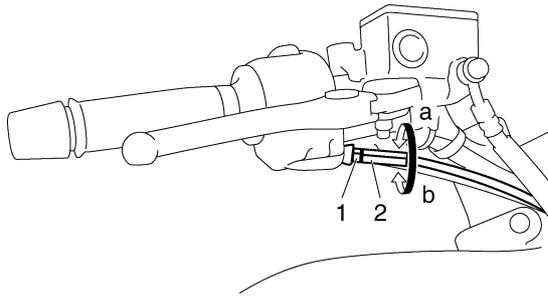
### NOTE:

The CO adjustment volume appears on the tripmeter LCD.

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

7. Release the switch to execute the selection.





c. Tighten the locknut.

EW2D1001

**WARNING**

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



EAS20680

**CHECKING THE SPARK PLUGS**

The following procedure applies to all of the spark plugs.

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

ECA13320

**CAUTION:**

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

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

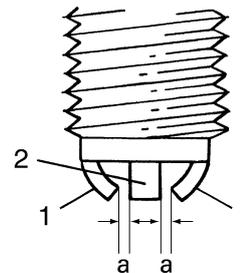
	<b>Spark plug type (manufacturer) CR9EK (NGK)</b>
---	---

4. Check:
  - Electrode "1"
 Damage/wear → Replace the spark plug.
  - Insulator "2"
 Abnormal color → Replace the spark plug. Normal color is medium-to-light tan.
5. Clean:
  - Spark plug
 (with a spark plug cleaner or wire brush)

6. Measure:

- Spark plug gap "a" (with a wire thickness gauge)
- Out of specification → Regap.

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



7. Install:

- Spark plugs
- Ignition coils

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

**NOTE:**

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

8. Install:

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

EAS20710

**MEASURING THE COMPRESSION PRESSURE**

The following procedure applies to all of the cylinders.

**NOTE:**

Insufficient compression pressure will result in a loss of performance.

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

ECA13340

**CAUTION:**

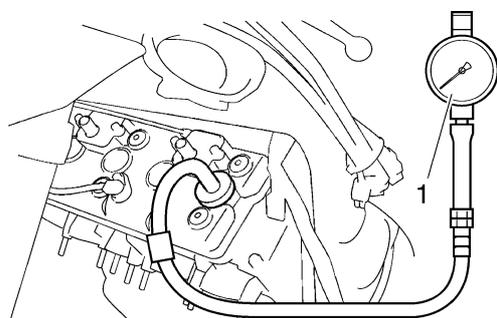
Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.

4. Install:

- Compression gauge “1”
- Extension



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



5. Measure:

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



**Compression pressure (at sea level)**

**Minimum**  
1290 kPa (12.90 kg/cm<sup>2</sup>, 12.90 bar, 183.5 psi)

**Standard**  
1480 kPa (14.80 kg/cm<sup>2</sup>, 14.80 bar, 210.5 psi)

**Maximum**  
1660 kPa (16.60 kg/cm<sup>2</sup>, 16.60 bar, 236.1 psi)

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

EW2D1002

**⚠ 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/cm<sup>2</sup>, 1 bar, 14.22 psi).

- If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.  
Carbon deposits → Eliminate.
- If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.  
Refer to the following table.

Compression pressure (with oil applied into the cylinder)	
Reading	Diagnosis
Higher than without oil	Piston ring(s) wear or damage → Repair.
Same as without oil	Piston, valves, cylinder head gasket or piston possibly defective → Repair.

6. Install:

- Spark plug



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

7. Install:

- Ignition coils

EAS20730

**CHECKING THE ENGINE OIL LEVEL**

- Stand the vehicle on a level surface.

**NOTE:**

- Place the vehicle on a suitable stand.
  - Make sure the vehicle is upright.
- Start the engine, warm it up for several minutes, and then turn it off.
  - 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 → 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

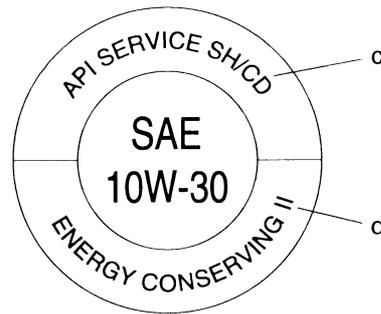
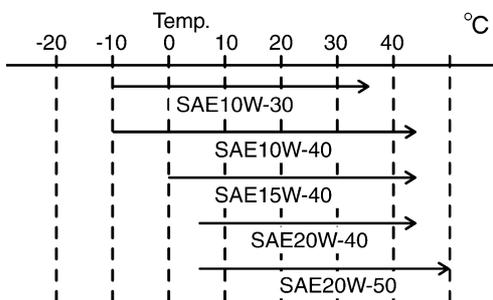
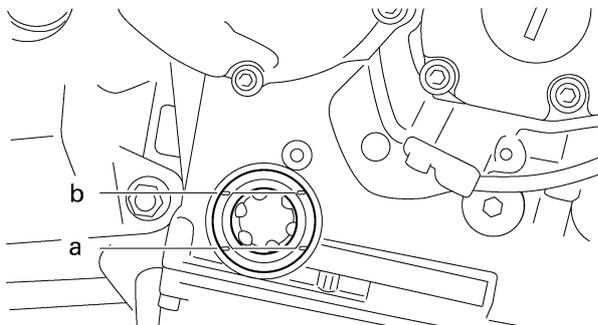
ECA13360

**CAUTION:**

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

**NOTE:**

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



11750701

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

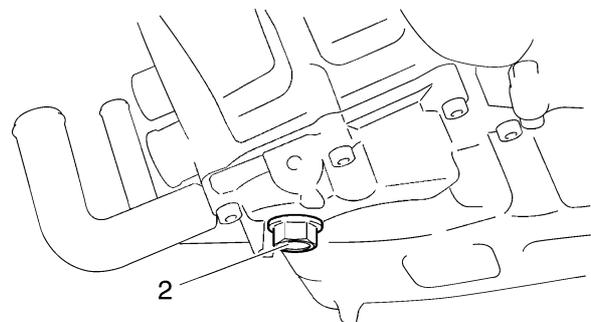
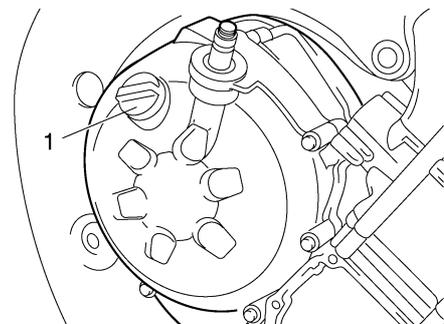
**NOTE:**

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

EAS20790

**CHANGING THE ENGINE OIL**

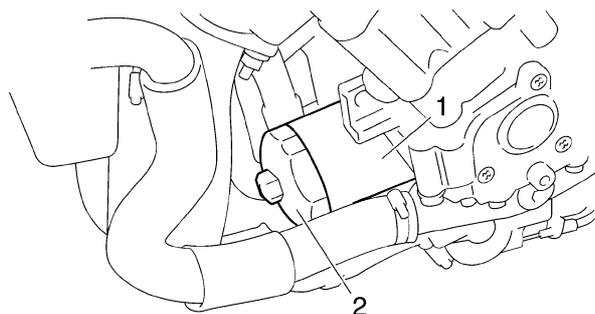
1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.
3. Remove:
  - Engine oil filler cap “1”
  - Engine oil drain bolt “2” (along with the gasket)



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

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

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

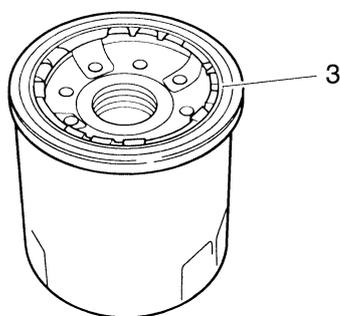


b. Lubricate the O-ring "3" of the new oil filter cartridge with a thin coat of engine oil.

ECA13390

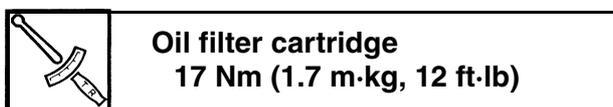
**CAUTION:**

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



11730302

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

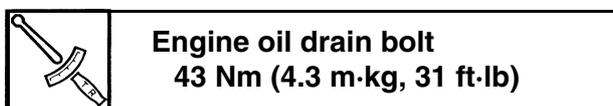


6. Replace:

- Engine oil drain bolt gasket **New**

7. Install:

- Engine oil drain bolt (along with the new gasket)



8. Fill:

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

	<b>Quantity</b>
	<b>Total amount</b>
	<b>Without oil filter cartridge replacement</b>
	<b>With oil filter cartridge replacement</b>

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:

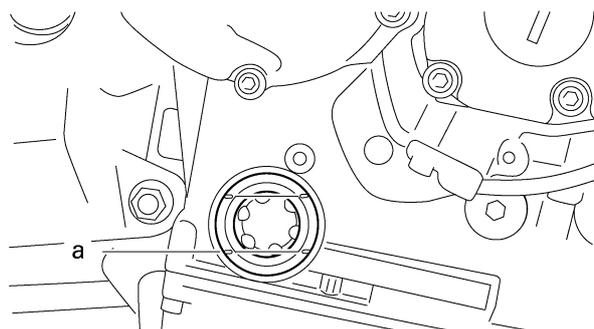
- Engine oil level Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-11.

EAS20820

**MEASURING THE ENGINE OIL PRESSURE**

1. Check:

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



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

ECA13410

**CAUTION:**

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

**to measure the engine oil pressure after warming up the engine.**

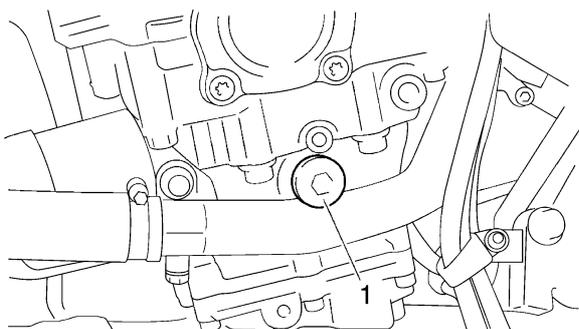
3. Remove:
- Oil gallery bolt "1"

EWA12980



**WARNING**

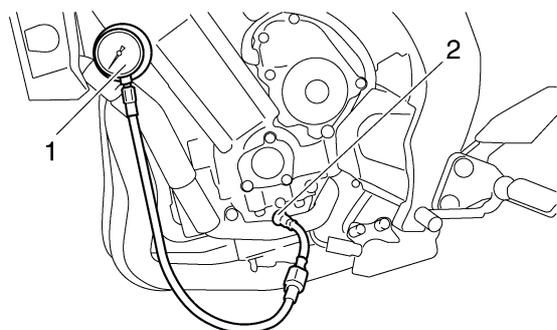
**The engine, muffler and engine oil are extremely hot.**



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



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



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



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

**NOTE:**

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

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

6. Install:
- Oil gallery bolt "1"

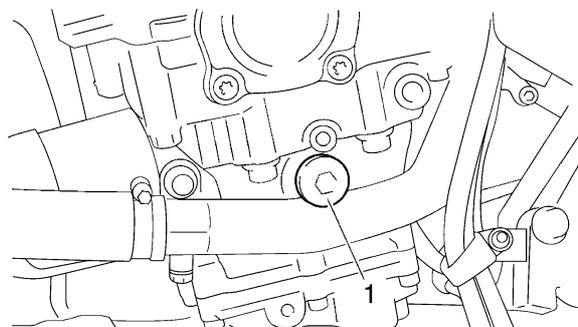


**Oil gallery bolt**  
**8 Nm (0.8 m·kg, 5.8 ft·lb)**

ECS2D1001

**CAUTION:**

**Be careful to tighten too much.**



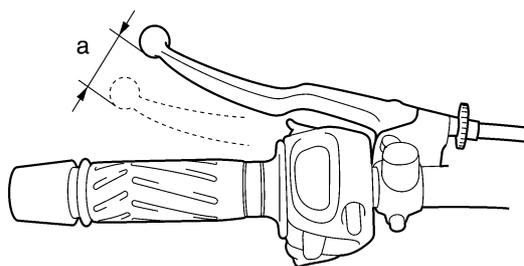
ET2D1004

**ADJUSTING THE CLUTCH CABLE FREE PLAY**

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



**Clutch cable free play (at the end of the clutch lever)**  
**10–15 mm (0.39–0.59 in)**



2. Adjust
- Clutch cable free play

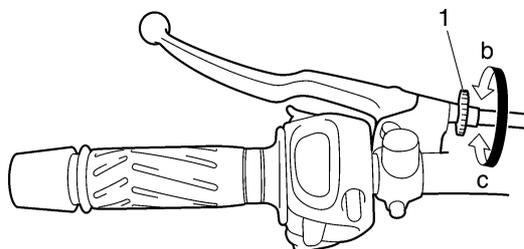
### Handlebar side

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

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

### NOTE:

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



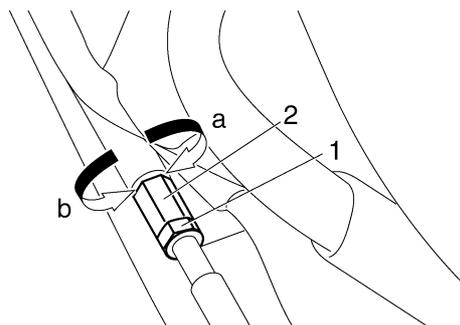
### Engine side

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

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

- c. Tighten the locknuts.

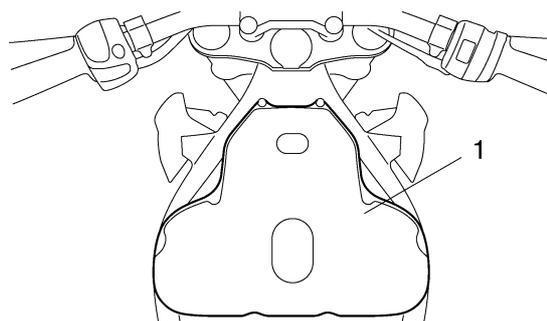
**Locknut**  
7 Nm (0.7 m·kg, 5.1 ft·lb)



EAS20960

### REPLACING THE AIR FILTER ELEMENT

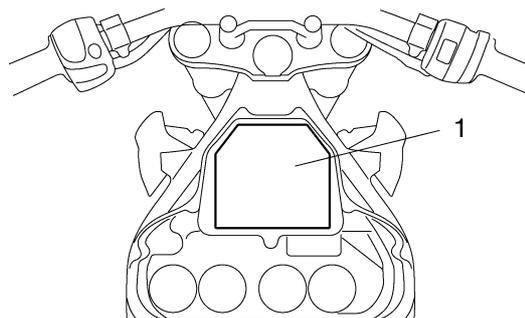
1. Remove:
  - Rider and passenger seat  
Refer to "GENERAL CHASSIS" on page 4-1.
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
2. Remove:
  - Air filter case cover "1"



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

### NOTE:

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



4. Install:
  - Air filter case cover

ECA14400

**CAUTION:**

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

**NOTE:**

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

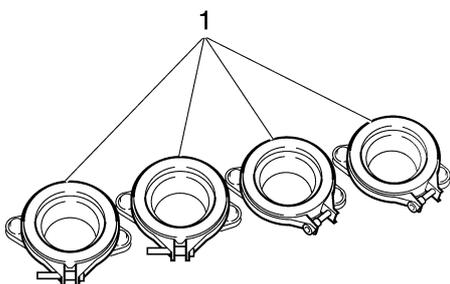
5. Install:
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
  - Rider and passenger seat  
Refer to "GENERAL CHASSIS" on page 4-1.

EAS21010

**CHECKING THE THROTTLE BODY JOINTS**

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

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



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

EAS21030

**CHECKING THE FUEL LINE**

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

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

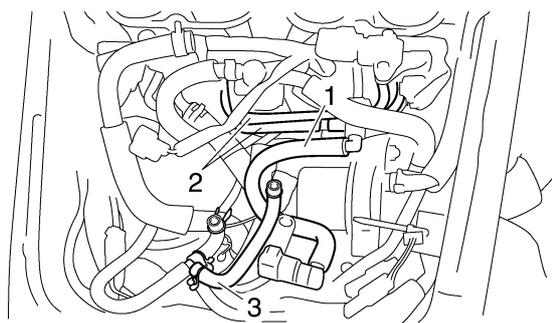
**NOTE:**

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

ECA14940

**CAUTION:**

Make sure the fuel tank breather hose is routed correctly.



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

ECS2D002

**CAUTION:**

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

EAS21070

**CHECKING THE CRANKCASE BREATHER HOSE**

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

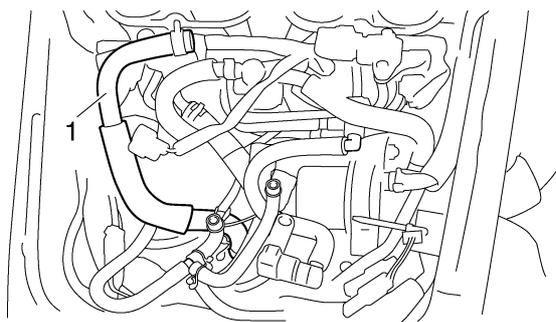
Refer to "FUEL TANK" on page 7-1.

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

ECA13450

**CAUTION:**

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



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

ECS2D003

**CAUTION:**

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

EAS21080

**CHECKING THE EXHAUST SYSTEM**

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

1. Check:
  - Exhaust pipe "1"
  - Muffler "2"  
Cracks/damage → Replace.
  - Gaskets "3"  
Exhaust gas leaks → Replace.
2. Check:
  - Tightening torque
  - Exhaust pipe nut "4"
  - Exhaust pipe and exhaust pipe bracket bolt "5"
  - Exhaust pipe and muffler bolt "6"
  - Muffler and rear footrest bracket bolt "7"

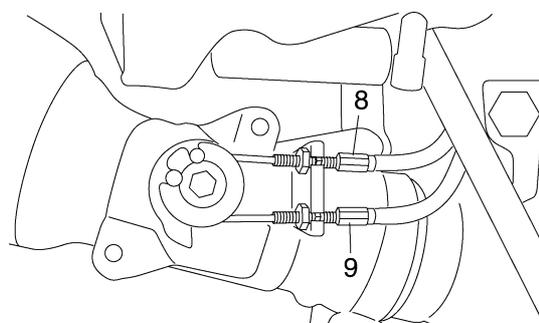
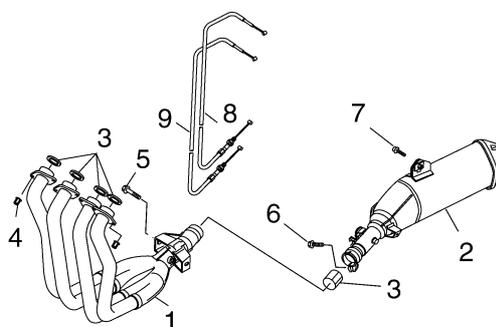


- Exhaust pipe nut  
20 Nm (2.0 m·kg, 14 ft·lb)
- Exhaust pipe and exhaust pipe bracket bolt  
20 Nm (2.0 m·kg, 14 ft·lb)
- Exhaust pipe and muffler bolt  
20 Nm (2.0 m·kg, 14 ft·lb)
- Muffler and rear footrest bracket bolt  
48 Nm (4.8 m·kg, 35 ft·lb)

**NOTE:**

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

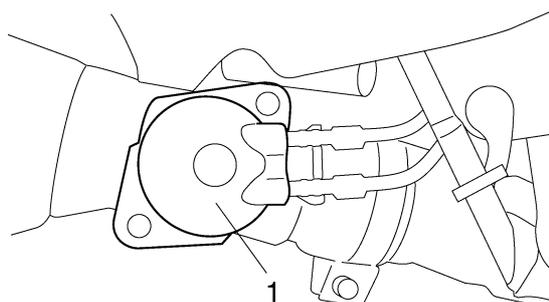
- Upper cable: White metal section "8"
- Lower cable: Black metal section "9"



ET2D1005

**ADJUSTING THE EXUP CABLES**

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



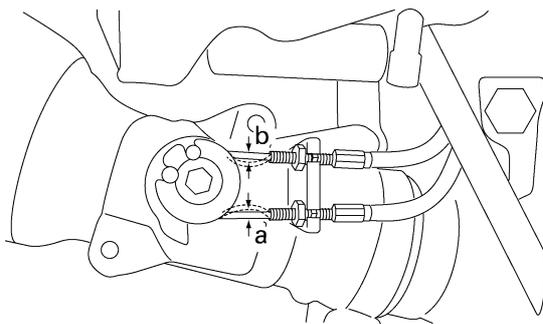
2. Check:
  - EXUP system operation

- a. Activate the diagnostic mode and select the diagnostic code number "53". Refer to "FUEL INJECTION SYSTEM" on page 8-31.
- b. Set the engine stop switch to "○".
- c. Check that the EXUP valve operates properly.

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



**Maximum EXUP cable free play (at the EXUP valve pulley)**  
**a: Less than 3 mm (0.12 in)**  
**b: Less than 3 mm (0.12 in)**

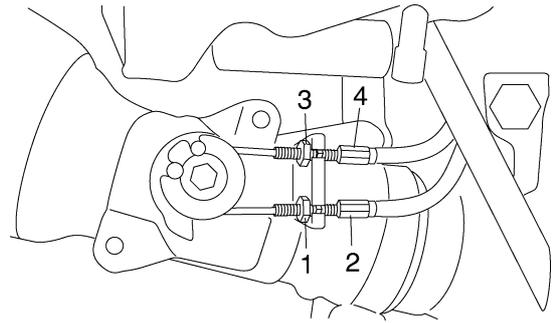


4. Adjust:
  - EXUP cable free play

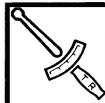
- a. Turn the main switch to "ON"
- b. Check the EXUP pulley position.
- c. Loosen the locknut "1".
- d. Loosen the locknut "3"
- e. Turn the adjusting nut "2" in or out.
- f. Tighten the locknut.
- g. Turn the adjusting nut "4" in or out.
- h. Tighten the locknut.



**EXUP cable locknut**  
**6 Nm (0.6 m·kg, 4.3 ft·lb)**



5. Install:
  - EXUP valve pulley cover



**EXUP valve pulley cover bolt**  
**14 Nm (1.4 m·kg, 10 ft·lb)**

EAS28360

## CHECKING THE EXUP SERVO MOTOR

1. Check:
  - EXUP servo motor operation
  - Out of specification → Replace.
- a. Check whether or not the EXUP valve is seized.
  - Disconnect the EXUP cable and check that the EXUP valve is moved smoothly by hand.
  - When the valve is not moved smoothly, repair or replace it.

Refer to "ADJUSTING THE EXUP CABLES" on page 3-17.
- b. When the EXUP valve is moved smoothly, replace the EXUP servo motor.
- c. Perform the self-diagnosis mode and check the operation of EXUP valve by visual inspection (Code No: 53).  
 The operation should be carried out as 3-second drive in the full open direction, 2-second stop and 3-second drive in the full close direction.
- d. Check that the EXUP servo motor pulley rotates several times.

EAS21110

## CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

### NOTE:

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

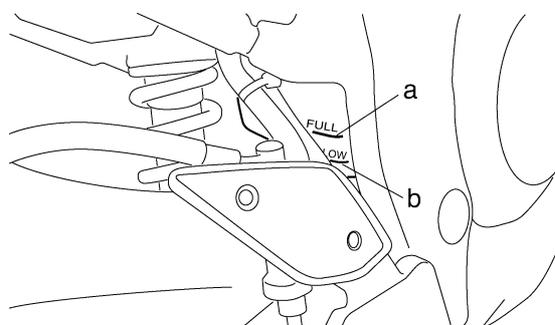
2. Check:

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

ECA13470

**CAUTION:**

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



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

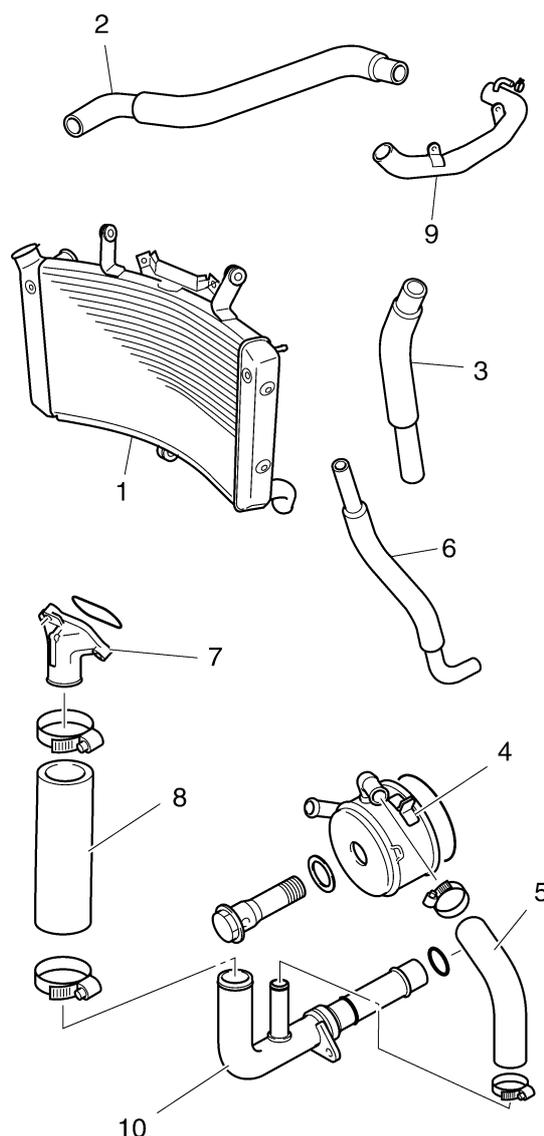
**NOTE:**

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

EAS21120

**CHECKING THE COOLING SYSTEM**

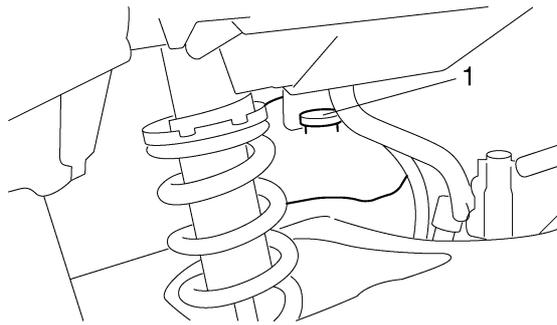
1. Check:
  - Radiator “1”
  - Radiator inlet hose “2”
  - Radiator outlet hose “3”
  - Oil cooler “4”
  - Oil cooler inlet hose “5”
  - Oil cooler outlet hose “6”
  - Water jacket joint “7”
  - Water jacket joint inlet hose “8”
  - Water pump inlet pipe “9”
  - Water pump outlet pipe “10”
 Cracks/damage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



EAS21130

**CHANGING THE COOLANT**

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



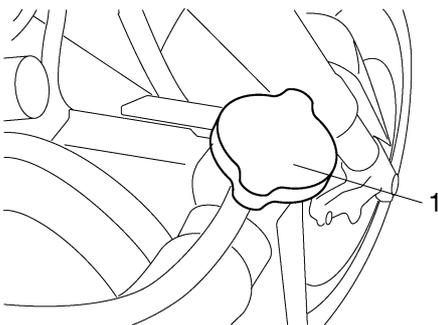
4. Drain:
  - Coolant (from the coolant reservoir)
5. Remove:
  - Radiator cap "1"

EWA13030

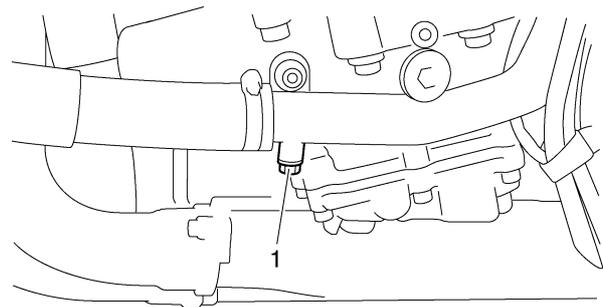
**⚠ WARNING**

**A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows: Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.**

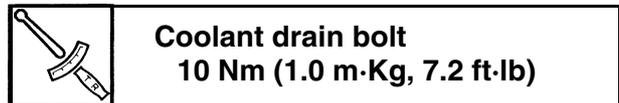
The following procedure applies to all of the coolant drain bolts and copper washers.



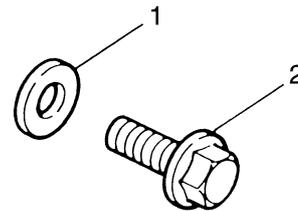
6. Remove:
  - Coolant drain bolts "1" (along with the copper washers)



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



**Coolant drain bolt**  
**10 Nm (1.0 m·Kg, 7.2 ft·lb)**



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



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

Handling notes for coolant

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

EWA13040

## **WARNING**

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

ECA13480

## **CAUTION:**

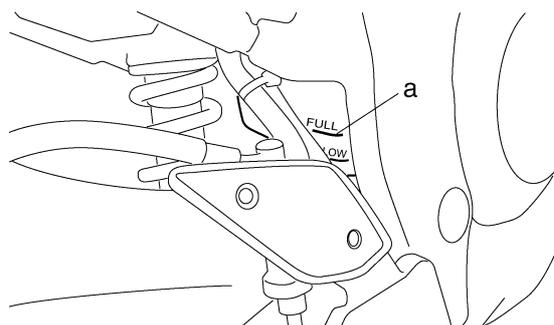
- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- If coolant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

13. Install:

- Radiator cap

14. Fill:

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



15. Install:

- Coolant reservoir cap

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

17. Check:

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

## **NOTE:**

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

18. Install:

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

EAS21140

## CHASSIS

EAS21160

### ADJUSTING THE FRONT DISC BRAKE

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

#### NOTE:

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

Direction "b"  
Distance "a" is the largest.  
Direction "c"  
Distance "a" is the smallest.

EWA13060

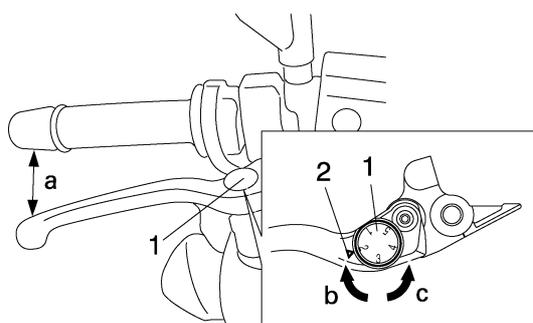
#### WARNING

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

ECA13490

#### CAUTION:

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



EAS21190

### ADJUSTING THE REAR DISC BRAKE

1. Adjust:
  - Brake pedal position

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

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

EWA13070

#### WARNING

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

- c. Tighten the locknut "1" to specification.



Locknut  
18 Nm (1.8 m·kg, 13 ft·lb)

EWA13050

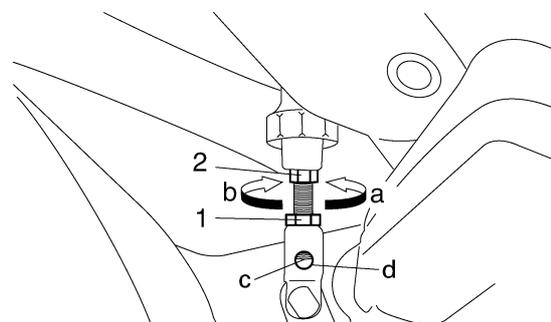
#### WARNING

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

ECA13510

#### CAUTION:

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



2. Adjust:
  - Rear brake light switch  
Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-24.

EAS21240

## CHECKING THE BRAKE FLUID LEVEL

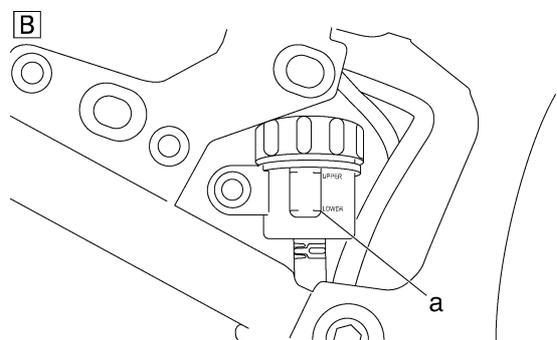
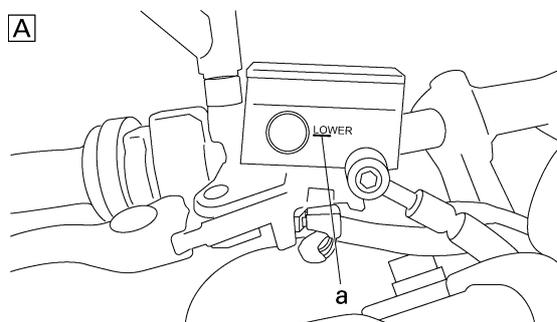
1. Stand the vehicle on a level surface.

### NOTE:

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

2. Check:

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



- A. Front brake  
B. Rear brake

EWA13090

### WARNING

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

the brake fluid and could cause vapor lock.

ECA13540

### CAUTION:

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

### NOTE:

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

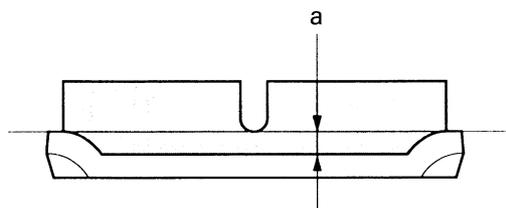
EAS21250

## CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:

- Front brake pad  
Wear indicators "a" almost touch the brake disc → Replace the brake pads as a set. Refer to "FRONT BRAKE" on page 4-20.



I2220404

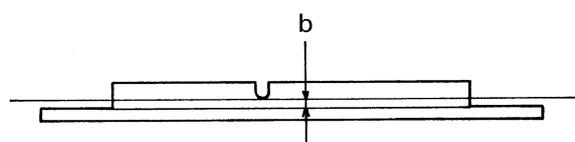
EAS21260

## CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:

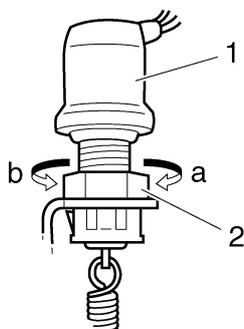
- Rear brake pad  
Wear indicators "b" almost touch the brake disc → Replace the brake pads as a set. Refer to "REAR BRAKE" on page 4-32.





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

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



EAS21350

## BLEEDING THE HYDRAULIC BRAKE SYSTEM

EWA13100

### **WARNING**

**Bleed the hydraulic brake system whenever:**

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

#### **NOTE:**

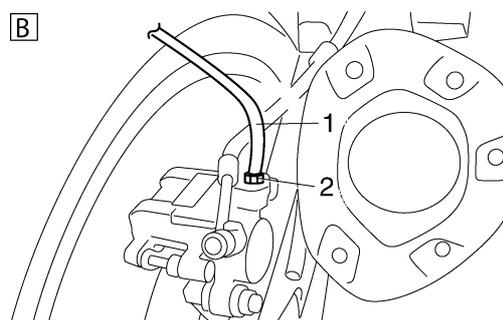
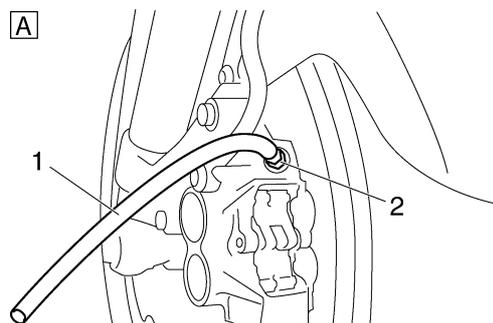
- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the hydraulic brake system, make sure there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic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

1. Bleed:
  - Hydraulic brake system



- a. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
- b. Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir).

- c. Connect a clear plastic hose "1" tightly to the bleed screw "2".



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

#### **NOTE:**

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

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



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

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

EWA13110

**WARNING**

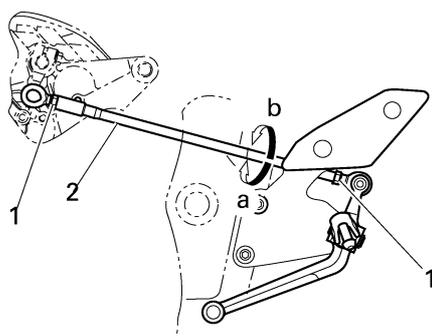
After bleeding the hydraulic brake system, check the brake operation.

ET2D1006

**ADJUSTING THE SHIFT PEDAL**

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

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



- c. Tighten both locknuts.

ET2D1007

**ADJUSTING THE DRIVE CHAIN SLACK**

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

ECA13550

**CAUTION:**

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

1. Stand the vehicle on a level surface.

EW2D1005

**WARNING**

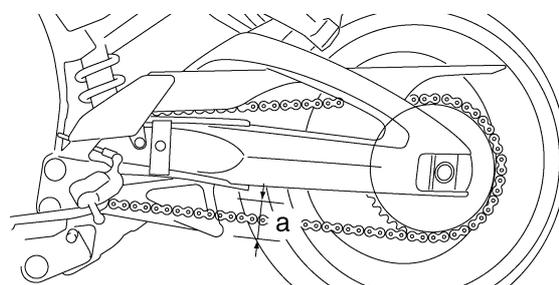
Securely support the vehicle so that there is no danger of it falling over.

**NOTE:**

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

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

**Drive chain slack**  
25–35 mm (0.98–1.38 in)



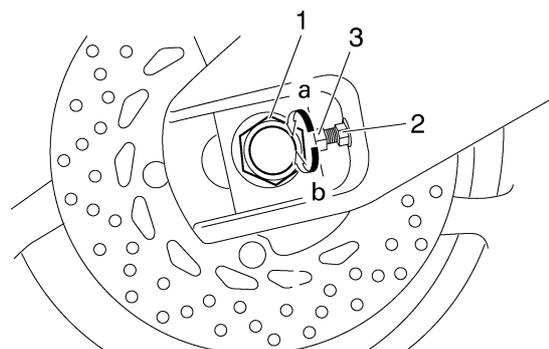
4. Adjust:
  - Drive chain slack

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

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

**NOTE:**

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



d. Tighten both locknuts to specification.

	<b>Locknut</b> <b>16 Nm (1.6 m·kg, 12 ft·lb)</b>
---	---

e. Tighten the wheel axle nut to specification.

	<b>Wheel axle nut</b> <b>150 Nm (15 m·kg, 108 ft·lb)</b>
---	---

ET2D1008

## LUBRICATING THE DRIVE CHAIN

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

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

	<b>Recommended lubricant</b> <b>Engine oil or chain lubricant</b> <b>suitable for O-ring chains</b>
---	---

EAS21510

## CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

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

### NOTE:

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

2. Check:

- Steering head  
Grasp the bottom of the front fork legs and gently rock the front fork.  
Binding/looseness → Adjust the steering head.

3. Remove:

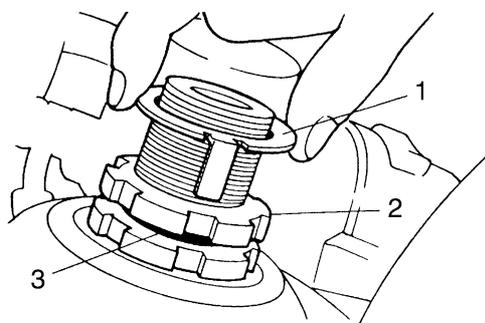
- Upper bracket

Refer to "STEERING HEAD" on page 4-57.

4. Adjust:

- Steering head

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



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

### NOTE:

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

	<b>Steering nut wrench</b> <b>90890-01403</b> <b>Spanner wrench</b> <b>YU-33975</b>
---	--

	<b>Lower ring nut (initial tightening torque)</b> <b>52 Nm (5.2 m·kg, 38 ft·lb)</b>
---	--

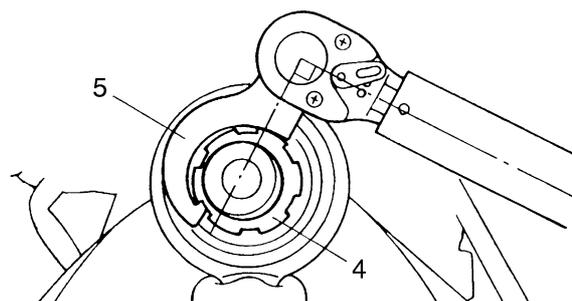
c. Loosen the lower ring nut "4" completely, and then tighten it to specification.

EWA13140

### **WARNING**

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

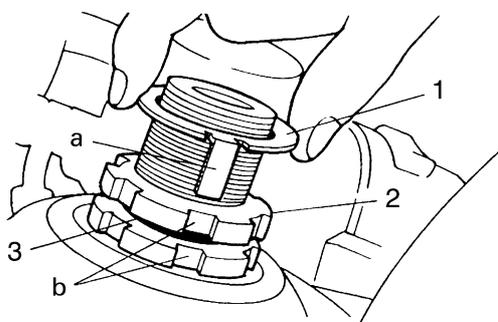
	<b>Lower ring nut (final tightening torque)</b> <b>18 Nm (1.8 m·kg, 13 ft·lb)</b>
---	--



- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings. Refer to "STEERING HEAD" on page 4-57.
- e. Install the rubber washer "3".
- f. Install the upper ring nut "2".
- g. Finger tighten the upper ring nut "2", then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- h. Install the lock washer "1".

**NOTE:**

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



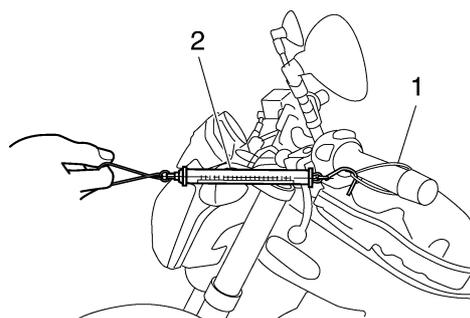
5. Install:
  - Upper bracket
 Refer to "STEERING HEAD" on page 4-57.
6. Measure:
  - Steering head tension



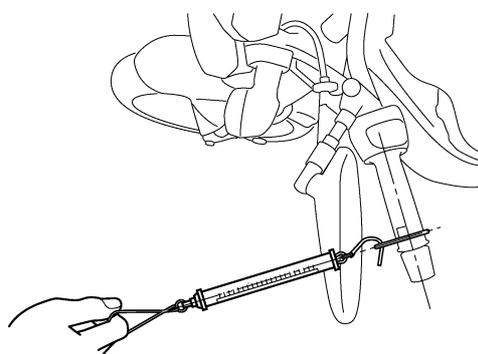
**NOTE:**

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

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



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



	<p><b>Steering head tension</b> 200–500 g</p>
--	---

- 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. Binding/looseness → Adjust the steering head.



EAS21530

**CHECKING THE FRONT FORK**

1. Stand the vehicle on a level surface.

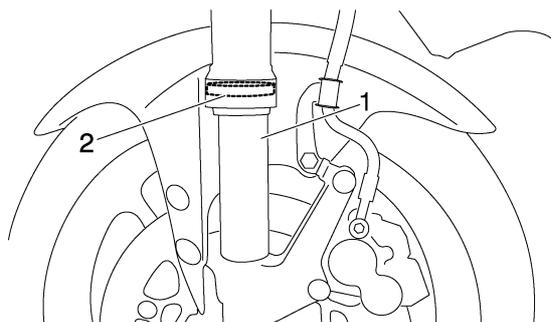
EWA13120

**WARNING**

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

2. Check:

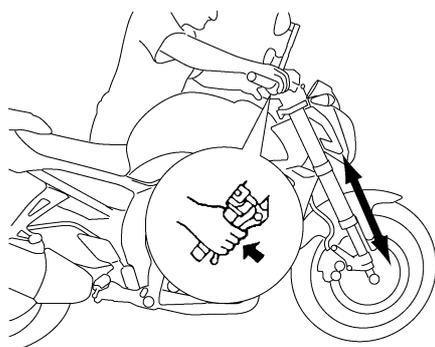
- Inner tube "1"  
Damage/scratches → Replace.
- Oil seal "2"  
Oil leakage → Replace.



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

4. Check:

- Front fork operation  
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.  
Rough movement → Repair.  
Refer to "FRONT FORK" on page 4-48.



EAS21580

**ADJUSTING THE FRONT FORK LEGS**

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

**NOTE:**

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

EWA13150

**WARNING**

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

**Spring preload**

ECA13570

**CAUTION:**

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

1. Adjust:

- Spring preload



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

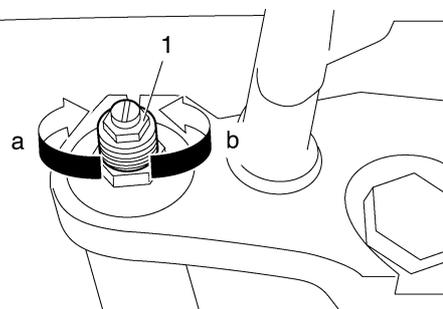
**Direction "a"**  
Spring preload is increased  
(suspension is harder).

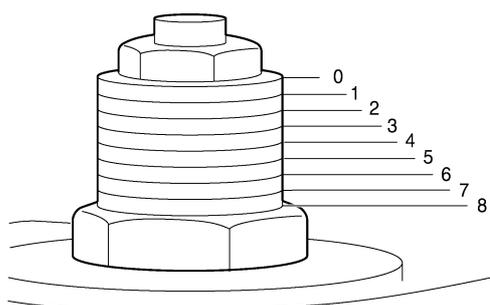
**Direction "b"**  
Spring preload is decreased  
(suspension is softer).



**Spring preload adjusting positions**

- Minimum  
8
- Standard  
6
- Maximum  
0





## Rebound damping (Right side front fork)

EC2D1006

### CAUTION:

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

#### 1. Adjust:

- Rebound damping



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

#### Direction "a" (turn in)

Rebound damping is increased  
(suspension is harder).

#### Direction "b" (turn out)

Rebound damping is decreased  
(suspension is softer).



#### Rebound damping adjusting positions

Minimum

26 clicks in direction: "b"\*

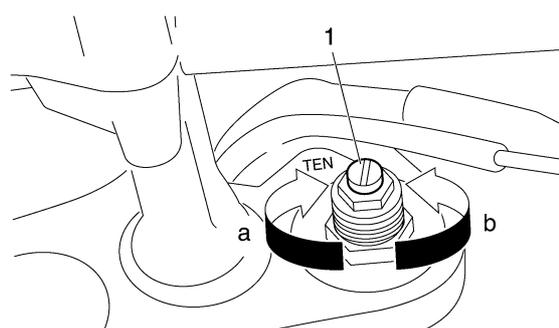
Standard

15 clicks in direction: "b"\*

Maximum

1 clicks in direction: "b"\*

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



## Compression damping (Left side front fork)

ECA13590

### CAUTION:

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

#### 1. Adjust:

- Compression damping



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

#### Direction "a" (turn in)

Compression damping is increased  
(suspension is harder).

#### Direction "b" (turn out)

Compression damping is decreased  
(suspension is softer).



#### Compression damping adjusting positions

Minimum

26 clicks in direction: "b"\*

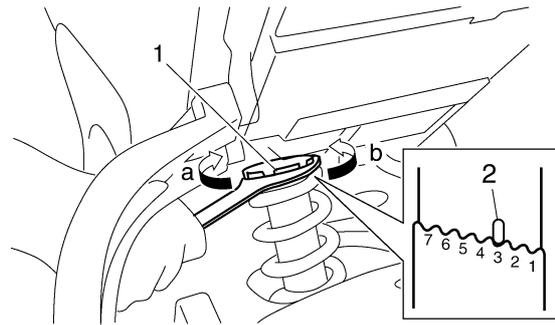
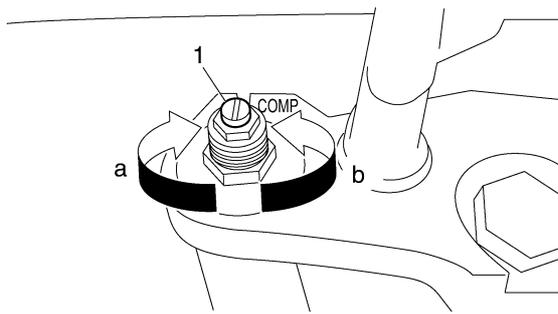
Standard

5 clicks in direction: "b"\*

Maximum

1 clicks in direction: "b"\*

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



EAS21620  
**ADJUSTING THE REAR SHOCK  
 ABSORBER ASSEMBLY**

EWA13120

**WARNING**

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

**Spring preload**

ECA13590

**CAUTION:**

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
  - Spring preload

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

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

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



**Spring preload adjusting positions**

- Minimum  
1
- Standard  
3
- Maximum  
7

**Rebound damping**

ECA13590

**CAUTION:**

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
  - Rebound damping

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

**Direction "a"**  
 Rebound damping is increased  
 (suspension is harder).

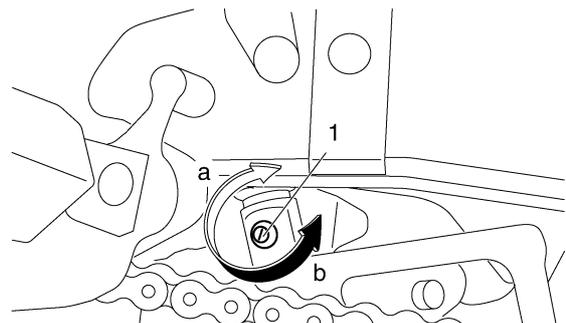
**Direction "b"**  
 Rebound damping is decreased  
 (suspension is softer).



**Rebound damping adjusting position**

- Minimum  
12 clicks in direction: "b"\*
- Standard  
6 clicks in direction: "b"\*
- Maximum  
1 clicks in direction: "b"\*

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

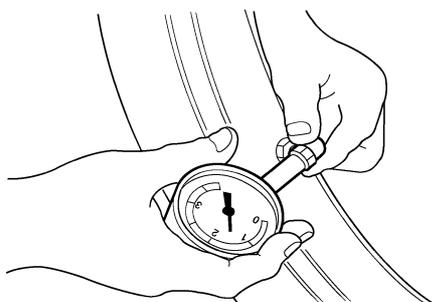


EAS21650

## CHECKING THE TIRES

The following procedure applies to both of the tires.

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



I2070102

EWA13180

### **WARNING**

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

**NEVER OVERLOAD THE VEHICLE.**



Tire air pressure (measured on cold tires):

Basic weight (with oil and a full fuel tank)

FZ1-N

214kg (472lb)

FZ1-S

220kg (485lb)

Loading condition\*

0–90 kg (0–198 lb)

Front

250 kPa (2.5 kg/cm<sup>2</sup>, 2.5 bar, 36 psi)

Rear

290 kPa (2.9 kg/cm<sup>2</sup>, 2.9 bar, 42 psi)

Loading condition\*

FZ1-N

90–196 kg (198–432 lb)

FZ1-S

90–190 kg (198–419 lb)

Front

250 kPa (2.5 kg/cm<sup>2</sup>, 2.5 bar, 36 psi)

Rear

290 kPa (2.9 kg/cm<sup>2</sup>, 2.9 bar, 42 psi)

High speed riding:

Front

250 kPa (2.5 kg/cm<sup>2</sup>, 2.5 bar, 36 psi)

Rear

290 kPa (2.9 kg/cm<sup>2</sup>, 2.9 bar, 42 psi)

Maximum load\*

FZ1-N

196 kg (432 lb)

FZ1-S

190 kg (419 lb)

\* Total weight of rider, passenger, cargo and accessories.

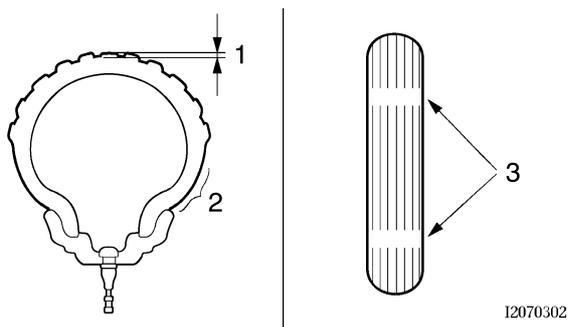
EWA13190

### **WARNING**

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

2. Check:

- Tire surfaces
- Damage/wear → Replace the tire.



I2070302

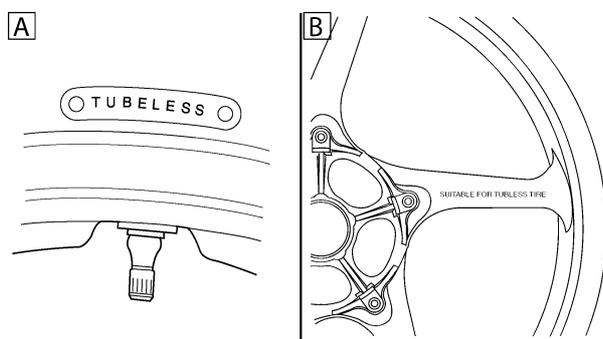
1. Tire tread depth
2. Side wall
3. Wear indicator

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

EWA14080

 **WARNING**

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



- A. Tire  
B. Wheel

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

EWA14090

 **WARNING**

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



**Front tire**

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



**Rear tire**

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

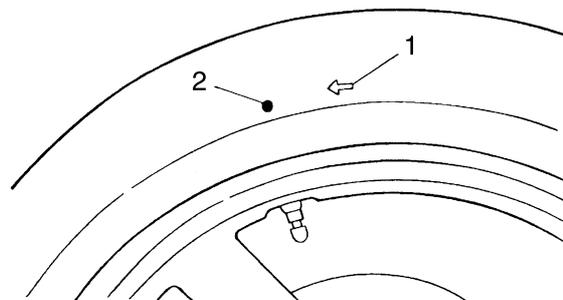
EWA13210

 **WARNING**

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

**NOTE:**

- For tires with a direction of rotation mark "1":
- Install the tire with the mark pointing in the direction of wheel rotation.
  - Align the mark "2" with the valve installation point.



EAS21670

## CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

EWA13260



**WARNING**

**Never attempt to make any repairs to the wheel.**

### NOTE:

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

EAS21690

## CHECKING AND LUBRICATING THE CABLES

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

EWA13270



**WARNING**

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

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



**Recommended lubricant**  
**Engine oil or a suitable cable lubricant**

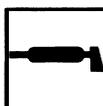
### NOTE:

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

EAS21700

## LUBRICATING THE LEVERS

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



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

EAS21710

## LUBRICATING THE PEDAL

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



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

EAS21720

## LUBRICATING THE SIDESTAND

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

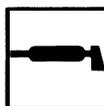


**Recommended lubricant**  
**Lithium - soap - based grease**

EAS21730

## LUBRICATING THE CENTERSTAND (FZ1-S)

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

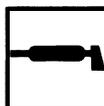


**Recommended lubricant**  
**Lithium - soap - based grease**

EAS21740

## LUBRICATING THE REAR SUSPENSION

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



**Recommended lubricant**  
**Molybdenum disulfide grease**

EAS21750

## ELECTRICAL SYSTEM

EAS21760

### CHECKING AND CHARGING THE BATTERY

Refer to "ELECTRICAL COMPONENTS" on page 8-89.

EAS21770

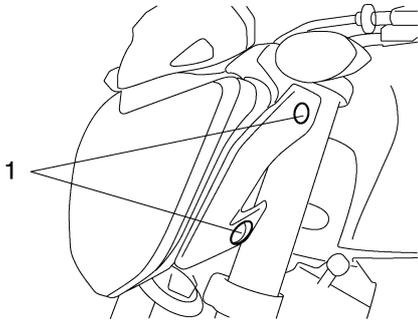
### CHECKING THE FUSES

Refer to "ELECTRICAL COMPONENTS" on page 8-89.

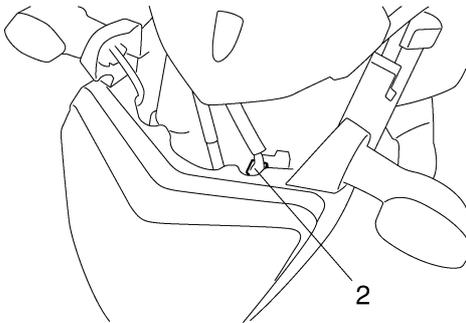
EAS21780

### REPLACING THE HEADLIGHT BULBS

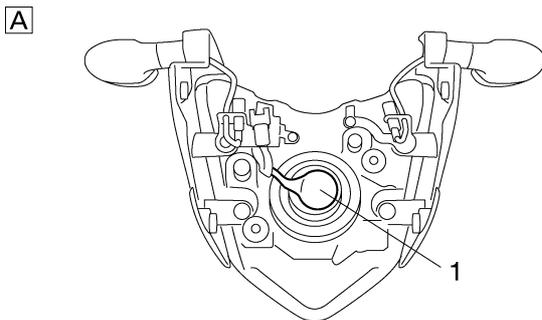
1. Remove:
  - Headlight side cover bolts "1" (FZ1-N)



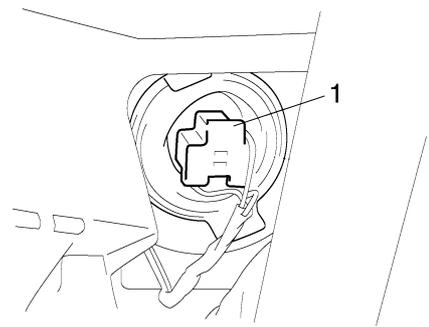
2. Disconnect:
  - Headlight sub-wire harness coupler "2" (FZ1-N)



3. Disconnect:
  - Headlight coupler "1"



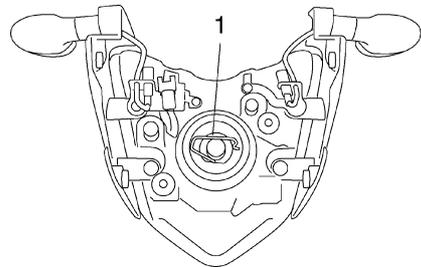
B



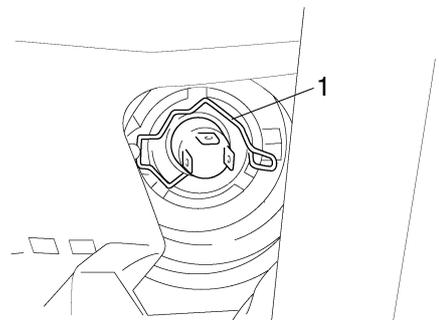
- A. FZ1-N
- B. FZ1-S
4. Remove:
  - Headlight bulb cover "1" (FZ1-S)

5. Remove:
  - Headlight bulb holder "1"

A

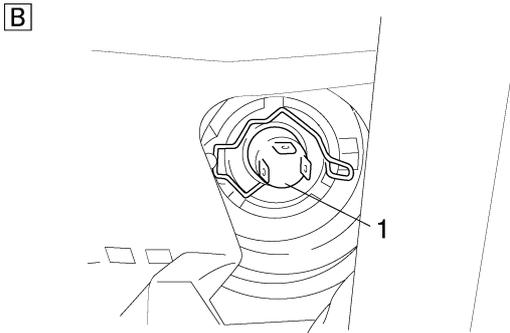
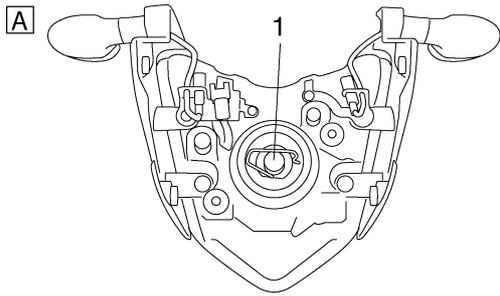


B



- A. FZ1-N
- B. FZ1-S
6. Remove:
  - Headlight bulb "1"

# ELECTRICAL SYSTEM



- A. FZ1-N
- B. FZ1-S

EWA13320

**⚠ WARNING**

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

7. Install:

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

ECA13690

**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.

8. Install:

- Headlight bulb holder

9. Install:

- Headlight bulb cover

10. Connect:

- Headlight coupler

11. Connect:

- Headlight assembly coupler

12. Install:

- Headlight assembly bolts

EAS21800

## ADJUSTING THE HEADLIGHT BEAM

1. Adjust:

- Headlight beam (vertically)



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

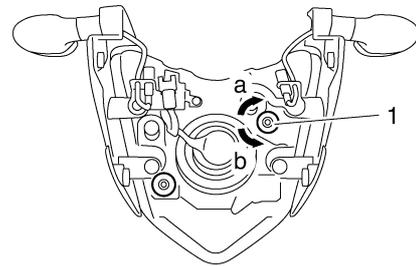
**Direction "a"**

**Headlight beam is raised.**

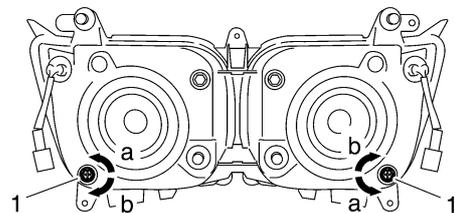
**Direction "b"**

**Headlight beam is lowered.**

A



B



A. FZ1-N

B. FZ1-S



2. Adjust:

- Headlight beam (horizontally)



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

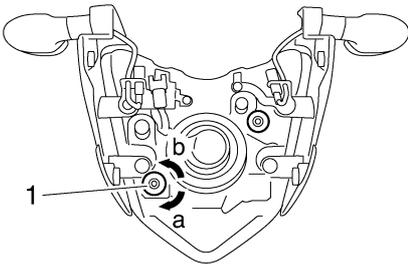
**Direction "a"**

**Headlight beam moves to the left.**

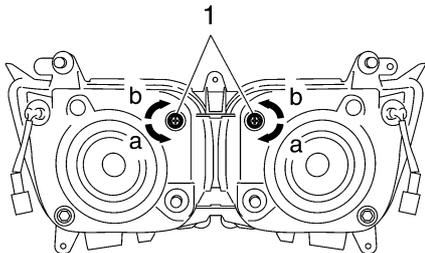
**Direction "b"**

**Headlight beam moves to the right.**

A



B



- A. FZ1-N
- B. FZ1-S



---

# CHASSIS

<b>GENERAL CHASSIS</b> .....	4-1
REMOVING THE COVER.....	4-7
INSTALLING THE COVER .....	4-7
<b>FRONT WHEEL</b> .....	4-8
REMOVING THE FRONT WHEEL .....	4-10
CHECKING THE FRONT WHEEL.....	4-10
ADJUSTING THE FRONT WHEEL STATIC BALANCE .....	4-11
INSTALLING THE FRONT WHEEL (DISC).....	4-12
<b>REAR WHEEL</b> .....	4-14
REMOVING THE REAR WHEEL (DISC) .....	4-17
CHECKING THE REAR WHEEL.....	4-17
CHECKING THE REAR WHEEL DRIVE HUB .....	4-17
CHECKING AND REPLACING THE REAR WHEEL SPROCKET .....	4-18
ADJUSTING THE REAR WHEEL STATIC BALANCE.....	4-18
INSTALLING THE REAR WHEEL (DISC) .....	4-18
<b>FRONT BRAKE</b> .....	4-20
INTRODUCTION .....	4-25
CHECKING THE FRONT BRAKE DISCS .....	4-25
REPLACING THE FRONT BRAKE PADS .....	4-26
REMOVING THE FRONT BRAKE CALIPERS.....	4-27
DISASSEMBLING THE FRONT BRAKE CALIPERS.....	4-27
CHECKING THE FRONT BRAKE CALIPERS .....	4-28
ASSEMBLING THE FRONT BRAKE CALIPERS.....	4-28
INSTALLING THE FRONT BRAKE CALIPERS.....	4-28
REMOVING THE FRONT BRAKE MASTER CYLINDER.....	4-29
CHECKING THE FRONT BRAKE MASTER CYLINDER.....	4-30
ASSEMBLING THE FRONT BRAKE MASTER CYLINDER.....	4-30
INSTALLING THE FRONT BRAKE MASTER CYLINDER .....	4-30
<b>REAR BRAKE</b> .....	4-32
INTRODUCTION .....	4-37
CHECKING THE REAR BRAKE DISC.....	4-37
REPLACING THE REAR BRAKE PADS .....	4-37
REMOVING THE REAR BRAKE CALIPER.....	4-38
DISASSEMBLING THE REAR BRAKE CALIPER.....	4-38
CHECKING THE REAR BRAKE CALIPER .....	4-39
ASSEMBLING THE REAR BRAKE CALIPER.....	4-39
INSTALLING THE REAR BRAKE CALIPER .....	4-40
REMOVING THE REAR BRAKE MASTER CYLINDER.....	4-41
CHECKING THE REAR BRAKE MASTER CYLINDER .....	4-41
ASSEMBLING THE REAR BRAKE MASTER CYLINDER.....	4-41
INSTALLING THE REAR BRAKE MASTER CYLINDER.....	4-41
<b>HANDLEBAR</b> .....	4-43

---

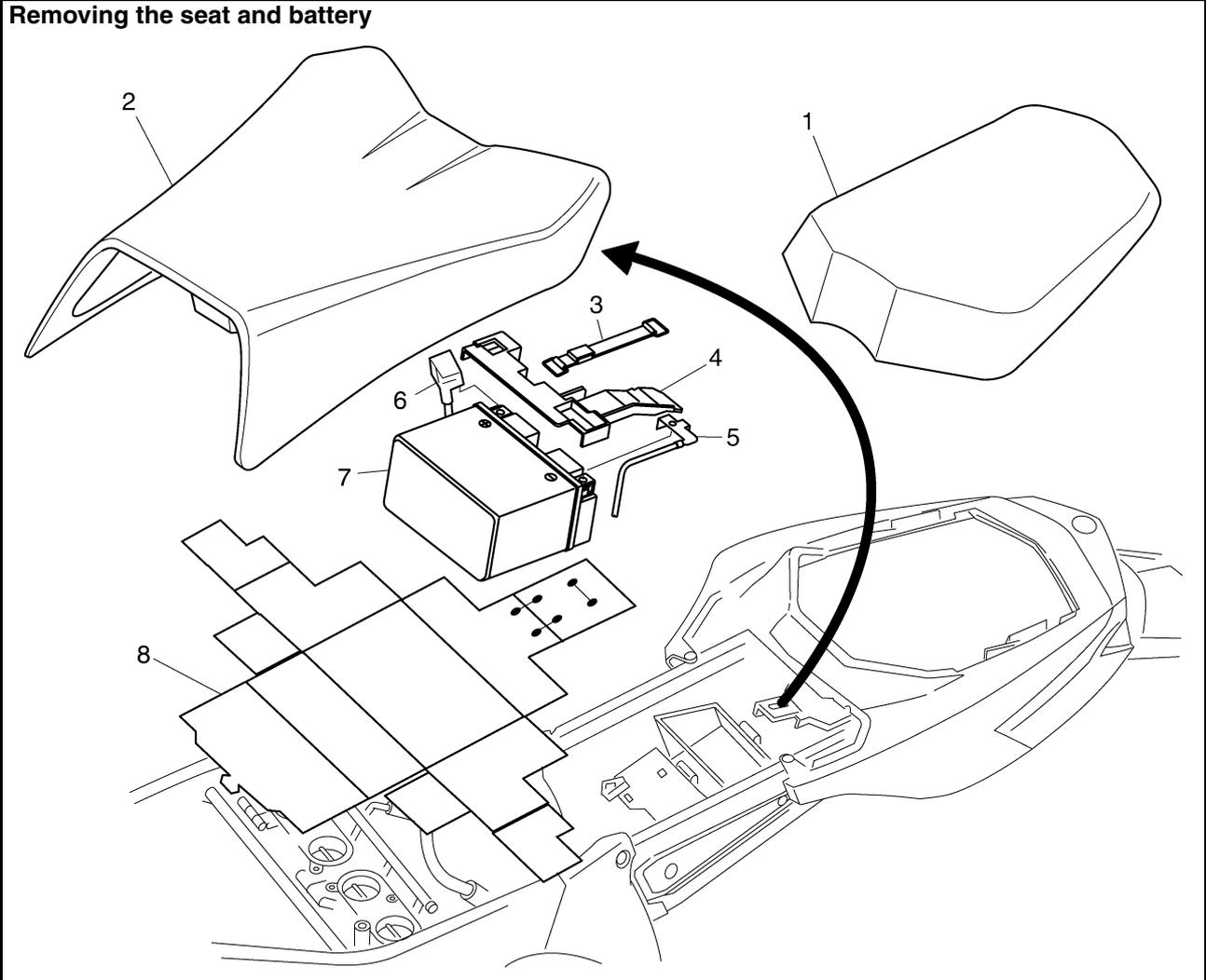
REMOVING THE HANDLEBAR .....	4-45
CHECKING THE HANDLEBAR.....	4-45
INSTALLING THE HANDLEBAR .....	4-45
<b>FRONT FORK.....</b>	<b>4-48</b>
REMOVING THE FRONT FORK LEGS .....	4-50
DISASSEMBLING THE FRONT FORK LEGS .....	4-50
CHECKING THE FRONT FORK LEGS.....	4-51
ASSEMBLING THE FRONT FORK LEGS .....	4-52
INSTALLING THE FRONT FORK LEGS .....	4-56
<b>STEERING HEAD.....</b>	<b>4-57</b>
REMOVING THE LOWER BRACKET .....	4-59
CHECKING THE STEERING HEAD .....	4-59
INSTALLING THE STEERING HEAD.....	4-60
<b>REAR SHOCK ABSORBER ASSEMBLY .....</b>	<b>4-61</b>
HANDLING THE REAR SHOCK ABSORBER .....	4-63
DISPOSING OF A REAR SHOCK ABSORBER.....	4-63
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY.....	4-63
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY .....	4-63
CHECKING THE CONNECTING ARM AND RELAY ARM .....	4-64
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY .....	4-64
<b>SWINGARM.....</b>	<b>4-65</b>
REMOVING THE SWINGARM .....	4-67
CHECKING THE SWINGARM .....	4-67
INSTALLING THE SWINGARM.....	4-68
<b>CHAIN DRIVE.....</b>	<b>4-69</b>
REMOVING THE DRIVE CHAIN .....	4-70
CHECKING THE DRIVE CHAIN .....	4-70
CHECKING THE DRIVE SPROCKET .....	4-71
CHECKING THE REAR WHEEL SPROCKET .....	4-71
CHECKING THE REAR WHEEL DRIVE HUB .....	4-71
INSTALLING THE DRIVE CHAIN.....	4-71

---

EAS21830

## GENERAL CHASSIS

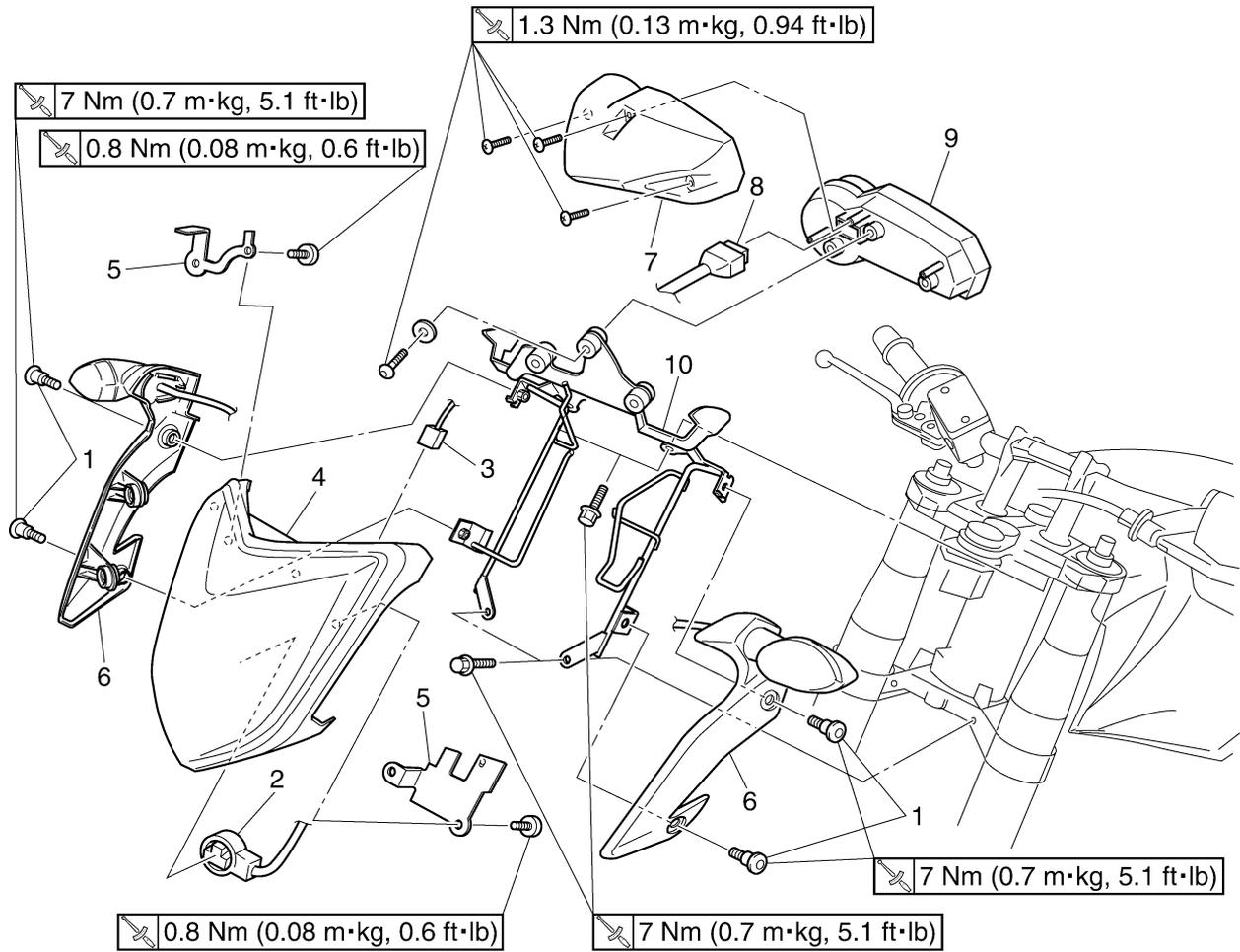
### Removing the seat and battery



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

# GENERAL CHASSIS

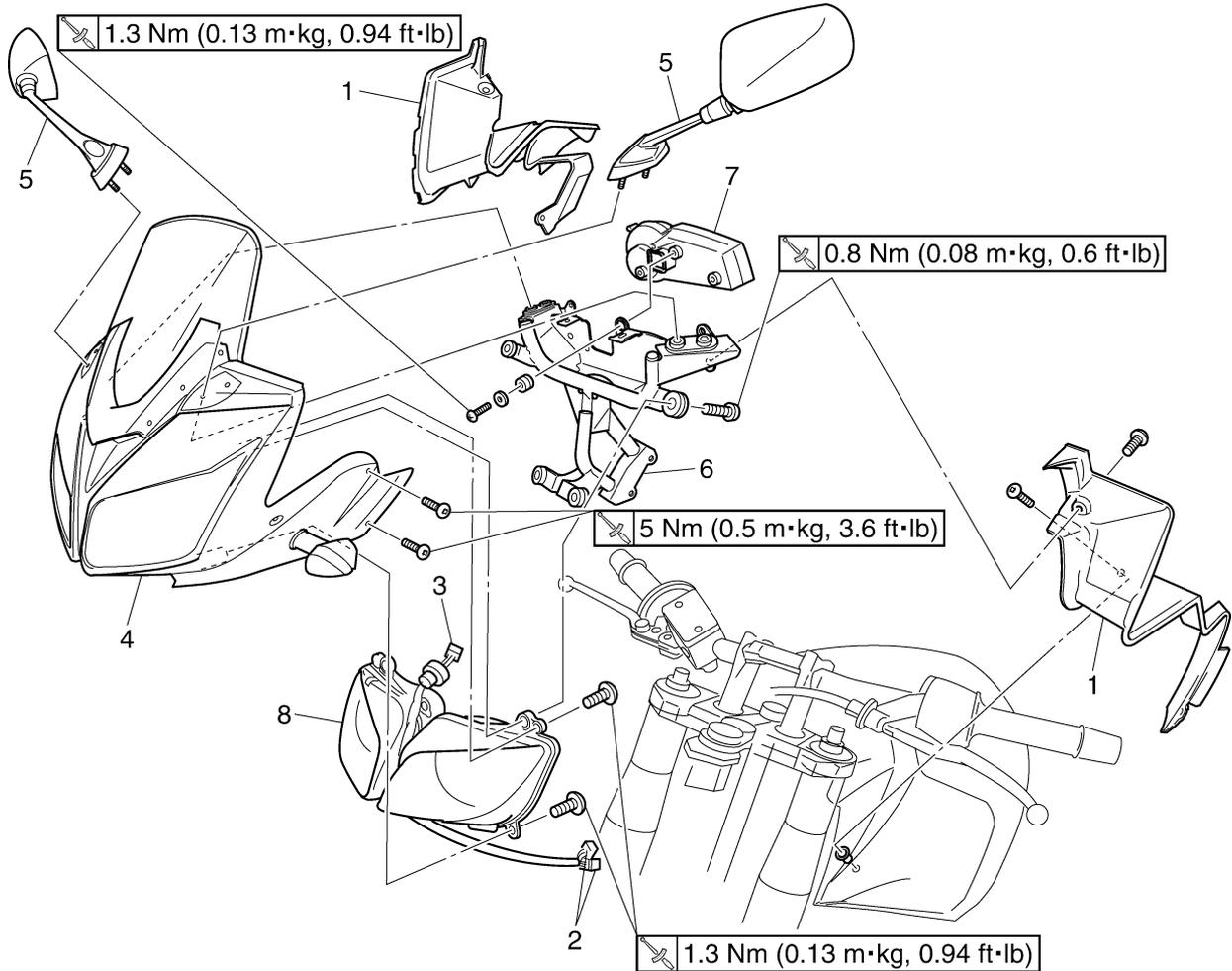
## Removing the headlight and meter assembly (FZ1-N)



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

# GENERAL CHASSIS

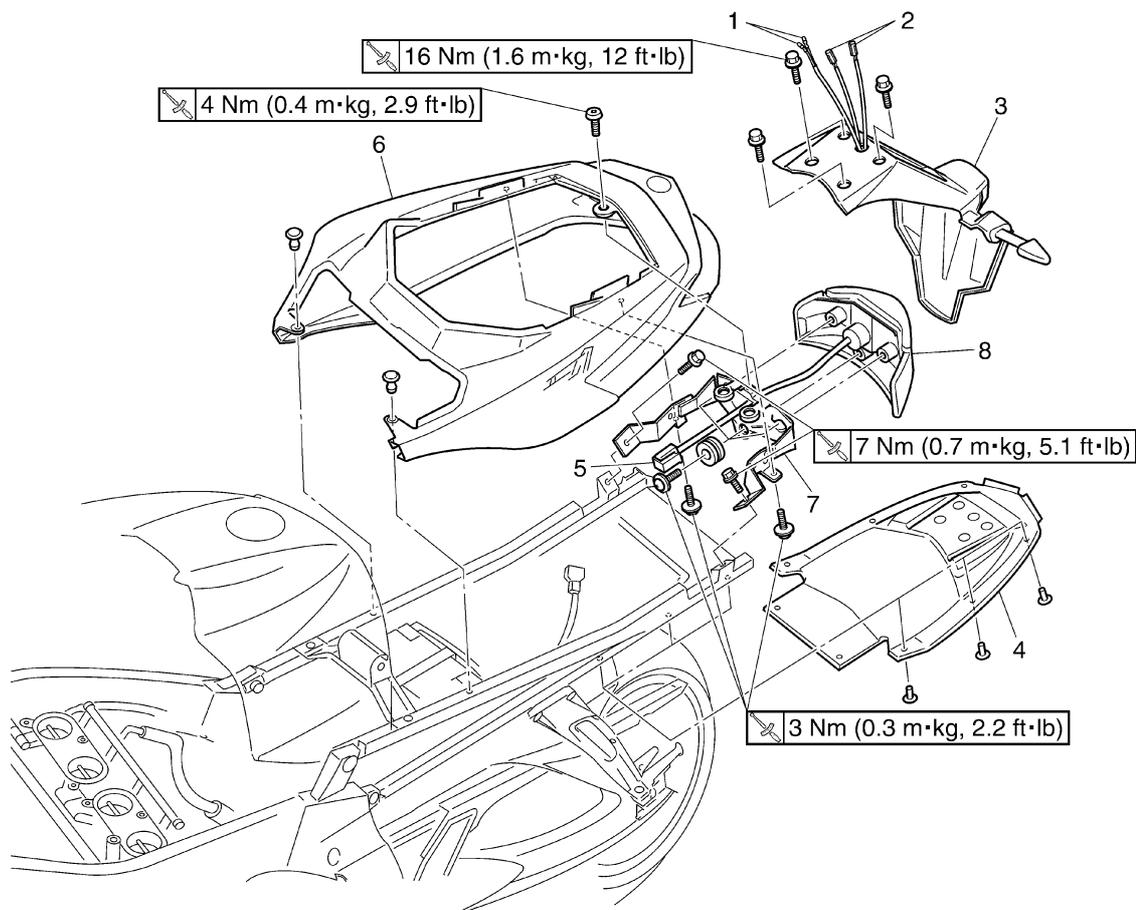
## Removing the front cowling (FZ1-S)



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

# GENERAL CHASSIS

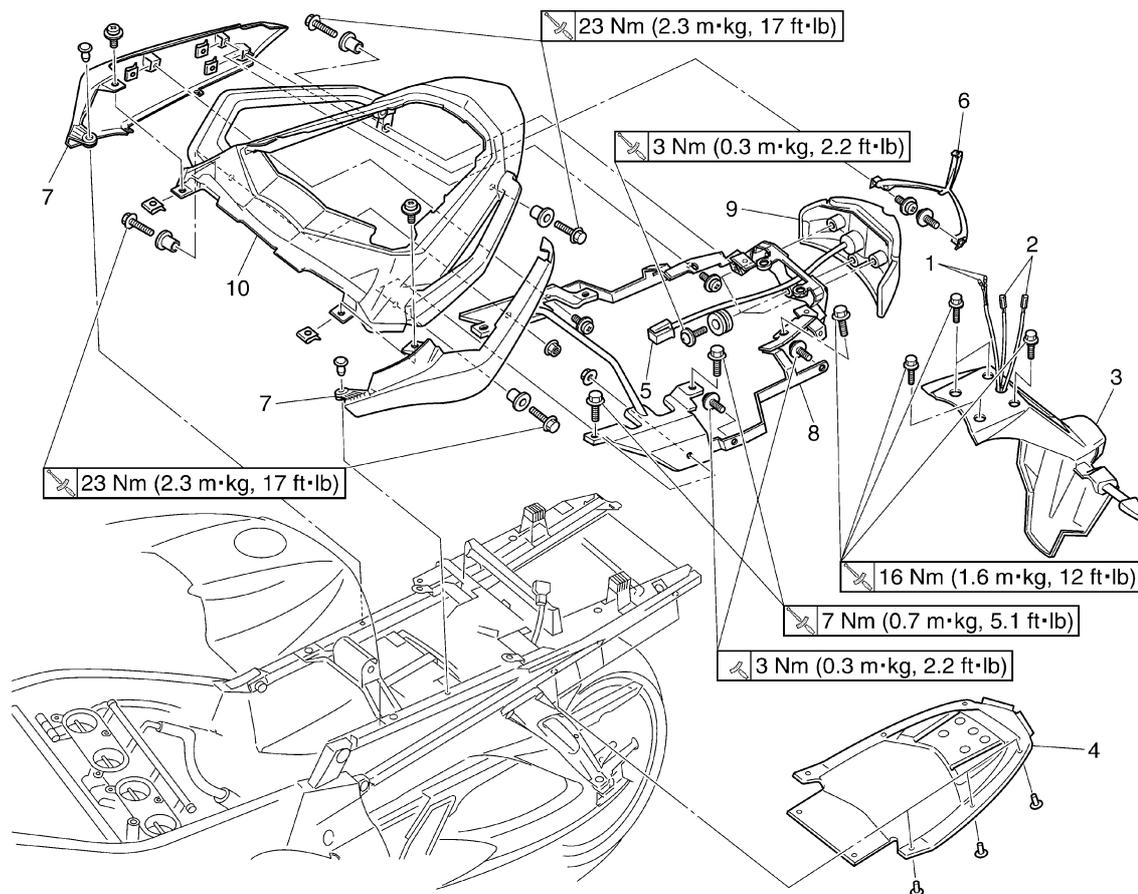
## Removing the rear fender (FZ1-N)



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

# GENERAL CHASSIS

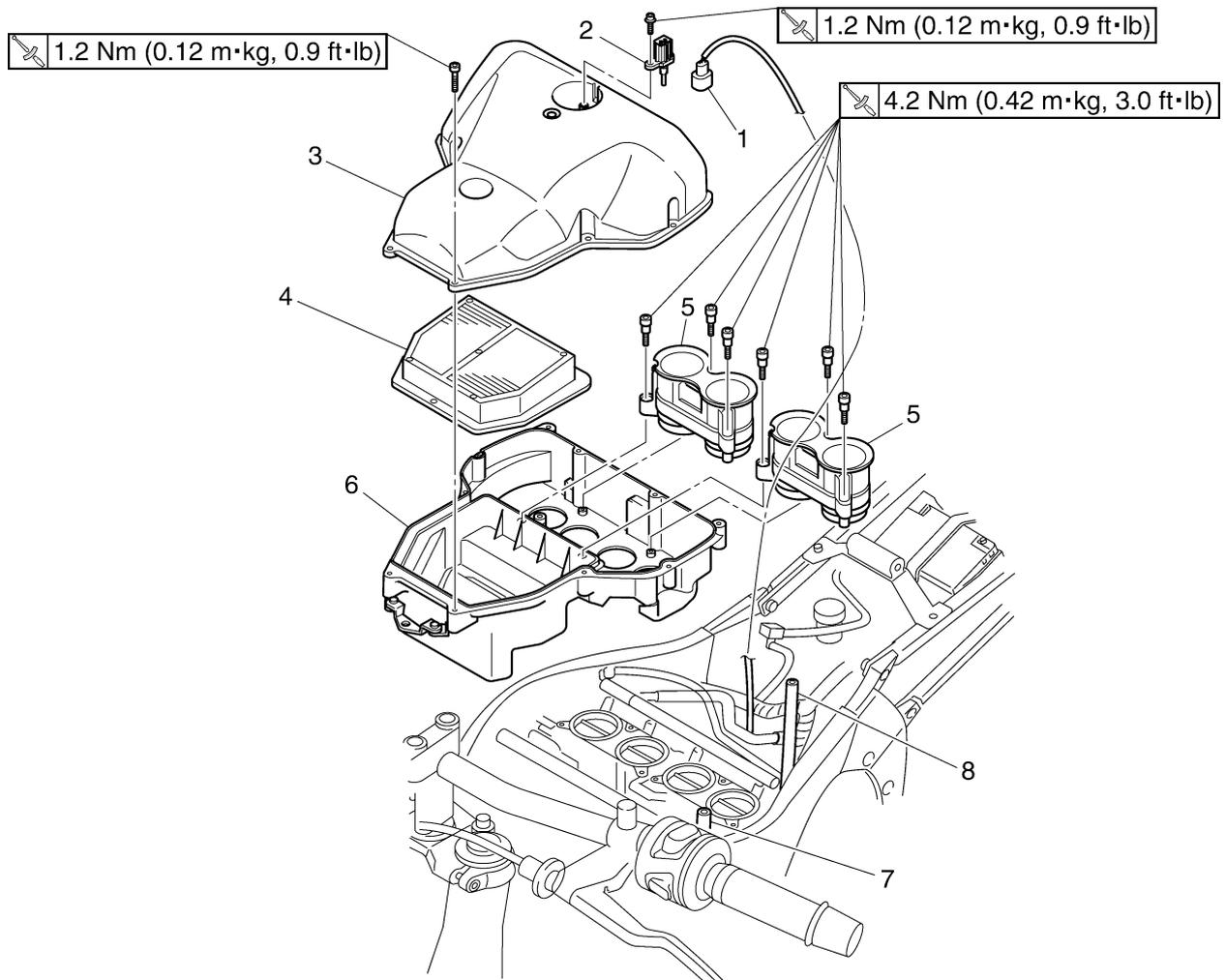
## Removing the rear fender (FZ1-S)



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

# GENERAL CHASSIS

## Removing the air filter case



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

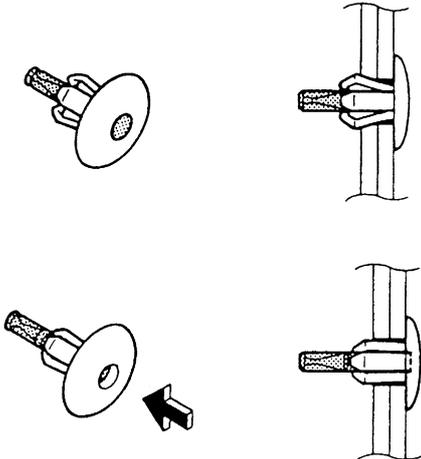
EAS21840

**REMOVING THE COVER**

- 1. Remove:
  - Tail cover
  - Rear fender

**NOTE:**

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



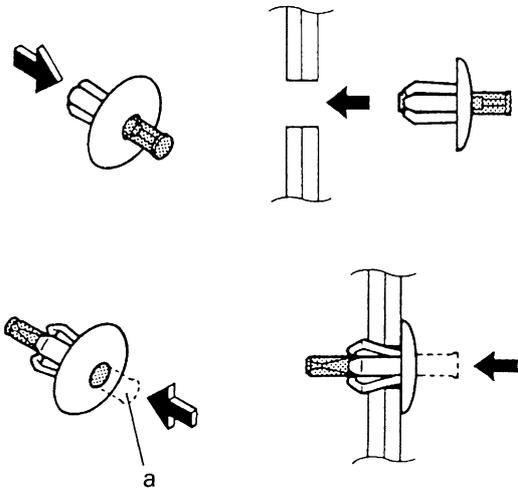
EAS21850

**INSTALLING THE COVER**

- 1. Install:
  - Rear fender
  - Tail cover

**NOTE:**

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

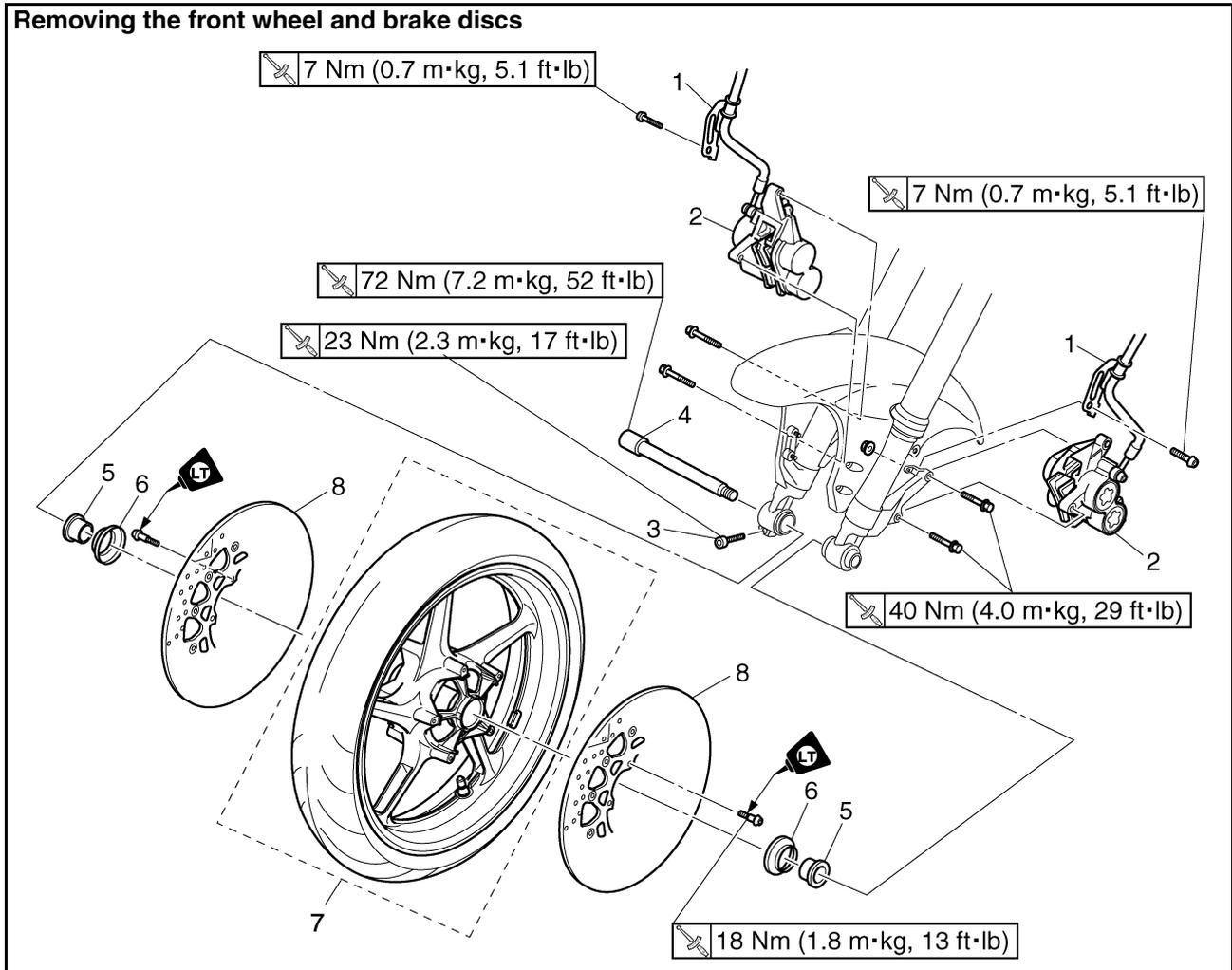


# FRONT WHEEL

EAS21870

## FRONT WHEEL

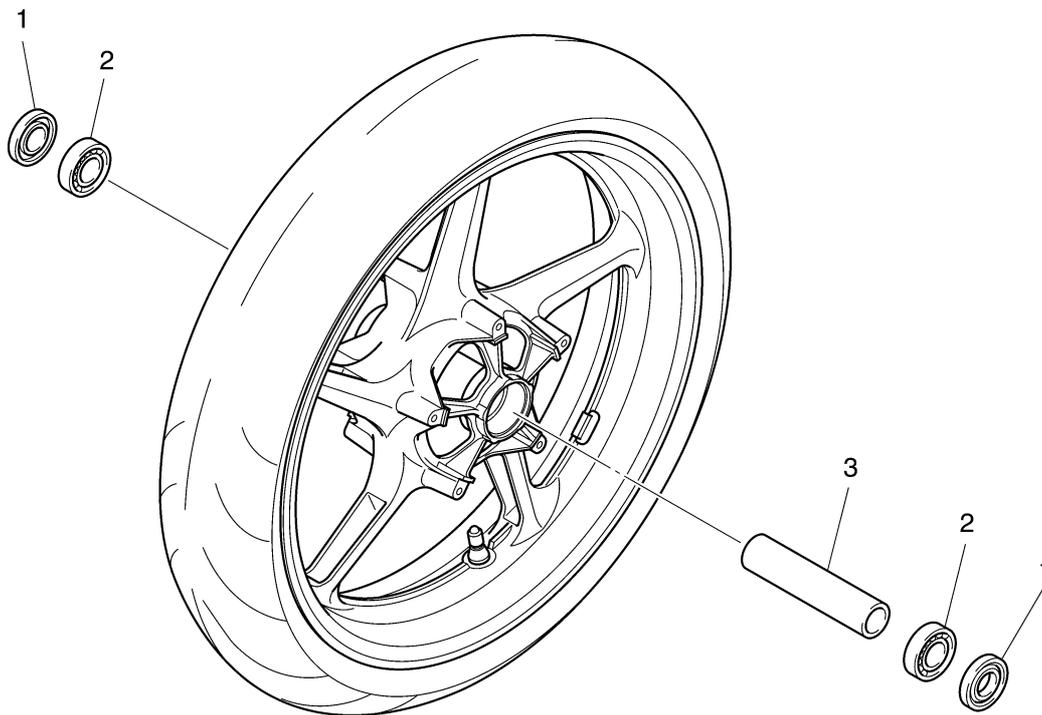
### Removing the front wheel and brake discs



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

# FRONT WHEEL

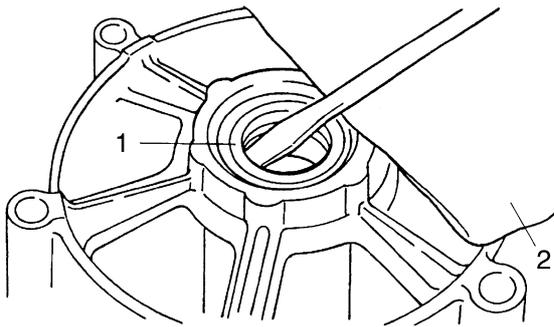
## Disassembling the front wheel



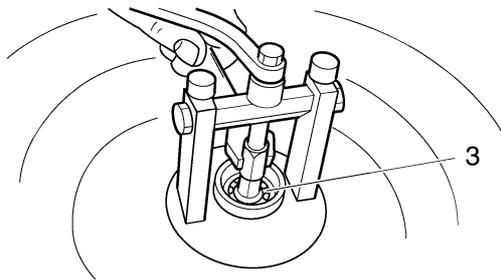
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal (left and right)	2	
2	Wheel bearing (left and right)	2	
3	Spacer	1	
			For assembly, reverse the disassembly procedure.



# FRONT WHEEL



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



I2010201

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

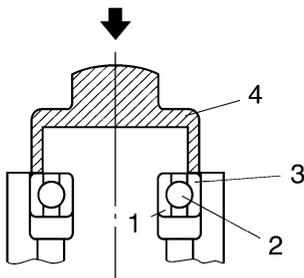
ECA14130

**CAUTION:**

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

**NOTE:**

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



EAS21970

## ADJUSTING THE FRONT WHEEL STATIC BALANCE

**NOTE:**

- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.

- Adjust the front wheel static balance with the brake disc installed.

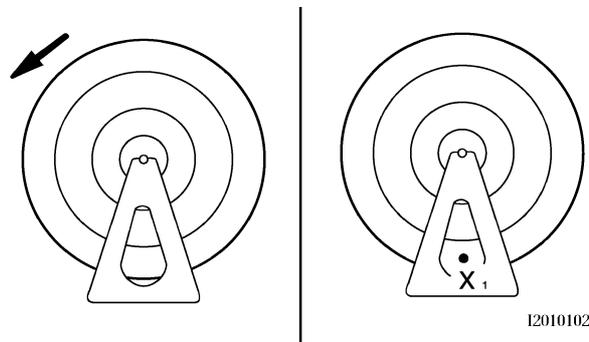
1. Remove:
  - Balancing weight(s)
2. Find:
  - Front wheel’s heavy spot

**NOTE:**

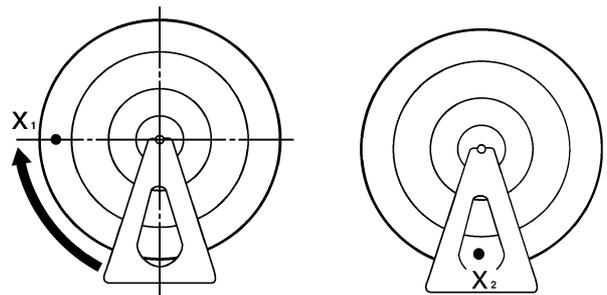
Place the front wheel on a suitable balancing stand.



- a. Spin the front wheel.
- b. When the front wheel stops, put an “X<sub>1</sub>” mark at the bottom of the wheel.



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



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



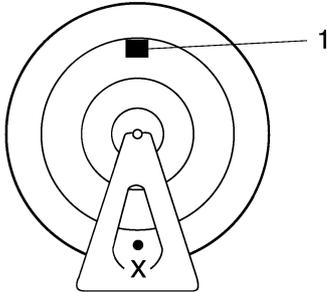
3. Adjust:
  - Front wheel static balance



# FRONT WHEEL

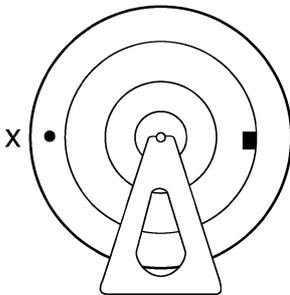
- a. Install a balancing weight "1" onto the rim exactly opposite the heavy spot "X".

**NOTE:** \_\_\_\_\_  
Start with the lightest weight.



I2010103

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



I2010105

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

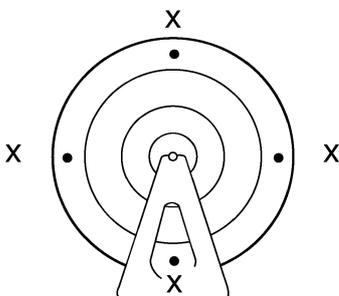


4. Check:

- Front wheel static balance



- a. Turn the front wheel and make sure it stays at each position shown.



I2010106

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



EAS22000

## INSTALLING THE FRONT WHEEL (DISC)

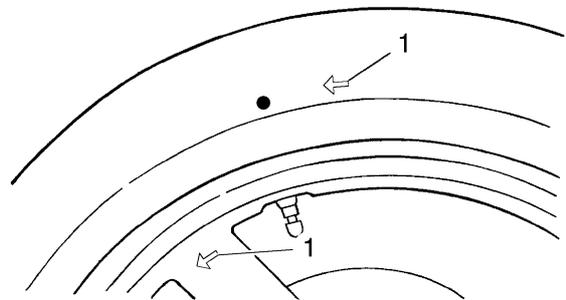
The following procedure applies to both of the brake discs.

1. Lubricate:
  - Wheel axle
  - Oil seal lips

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

2. Lift the wheel up between the fork legs.
3. Insert the wheel axle.

**NOTE:** \_\_\_\_\_  
Install the tire and wheel with the mark "1" pointing in the direction of wheel rotation.



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

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

- Wheel axle pinch bolt

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

ECA14140

**CAUTION:** \_\_\_\_\_

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

6. Install:
  - Brake caliper

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

EWA13490

 **WARNING**

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

---

**NOTE:**

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

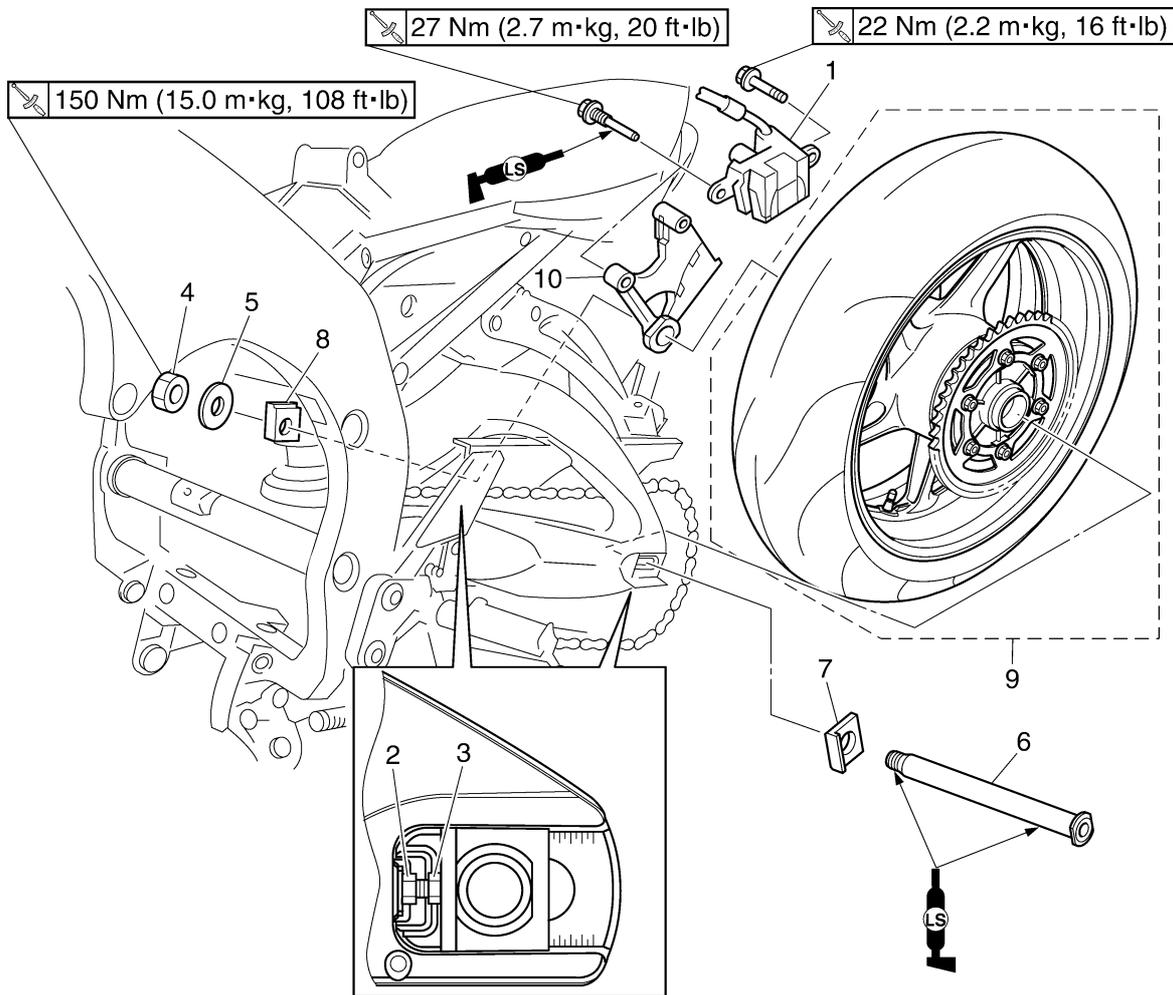
---

# REAR WHEEL

EAS22020

## REAR WHEEL

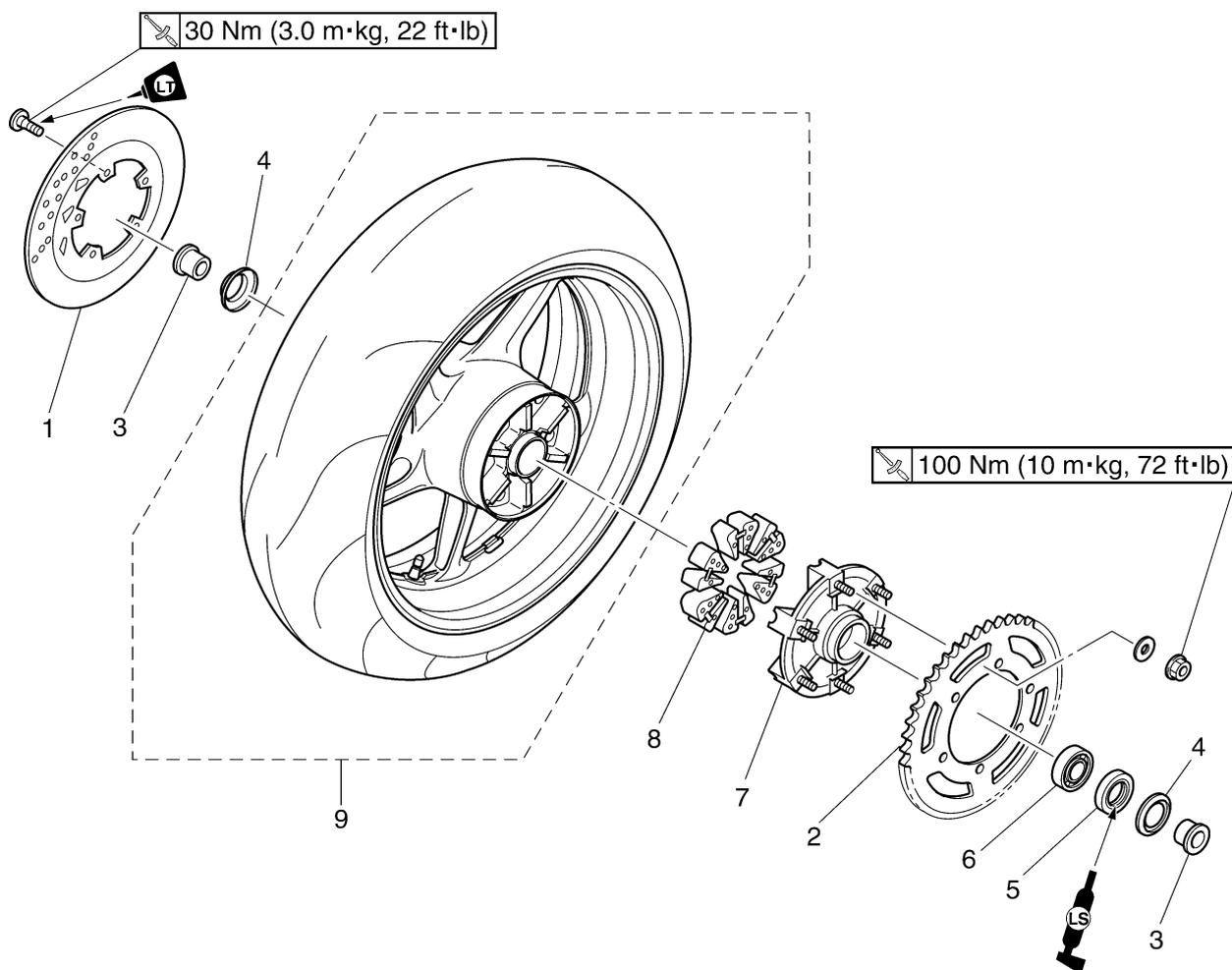
### Removing the rear wheel



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

# REAR WHEEL

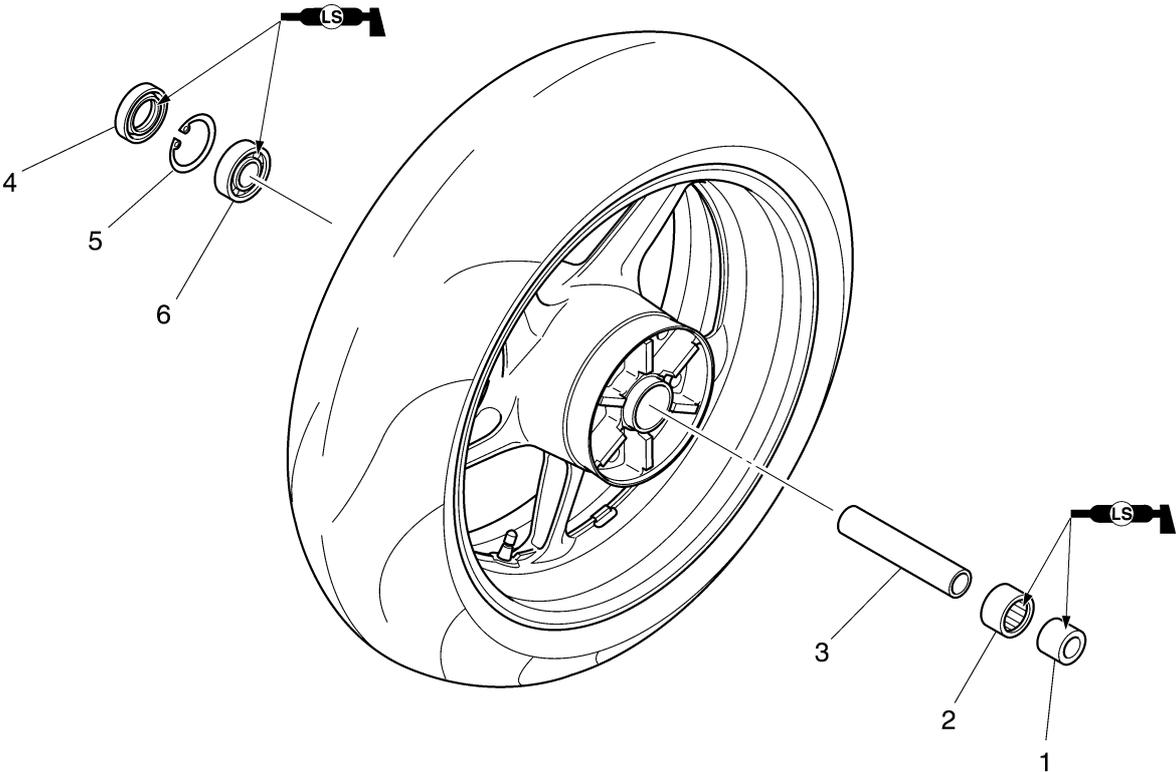
## Removing the brake disc and rear wheel sprocket



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

# REAR WHEEL

## Disassembling the rear wheel



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

## REAR WHEEL

EAS22040

### REMOVING THE REAR WHEEL (DISC)

1. Stand the vehicle on a level surface.

EWA13120

#### **WARNING**

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

#### NOTE:

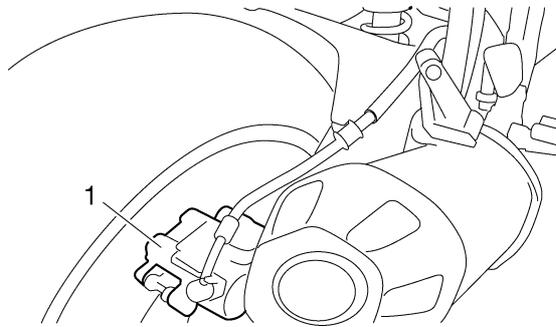
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- Brake caliper "1"

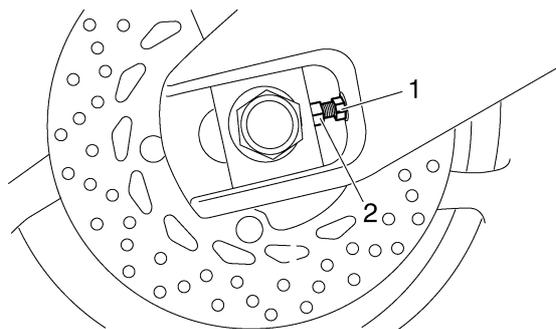
#### NOTE:

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



3. Loosen:

- Locknut "1"
- Adjusting bolt "2"

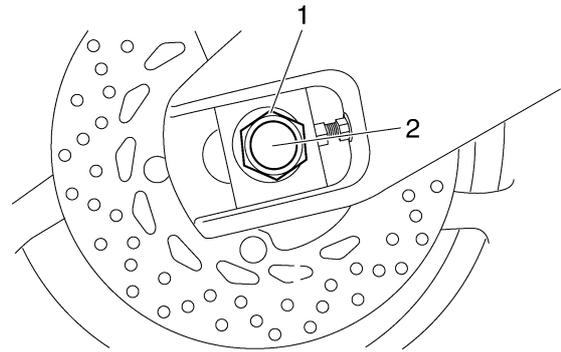


4. Remove:

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

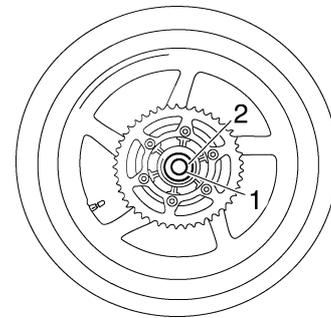
#### NOTE:

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



5. Remove:

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



EAS22090

### CHECKING THE REAR WHEEL

1. Check:

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

Refer to "FRONT WHEEL" on page 4-8.

2. Check:

- Tire
- Rear wheel

Damage/wear → Replace.

Refer to "CHECKING THE TIRES" on page 3-32 and "CHECKING THE WHEELS" on page 3-34.

3. Measure:

- Radial wheel runout
- Lateral wheel runout

Refer to "FRONT WHEEL" on page 4-8.

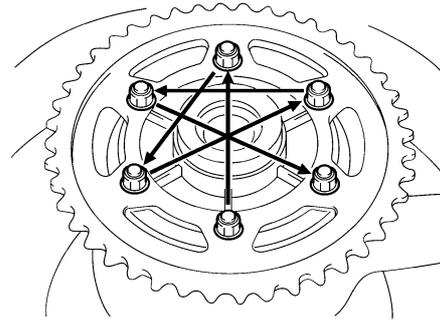
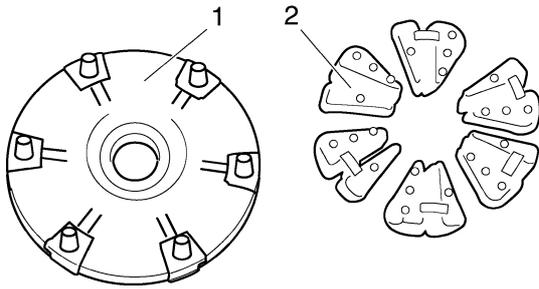
EAS22110

### CHECKING THE REAR WHEEL DRIVE HUB

1. Check:

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

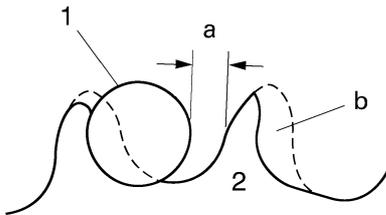
Damage/wear → Replace.



EAS22120

## CHECKING AND REPLACING THE REAR WHEEL SPROCKET

1. Check:
  - Rear wheel sprocket
    - More than 1/4 tooth “a” wear → Replace the rear wheel sprocket.
    - Bent teeth → Replace the rear wheel sprocket.



I2560103

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

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



**Rear wheel sprocket self-locking nut**  
100 Nm (10 m·kg, 72 ft·lb)

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



EAS22150

## ADJUSTING THE REAR WHEEL STATIC BALANCE

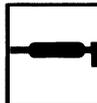
- NOTE:**
- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
  - Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.

1. Adjust:
  - Rear wheel static balance
    - Refer to "ADJUSTING THE FRONT WHEEL STATIC BALANCE" on page 4-11.

EAS22160

## INSTALLING THE REAR WHEEL (DISC)

1. Lubricate:
  - Wheel axle
  - Wheel bearings
  - Oil seal lips



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

2. Adjust:
  - Drive chain slack
    - Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-26.



**Drive chain slack**  
25–35 mm (0.98–1.38 in)

3. Tighten:
  - Wheel axle nut
  - Brake caliper bolts



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

EWA13500



---

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

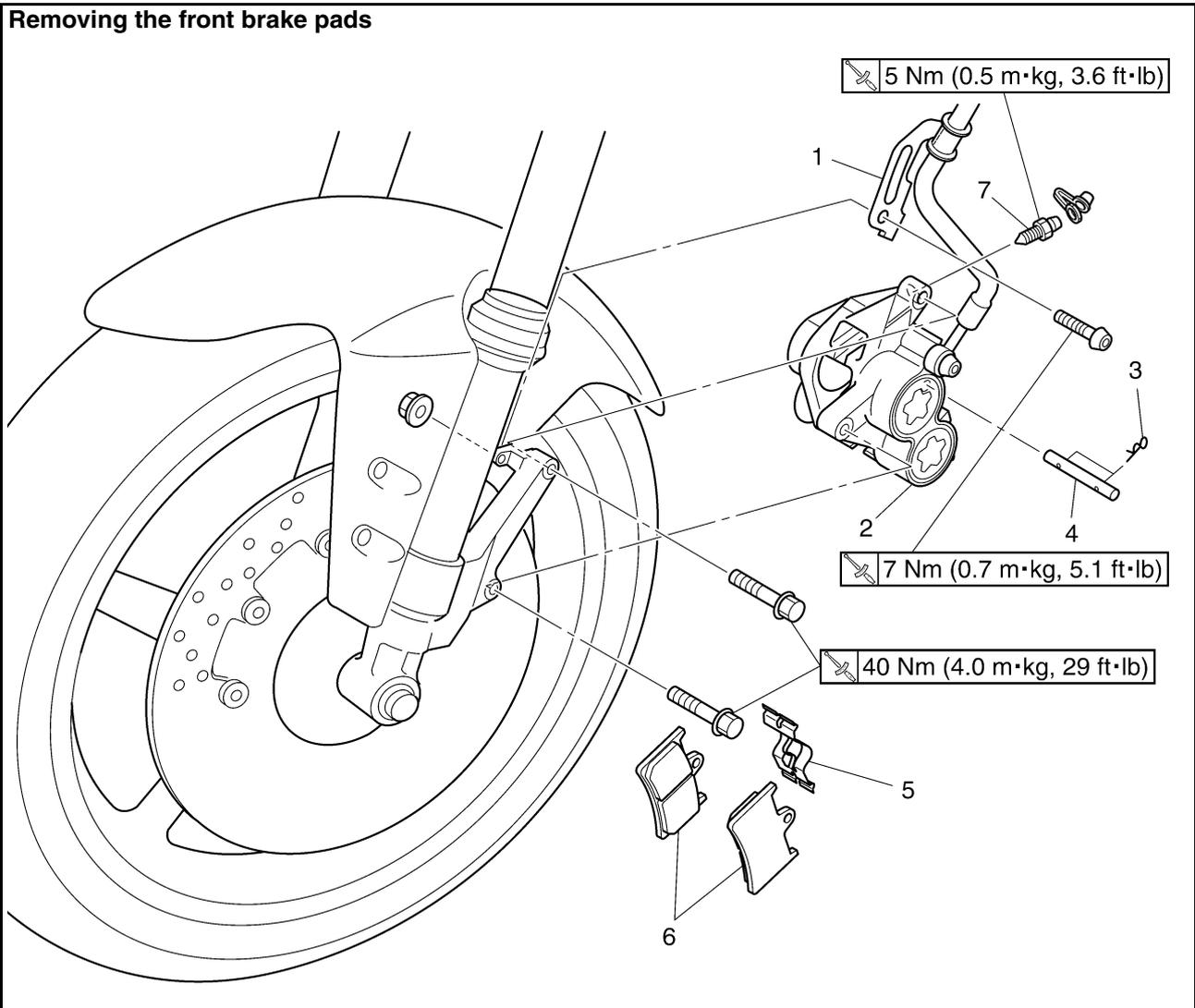
---

# FRONT BRAKE

EAS22210

## FRONT BRAKE

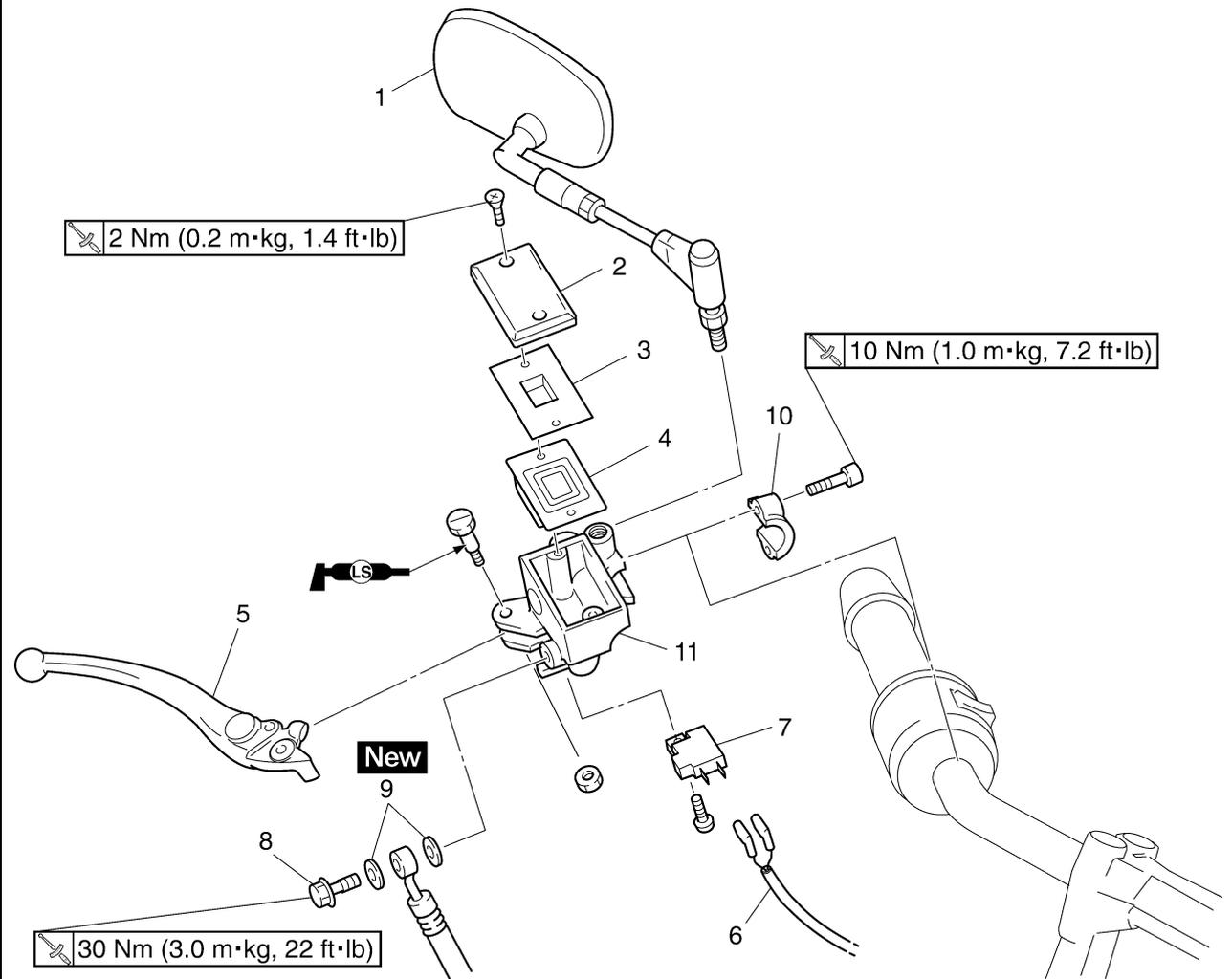
### Removing the front brake pads



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

# FRONT BRAKE

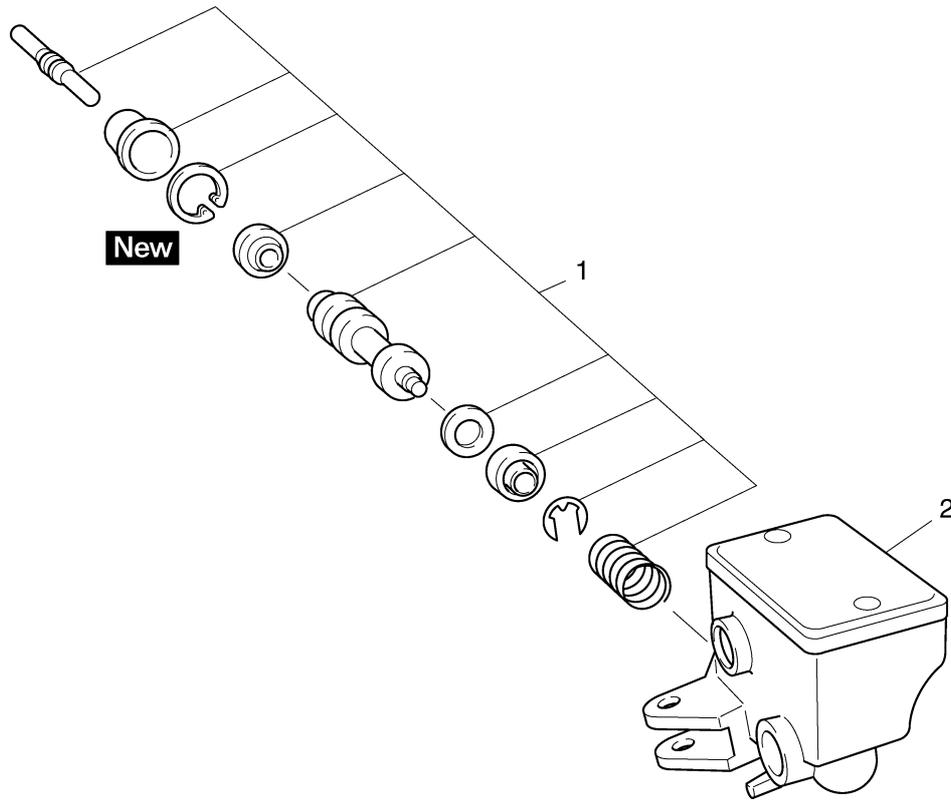
## Removing the front brake master cylinder



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

# FRONT BRAKE

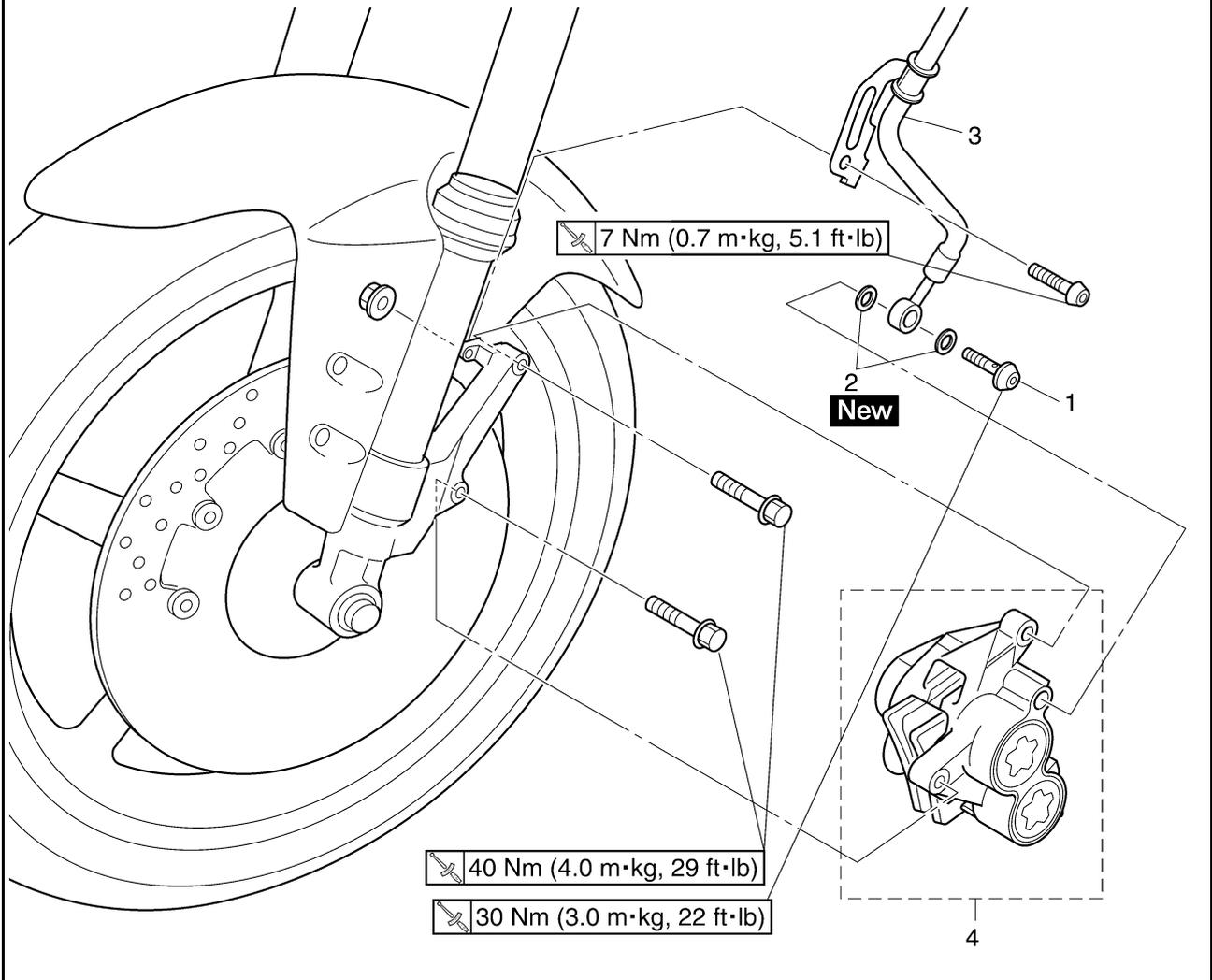
## Disassembling the front brake master cylinder



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

# FRONT BRAKE

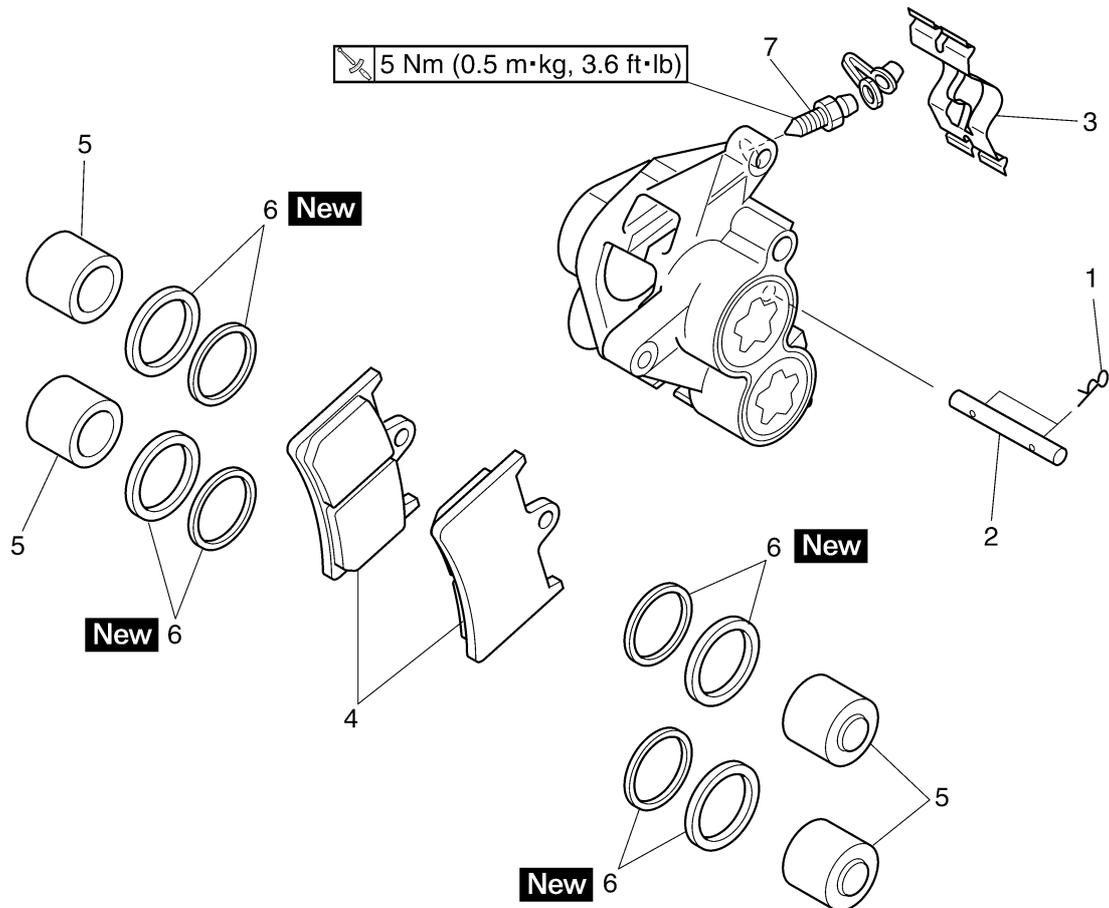
## Removing the front brake calipers



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

# FRONT BRAKE

## Disassembling the front brake calipers



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

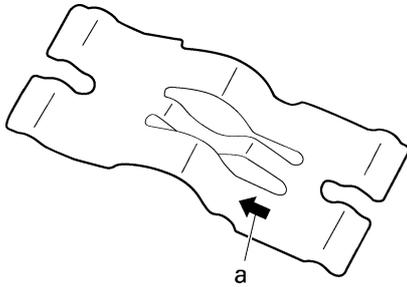




# FRONT BRAKE

**NOTE:**

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



3. Install:

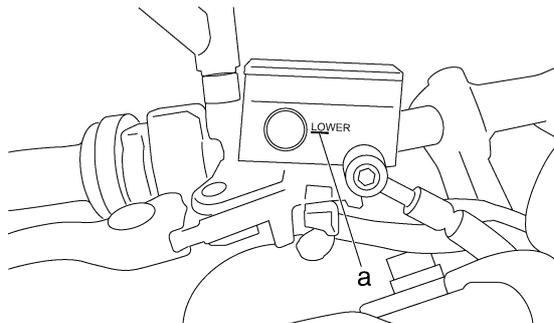
- Brake pad pins
- Brake pad clips
- Brake caliper



**Brake caliper bolt**  
40 Nm (4.0 m·kg, 29 ft·lb)

4. Check:

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



5. Check:

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

EAS22300

**REMOVING THE FRONT BRAKE CALIPERS**

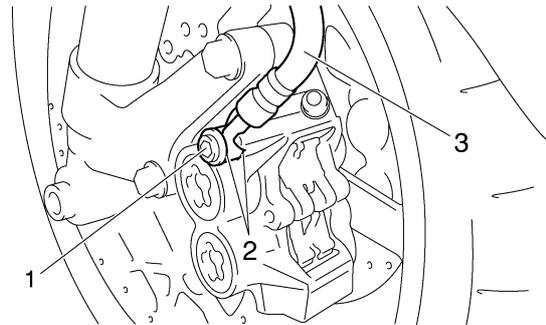
The following procedure applies to both of the brake calipers.

**NOTE:**

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

1. Remove:

- Union bolt "1"
- Copper washers "2"
- Brake hose "3"



**NOTE:**

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

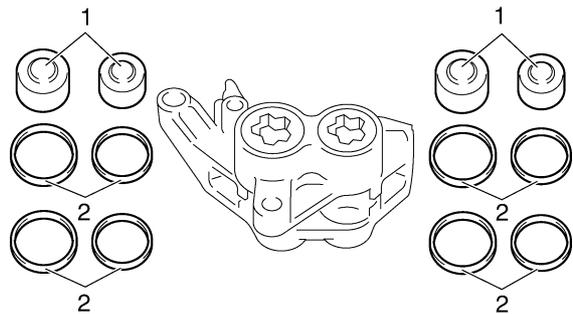
EAS22360

**DISASSEMBLING THE FRONT BRAKE CALIPERS**

The following procedure applies to both of the brake calipers.

1. Remove:

- Brake caliper pistons "1"
- Brake caliper piston seals "2"

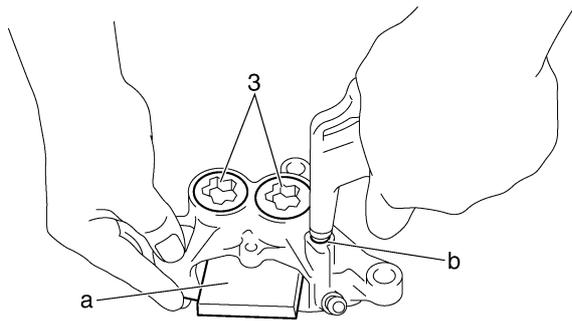


- Secure the brake caliper pistons with a piece of wood "a".
- Blow compressed air into the brake hose joint opening "b" to force out the left side pistons from the brake caliper.

EWA13570

**WARNING**

- Never try to pry out the brake caliper pistons.
- Do not loosen the bolts "3".



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



EAS22390  
**CHECKING THE FRONT BRAKE CALIPERS**

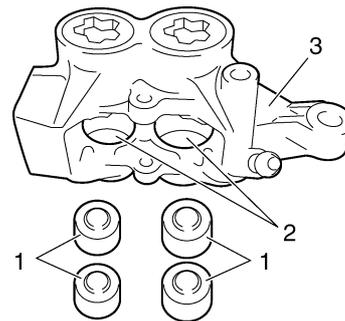
Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seals	Every two years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

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

EWA13600



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



EAS22410

**ASSEMBLING THE FRONT BRAKE CALIPERS**

EWA13620



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



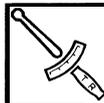
**Recommended brake fluid  
DOT4**

EAS22440

**INSTALLING THE FRONT BRAKE CALIPERS**

The following procedure applies to both of the brake calipers.

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



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

EWA13530



**Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-39.**

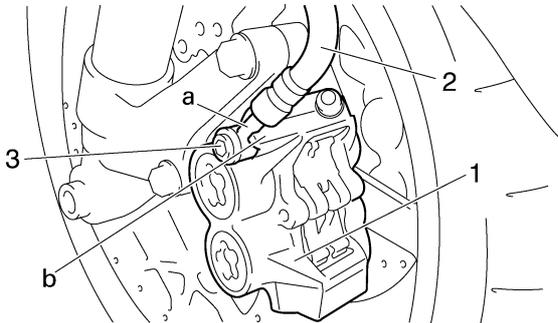
ECA14170



**When installing the brake hose onto the brake caliper "1", make sure the brake pipe**

# FRONT BRAKE

“a” touches the projection “b” on the brake caliper.



2. Remove:
  - Brake caliper
3. Install:
  - Brake pads
  - Brake pad spring
  - Brake pad pin
  - Brake pad clips
  - Brake caliper
  - Brake hose holder



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

Refer to "REPLACING THE FRONT BRAKE PADS" on page 4-26.

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



**Recommended fluid**  
DOT4

EWA13090

## **WARNING**

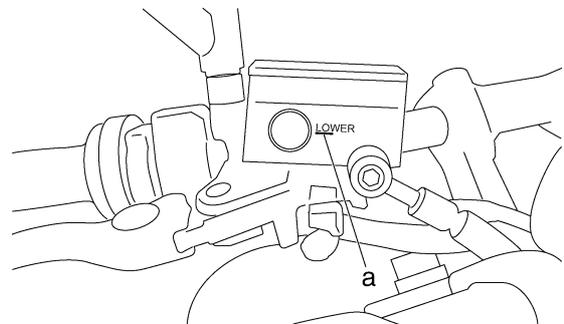
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

ECA13540

## **CAUTION:**

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

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



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

EAS22490

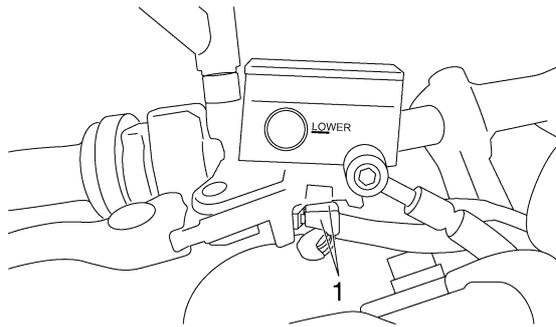
## **REMOVING THE FRONT BRAKE MASTER CYLINDER**

### **NOTE:**

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

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

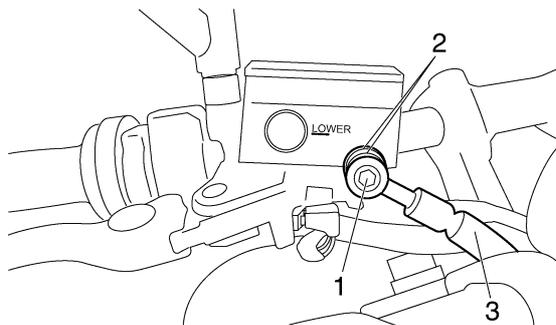
# FRONT BRAKE



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

## NOTE:

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



EAS22500

## CHECKING THE FRONT BRAKE MASTER CYLINDER

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

EAS22520

## ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

### ⚠ WARNING

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



**Recommended fluid**  
**DOT4**

EAS22530

## INSTALLING THE FRONT BRAKE MASTER CYLINDER

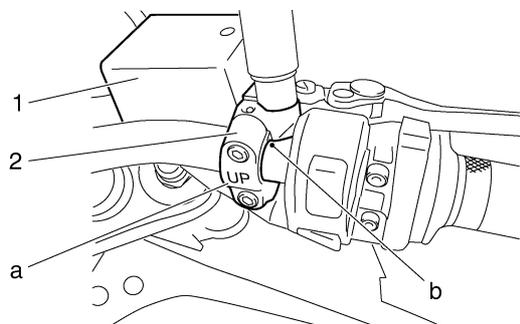
1. Install:
  - Brake master cylinder “1”
  - Brake master cylinder bracket “2”



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

## NOTE:

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



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

# FRONT BRAKE



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

EWA13530

## ⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-39.

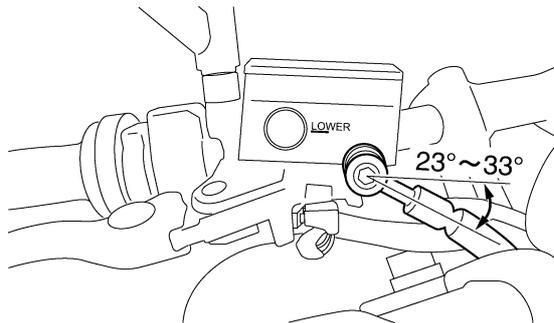
## NOTE:

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

EC2D1004

## CAUTION:

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



## 3. Fill:

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



**Recommended fluid**  
DOT4

EWA13540

## ⚠ WARNING

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

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

ECA13540

## CAUTION:

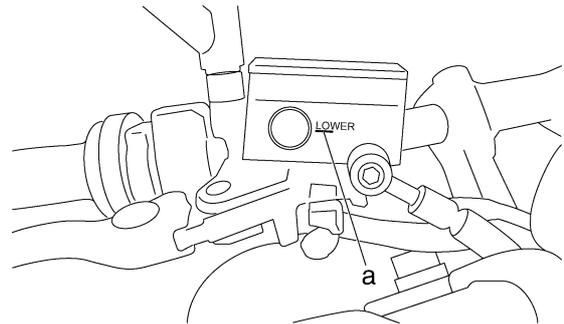
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

## 4. Bleed:

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

## 5. Check:

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



## 6. Check:

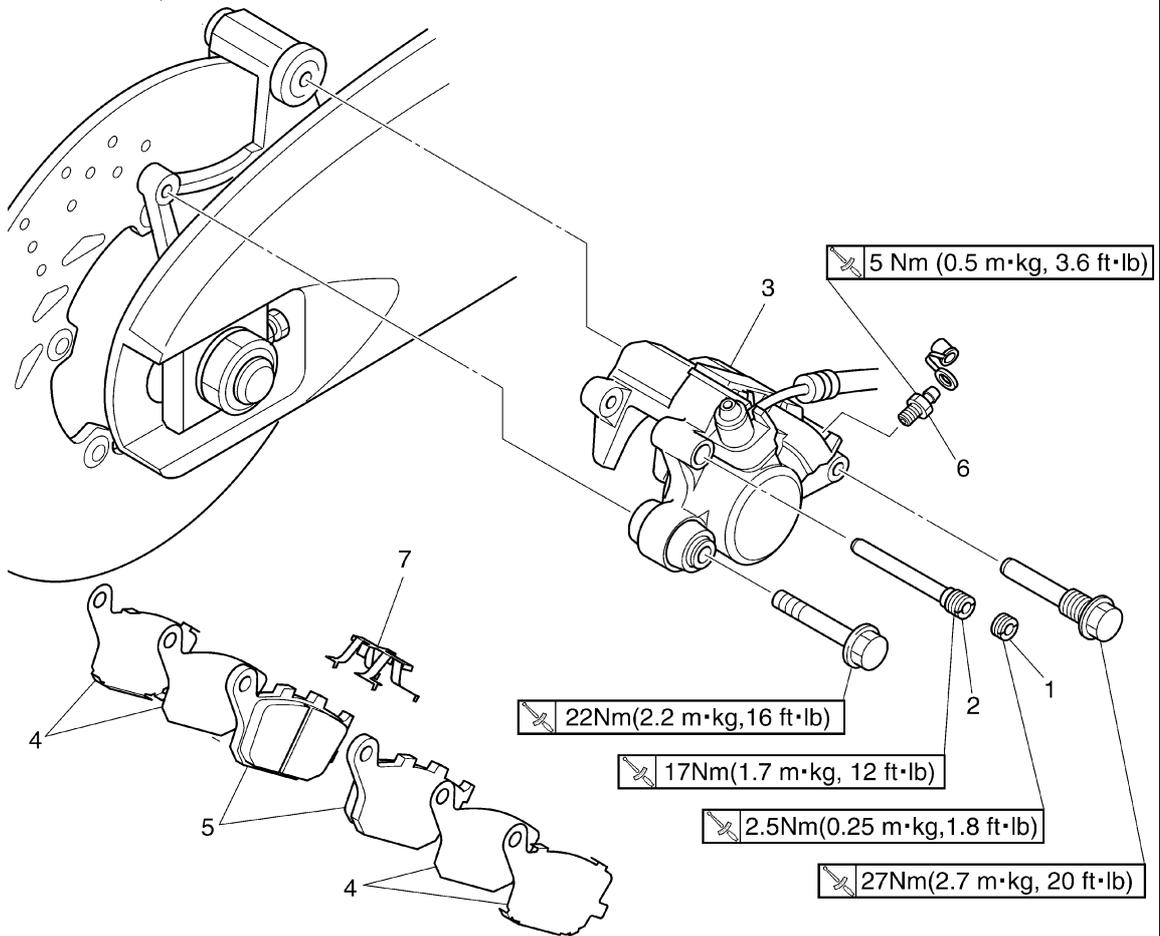
- Brake lever operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.

# REAR BRAKE

EAS22550

## REAR BRAKE

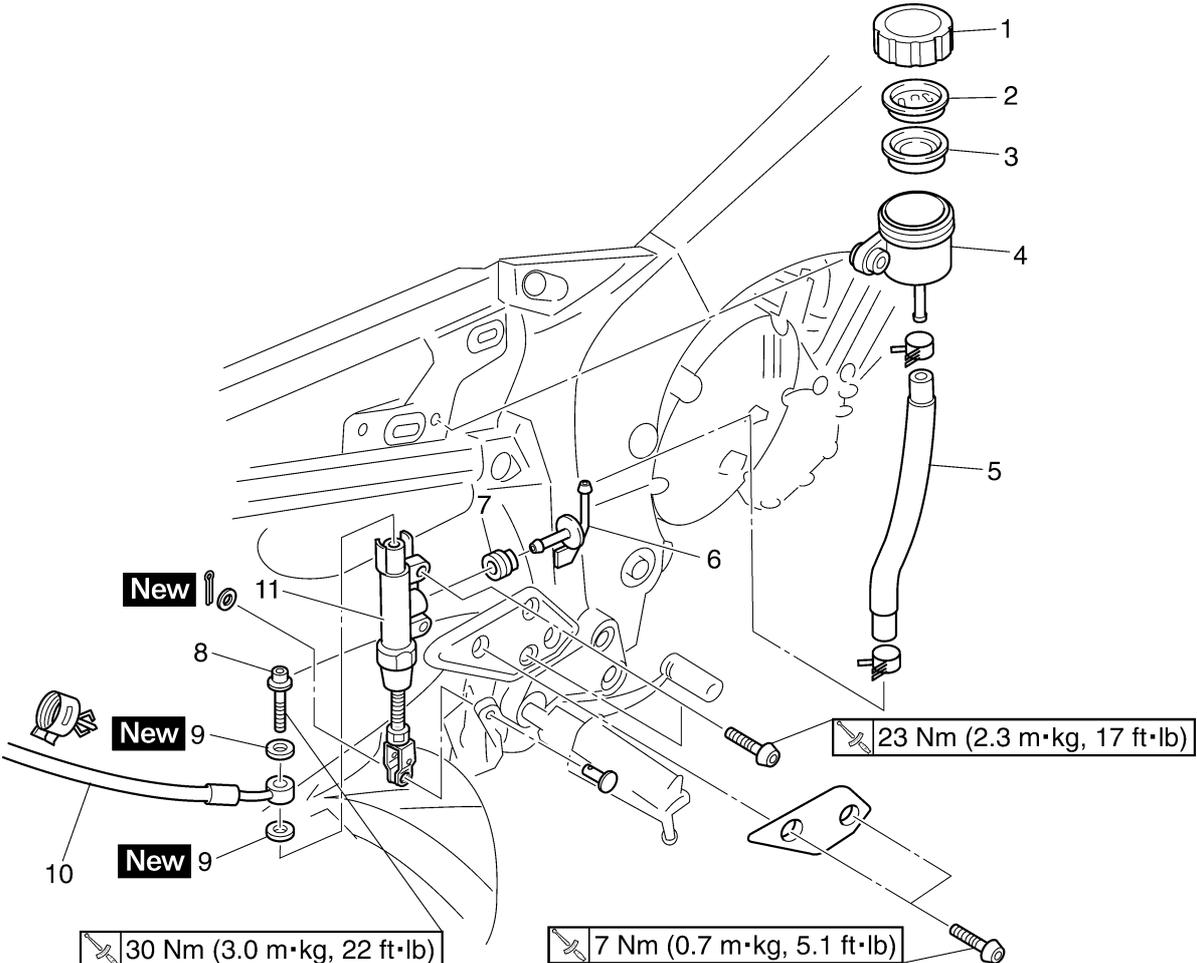
### Removing the rear brake pads



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

# REAR BRAKE

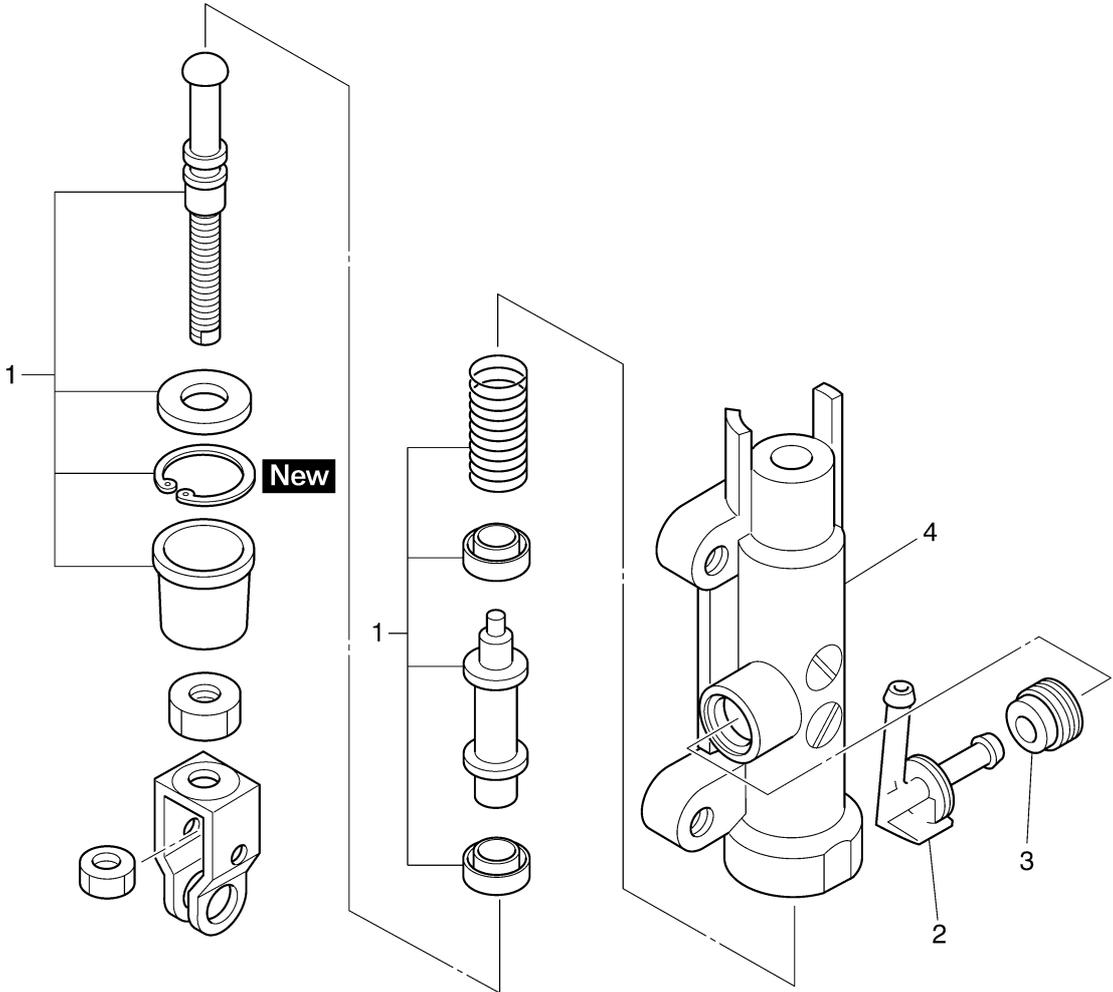
## Removing the rear brake master cylinder



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

# REAR BRAKE

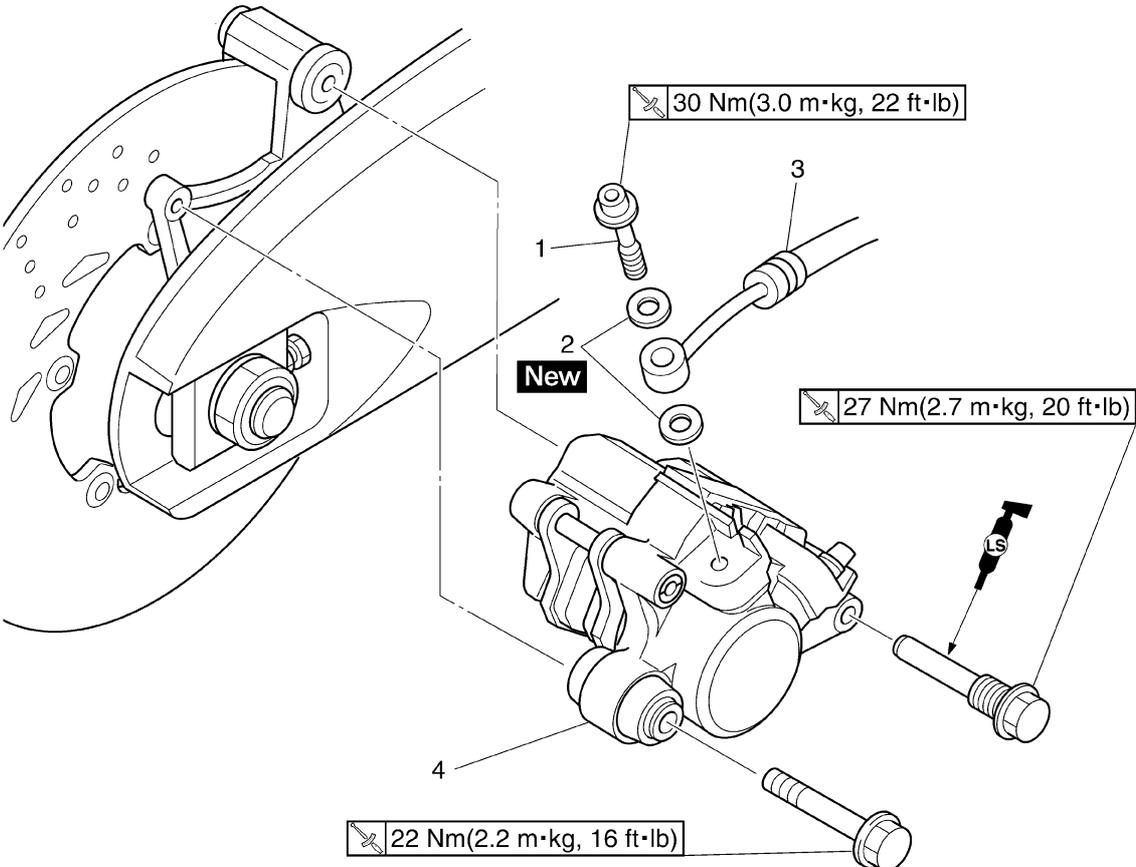
## Disassembling the rear brake master cylinder



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

# REAR BRAKE

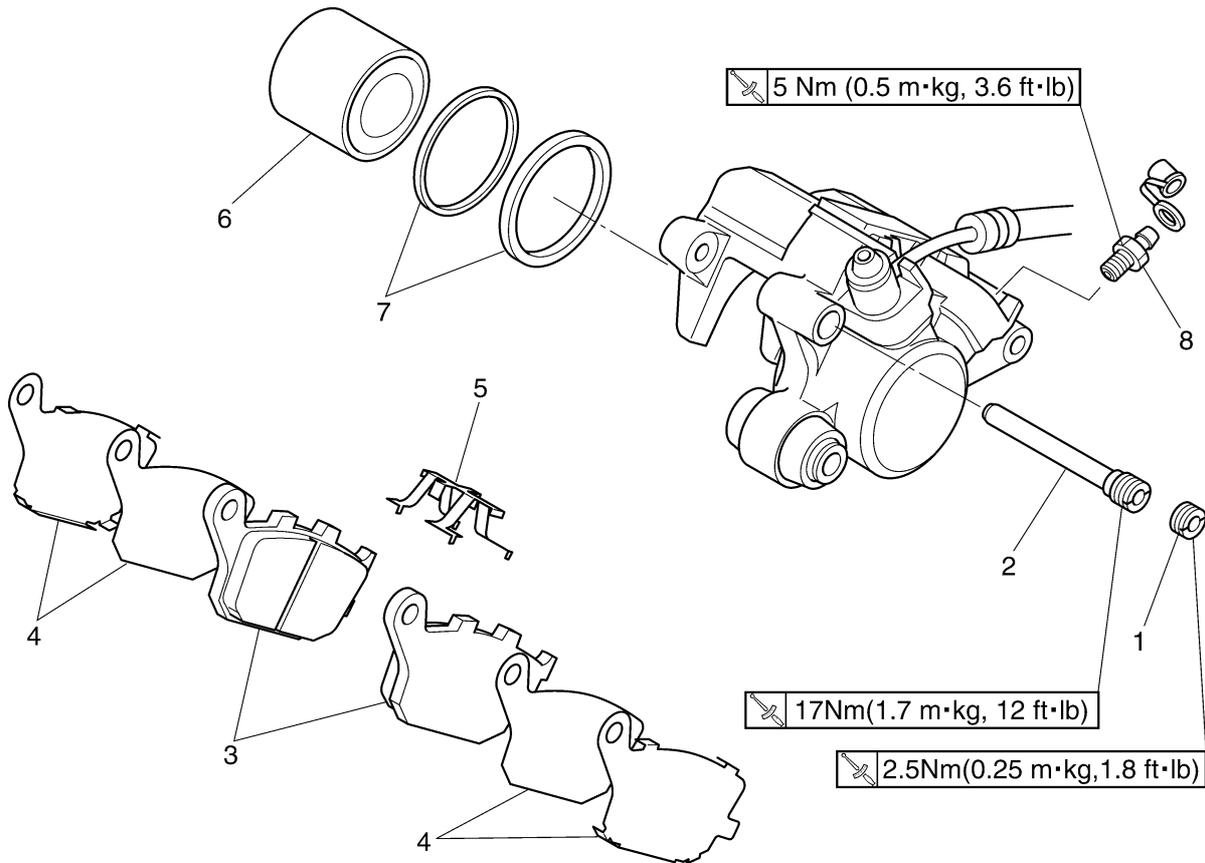
## Removing the rear brake caliper



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

# REAR BRAKE

## Disassembling the rear brake caliper



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

EAS22560

## INTRODUCTION

EWA14100



**WARNING**

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

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

EAS22570

## CHECKING THE REAR BRAKE DISC

1. Remove:
  - Rear wheel  
Refer to "REAR WHEEL" on page 4-14.
2. Check:
  - Brake disc  
Damage/galling → Replace.
3. Measure:
  - Brake disc deflection  
Out of specification → Correct the brake disc deflection or replace the brake disc.  
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-25.



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

4. Measure:
  - Brake disc thickness  
Measure the brake disc thickness at a few different locations.  
Out of specification → Replace.  
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-25.



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

5. Adjust:
  - Brake disc deflection  
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-25.



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

6. Install:
  - Rear wheel  
Refer to "REAR WHEEL" on page 4-14.

EAS22580

## REPLACING THE REAR BRAKE PADS

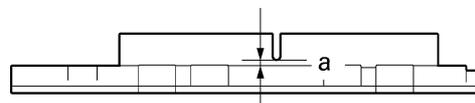
### NOTE:

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

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



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



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

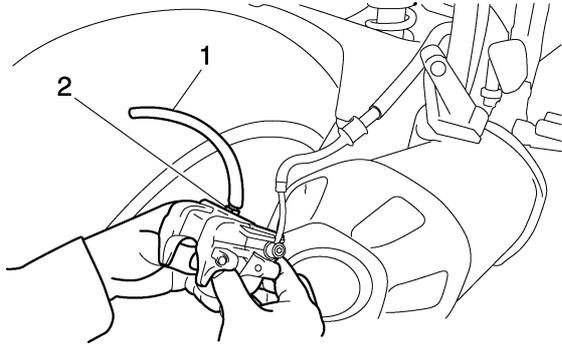
### NOTE:

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



## REAR BRAKE

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

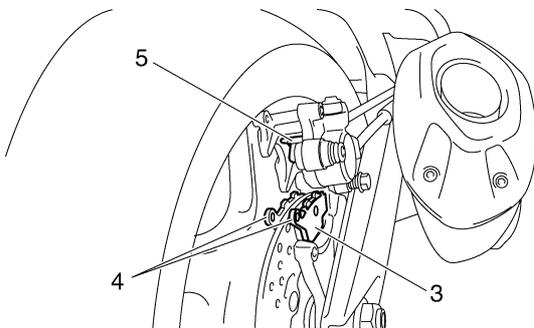


- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.  
c. Tighten the bleed screw.



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

- d. Install a new brake pad shim "3" onto each new brake pad "4".  
e. Install new brake pads and a new brake pad spring "5".



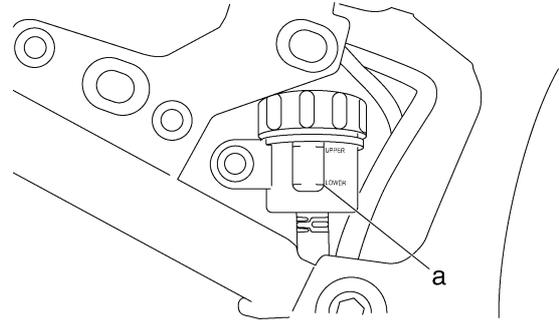
3. Install:
- Brake caliper
  - Brake pad pin
  - Screw plug



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

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

Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.



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

EAS22590

### REMOVING THE REAR BRAKE CALIPER

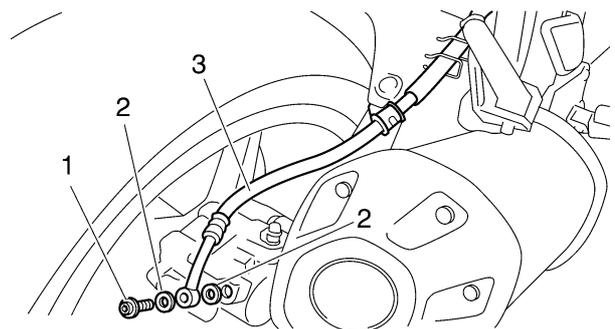
#### NOTE:

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

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

#### NOTE:

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

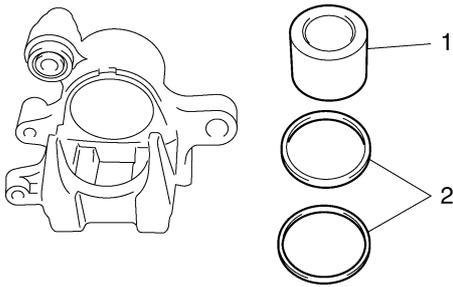


EAS22600

### DISASSEMBLING THE REAR BRAKE CALIPER

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

# REAR BRAKE

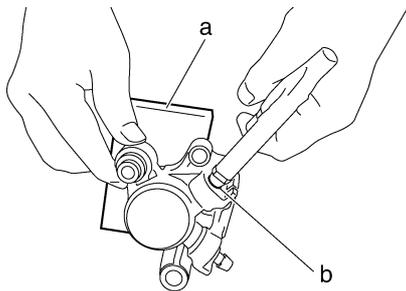


- a. Secure the brake caliper pistons with a piece of wood "a".
- b. Blow compressed air into the brake hose joint opening "b" to force out the piston from the brake caliper.

EWA13550

**⚠ WARNING**

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



- c. Remove the brake caliper piston seals.

EAS22640

## CHECKING THE 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 pistons.
  - Brake caliper cylinders "2"

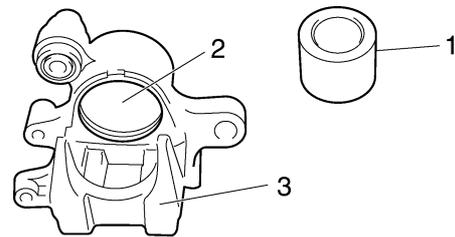
Scratches/wear → Replace the brake caliper assembly.

- Brake caliper body "3"  
Cracks/damage → Replace the brake caliper assembly.
- Brake fluid delivery passages (brake caliper body)  
Obstruction → Blow out with compressed air.

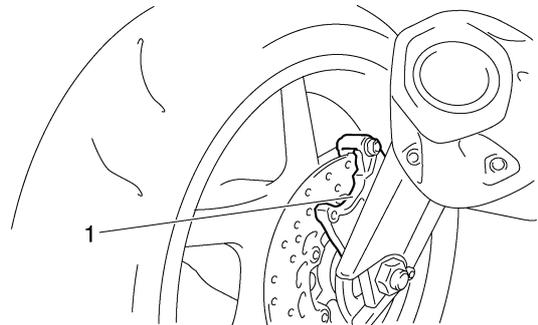
EWA13610

**⚠ WARNING**

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



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



EAS22650

## ASSEMBLING THE REAR BRAKE CALIPER

EWA13620

**⚠ WARNING**

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



**Recommended fluid  
DOT4**

## REAR BRAKE

EAS22670

### INSTALLING THE REAR BRAKE CALIPER

1. Install:

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



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

EWA13530

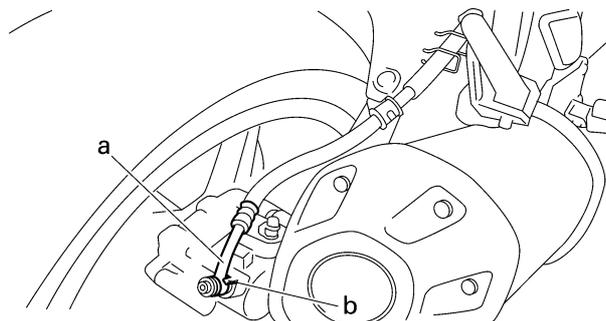
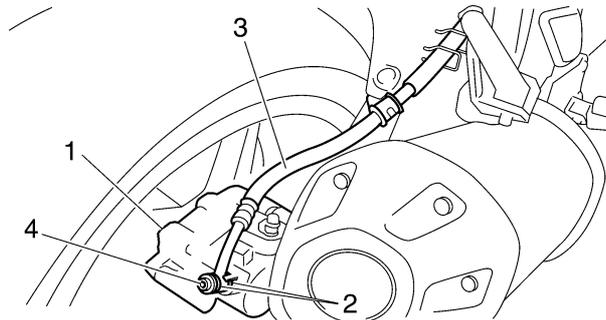
#### **WARNING**

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-39.

EC2D1010

#### **CAUTION:**

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



2. Remove:

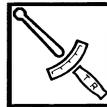
- Brake caliper

3. Install:

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

- Brake caliper

Refer to "REPLACING THE REAR BRAKE PADS" on page 4-37.



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

4. Fill:

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



**Recommended fluid**  
DOT4

EWA13090

#### **WARNING**

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

ECA13540

#### **CAUTION:**

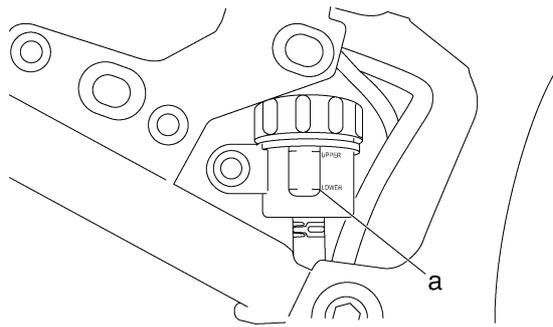
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:

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

6. Check:

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

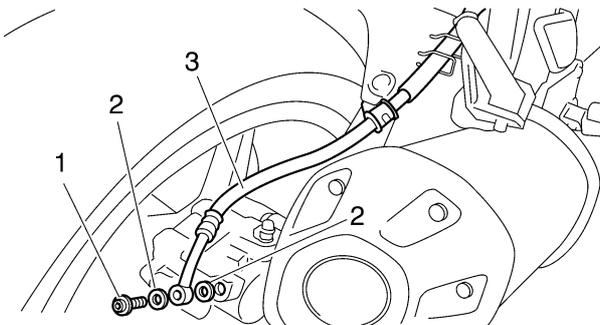


7. Check:
- Brake pedal operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.

EAS22700  
**REMOVING THE REAR BRAKE MASTER CYLINDER**

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

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



EAS22720  
**CHECKING THE REAR BRAKE MASTER CYLINDER**

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

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

EAS22730  
**ASSEMBLING THE REAR BRAKE MASTER CYLINDER**

EWA13520

**WARNING**

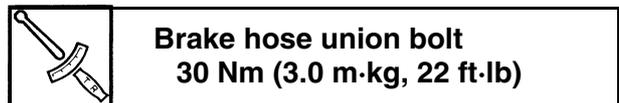
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.



ET2D1022

**INSTALLING THE REAR BRAKE MASTER CYLINDER**

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



EW2D1004

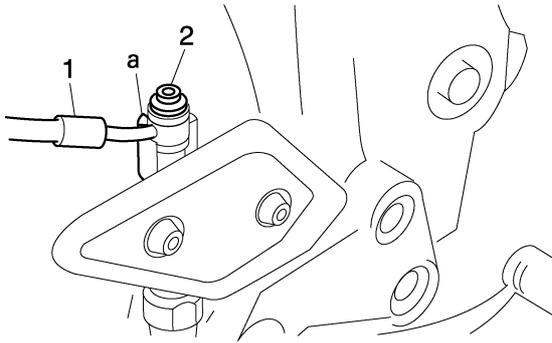
**WARNING**

Proper brake hose routing is essential to insure safe vehicle operation.  
Refer to "CABLE ROUTING" on page 2-39.

EC2D1005

**CAUTION:**

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



2. Fill:

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



EW2D1005

**WARNING**

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

EC2D1010

**CAUTION:**

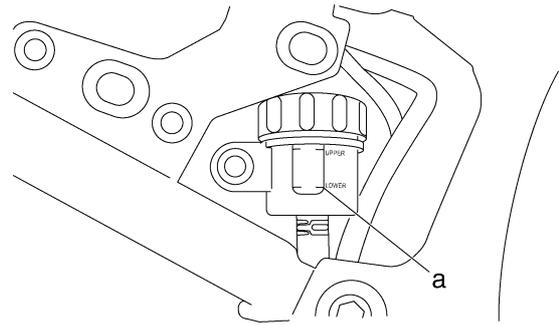
**Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**

3. Bleed:

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

4. Check:

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



5. Check:

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

6. Adjust:

- Brake pedal position  
Refer to "ADJUSTING THE REAR DISC BRAKE" on page 3-22.

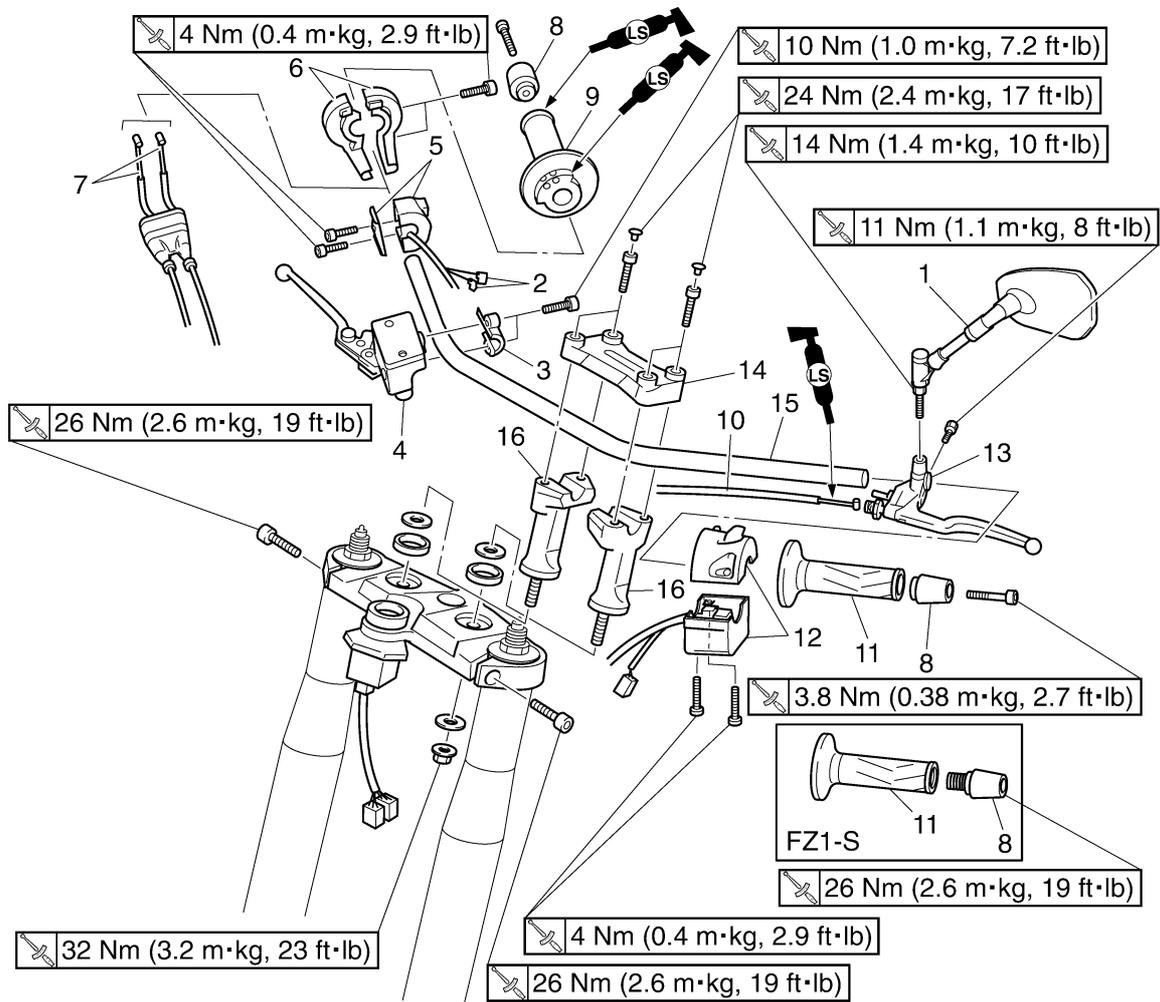
7. Adjust:

- Rear brake light operation timing  
Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-24.

EAS22840

## HANDLEBAR

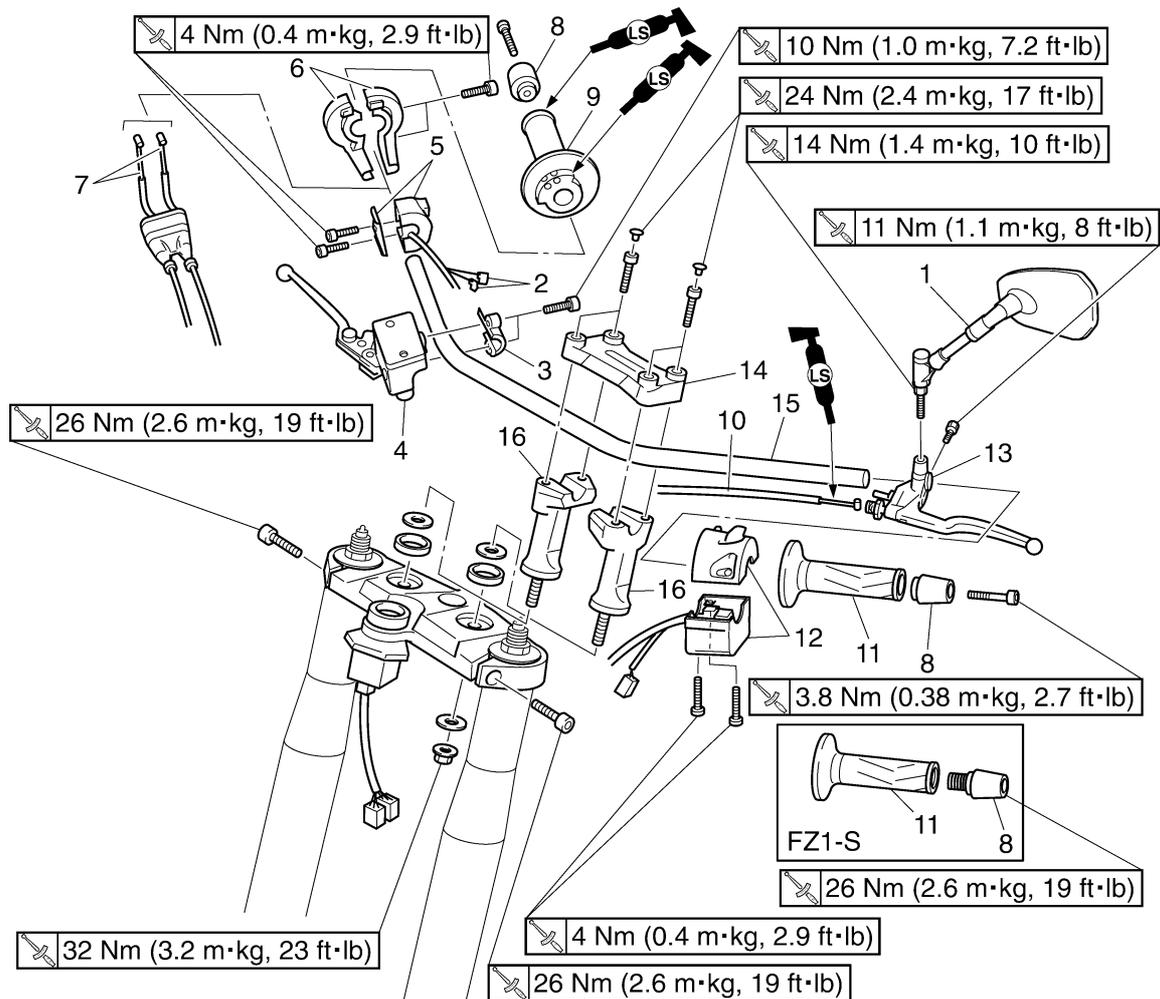
### Removing the handlebar



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

# HANDLEBAR

## Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
15	Handlebar	1	
16	Lower handlebar holder	2	
			For installation, reverse the removal procedure.

# HANDLEBAR

EAS22860

## REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

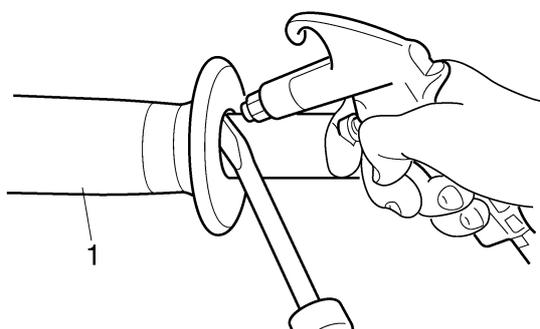
### **WARNING**

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

2. Remove:
  - Handlebar grip "1"

### NOTE:

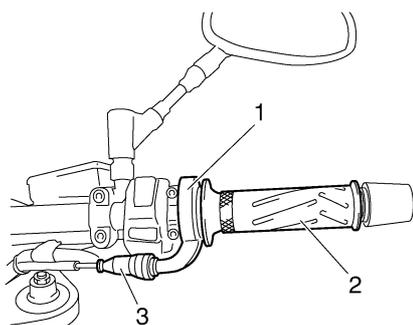
Blow compressed air between the handlebar and the handlebar grip, and gradually push the grip off the handlebar.



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

### NOTE:

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



EAS22880

## CHECKING THE HANDLEBAR

1. Check:
  - HandlebarBends/cracks/damage → Replace.

EWA13690

### **WARNING**

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

EAS22930

## INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

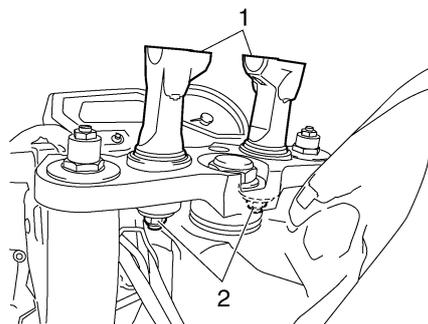
### **WARNING**

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

2. Install:
  - Lower handlebar holders "1"

### NOTE:

Temporarily tighten the nuts "2".



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



**Upper handlebar holder bolt**  
24 Nm (2.4 m·kg, 17 ft·lb)

ECA14250

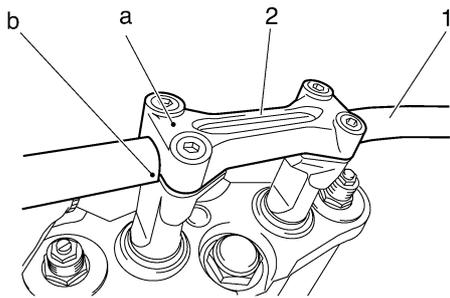
### **CAUTION:**

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

### NOTE:

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

# HANDLEBAR



4. Tighten:

- Lower handlebar holder nuts



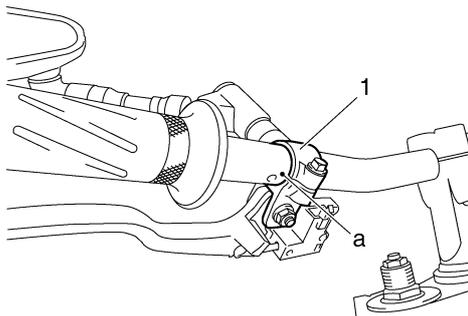
**Lower handlebar holder nut**  
**32 Nm (3.2 m·kg, 23 ft·lb)**

5. Install:

- Clutch lever holder "1"
- Clutch cable

**NOTE:**

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

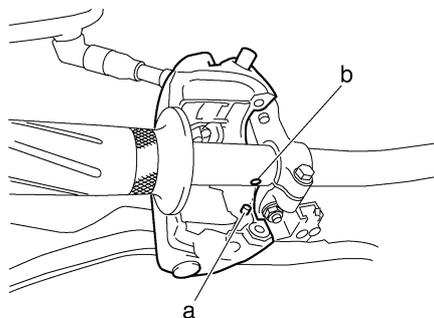


6. Install:

- Left handlebar switch

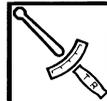
**NOTE:**

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



7. Install:

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



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

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

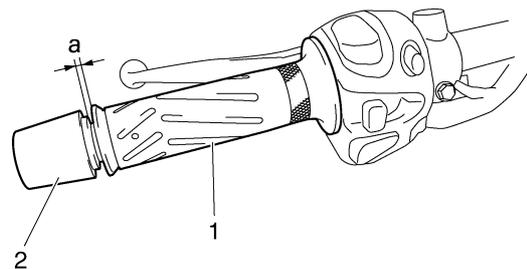
EW2D1007

**WARNING**

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

**NOTE:**

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

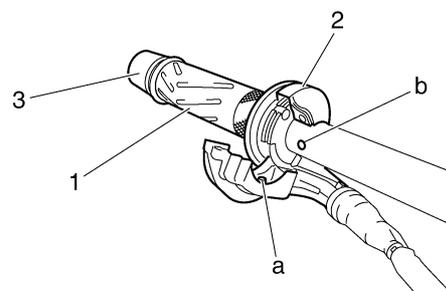


8. Install:

- Throttle grip "1"
- Throttle cable housing "2"
- Throttle cables
- Grip end "3"

**NOTE:**

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

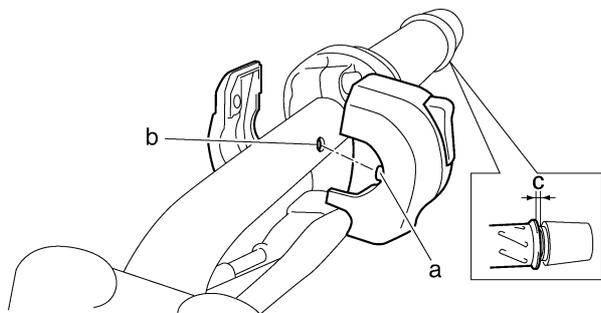


9. Install:

- Right handlebar switch

**NOTE:**

- Align the projections "a" on the handlebar switch with the holes "b" in the handlebar.
- There should be 1–3 mm (0.04–0.12 in) of clearance "c" between the handlebar grip and the grip end.



10. Install:

- Front brake master cylinder assembly
- Front brake master cylinder holder "1"

	<b>Front brake master cylinder bracket bolt</b> <b>10 Nm (1.0 m·kg, 7.2 ft·lb)</b>
--	---

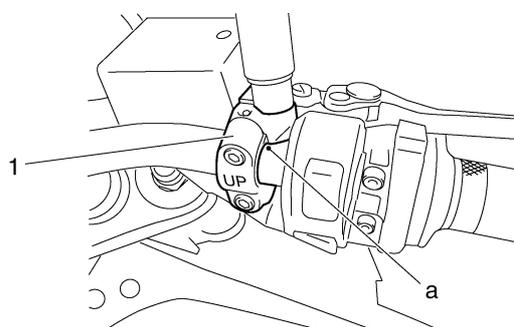
ECS2D1010

**CAUTION:**

- **Install the brake master cylinder bracket with the "UP" mark facing up.**
- **First, tighten the upper bolt, then the lower bolt.**

**NOTE:**

Align the end of the brake master cylinder holder with the punch mark "a" on the handlebar.



11. Adjust:

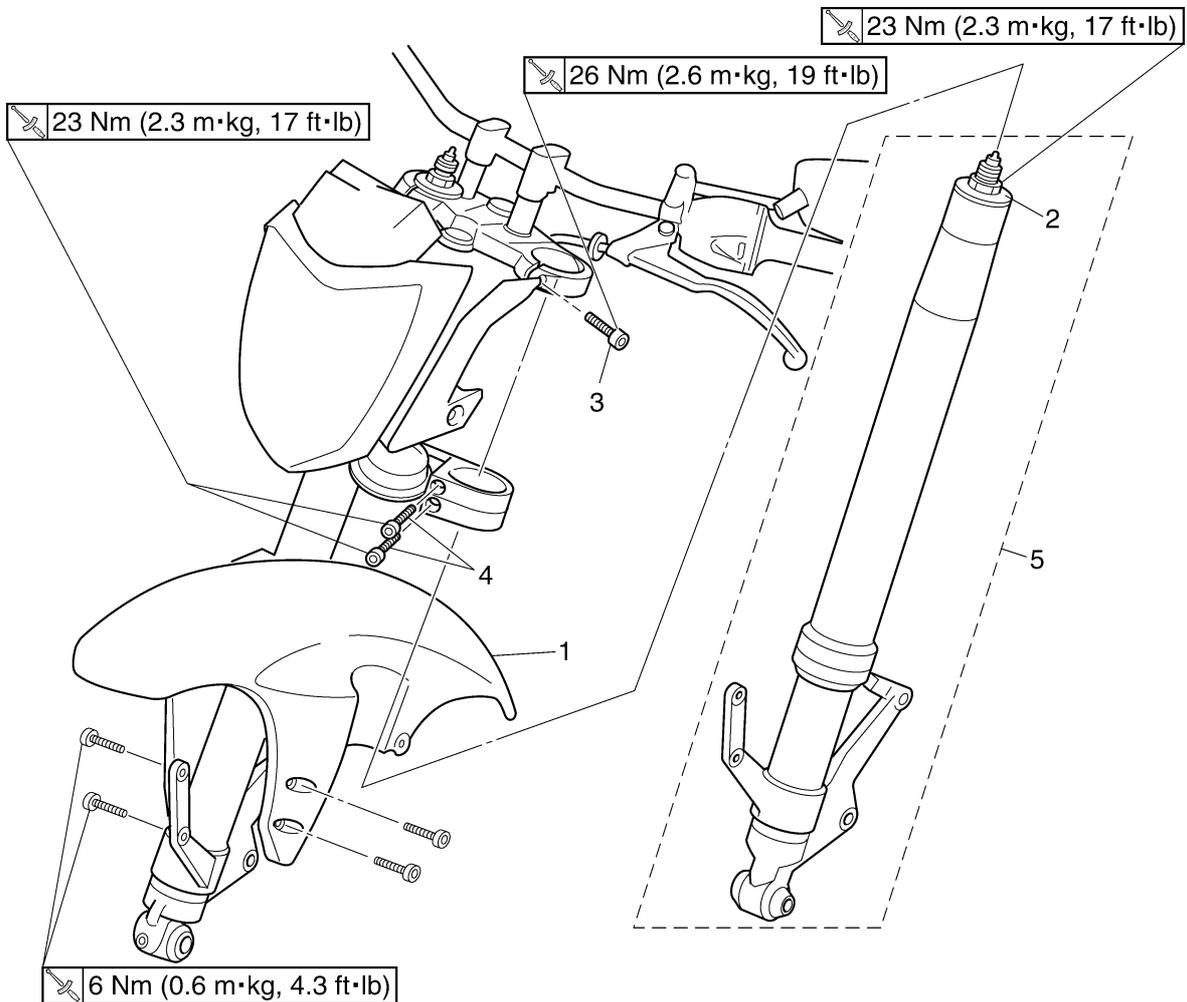
- Throttle cable free play

# FRONT FORK

EAS22950

## FRONT FORK

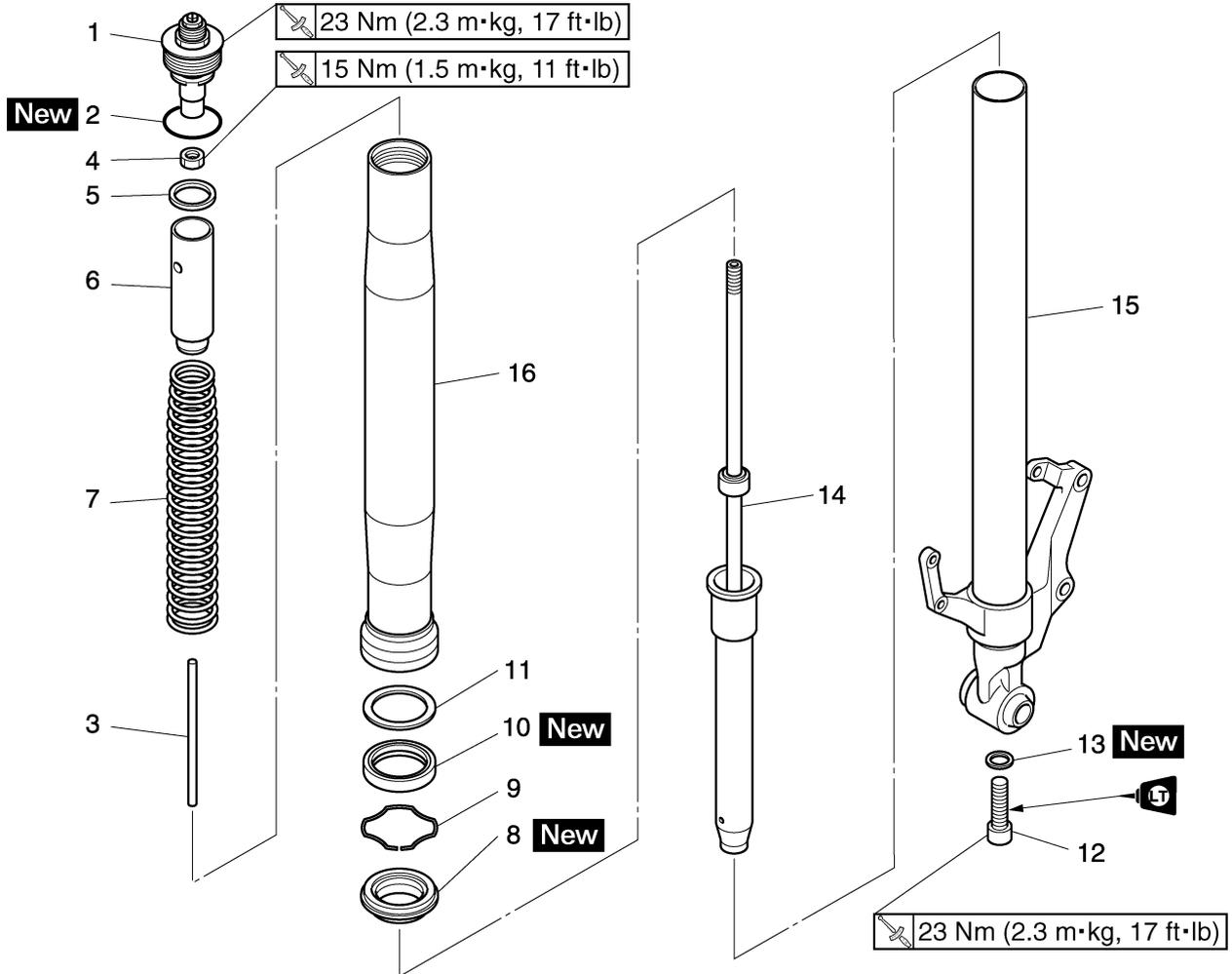
### Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
	Front wheel Front brake calipers		Refer to "CHECKING THE TIRES" on page 3-32 and "CHECKING THE WHEELS" on page 3-34.
1	Front fender	1	
2	Cap bolt	1	Loosen.
3	Upper bracket pinch bolt	1	Loosen.
4	Lower bracket pinch bolt	2	Loosen.
5	Front fork leg	1	
			For installation, reverse the removal procedure.

# FRONT FORK

## Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
1	Cap bolt	1	
2	O-ring	1	
3	Damper adjusting rod	1	
4	Nut	1	
5	Washer	1	
6	Spacer	1	
7	Fork spring	1	
8	Dust seal	1	
9	Oil seal clip	1	
10	Oil seal	1	
11	Washer	1	
12	Damper rod assembly bolt	1	
13	Copper washer	1	
14	Damper rod assembly	1	
15	Inner tube	1	
16	Outer tube	1	
			For assembly, reverse the disassembly procedure.

# FRONT FORK

EAS22970

## REMOVING THE FRONT FORK LEGS

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

### NOTE:

Each front fork leg is equipped with a spring preload adjusting bolt, the right fork leg is equipped with a rebound damping force adjusting screw and left front fork is equipped with a compression damping force adjusting screw. Pay attention not to mistake the right and left.

1. Stand the vehicle on a level surface.

EWA13120



**WARNING**

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

### NOTE:

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

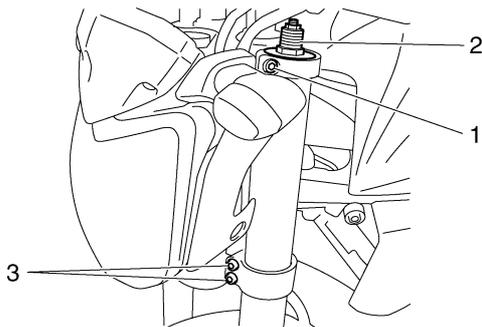
2. Loosen:
  - Upper bracket pinch bolts "1"
  - Cap bolt "2"
  - Lower bracket pinch bolts "3"

EWA13640



**WARNING**

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



3. Remove:
  - Front fork leg

EAS22990

## DISASSEMBLING THE FRONT FORK LEGS

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

1. Remove:
  - Cap bolt "1"
  - (from the damper adjusting rod)
  - Spacers "2"

- Nut "3"



- a. Press down on the spacer with the fork spring compressor "4".
- b. Install the rod holder "5" between the nut "3" and the spacer "2".



**Fork spring compressor**

**90890-01441**

**YM-01441**

**Rod holder**

**90890-01434**

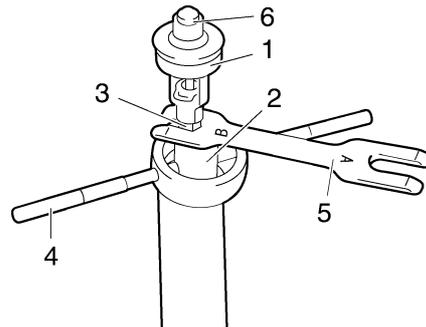
**Damper rod holder double ended**

**YM-01434**

### NOTE:

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

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



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

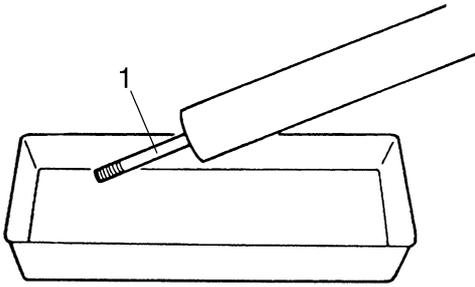


2. Drain:
  - Fork oil

### NOTE:

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

# FRONT FORK



- A. Compression side
- B. Rebound side

**NOTE:**

While holding the damper rod with the damper rod holder "1", loosen the damper rod assembly bolt.

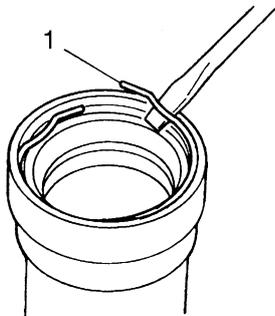
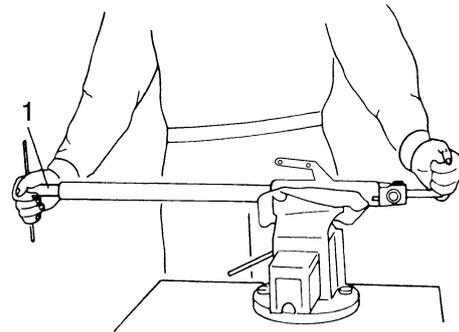
	<b>Damper rod holder</b>
	<b>90890-01423</b>
	<b>Damping rod holder</b>
	<b>YM-01423</b>

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

ECA14180

**CAUTION:**

**Do not scratch the inner tube.**



EAS23010

**CHECKING THE FRONT FORK LEGS**

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

1. Check:
- Inner tube "1"
  - Outer tube "2"
- Bends/damage/scratches → Replace.

4. Remove:
- Damper rod assembly bolt
  - Damper rod assembly

EC2D1080

**CAUTION:**

**For the damper rod assembly, the right side is used for the rebound operation and left side for the compression. Pay attention not to mistake the right and left.**

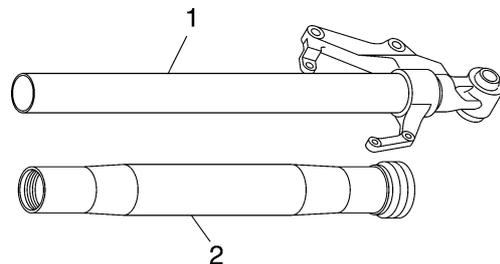
EWA13650

**WARNING**

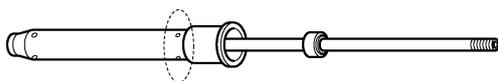
**Do not attempt to straighten a bent inner tube as this may dangerously weaken it.**

**NOTE:**

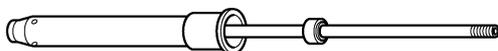
The left side (for the compression) damper rod assembly has the four holes of oil path, unlike the right side.



**A**



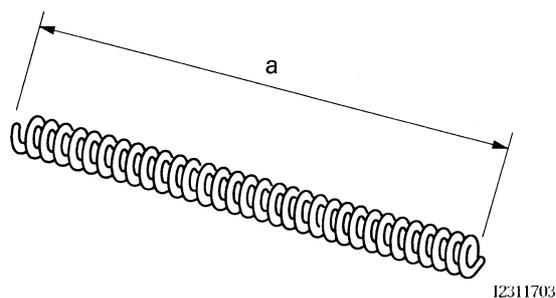
**B**



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

	<b>Spring free length</b>
	<b>243.5 mm (9.59 in)</b>
	<b>Limit</b>
	<b>238.6 mm (9.39 in)</b>

# FRONT FORK



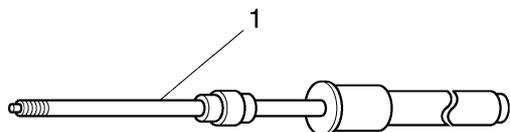
12311703

3. Check:
- Damper rod “1”  
Damage/wear → Replace.  
Obstruction → Blow out all of the oil passages with compressed air.
  - Damper adjusting rod  
Bends/damage → Replace.

ECA14200

### CAUTION:

- The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.



EAS23030

### ASSEMBLING THE FRONT FORK LEGS

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

EWA13660

### WARNING

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

### NOTE:

- When assembling the front fork leg, be sure to replace the following parts:
  - Oil seal
  - Dust seal
- Before assembling the front fork leg, make sure all of the components are clean.

### 1. Install:

- Damper rod assembly “1”
- Inner tube “2”

- Damper rod assembly bolt
- Copper washer **New**

EC2D1080

### CAUTION:

For the damper rod assembly, the right side is used for the rebound operation and left side for the compression. Pay attention not to mistake the right and left.

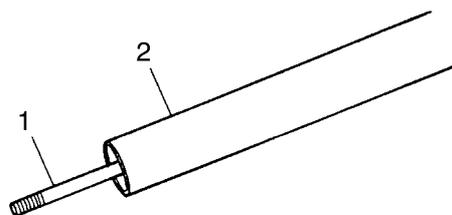
### NOTE:

The left side (for the compression) damper rod assembly has the four holes of oil path, unlike the right side.

ECA14210

### CAUTION:

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



### 2. Lubricate:

- Inner tube’s outer surface



**Recommended oil**  
Suspension oil 01 or equivalent

### 3. Tighten:

- Damper rod assembly bolt “1”



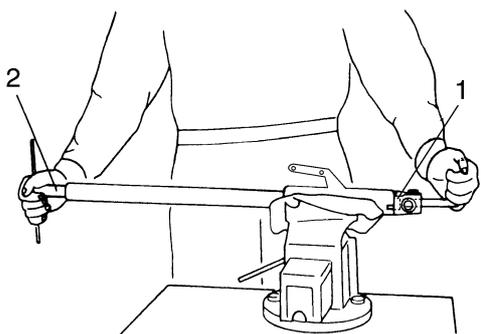
**Damper rod assembly bolt**  
23 Nm (2.3 m·kg, 17 ft·lb)  
LOCTITE®

### NOTE:

While holding the damper rod assembly with the damper rod holder “2”, tighten the damper rod assembly bolt.



**Damper rod holder**  
90890-01423  
**Damping rod holder**  
YM-01423



4. Install:
- Dust seal “1”
  - Oil seal clip “2”
  - Oil seal “3”
  - Washer “4”

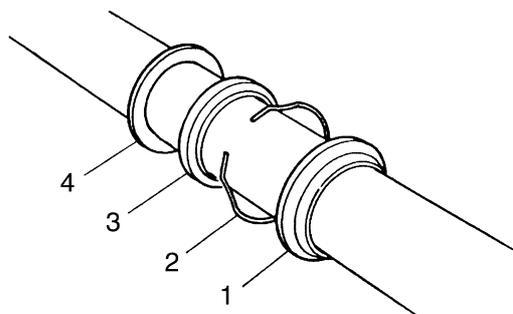
ECA14220

**CAUTION:**

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

**NOTE:**

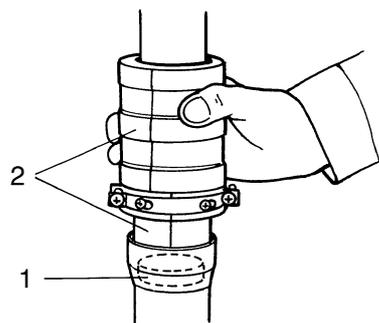
- Before installing the oil seal, lubricate its lips with lithium-soap-based grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.



5. Install:
- Oil seal “1”  
(with the fork seal driver “2”)



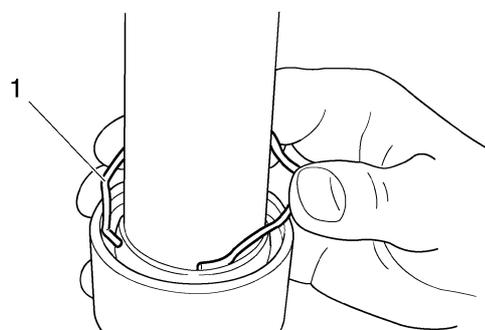
**Fork seal driver**  
**90890-01442**  
**Adjustable fork seal driver (36–46 mm)**  
**YM-01442**



6. Install:
- Oil seal clip “1”

**NOTE:**

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

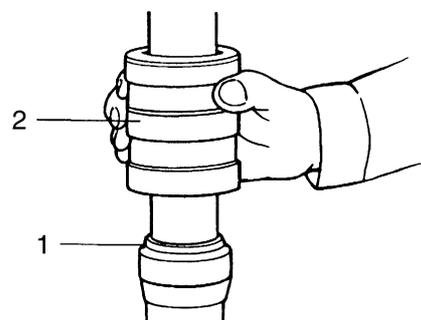


12310403

7. Install:
- Dust seal “1”  
(with the fork seal driver weight “2”)



**Fork seal driver**  
**90890-01442**  
**Adjustable fork seal driver (36–46 mm)**  
**YM-01442**

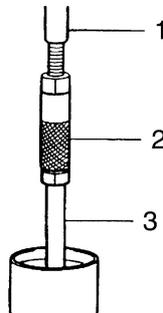


8. Install:
- Rod puller “1”
  - Rod puller attachment (M 10) “2”  
(onto the damper rod “3”)

# FRONT FORK



**Rod puller**  
90890-01437  
**Rod puller attachment (M10)**  
90890-01436



9. Fill:
- Front fork leg  
(with the specified amount of the recommended fork oil)



**Quantity**  
545.0 cm<sup>3</sup> (18.43 US oz) (19.18 Imp.oz)  
**Recommended oil**  
Suspension oil 01 or equivalent

ECA14230

**CAUTION:**

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

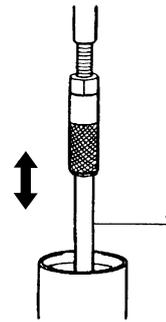
**NOTE:**

Be sure to bleed the front fork.

10. After filling the front fork leg, slowly stroke the damper rod "1" up and down (at least ten times) to distribute the fork oil.

**NOTE:**

Be sure to stroke the damper rod slowly because the fork oil may spurt out.



11. Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

**NOTE:**

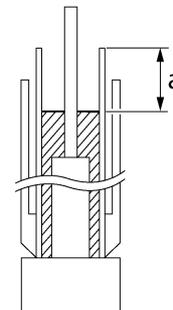
Be sure to bleed the front fork leg of any residual air.

12. Measure:

- Front fork leg oil level "a"  
(from the top of the outer tube, with the outer tube fully compressed and without the fork spring)  
Out of specification → Correct.



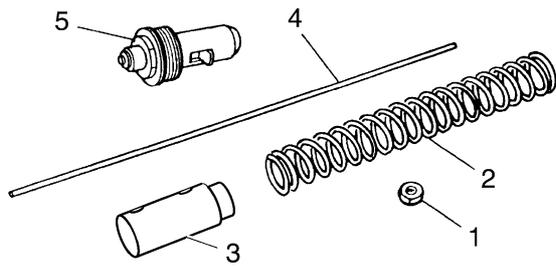
**Front fork leg oil level**  
91 mm (3.58 in)



13. Install:

- Nut "1"
- Fork spring "2"
- Spacer "3"
- Damper adjusting rod "4"
- Cap bolt "5"

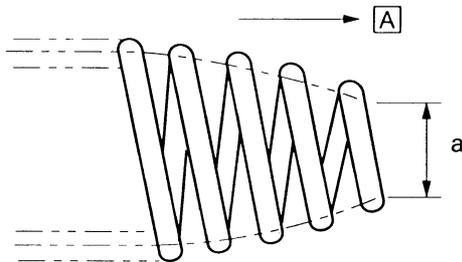
# FRONT FORK



- Remove the rod puller and adapter.
- Install the nut.
- Install the fork spring and spacer.

**NOTE:**

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



12311702

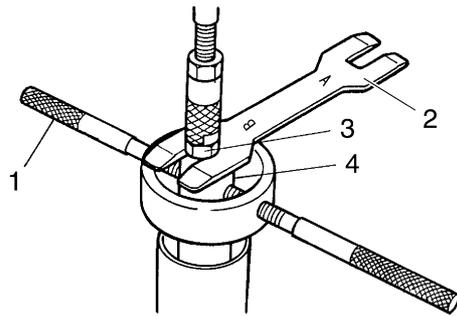
- Press down in the spacer with the fork spring compressor "1"
- Pull up the rod puller and install the rod holder "2" between the damper adjusting rod locknut "3" and the spacer "4".

**NOTE:**

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



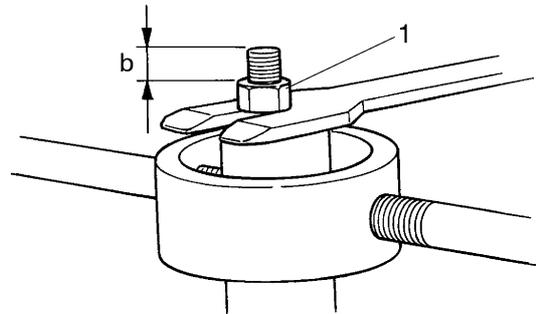
**Fork spring compressor**  
**90890-01441**  
**YM-01441**  
**Rod holder**  
**90890-01434**  
**Damper rod holder double ended**  
**YM-01434**



- Remove the rod puller and the rod puller attachment.
- Install the nut "1" and position it as specified "b".



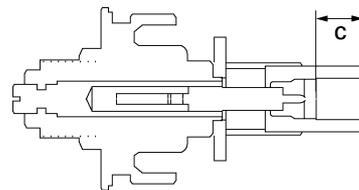
**Distance "b"**  
**12 mm (0.47 in)**



- Set the cap bolt distance "c" to specification.



**Distance "c"**  
**13 mm (0.51 in)**



- Install the damper adjusting rod and cap bolt, and then finger tighten the cap bolt.
- Hold the cap bolt and tighten the damper adjusting rod locknut to specification.



**Damper adjusting rod locknut**  
**15 Nm (1.5 m·kg, 11 ft·lb)**

- Remove the rod holder and fork spring compressor.

# FRONT FORK

EW2D1003

**WARNING**

- The fork spring is compressed.
- Always use a new cap bolt O-ring.



EAS23050

**INSTALLING THE FRONT FORK LEGS**

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

**NOTE:**

Each front fork leg is equipped with a spring preload adjusting bolt, the right fork leg is equipped with a rebound damping force adjusting screw and left front fork is equipped with a compression damping force adjusting screw. Pay attention not to mistake the right and left.

1. Install:

- Front fork leg  
Temporarily tighten the upper and lower bracket pinch bolts.

**NOTE:**

Make sure the inner fork tube is flush with the top of the handlebar holder.

2. Tighten:

- Lower bracket pinch bolt "1"

	<p><b>Lower bracket pinch bolt</b> 23 Nm (2.3 m·kg, 17 ft·lb)</p>
--	---

- Cap bolt "2"

	<p><b>Cap bolt</b> 23 Nm (2.3 m·kg, 17 ft·lb)</p>
--	---

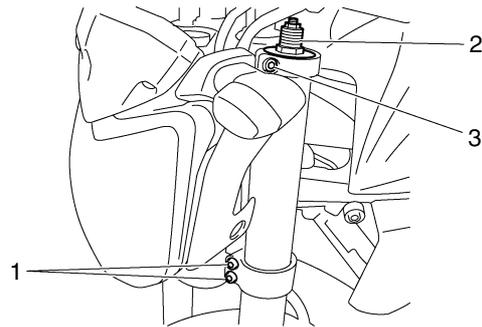
- Upper bracket pinch bolt "3"

	<p><b>Upper bracket pinch bolt</b> 26 Nm (2.6 m·kg, 19 ft·lb)</p>
--	---

EWA13680

**WARNING**

Make sure the brake hoses are routed properly.



3. Adjust:

- Spring preload
- Rebound damping
- Compression damping

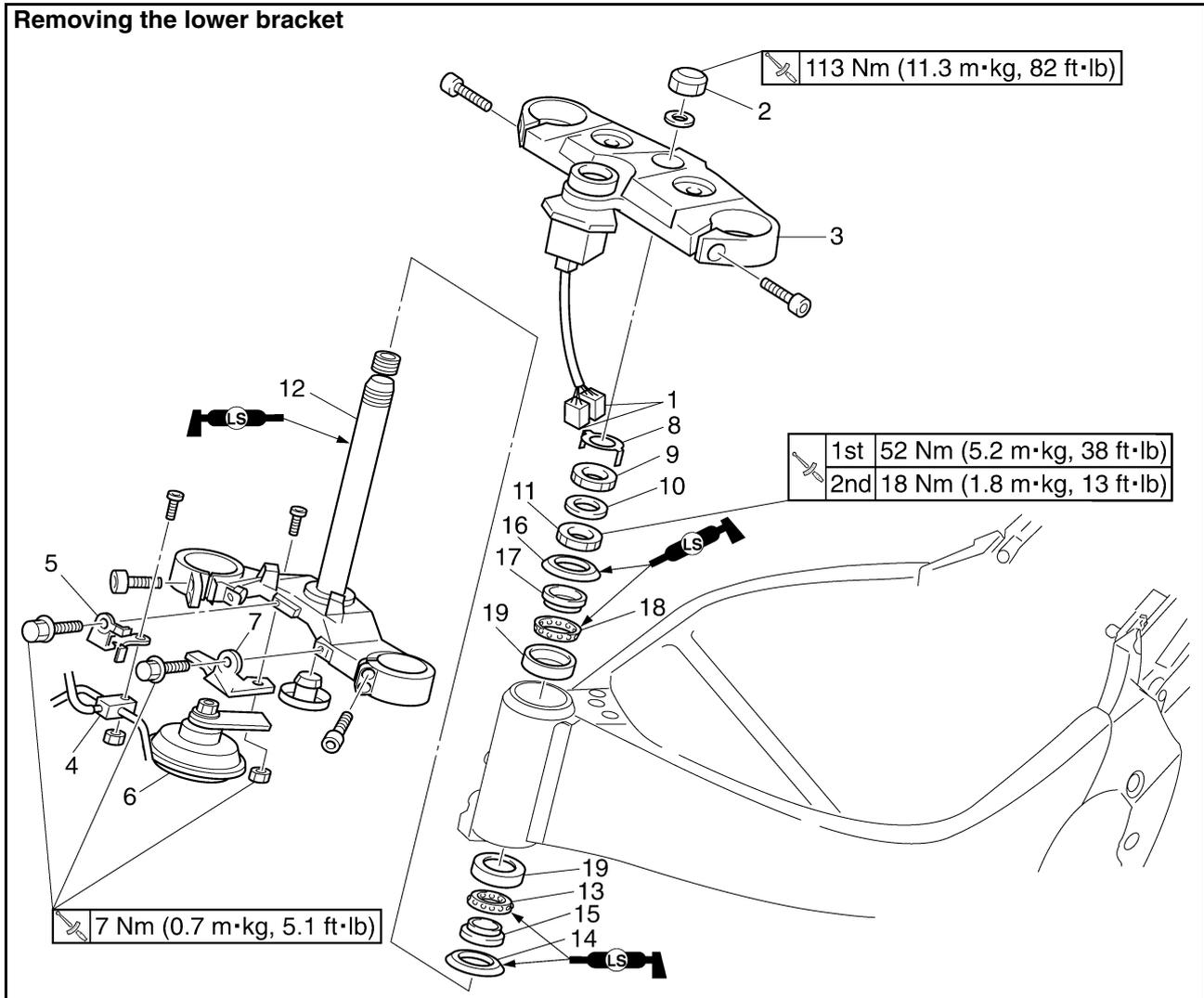
Refer to "ADJUSTING THE FRONT FORK LEGS" on page 3-29.

# STEERING HEAD

EAS23090

## STEERING HEAD

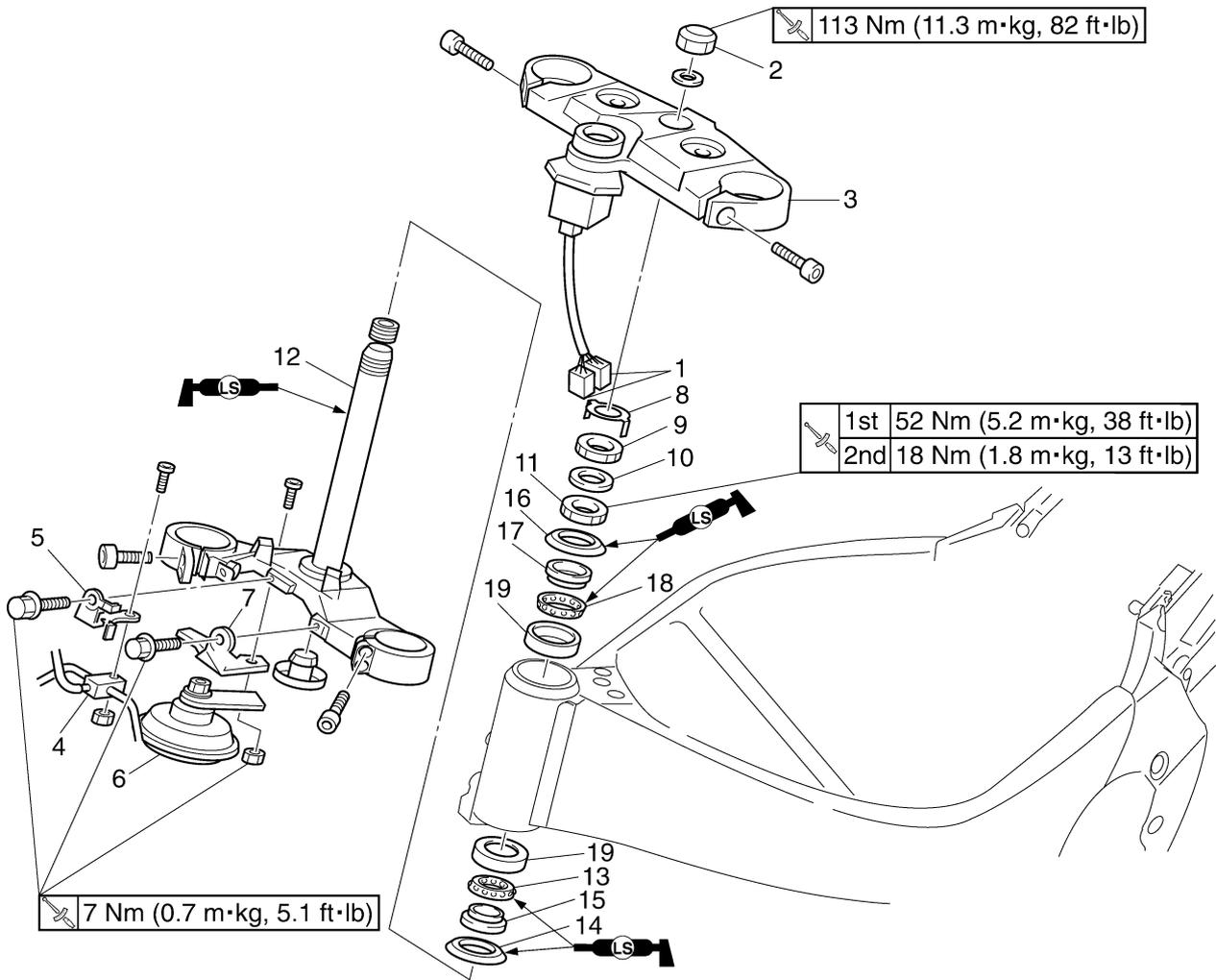
### Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
	Front wheel		Refer to "FRONT WHEEL" on page 4-8.
	Front brake calipers		Refer to "FRONT BRAKE" on page 4-20.
	Front cowling (FZ1-S)		Refer to "GENERAL CHASSIS" on page 4-1.
	Headlight and meter assembly (FZ1-N)		Refer to "GENERAL CHASSIS" on page 4-1.
	Handlebar		Refer to "HANDLEBAR" on page 4-43.
	Front fork legs		Refer to "FRONT FORK" on page 4-48.
1	Main switch connector	2	Disconnect.
2	Steering stem nut	1	
3	Upper bracket	1	
4	Front brake hose joint	1	

# STEERING HEAD

## Removing the lower bracket

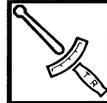


Order	Job/Parts to remove	Q'ty	Remarks
5	Front brake hose joint bracket	1	
6	Horn	1	
7	Horn bracket	1	
8	Lock washer	1	
9	Upper ring nut	1	
10	Rubber washer	1	
11	Lower ring nut	1	
12	Lower bracket	1	
13	Lower bearing	1	
14	Lower bearing dust seal	1	
15	Lower bearing inner race	1	
16	Bearing cover	1	
17	Upper bearing inner race	1	
18	Upper bearing	1	
19	Bearing outer race	2	
			For installation, reverse the removal procedure.



# STEERING HEAD

4. Check:
  - Upper bracket
  - Lower bracket  
(along with the steering stem)  
Bends/cracks/damage → Replace.



**Steering stem nut**  
**113 Nm (11.3 m·kg, 82 ft·lb)**

EAS23140

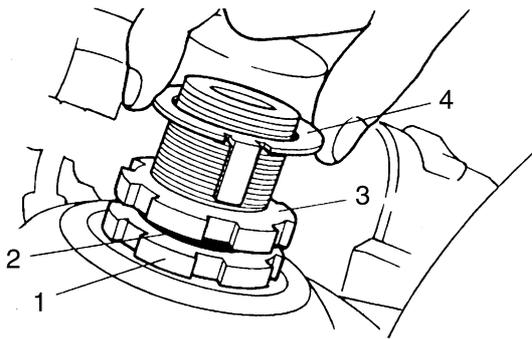
## INSTALLING THE STEERING HEAD

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



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

2. Install:
  - Lower ring nut "1"
  - Rubber washer "2"
  - Upper ring nut "3"
  - Lock washer "4"Refer to "INSTALLING THE STEERING HEAD" on page 4-60.



3. Install:
  - Front brake hose joint bracket
  - Front brake hose joint
4. Install:
  - Upper bracket
  - Steering stem nut

**NOTE:** \_\_\_\_\_  
Temporarily tighten the steering stem nut.

5. Install:
  - Front fork legsRefer to "FRONT FORK" on page 4-48.

**NOTE:** \_\_\_\_\_  
Temporarily tighten the upper and lower bracket pinch bolts.

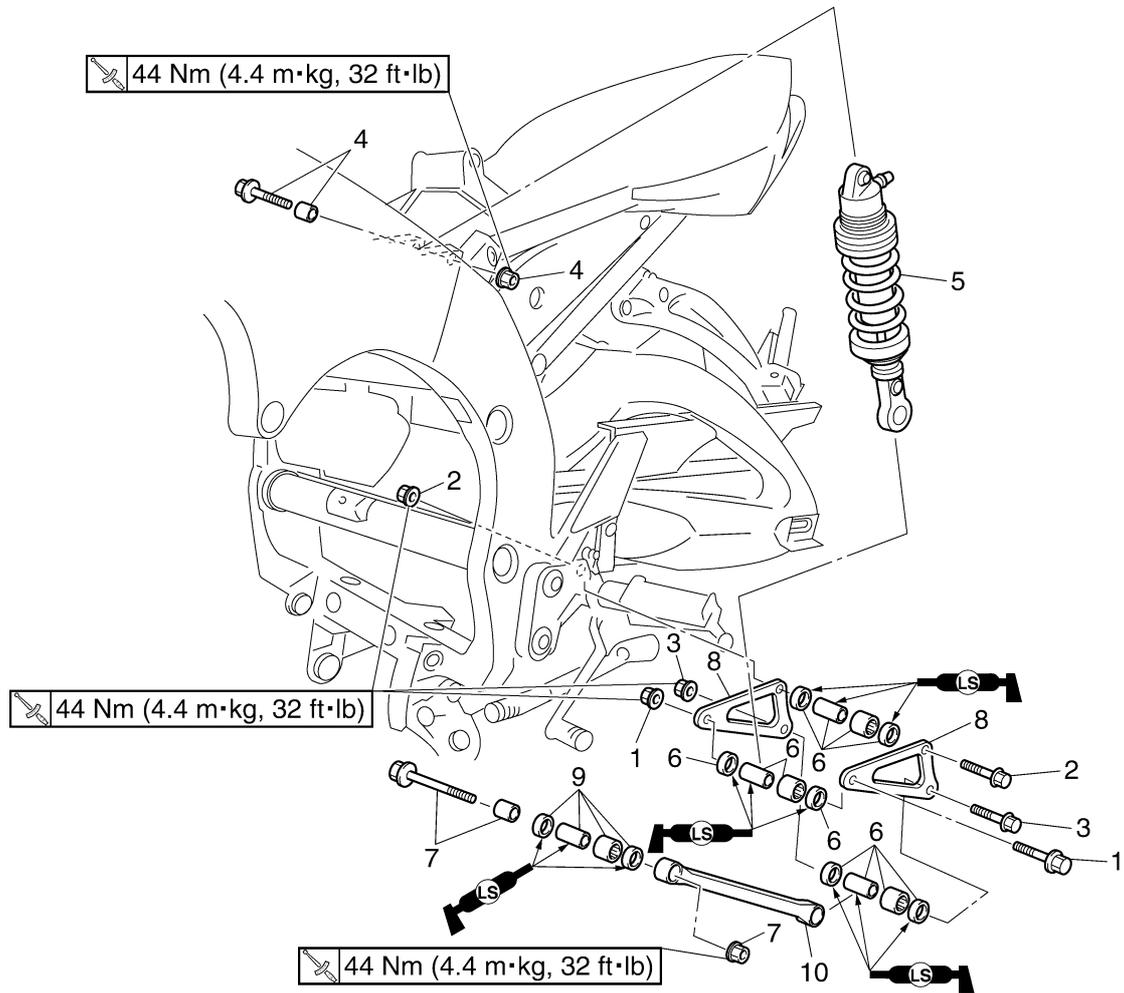
6. Tighten:
  - Steering stem nut

# REAR SHOCK ABSORBER ASSEMBLY

EAS23160

## REAR SHOCK ABSORBER ASSEMBLY

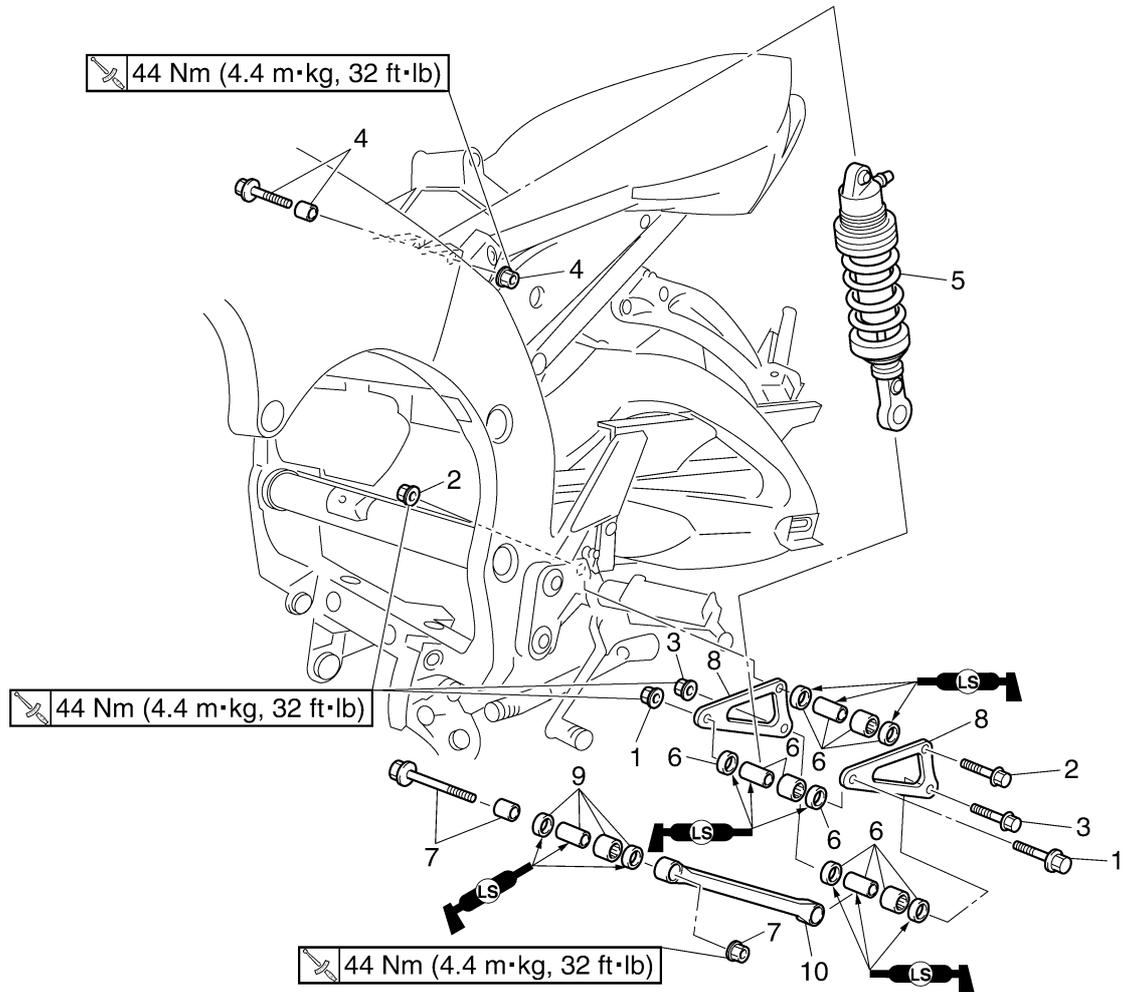
### Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left and right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Brake fluid reservoir tank bolt		Refer to "REAR BRAKE" on page 4-32.
1	Self-locking nut/bolt	1/1	
2	Self-locking nut/bolt	1/1	
3	Self-locking nut/bolt	1/1	
4	Self-locking nut/bolt/collar	1/1/1	
5	Rear shock absorber assembly	1	
6	Oil seal/bearing/collar	6/3/3	
7	Collar/self-locking nut/bolt	1/1/1	
8	Connecting arm	2	
9	Oil seal/bearing/collar	2/1/1	
10	Relay arm	1	

# REAR SHOCK ABSORBER ASSEMBLY

## Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
			For installation, reverse the removal procedure.

# REAR SHOCK ABSORBER ASSEMBLY

EAS23180

## HANDLING THE REAR SHOCK ABSORBER

EWA13740

### WARNING

This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber.

- Do not tamper or attempt to open the rear shock absorber.
- Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.
- Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.

EAS23190

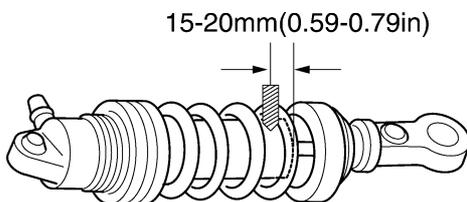
## DISPOSING OF A REAR SHOCK ABSORBER

1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3mm (0.079–0.118 in) hole through the rear shock absorber at a point 15–20 mm (0.59–0.79 in) from its end as shown.

EWA13760

### WARNING

Wear eye protection to prevent eye damage from released gas or metal chips.



EAS23210

## REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120

### WARNING

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

### NOTE:

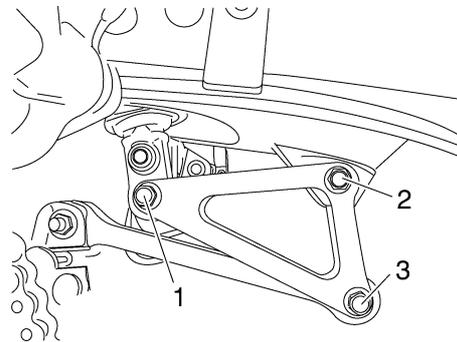
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- Rear shock absorber assembly lower bolt “1”
- Relay arm-to-swingarm bolt “2”
- Connecting arm-to-relay arm bolt “3”

### NOTE:

While removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.

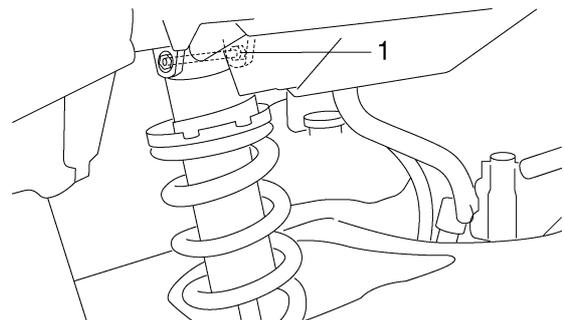


3. Remove:

- Rear shock absorber assembly upper bolt “1”
- Rear shock absorber assembly

### NOTE:

Raise the swingarm and then remove the rear shock absorber assembly from between the swingarm.



EAS23240

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:

- Rear shock absorber rod  
Bends/damage → Replace the rear shock absorber assembly.
- Rear shock absorber

# REAR SHOCK ABSORBER ASSEMBLY

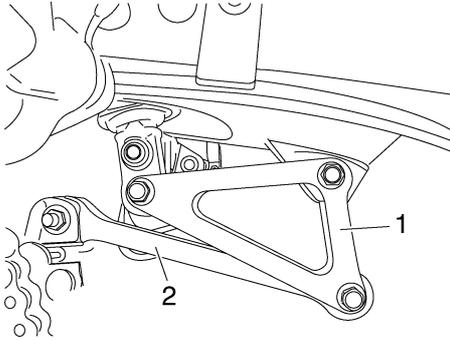
Gas leaks/oil leaks → Replace the rear shock absorber assembly.

- Spring  
Damage/wear → Replace the rear shock absorber assembly.
- Bushings  
Damage/wear → Replace.
- Dust seals  
Damage/wear → Replace.
- Bolts  
Bends/damage/wear → Replace.

EAS23260

## CHECKING THE CONNECTING ARM AND RELAY ARM

1. Check:
  - Connecting arms "1"
  - Relay arm "2"  
Damage/wear → Replace.



2. Check:
  - Bearings
  - Oil seals  
Damage/pitting → Replace.
3. Check:
  - Coller  
Damage/scratches → Replace.

EAS23300

## INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
  - Spacers
  - Bearings



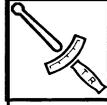
**Recommended lubricant**  
**Lithium-soap-based grease**

2. Install:
  - Rear shock absorber assembly

### NOTE:

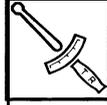
When installing the rear shock absorber assembly, lift up the swingarm.

3. Tighten:
  - Rear shock absorber assembly upper nut



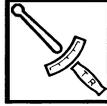
**Rear shock absorber assembly upper nut**  
**44 Nm (4.4 m·kg, 32 ft·lb)**

- Rear shock absorber assembly lower nut



**Rear shock absorber assembly lower nut**  
**44 Nm (4.4 m·kg, 32 ft·lb)**

- Relay-arm-to-swingarm nut

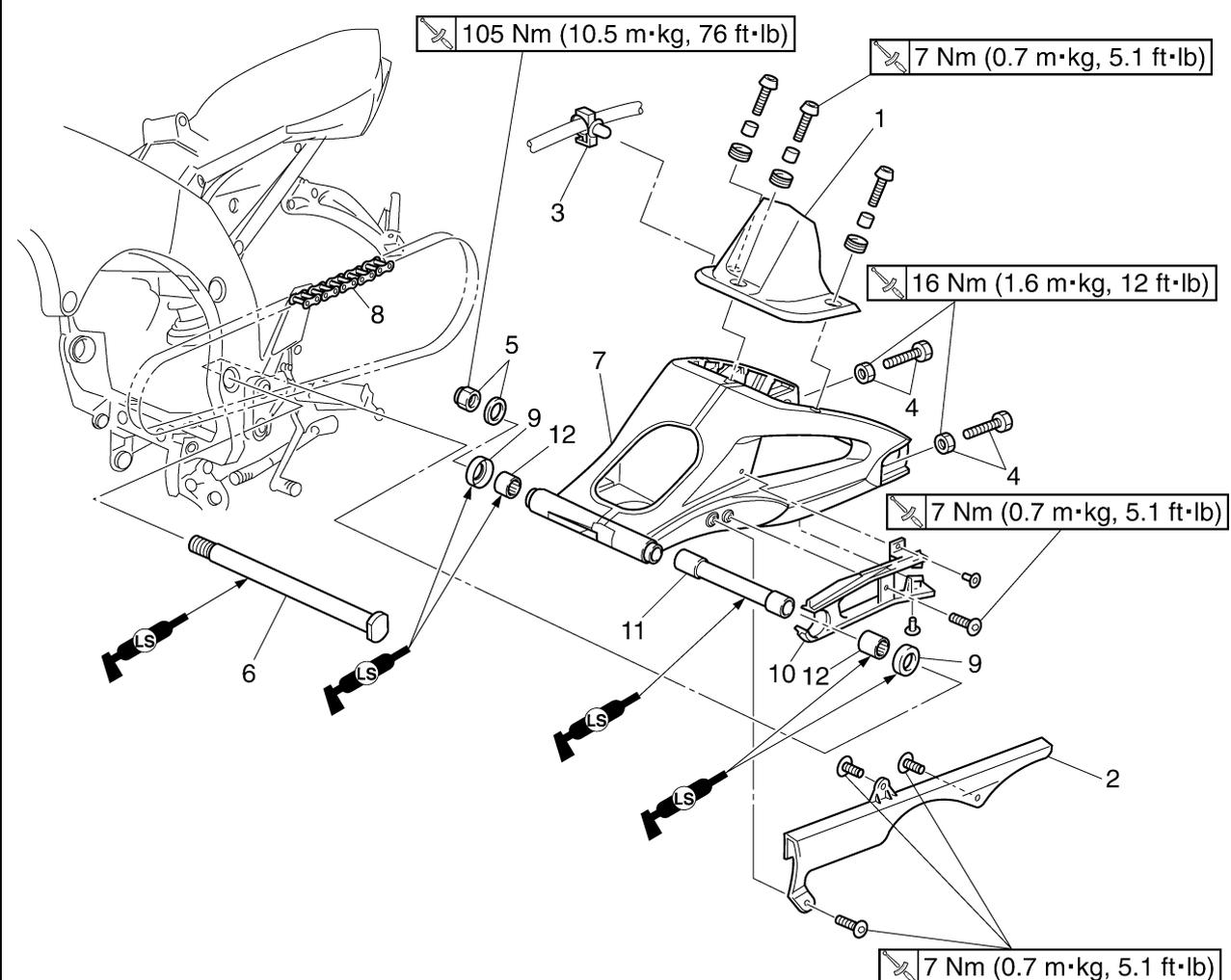


**Relay-arm-to-swingarm nut**  
**44 Nm (4.4 m·kg, 32 ft·lb)**

EAS23330

## SWINGARM

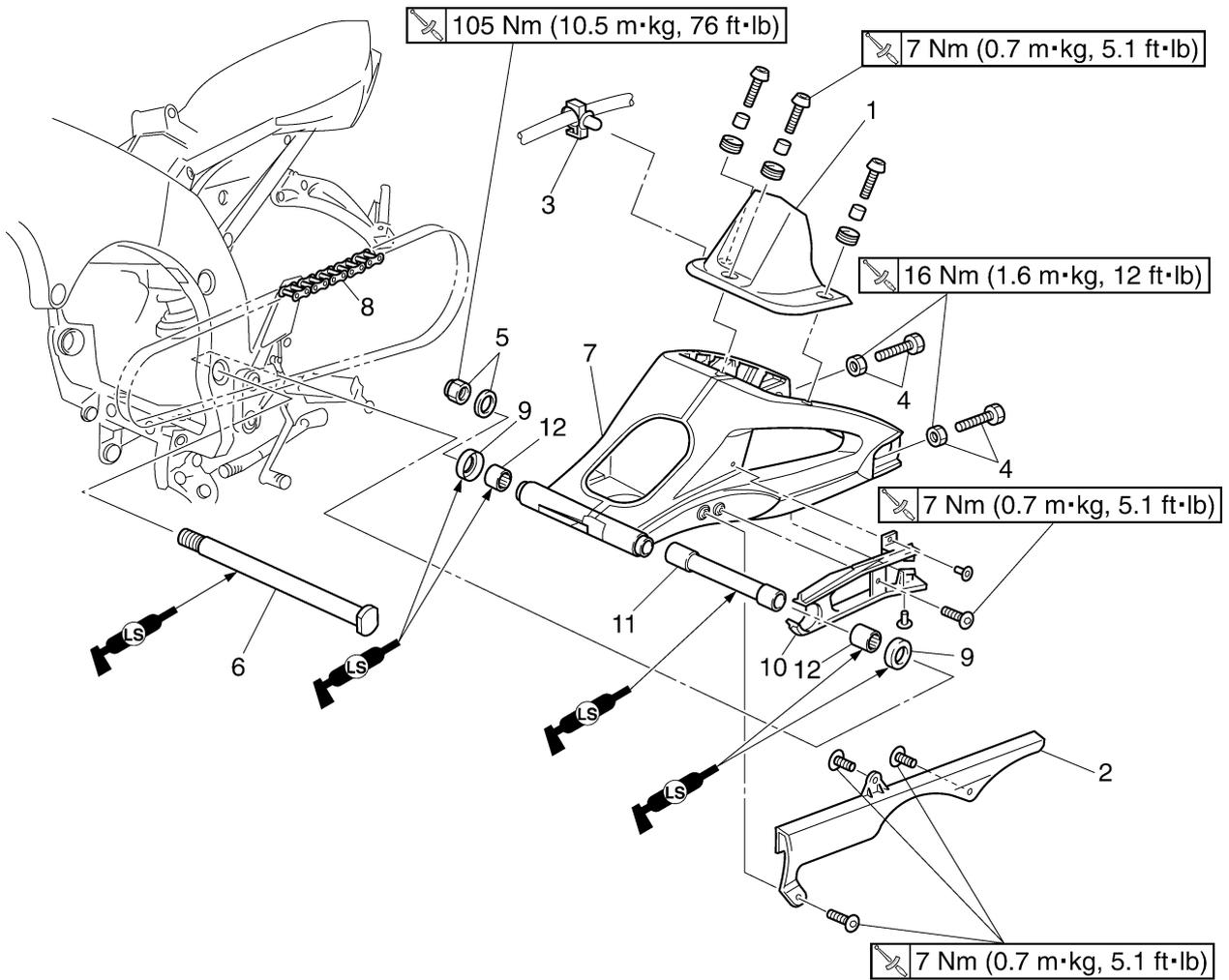
### Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-14.
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-32.
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-61.
	Drive sprocket		Refer to "ENGINE REMOVAL" on page 5-2.
1	Rear fender cover	1	
2	Drive chain guard	1	
3	Brake hose holder	1	
4	Drive chain adjusting bolt/locknut	2/2	
5	Pivot shaft nut/washer	1/1	
6	Pivot shaft	1	
7	Swingarm	1	

# SWINGARM

## Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
8	Drive chain	1	
9	Dust cover	2	
10	Drive chain guide	1	
11	Spacer	1	
12	Bearing	2	
			For installation, reverse the removal procedure.

# SWINGARM

EAS23350

## REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120

### WARNING

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

#### NOTE:

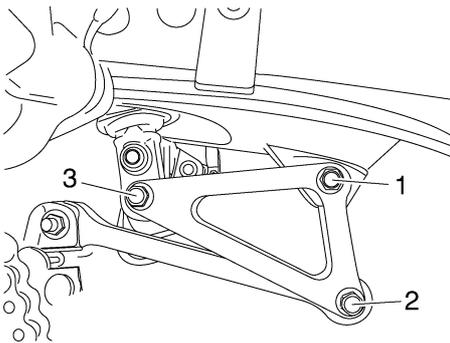
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- Relay arm-to-swingarm bolt "1"
- Connecting arm bolt "2"
- Rear shock absorber assembly lower bolt "3"

#### NOTE:

When removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.



3. Measure:

- Swingarm side play
- Swingarm vertical movement

a. Measure the tightening torque of the pivot shaft nut.

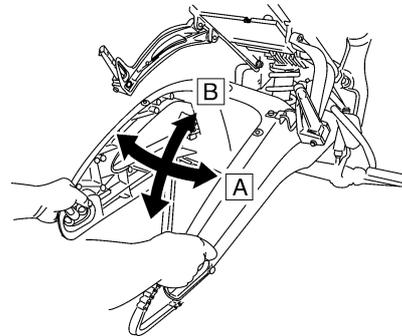
	<b>Pivot shaft nut</b> <b>105 Nm (10.5 m·kg, 76 ft·lb)</b>
---	---

- b. Measure the swingarm side play "A" by moving the swingarm from side to side.
- c. If the swingarm side play is out of specification, check the spacers, bearings, washers, and dust covers.

	<b>Swingarm side play (at the end of the swingarm)</b> <b>1.0 mm (0.04 in)</b>
---	---

d. Check the swingarm vertical movement "B" by moving the swingarm up and down.

If swingarm vertical movement is not smooth or if there is binding, check the spacers, bearings, washers, and dust covers.



EAS23360

## CHECKING THE SWINGARM

1. Check:

- Swingarm  
Bends/cracks/damage → Replace.

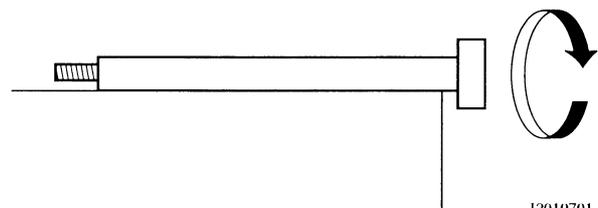
2. Check:

- Pivot shaft  
Roll the pivot shaft on a flat surface.  
Bends → Replace.

EWA13770

### WARNING

Do not attempt to straighten a bent pivot shaft.



12010701

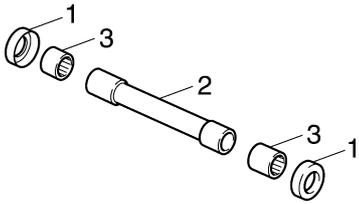
3. Wash:

- Pivot shaft
- Dust covers
- Spacer
- Washers
- Bearings

	<b>Recommended cleaning solvent</b> <b>Kerosene</b>
---	--

4. Check:

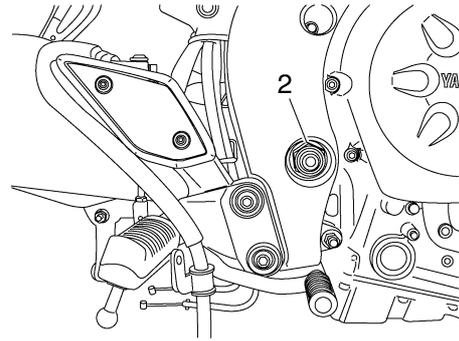
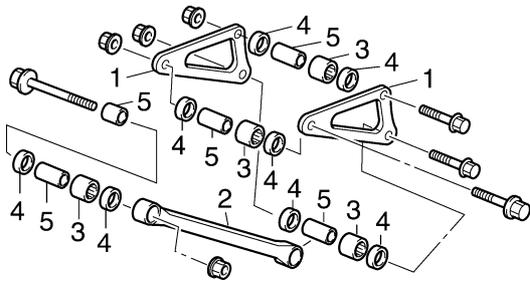
- Dust covers "1"
- Spacer "2"
- Bearings "3"  
Damage/pitting → Replace.



5. Check:
- Connecting arms "1"
  - Relay arm "2"
- Damage/wear → Replace.

6. Check:
- Bearings "3"
  - Oil seals "4"
- Damage/pitting → Replace.

7. Check:
- Collars "5"
- Damage/scratches → Replace.



3. Install:
- Rear shock absorber assembly
  - Rear wheel
- Refer to "INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY" on page 4-64 and "INSTALLING THE REAR WHEEL (DISC)" on page 4-18.

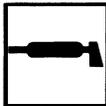
4. Adjust:
- Drive chain slack
- Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-26.

	<p><b>Drive chain slack</b> 25–35 mm (0.98–1.38 in)</p>
--	---

EAS23380

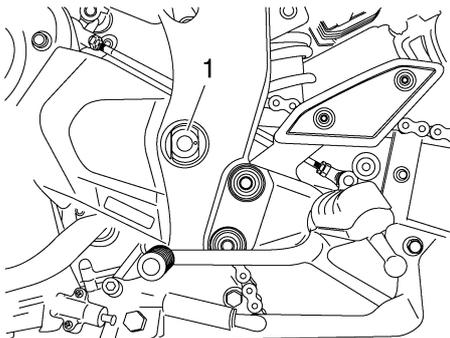
## INSTALLING THE SWINGARM

1. Lubricate:
- Bearings
  - Spacers
  - Dust covers
  - Pivot shaft



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

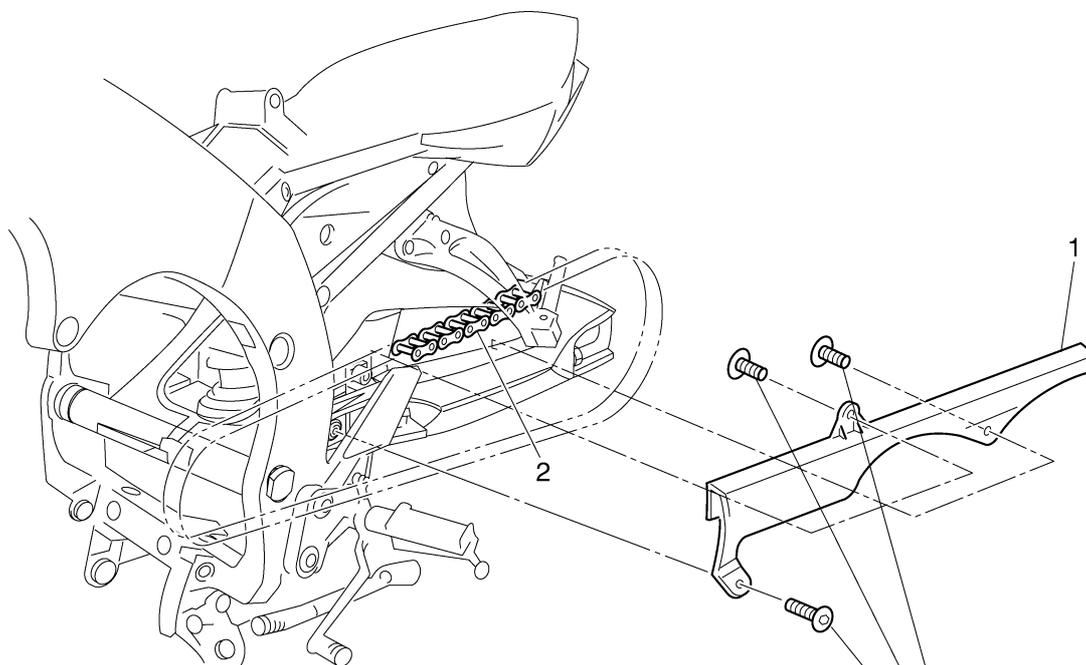
2. Install:
- Swingarm
  - Pivot shaft "1"
  - Pivot shaft nut "2"



EAS23400

## CHAIN DRIVE

### Removing the drive chain



 7 Nm (0.7 m·kg, 5.1 ft·lb)

Order	Job/Parts to remove	Q'ty	Remarks
	Drive sprocket		Refer to "ENGINE REMOVAL" on page 5-2.
1	Drive chain guard	1	
2	Drive chain	1	
			For installation, reverse the removal procedure.

# CHAIN DRIVE

EAS23410

## REMOVING THE DRIVE CHAIN

1. Stand the vehicle on a level surface.

EWA13120



**WARNING**

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

### NOTE:

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

2. Remove:

- Drive chain  
(with the drive chain cutter)

### NOTE:

Only cut the drive chain if it or the swingarm is to be replaced.

EAS23440

## CHECKING THE DRIVE CHAIN

1. Measure:

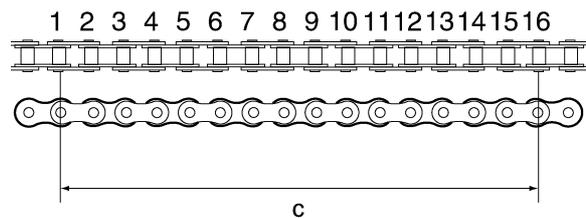
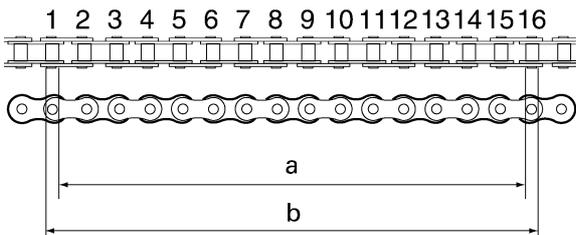
- Measure the dimension between 15-links on the inner side "a" and outer side "b" of the roller and calculate the dimension between pin centers.
- Dimension "c" between pin centers = (Inner dimension "a" + Outer dimension "b")/2
- 15-link section "c" of the drive chain  
Out of specification → Replace the drive chain, front drive sprocket and rear drive sprocket as a set.



**15-link drive chain section limit (maximum)**  
**239.3 mm (9.42 in)**

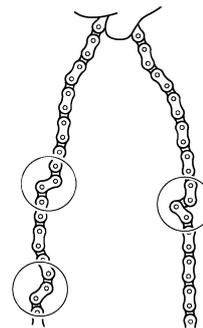
### NOTE:

- While measuring the 15-link section, push down on the drive chain to increase its tension.
- Perform this measurement at two or three different places.



2. Check:

- Drive chain  
Stiffness → Clean and lubricate or replace.



3. Clean:

- Drive chain



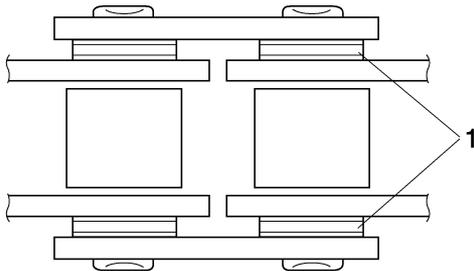
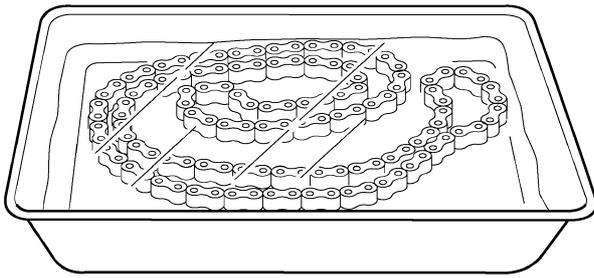
- Wipe the drive chain with a clean cloth.
- Put the drive chain in kerosene and remove any remaining dirt.
- Remove the drive chain from the kerosene and completely dry it.

ECA14290

### CAUTION:

- This vehicle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzene), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.
- Do not soak the drive chain in kerosene for more than ten minutes, otherwise the O-rings can be damaged.

# CHAIN DRIVE

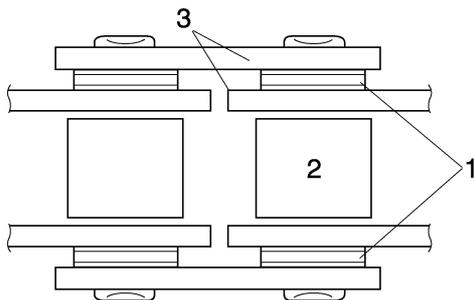


I2510201



## 4. Check:

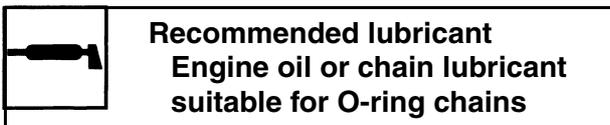
- O-rings "1"  
Damage → Replace the drive chain.
- Drive chain rollers "2"  
Damage/wear → Replace the drive chain.
- Drive chain side plates "3"  
Damage/wear → Replace the drive chain.  
Cracks → Replace the drive chain and make sure the battery breather hose is properly routed away from the drive chain and below the swingarm.



I2510201

## 5. Lubricate:

- Drive chain



EAS23460

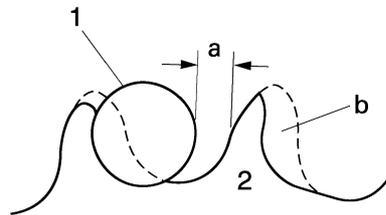
## CHECKING THE DRIVE SPROCKET

### 1. Check:

- Drive sprocket

More than 1/4 tooth "a" wear → Replace the drive chain sprockets as a set.

Bent teeth → Replace the drive chain sprockets as a set.



I2560103

- b. Correct

- 1. Drive chain roller
- 2. Drive chain sprocket

EAS23470

## CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-18.

ET2D1031

## CHECKING THE REAR WHEEL DRIVE HUB

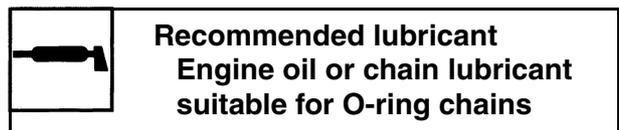
Refer to "CHECKING THE REAR WHEEL DRIVE HUB" on page 4-17.

EAS28800

## INSTALLING THE DRIVE CHAIN

### 1. Lubricate:

- Drive chain



### 2. Install:

- Drive sprocket
- Lock washer **New**
- Drive sprocket nut

Refer to "ENGINE REMOVAL" on page 5-2.



---

# ENGINE

<b>ENGINE REMOVAL</b> .....	5-2
INSTALLING THE ENGINE .....	5-8
<b>CAMSHAFTS</b> .....	5-10
REMOVING THE CAMSHAFTS .....	5-12
CHECKING THE CAMSHAFTS .....	5-13
CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET .....	5-14
CHECKING THE TIMING CHAIN GUIDES .....	5-14
CHECKING THE TIMING CHAIN TENSIONER .....	5-14
INSTALLING THE CAMSHAFTS .....	5-16
<b>CYLINDER HEAD</b> .....	5-19
REMOVING THE CYLINDER HEAD .....	5-20
CHECKING THE CYLINDER HEAD .....	5-20
INSTALLING THE CYLINDER HEAD .....	5-20
<b>VALVES AND VALVE SPRINGS</b> .....	5-22
REMOVING THE VALVES .....	5-24
CHECKING THE VALVES AND VALVE GUIDES .....	5-25
CHECKING THE VALVE SEATS .....	5-26
CHECKING THE VALVE SPRINGS.....	5-28
CHECKING THE VALVE LIFTERS .....	5-29
INSTALLING THE VALVES.....	5-29
<b>GENERATOR</b> .....	5-31
REMOVING THE GENERATOR .....	5-33
INSTALLING THE GENERATOR.....	5-33
<b>STARTER CLUTCH</b> .....	5-35
REMOVING THE STARTER CLUTCH .....	5-36
CHECKING THE DAMPER .....	5-36
CHECKING THE STARTER CLUTCH.....	5-36
INSTALLING THE STARTER CLUTCH .....	5-37
<b>CRANKSHAFT POSITION SENSOR</b> .....	5-38
REMOVING THE CRANKSHAFT POSITION SENSOR .....	5-39
INSTALLING THE CRANKSHAFT POSITION SENSOR .....	5-39
<b>ELECTRIC STARTER</b> .....	5-40
CHECKING THE STARTER MOTOR .....	5-42
ASSEMBLING THE STARTER MOTOR.....	5-43
INSTALLING THE STARTER MOTOR.....	5-43
<b>CLUTCH</b> .....	5-44
REMOVING THE CLUTCH.....	5-48

---

CHECKING THE FRICTION PLATES .....	5-49
CHECKING THE CLUTCH PLATES.....	5-49
CHECKING THE CLUTCH SPRINGS.....	5-50
CHECKING THE CLUTCH HOUSING .....	5-50
CHECKING THE CLUTCH BOSS .....	5-50
CHECKING THE PRESSURE PLATE.....	5-50
CHECKING THE PULL LEVER SHAFT AND PULL ROD.....	5-50
INSTALLING THE CLUTCH .....	5-51
<b>SHIFT SHAFT .....</b>	<b>5-54</b>
REMOVING THE SHIFT SHAFT .....	5-56
CHECKING THE SHIFT SHAFT .....	5-56
CHECKING THE STOPPER LEVER.....	5-56
INSTALLING THE SHIFT SHAFT .....	5-56
<b>OIL PUMP .....</b>	<b>5-58</b>
REMOVING THE OIL PAN .....	5-62
CHECKING THE SPROCKET AND CHAIN .....	5-62
CHECKING THE OIL PUMP .....	5-62
CHECKING THE RELIEF VALVE .....	5-63
CHECKING THE OIL DELIVERY PIPES.....	5-63
CHECKING THE OIL STRAINER.....	5-63
CHECKING THE OIL NOZZLES .....	5-63
ASSEMBLING THE OIL PUMP .....	5-63
INSTALLING THE OIL/WATER PUMP ASSEMBLY.....	5-64
INSTALLING THE OIL PAN .....	5-65
<b>CRANKCASE .....</b>	<b>5-66</b>
DISASSEMBLING THE CRANKCASE.....	5-68
CHECKING THE CRANKCASE .....	5-68
CHECKING THE BEARING AND OIL SEALS .....	5-68
ASSEMBLING THE CRANKCASE.....	5-68
<b>CRANKSHAFT .....</b>	<b>5-70</b>
REMOVING THE CONNECTING RODS AND PISTONS .....	5-72
REMOVING THE CRANKSHAFT ASSEMBLY .....	5-72
CHECKING THE CYLINDER AND PISTON.....	5-73
CHECKING THE PISTON RINGS .....	5-73
CHECKING THE PISTON PINS .....	5-74
CHECKING THE BIG END BEARINGS .....	5-75
INSTALLING THE CONNECTING ROD AND PISTON .....	5-78
CHECKING THE CRANKSHAFT .....	5-81
CHECKING THE CRANKSHAFT DRIVE SPROCKET.....	5-81
CHECKING THE CRANKSHAFT JOURNAL BEARINGS.....	5-81
INSTALLING THE CRANKSHAFT.....	5-83
<b>TRANSMISSION.....</b>	<b>5-85</b>
REMOVING THE TRANSMISSION.....	5-90
CHECKING THE SHIFT FORKS.....	5-90
CHECKING THE SHIFT DRUM ASSEMBLY.....	5-91

---

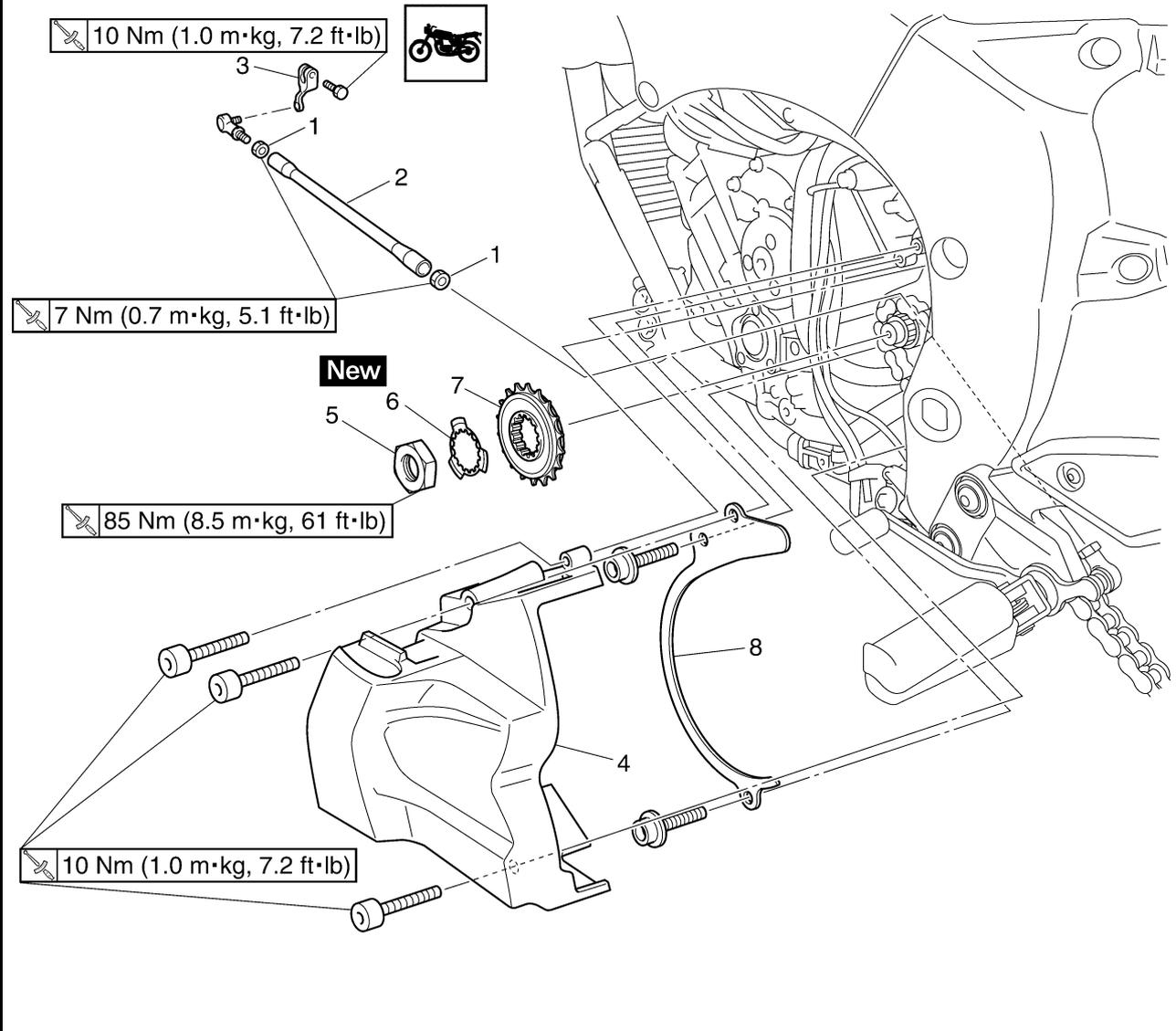
CHECKING THE TRANSMISSION .....	5-91
INSTALLING THE TRANSMISSION.....	5-92

# ENGINE REMOVAL

EAS23710

## ENGINE REMOVAL

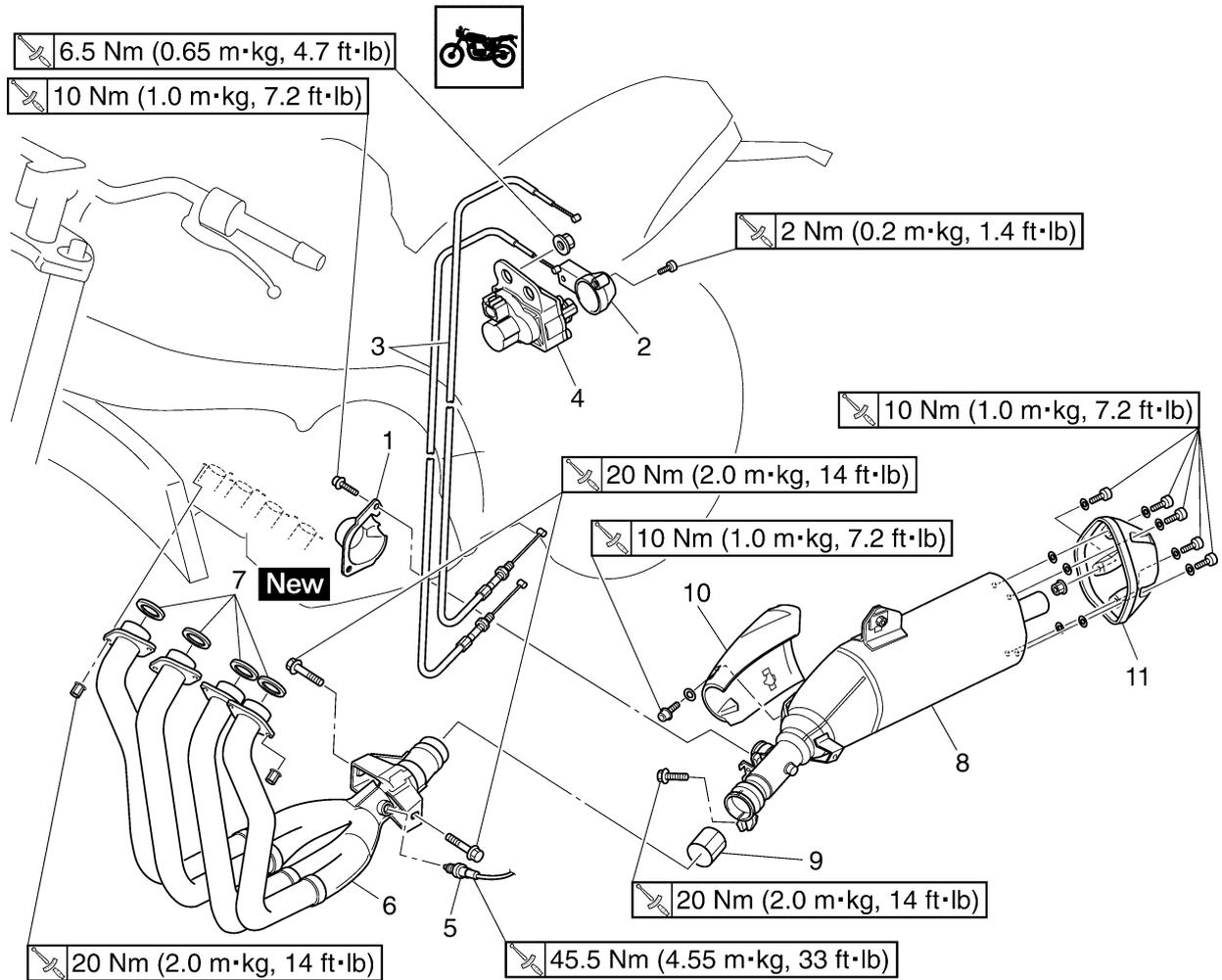
### Removing the drive sprocket



Order	Job/Parts to remove	Q'ty	Remarks
1	Locknut	2	
2	Shift rod	1	
3	Shift arm	1	
4	Drive sprocket cover	1	
5	Drive sprocket nut	1	
6	Lock washer	1	
7	Drive sprocket	1	
8	Plate	1	
			For installation, reverse the removal procedure.

# ENGINE REMOVAL

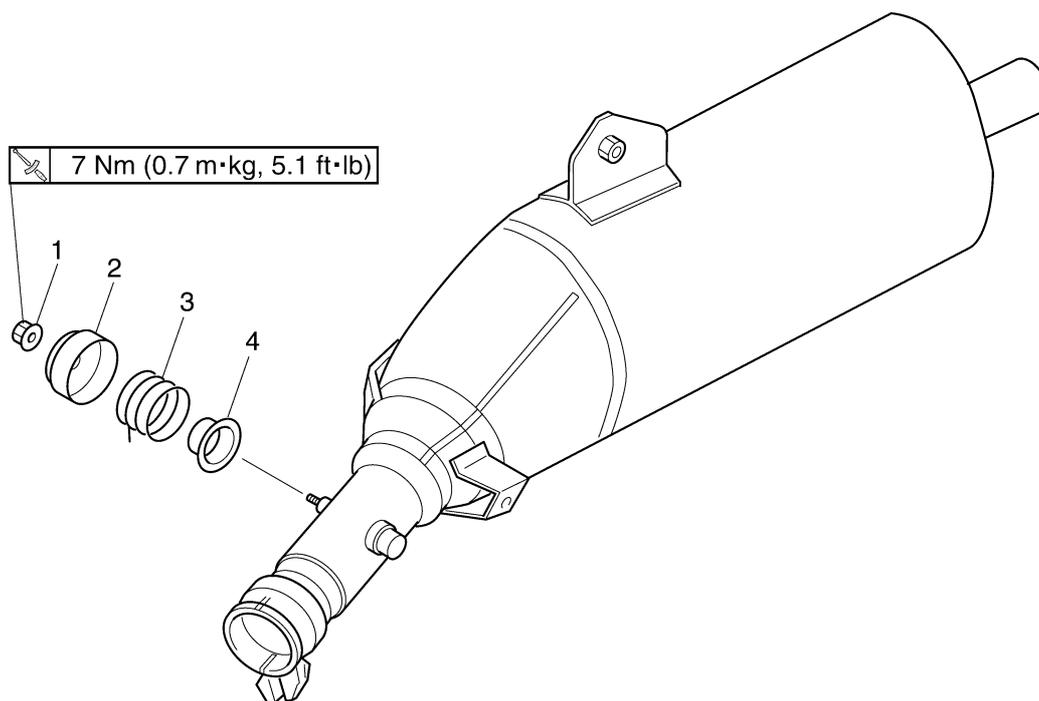
## Removing the exhaust pipe



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	EXUP pulley cover	1	
2	EXUP servo motor cover	1	
3	EXUP cables	2	
4	EXUP servo motor	1	
5	O <sub>2</sub> sensor	1	
6	Exhaust pipe assembly	1	
7	Exhaust pipe gasket	4	
8	Muffler	1	
9	Muffler gasket	1	
10	Muffler cover	1	
11	Muffler end cover	1	
			For installation, reverse the removal procedure.

# ENGINE REMOVAL

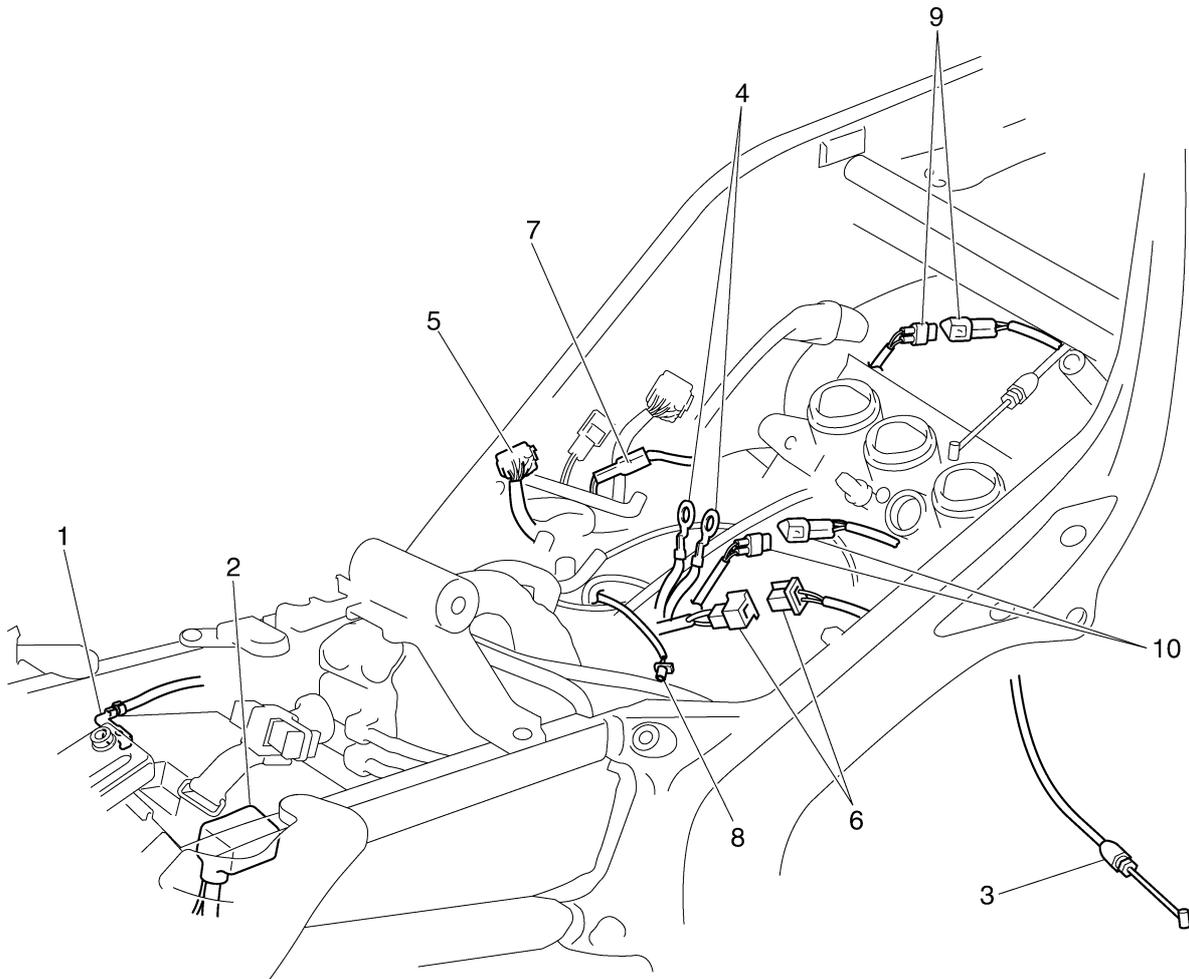
## Disassembling the exhaust valve pipe



Order	Job/Parts to remove	Q'ty	Remarks
1	Nut	1	
2	Pulley	1	
3	Spring	1	
4	Spring seat	1	
			For assembly, reverse the disassembly procedure.

# ENGINE REMOVAL

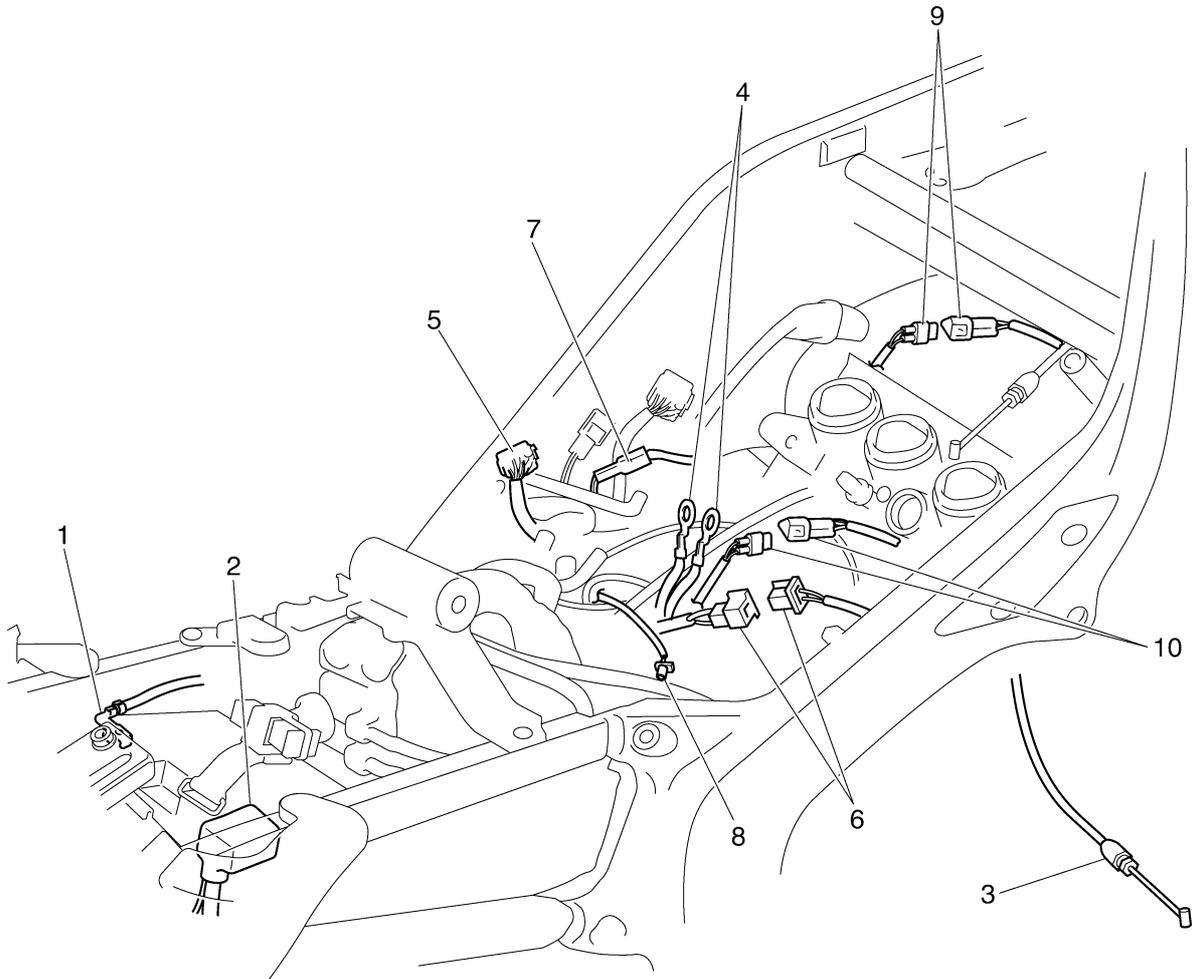
## Disconnecting the leads and hoses



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Throttle body assembly		Refer to "THROTTLE BODIES" on page 7-4.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
	Oil cooler		Refer to "OIL COOLER" on page 6-4.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-13.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-40.
1	Battery negative lead	1	
2	Battery positive lead	1	
3	Clutch cable	1	
4	Ground lead	2	
5	Stator coil assembly coupler	1	Disconnect.

# ENGINE REMOVAL

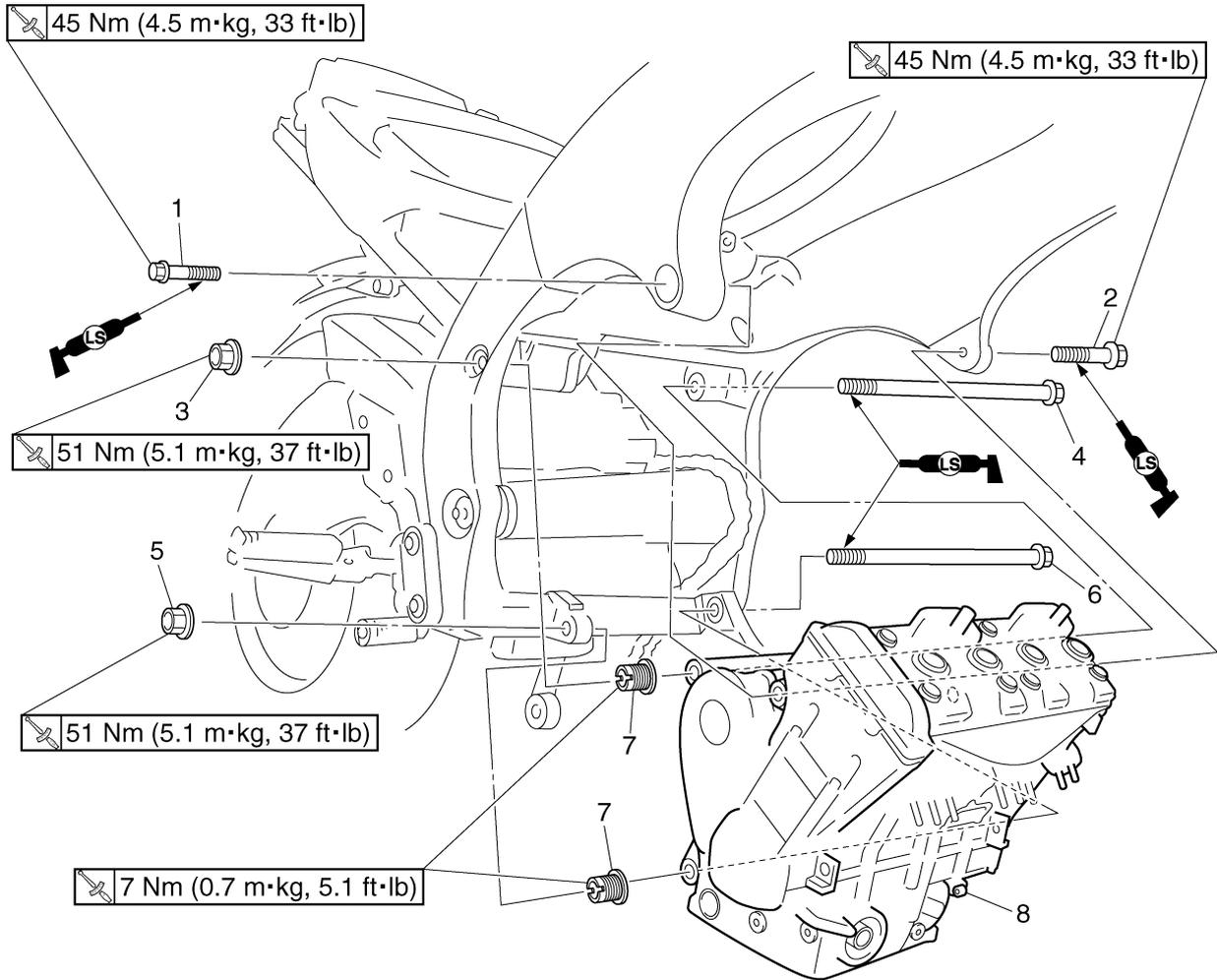
## Disconnecting the leads and hoses



Order	Job/Parts to remove	Q'ty	Remarks
6	Crankshaft position sensor lead coupler	1	Disconnect.
7	Oil level switch connector	1	Disconnect.
8	Neutral switch connector	1	Disconnect.
9	Cylinder identification sensor coupler	1	Disconnect.
10	Speed sensor coupler	1	Disconnect.
			For assembly, reverse the removal procedure.

# ENGINE REMOVAL

## Removing the engine



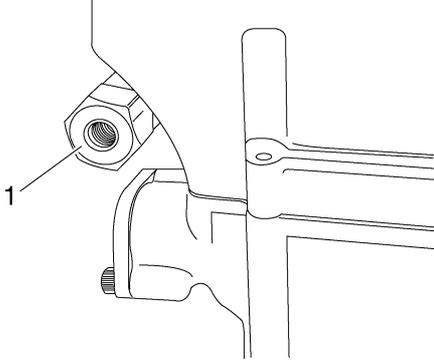
Order	Job/Parts to remove	Q'ty	Remarks
1	Right front engine mounting bolt 1	1	
2	Left front engine mounting bolt	1	
3	Upper self-locking nut	1	
4	Upper engine mounting bolt	1	
5	Lower self-locking nut	1	
6	Lower engine mounting bolt	1	
7	Engine mounting adjust bolt	2	
8	Engine	1	
			For assembly, reverse the removal procedure.

# ENGINE REMOVAL

EAS23720

## INSTALLING THE ENGINE

1. Install:
  - Right front engine mounting bolt 2 "1"  
Refer to "CYLINDER HEAD" on page 5-19.

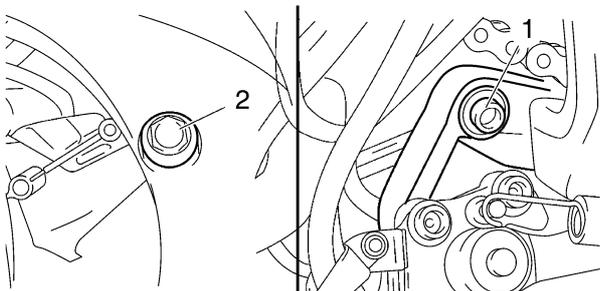


2. Tighten:
  - Right front engine mounting bolt 2

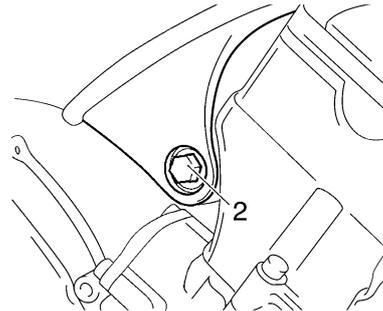
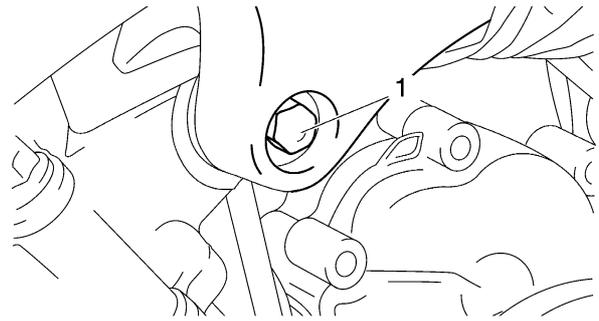
	<b>Right front engine mounting bolt 2</b> <b>50 Nm (5.0 m·kg, 36 ft·lb)</b>
---	--

3. Install:
  - Engine mounting adjust bolts (temporarily tighten)
4. Install:
  - Engine
5. Install:
  - Lower engine mounting bolt "1"
  - Upper engine mounting bolt "2"
  - Self-locking nuts

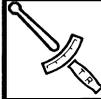
**NOTE:** \_\_\_\_\_  
Do not fully tighten the bolts and nuts.



6. Install:
  - Left front engine mounting bolt "1" (temporarily tighten)
  - Right front engine mounting bolt 1 "2" (temporarily tighten)

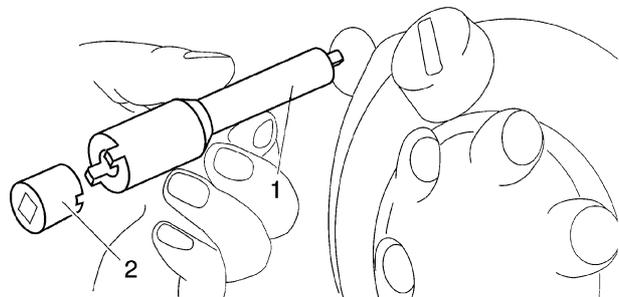


7. Tighten:
  - Engine mounting adjust bolts

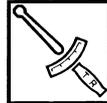
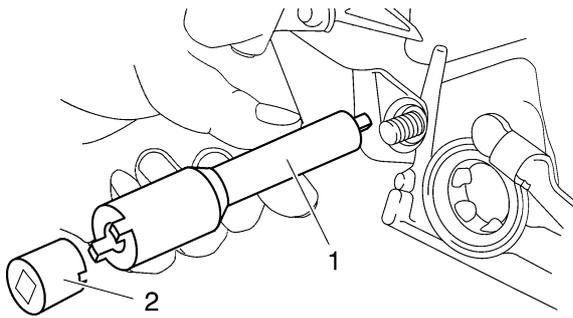
	<b>Engine mounting adjust bolt</b> <b>7 Nm (0.7 m·kg, 5.1 ft·lb)</b>
---	---

**NOTE:** \_\_\_\_\_  
Use the pivot shaft wrench "1" and pivot shaft wrench adapter "2" to tighten the engine mounting adjust bolts.

	<b>Pivot shaft wrench</b> <b>90890-01518</b> <b>Frame spanner socket</b> <b>YM-01518</b> <b>Pivot shaft wrench adapter</b> <b>90890-01476</b>
---	--



# ENGINE REMOVAL



**Left front engine mounting bolt**  
**45 Nm (4.5 m·kg, 33 ft·lb)**  
**Right front engine mounting**  
**bolt 1**  
**45 Nm (4.5 m·kg, 33 ft·lb)**

8. Tighten:

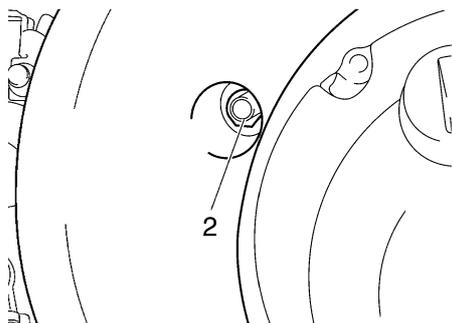
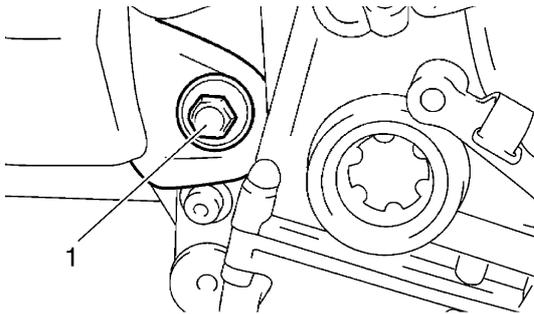
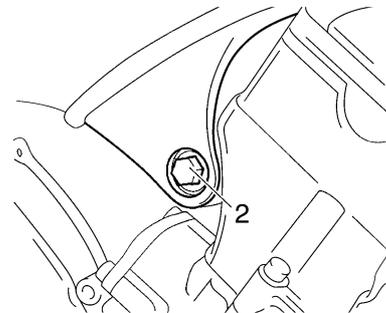
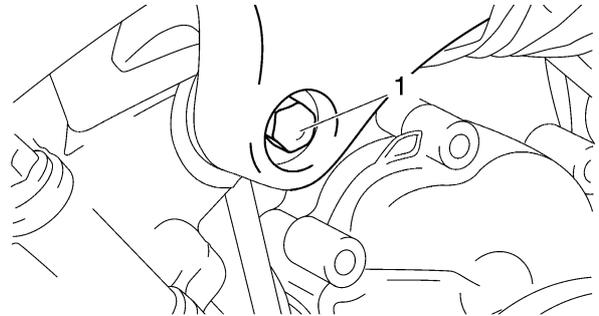
- Lower self-locking nut "1"
- Upper self-locking nut "2"



**Upper self-locking nut**  
**51 Nm (5.1 m·kg, 37 ft·lb)**  
**Lower self-locking nut**  
**51 Nm (5.1 m·kg, 37 ft·lb)**

## NOTE:

First tighten the lower self-locking nut, and then tighten the upper self-locking nut.



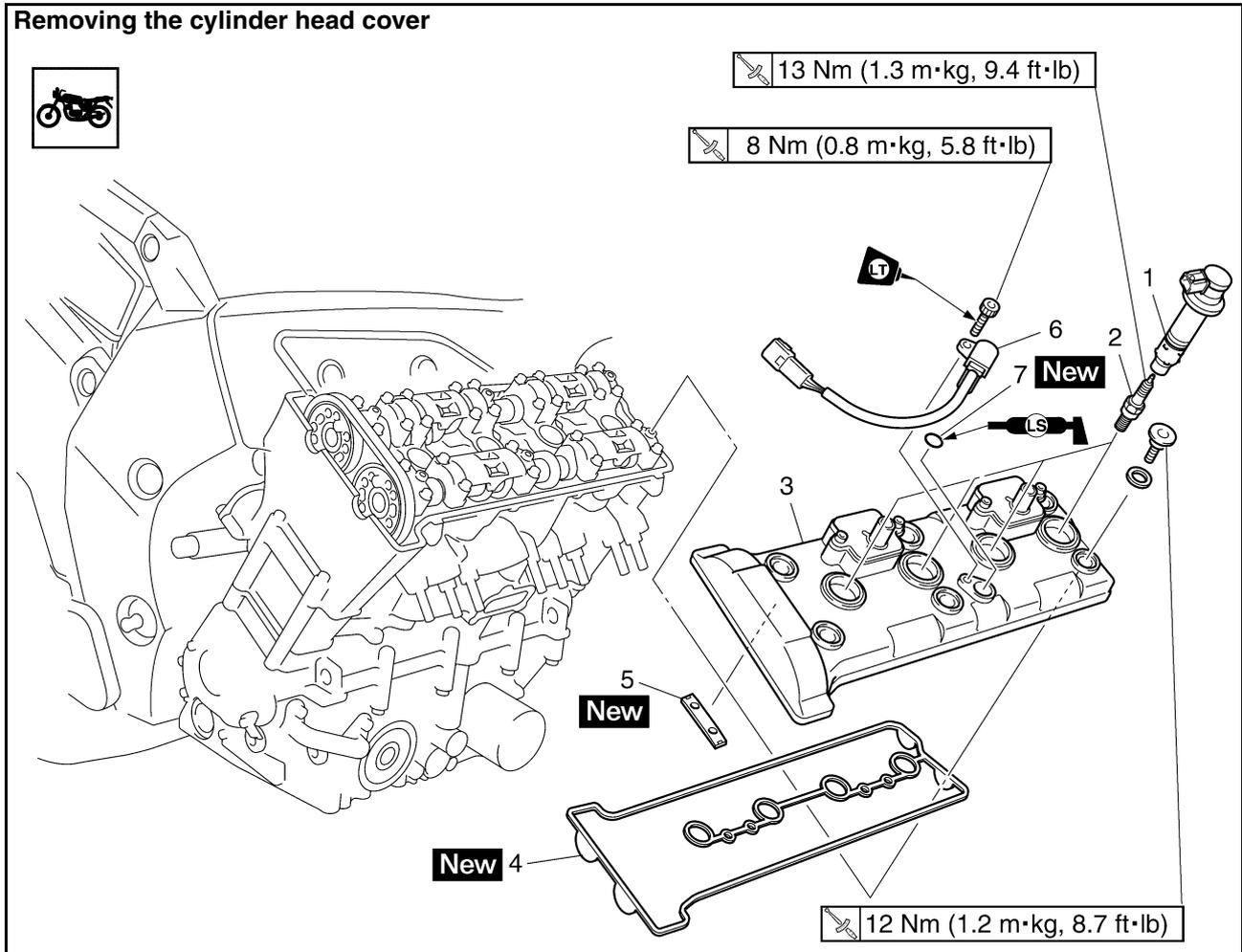
9. Tighten:

- Left front engine mounting bolt "1"
- Right front engine mounting bolt 1 "2"

EAS23760

## CAMSHAFTS

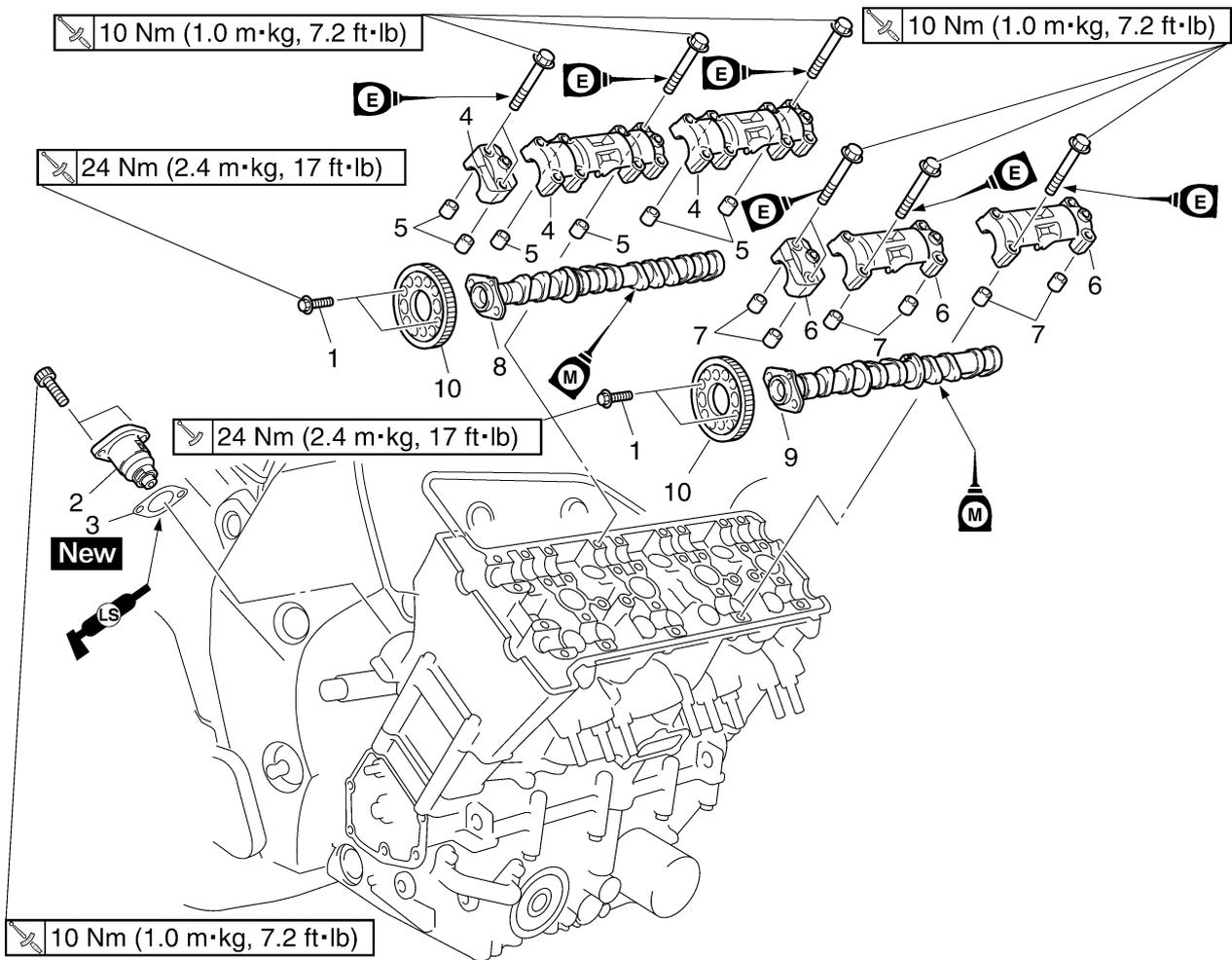
### Removing the cylinder head cover



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Throttle body assembly		Refer to "THROTTLE BODIES" on page 7-4.
	Radiator assembly		Refer to "RADIATOR" on page 6-1.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-13.
1	Ignition coil	4	
2	Spark plug	4	
3	Cylinder head cover	1	
4	Cylinder head cover gasket	1	
5	Timing chain guide (top side)	1	
6	Cylinder identification sensor	1	
7	O-ring	1	
			For assembly, reverse the removal procedure.

# CAMSHAFTS

## Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
	Pickup rotor cover		Refer to "CRANKSHAFT POSITION SENSOR" on page 5-38.
1	Camshaft sprocket bolt	4	Loosen.
2	Timing chain tensioner	1	
3	Timing chain tensioner gasket	1	
4	Intake camshaft cap	3	
5	Dowel pin	6	Refer to "REMOVING THE CAMSHAFTS" on page 5-12.
6	Exhaust camshaft cap	3	
7	Dowel pin	6	Refer to "REMOVING THE CAMSHAFTS" on page 5-12.
8	Intake camshaft	1	
9	Exhaust camshaft	1	
10	Camshaft sprocket	2	
			For assembly, reverse the removal procedure.

# CAMSHAFTS

EAS23810

## REMOVING THE CAMSHAFTS

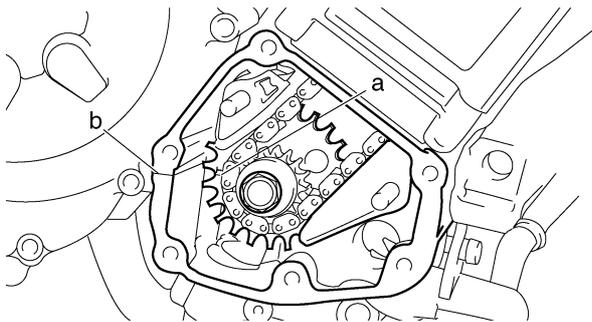
1. Remove:
  - Pickup rotor cover  
Refer to "CRANKSHAFT POSITION SENSOR" on page 5-38.
2. Align:
  - "T" mark "a" on the pickup rotor (with the crankcase mating surface "b")



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

### NOTE:

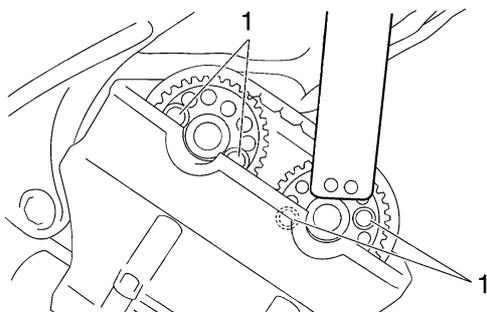
TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.



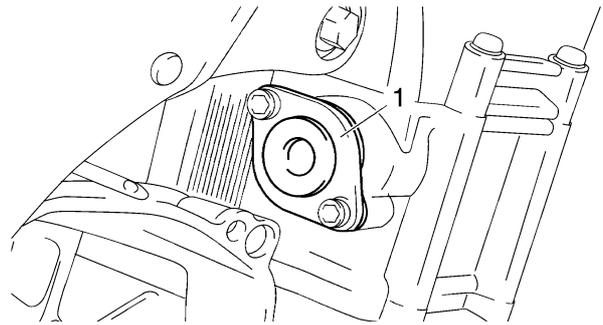
3. Loosen:
  - Camshaft sprocket bolts "1"



**Camshaft wrench**  
90890-04143



4. Remove:
  - Timing chain tensioner "1"
  - Gasket

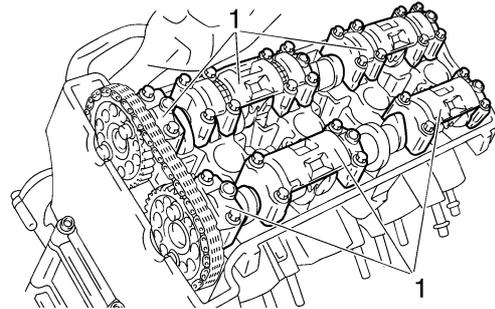


5. Remove:
  - Camshaft caps "1"
  - Dowel pins

ECA13720

### CAUTION:

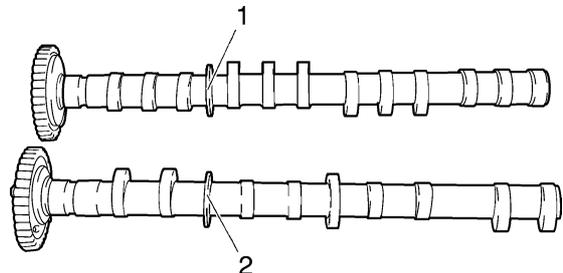
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.



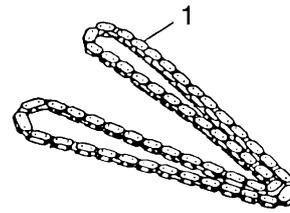
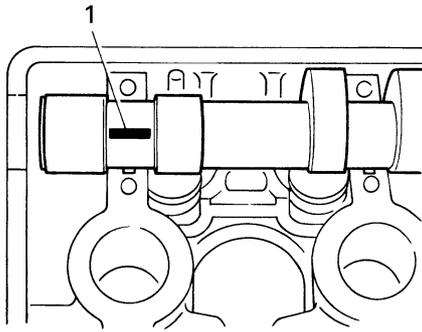
6. Remove:
  - Intake camshaft "1"
  - Exhaust camshaft "2"

### NOTE:

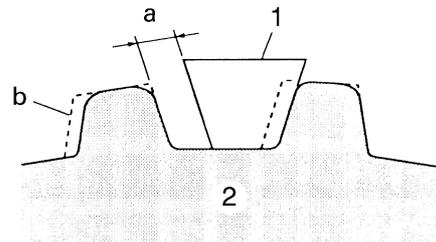
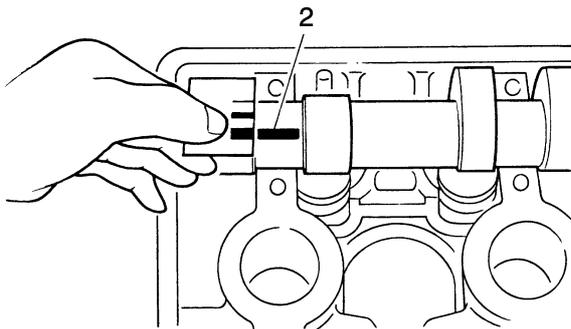
To prevent the timing chain from falling into the crankcase, fasten it with a wire "3".







2. Check:
  - Camshaft sprocket  
More than 1/4 tooth wear "a" → Replace the camshaft sprockets and the timing chain as a set.

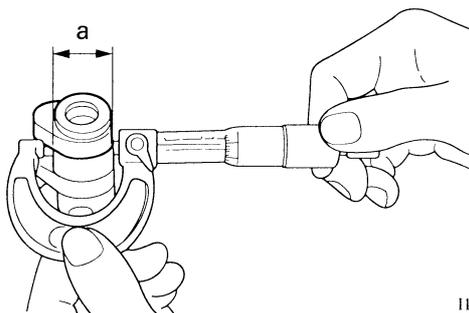


- a. 1/4 tooth
  - b. Correct
1. Timing chain roller
  2. Camshaft sprocket



5. Measure:
  - Camshaft journal diameter "a"  
Out of specification → Replace the camshaft.  
Within specification → Replace the cylinder head and the camshaft caps as a set.

	<p><b>Camshaft journal diameter</b> 22.459–22.472 mm (0.8842–0.8847 in)</p>
---	---



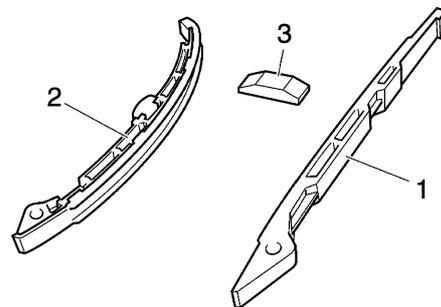
11151003

EAS23870  
**CHECKING THE TIMING CHAIN AND CAM-SHAFT SPROCKET**

1. Check:
  - Timing chain "1"  
Damage/stiffness → Replace the timing chain and camshaft and camshaft sprocket as a set.

EAS23950  
**CHECKING THE TIMING CHAIN GUIDES**  
The following procedure applies to all of the camshaft sprockets and timing chain guides.

1. Check:
  - Timing chain guide (exhaust side) "1"
  - Timing chain guide (intake side) "2"
  - Timing chain guide (top side) "3"
 Damage/wear → Replace the defective part(s).



EAS23960  
**CHECKING THE TIMING CHAIN TENSIONER**

1. Remove:
  - Timing chain tensioner housing "1"
  - Timing chain tensioner rod "2"
  - Timing chain tensioner spring "3"



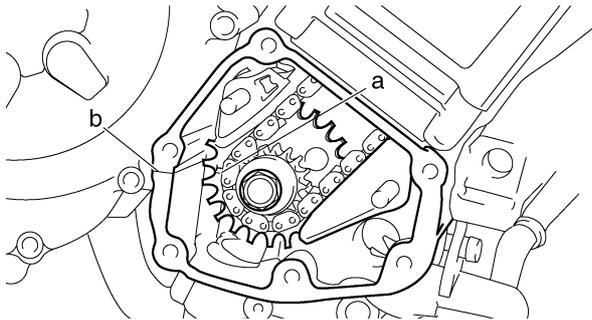
EAS24000

## INSTALLING THE CAMSHAFTS

1. Align:
  - “T” mark “a” on the pickup rotor (with the crankcase mating surface “b”)

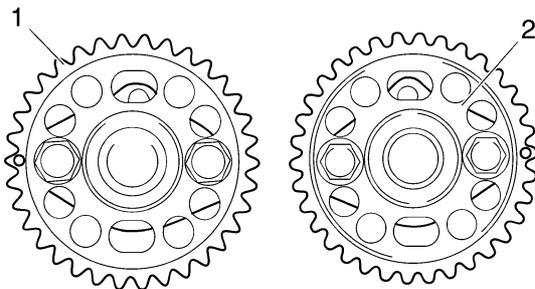


- a. Turn the crankshaft clockwise.
- b. When position #1 is at TDC, align the “T” mark “a” with the crankcase mating surface “b”.



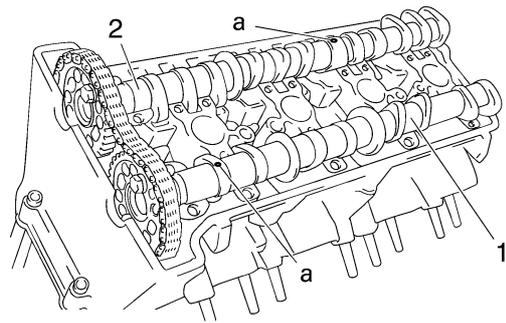
2. Install:
  - Intake camshaft sprocket “1”
  - Exhaust camshaft sprocket “2” (with the camshaft sprockets temporarily tightened)

**NOTE:**  
Install the camshaft sprockets as a illustration.



3. Install:
  - Exhaust camshaft “1”
  - Intake camshafts “2” (with the camshaft sprockets temporarily tightened)

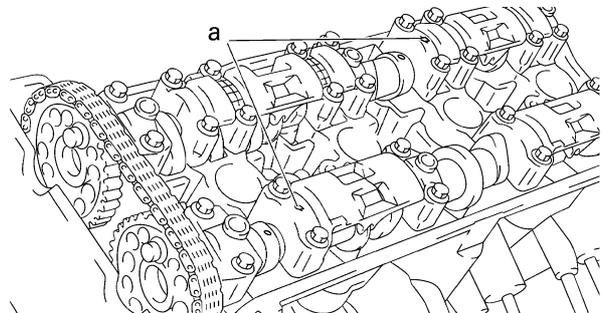
**NOTE:**  
Make sure the punch mark “a” on each camshaft faces up.



4. Install:
  - Dowel pins
  - Intake camshaft caps
  - Exhaust camshaft caps

**NOTE:**

- Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:
  - “I”: Intake side camshaft cap mark
  - “E”: Exhaust side camshaft cap mark
  - “L”: Left side camshaft cap mark
  - “R”: Right side camshaft cap mark
- Make sure the arrow mark “a” on each camshaft points towards the right side of the engine.



5. Install:
  - Camshaft cap bolts



**NOTE:**  
Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

EC2D1001

**CAUTION:**

- Lubricate the camshaft cap bolts with the engine oil.

# CAMSHAFTS

- The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.
- Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

## 6. Tighten:

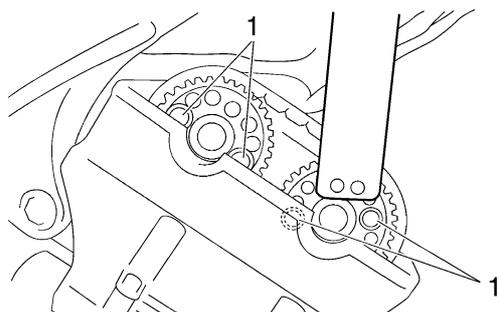
- Camshaft sprocket bolts "1"



EC2D1002

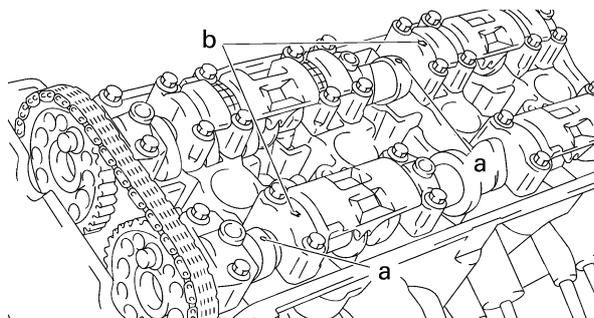
### CAUTION:

Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.



## 7. Align:

- Camshaft punch mark "a"  
Align the camshaft punch mark "a" and the camshaft cap arrow mark "b".



## 8. Install:

- Gasket **New**

- Timing chain tensioner "1"
- Timing chain tensioner bolts "2"



**Timing chain tensioner bolt**  
10 Nm (1.0 m·kg, 7.2 ft·lb)

EC2D1003

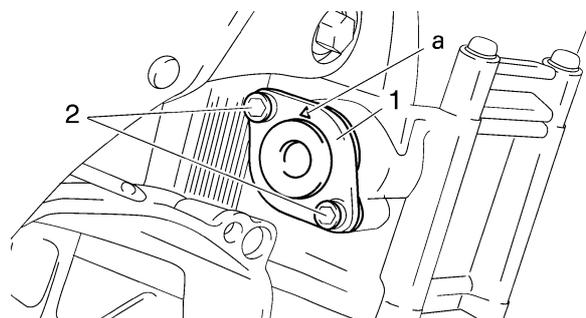
### CAUTION:

The arrow mark "a" on the timing chain tensioner should face up.

EW2D1006

### WARNING

Always use a new gasket.

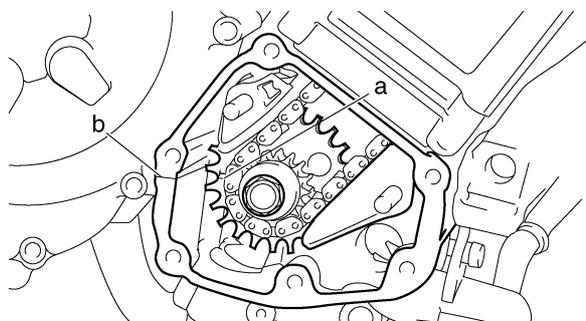


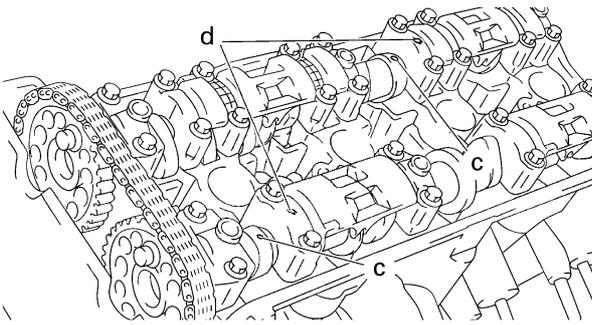
## 9. Turn:

- Crankshaft  
(several turns clockwise)

## 10. Check:

- "T" mark "a"  
Make sure the "T" mark on the pickup rotor is aligned with the crankcase mating surface "b".
- Camshaft punch mark "c"  
Make sure the punch mark "c" on the camshaft is aligned with the camshaft cap arrow mark "d".  
Out of alignment → Adjust.  
Refer to the installation steps above.





11. Measure:

- Valve clearance  
Out of specification → Adjust.  
Refer to "ADJUSTING THE VALVE  
CLEARANCE" on page 3-4.

12. Install:

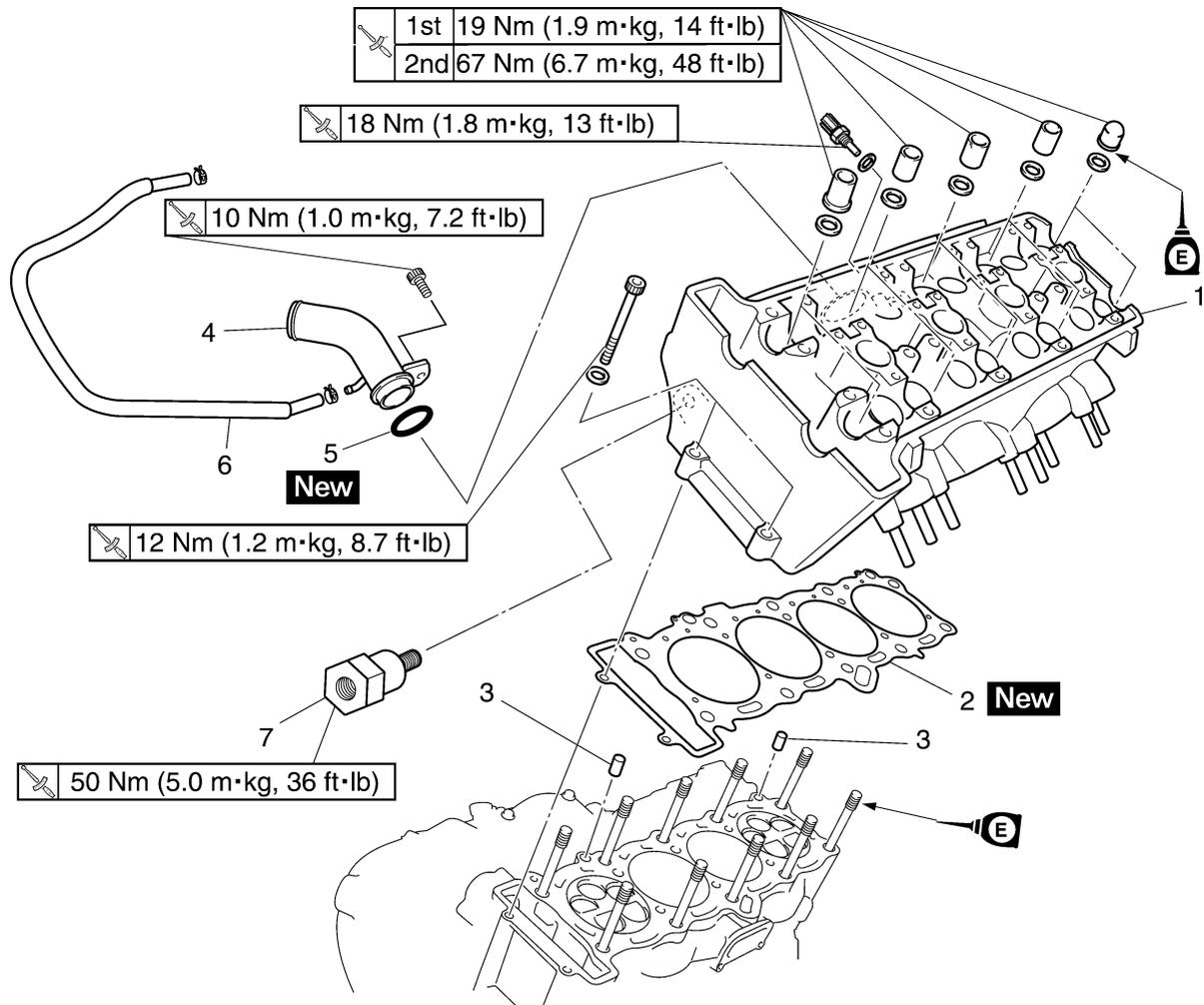
- Pickup coil rotor cover  
"CRANKSHAFT POSITION SENSOR" on  
page 5-38.

# CYLINDER HEAD

EAS24100

## CYLINDER HEAD

### Removing the cylinder head



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-2.
	Intake camshaft		Refer to "CAMSHAFTS" on page 5-10.
	Exhaust camshaft		Refer to "CAMSHAFTS" on page 5-10.
1	Cylinder head	1	
2	Cylinder head gasket	1	
3	Dowel pin	2	
4	Coolant pipe	1	
5	O-ring	1	
6	Thermo wax outlet hose	1	
7	Right front engine mounting bolt 2	1	
			For assembly, reverse the removal procedure.

# CYLINDER HEAD

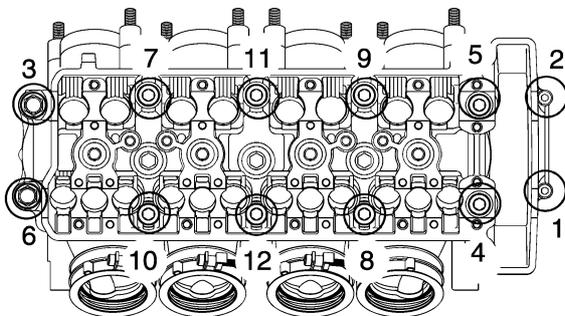
EAS24120

## REMOVING THE CYLINDER HEAD

- Remove:
  - Intake camshaft
  - Exhaust camshaft
 Refer to "REMOVING THE CAMSHAFTS" on page 5-12.
- Remove:
  - Cylinder head nuts
  - Cylinder head bolts

### NOTE:

- Loosen the nuts in the proper sequence as shown.
- Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.



EAS24160

## CHECKING THE CYLINDER HEAD

- Eliminate:
  - Combustion chamber carbon deposits (with a rounded scraper)

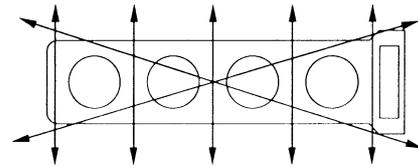
### NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

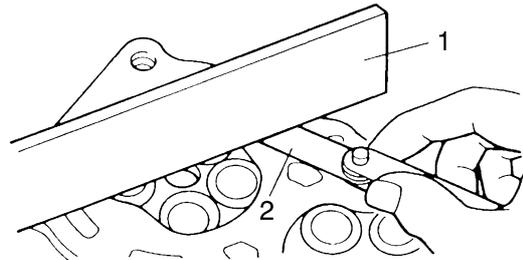
- Spark plug bore threads
- Valve seats

- Check:
  - Cylinder head  
Damage/scratches → Replace.
  - Cylinder head water jacket  
Mineral deposits/rust → Eliminate.
- Measure:
  - Cylinder head warpage  
Out of specification → Resurface the cylinder head.

	<p><b>Maximum cylinder head warpage</b>  <b>0.10 mm (0.0039 in)</b></p>
--	---



- Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



- Measure the warpage.
- If the limit is exceeded, resurface the cylinder head as follows.
- Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

### NOTE:

To ensure an even surface, rotate the cylinder head several times.

EAS24240

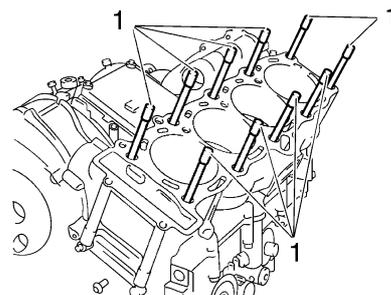
## INSTALLING THE CYLINDER HEAD

- Check:
  - Cylinder head bolts "1"

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

### NOTE:

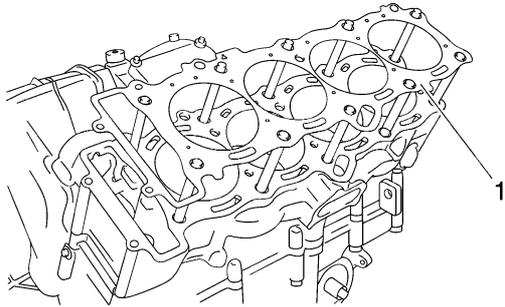
Retighten the cylinder head bolts to specification, before installing the cylinder head.



- Install:

# CYLINDER HEAD

- Gasket "1" **New**
- Dowel pins



- 5. Install:
  - Exhaust camshaft
  - Intake camshaftRefer to "INSTALLING THE CAMSHAFTS" on page 5-16.

- 3. Install:
  - Cylinder head

**NOTE:** \_\_\_\_\_  
Pass the timing chain through the timing chain cavity.

- 4. Tighten:
  - Cylinder head nuts "1" – "10"

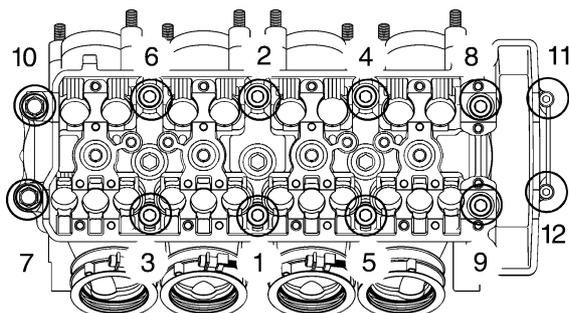
	<b>Cylinder head nut (1st)</b> <b>19 Nm (1.9 m·kg, 14 ft·lb)</b>
--	---

	<b>Cylinder head nut (2nd)</b> <b>67 Nm (6.7 m·kg, 48 ft·lb)</b>
---	---

- Cylinder head bolts "11" "12"

	<b>Cylinder head bolt</b> <b>12 Nm (1.2 m·kg, 8.7 ft·lb)</b>
---	---

- NOTE:** \_\_\_\_\_
- First, tighten the nuts "1" – "10" to approximately 19 Nm (1.9 m·kg, 14 ft·lb) with a torque wrench, and then tighten the 67 Nm (6.7 m·kg, 48 ft·lb).
  - Lubricate the cylinder head nuts with engine oil.
  - Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in two stages.

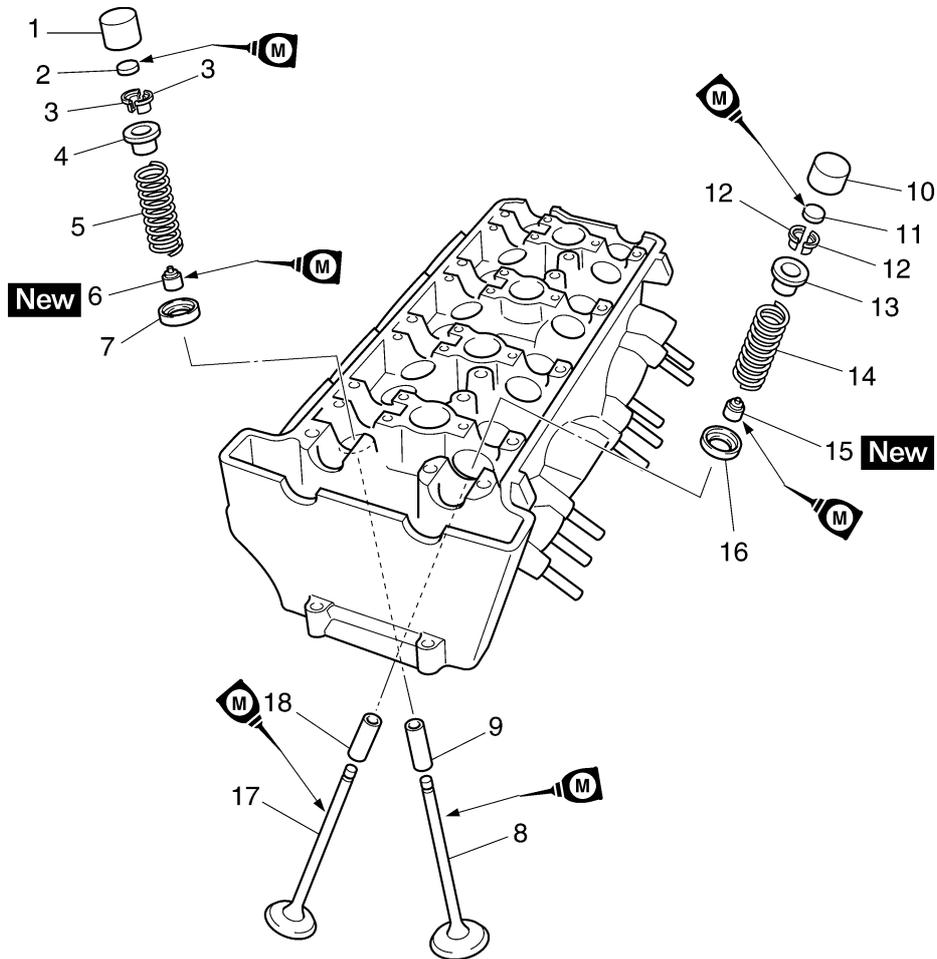


# VALVES AND VALVE SPRINGS

EAS24270

## VALVES AND VALVE SPRINGS

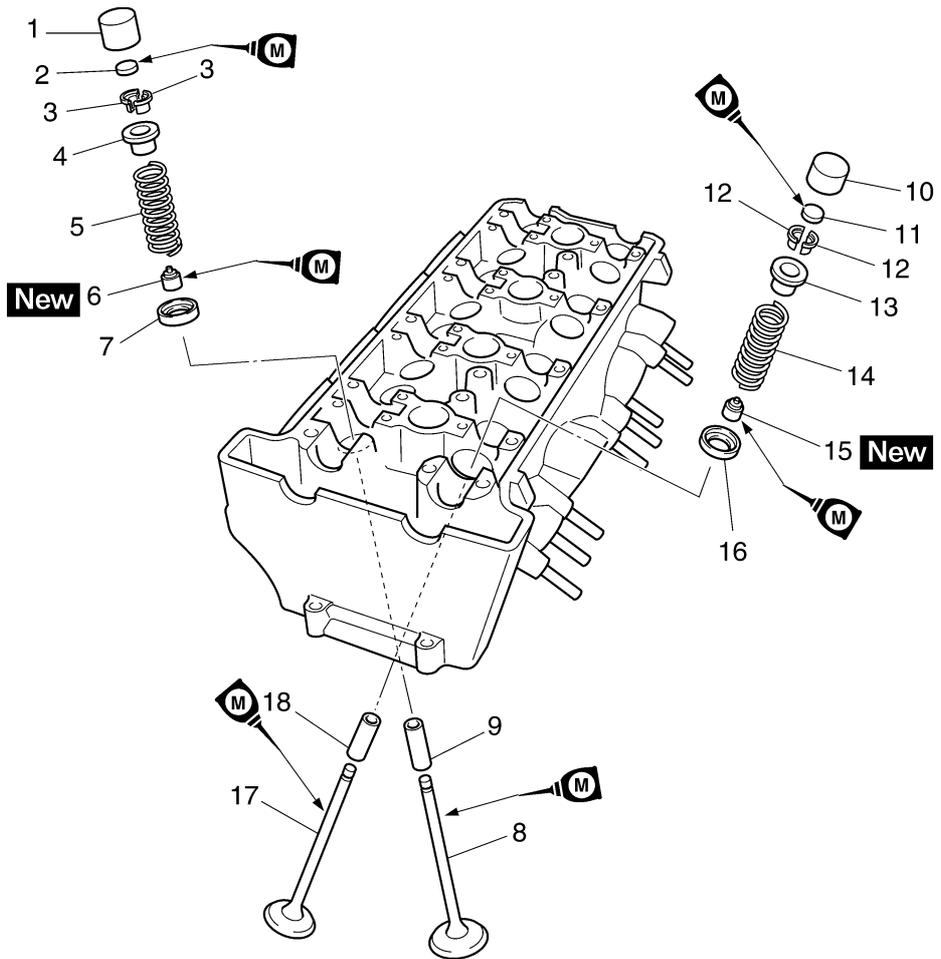
### Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-19.
1	Intake valve lifter	12	
2	Intake valve pad	12	
3	Intake valve cotter	24	
4	Intake valve upper spring seat	12	
5	Intake valve spring	12	
6	Intake valve stem seal	12	
7	Intake valve lower spring seat	12	
8	Intake valve	12	
9	Intake valve guide	12	
10	Exhaust valve lifter	8	
11	Exhaust valve pad	8	
12	Exhaust valve cotter	16	
13	Exhaust valve upper spring seat	8	
14	Exhaust valve spring	8	
15	Exhaust valve stem seal	8	

# VALVES AND VALVE SPRINGS

## Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
16	Exhaust valve lower spring seat	8	
17	Exhaust valve	8	
18	Exhaust valve guide	8	
			For installation, reverse the removal procedure.





# VALVES AND VALVE SPRINGS



**Intake**  
**Valve guide remover (ø4)**  
**90890-04111**  
**YM-04111**

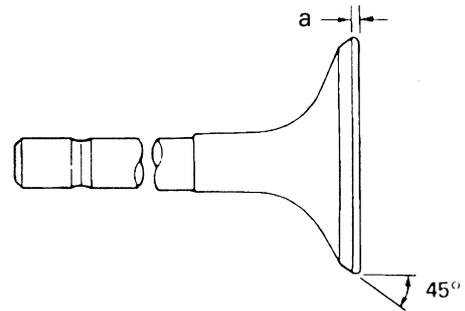
**Exhaust**  
**Valve guide remover (ø4.5)**  
**90890-04116**  
**YM-04116**

**Intake**  
**Valve guide installer (ø4)**  
**90890-04112**  
**YM-04112**

**Exhaust**  
**Valve guide installer (ø4.5)**  
**90890-04117**  
**YM-04117**

**Intake**  
**Valve guide reamer (ø4)**  
**90890-04113**  
**YM-04113**

**Exhaust**  
**Valve guide reamer (ø4.5)**  
**90890-04118**  
**YM-04118**



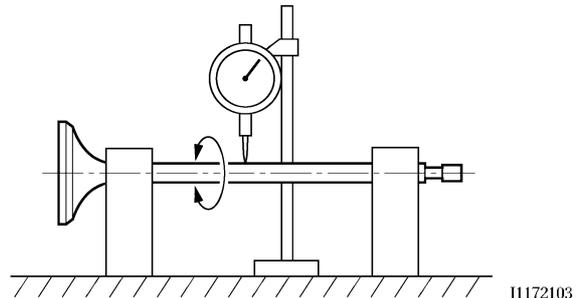
6. Measure:
- Valve stem runout  
 Out of specification → Replace the valve.

**NOTE:**

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the oil seal.



**Valve stem runout**  
**0.01 mm (0.0004 in)**



3. Eliminate:
- Carbon deposits  
 (from the valve face and valve seat)
4. Check:
- Valve face  
 Pitting/wear → Grind the valve face.
  - Valve stem end  
 Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
- Valve margin thickness “a”  
 Out of specification → Replace the valve.



**Valve margin thickness**  
**0.5–0.9 mm (0.0197–0.0354 in)**  
**Limit**  
**0.5 mm (0.02 in)**

EAS24300

## CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

1. Eliminate:
  - Carbon deposits  
 (from the valve face and valve seat)
2. Check:
  - Valve seat  
 Pitting/wear → Replace the cylinder head.
3. Measure:
  - Valve seat width “a”  
 Out of specification → Replace the cylinder head.

# VALVES AND VALVE SPRINGS



## Valve seat width

### Intake

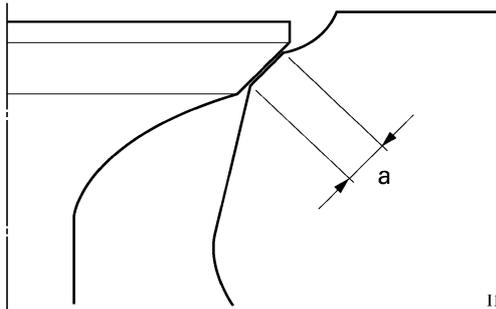
0.90–1.10 mm  
(0.0354–0.0433 in)

### Exhaust

0.90–1.10 mm  
(0.0354–0.0433 in)

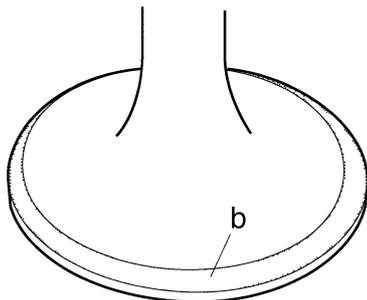
### Limit

1.6 mm (0.063 in)



11171603

- a. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



- b. Install the valve into the cylinder head.  
c. Press the valve through the valve guide and onto the valve seat to make a clear impression.  
d. Measure the valve seat width.

### NOTE:

Where the valve seat and valve face contacted one another, the blueing will have been removed.

## 4. Lap:

- Valve face
- Valve seat

### NOTE:

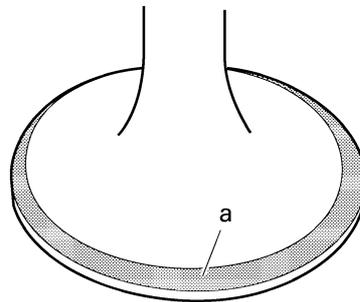
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

- a. Apply a coarse lapping compound "a" to the valve face.

ECA13790

### CAUTION:

Do not let the lapping compound enter the gap between the valve stem and the valve guide.

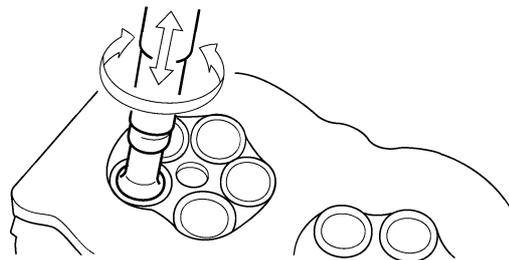


11171601

- b. Apply molybdenum disulfide oil onto the valve stem.  
c. Install the valve into the cylinder head.  
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

### NOTE:

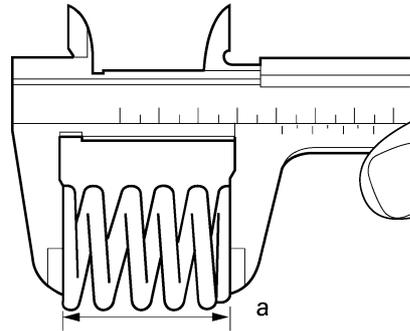
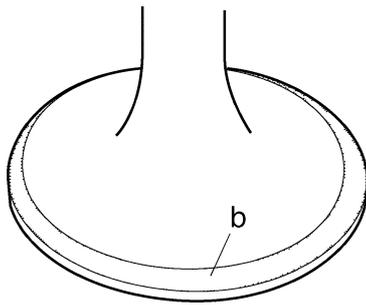
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



11171504

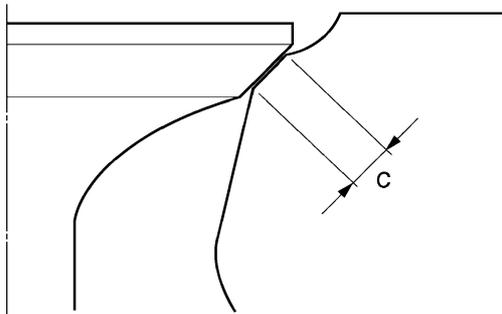
- e. Apply a fine lapping compound to the valve face and repeat the above steps.  
f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.  
g. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.

# VALVES AND VALVE SPRINGS



11171902

- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width "c" again. If the valve seat width is out of specification, reface and lap the valve seat.



2. Measure:
  - Compressed valve spring force "a"  
Out of specification → Replace the valve spring.

	<b>Compressed valve spring force (installed)</b>
	<b>Intake valve spring</b>
	127.4–144.6 N (12.99–14.74 kg, 28.64–32.51 lb)
	at 32.65 mm (1.285 in)
	<b>Exhaust valve spring</b>
	133.0–153.0 N (13.56–15.60 kg, 29.90–34.39 lb)
	at 32.82 mm (1.292 in)



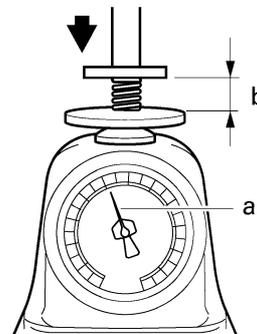
EAS24310

## CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:
  - Valve spring free length "a"  
Out of specification → Replace the valve spring.

	<b>Valve spring free length</b>
	<b>Intake valve spring</b>
	40.5 mm (1.60 in)
	<b>Limit</b>
	38.5 mm (1.47 in)
	<b>Exhaust valve spring</b>
	40.5 mm (1.60 in)
	<b>Limit</b>
	38.5 mm (1.47 in)

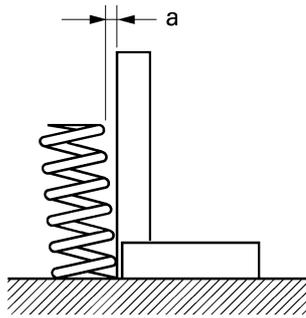


11171904

- b. Installed length
3. Measure:
  - Valve spring tilt "a"  
Out of specification → Replace the valve spring.

	<b>Spring tilt limit</b>
	<b>Intake valve spring</b>
	1.8 mm (0.07 in)
	<b>Exhaust valve spring</b>
	1.8 mm (0.07 in)

# VALVES AND VALVE SPRINGS



I1171903

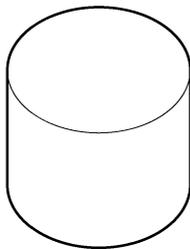
EAS24320

## CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

1. Check:
  - Valve lifter

Damage/scratches → Replace the valve lifters and cylinder head.



I1170701

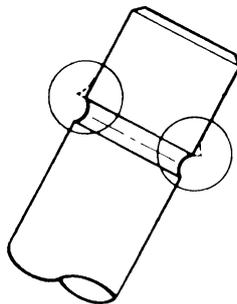
EAS24330

## INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

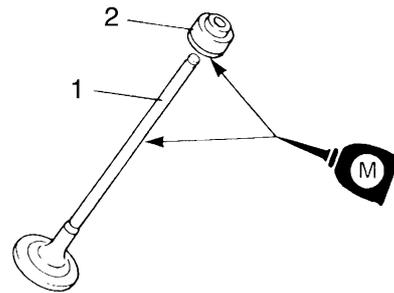
1. Deburr:
  - Valve stem end

(with an oil stone)



2. Lubricate:
  - Valve stem "1"
  - Valve stem seal "2"

(with the recommended lubricant)

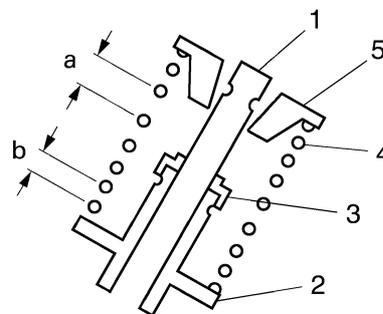


3. Install:
  - Valve "1"
  - Lower spring seat "2"
  - Valve stem seal "3"
  - Valve spring "4"
  - Upper spring seat "5"

(into the cylinder head)

### NOTE:

- Make sure each valve is installed in its original place. Refer to the following embossed marks.  
Right and left intake valve (-s): "5VY."  
Middle intake valve (-s): "5VY."  
Exhaust valve (-s): "5VY".
- Install the valve springs with the larger pitch "a" facing up.



I1172001

4. Install:
  - Valve cotters "1"

### NOTE:

Install the valve cotters by compressing the valve springs with the valve spring compressor "2" and the valve spring compressor attachment "3".

## VALVES AND VALVE SPRINGS



### Valve spring compressor

90890-04019

YM-04019

### Intake

#### Valve spring compressor

attachment

90890-04114

YM-04114

### Exhaust

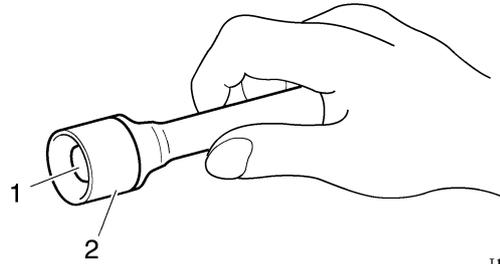
#### Valve spring compressor

attachment

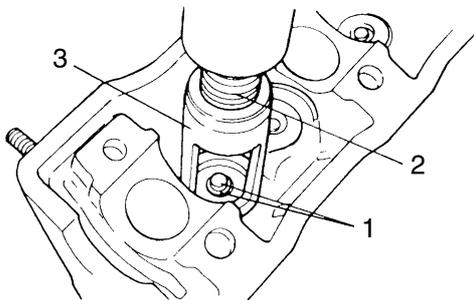
90890-04108

YM-04108

- Each valve lifter and valve pad must be reinstalled in its original position.



11171102

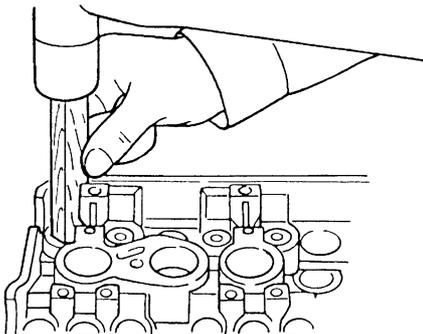


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

### CAUTION:

Hitting the valve tip with excessive force could damage the valve.



6. Install:
  - Valve pad "1"
  - Valve lifter "2"

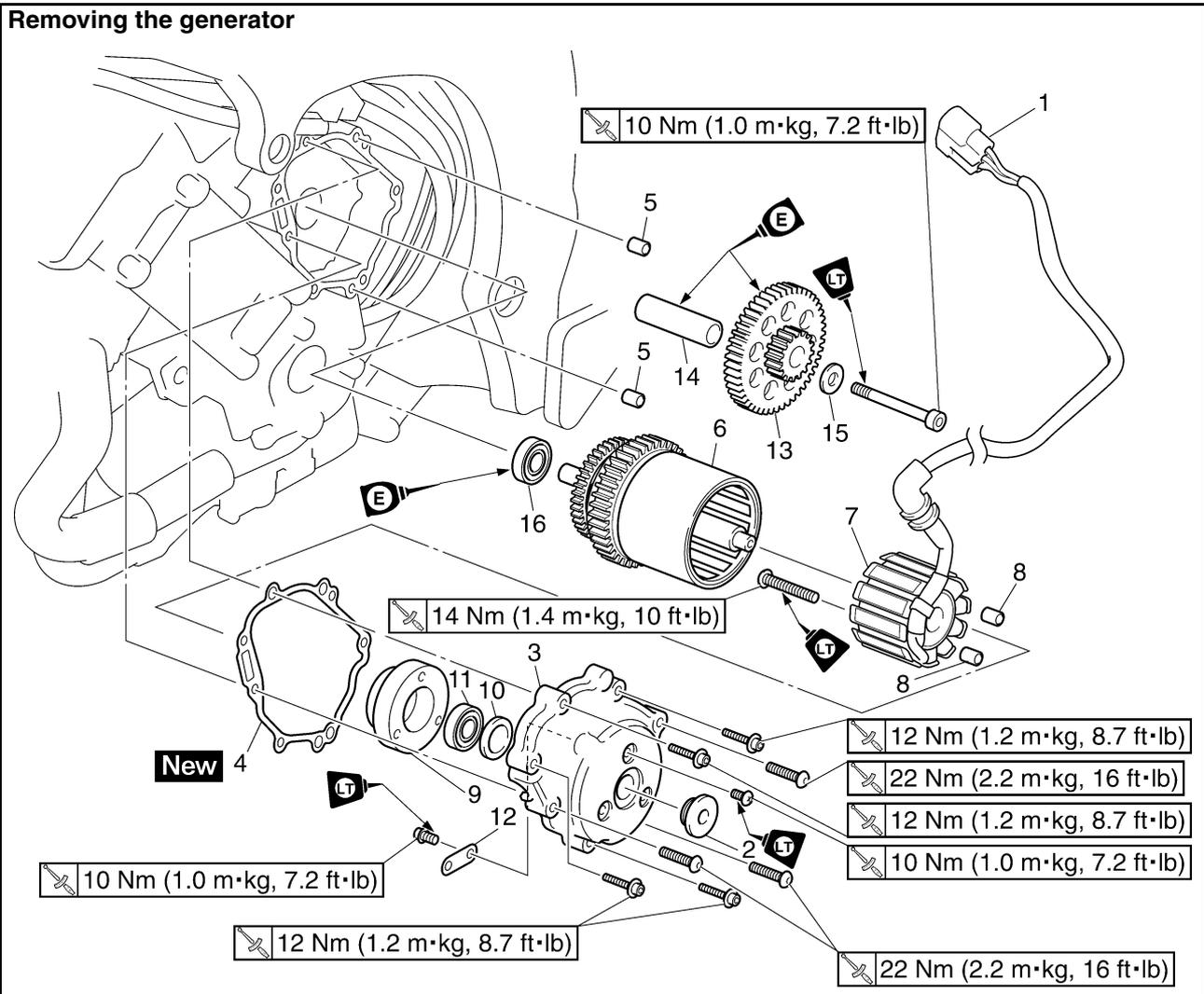
### NOTE:

- Lubricate the valve lifter and valve pad with molybdenum disulfide oil.
- The valve lifter must move smoothly when rotated with a finger.

EAS24480

## GENERATOR

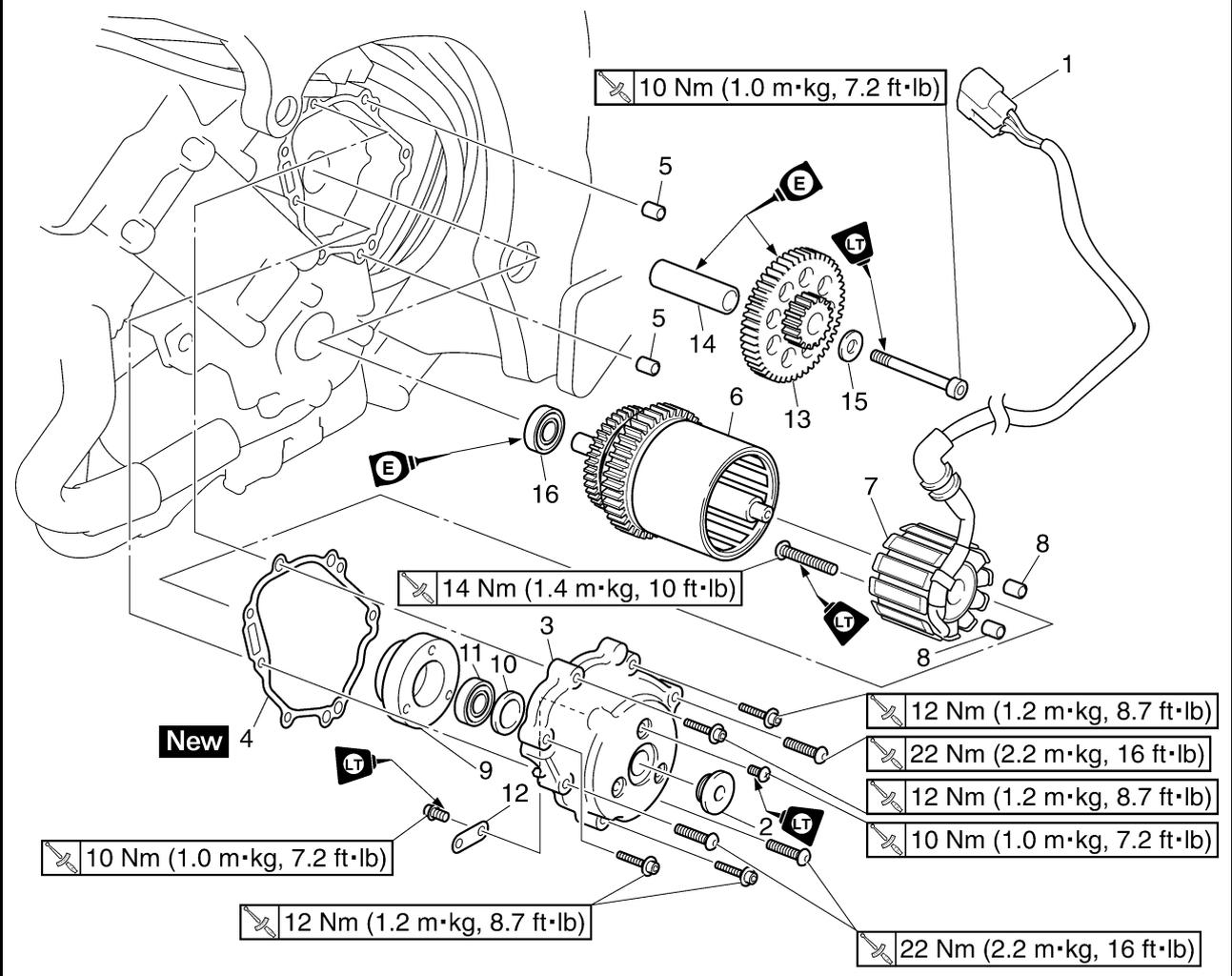
### Removing the generator



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
1	Stator coil assembly lead coupler	1	Disconnect.
2	Plug	1	
3	Generator rotor cover	1	
4	Gasket	1	
5	Dowel pin	2	
6	Generator rotor assembly	1	
7	Stator coil assembly	1	
8	Dowel pin	2	
9	Bearing housing	1	
10	Collar	1	

# GENERATOR

## Removing the generator



Order	Job/Parts to remove	Q'ty	Remarks
11	Bearing	1	
12	Stator coil assembly lead holder	1	
13	Idler gear	1	
14	Idler gear shaft	1	
15	Washer	1	
16	Bearing	1	
			For assembly, reverse the removal procedure.

# GENERATOR

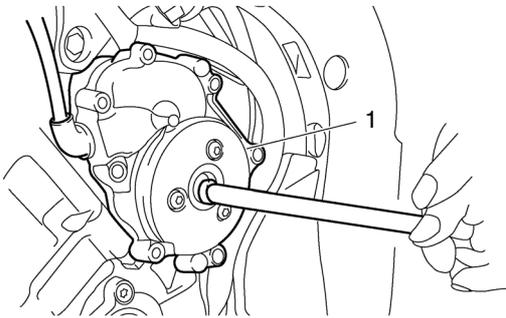
EAS24490

## REMOVING THE GENERATOR

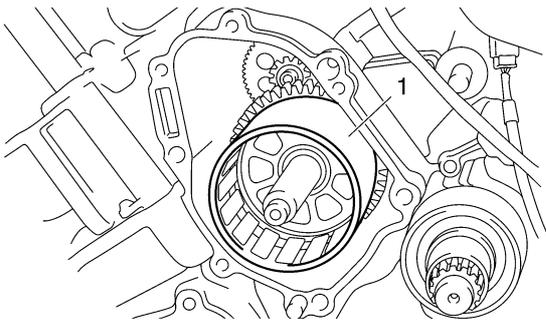
1. Remove:
  - Plug
  - Generator rotor cover "1"

### NOTE:

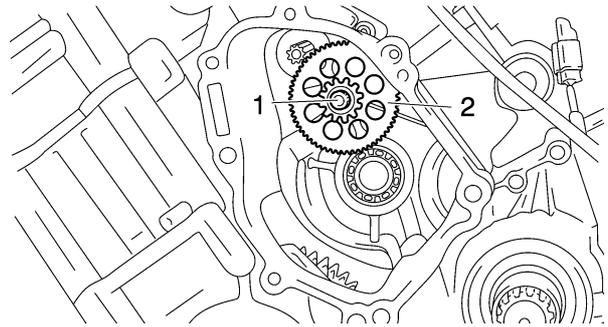
- While pushing generator rotor, remove the generator rotor cover.
- Loosen each bolt 1/4 of a turn a time, in stages and in a crisscross pattern.
- After all of the bolts are fully loosened, remove them.



2. Remove:
  - Generator rotor and starter clutch assembly "1"



3. Remove:
  - Idle gear shaft bolt "1"
  - Idle shaft
  - Idle gear "2"



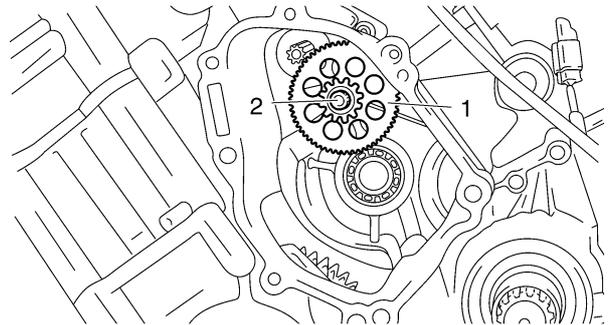
EAS24500

## INSTALLING THE GENERATOR

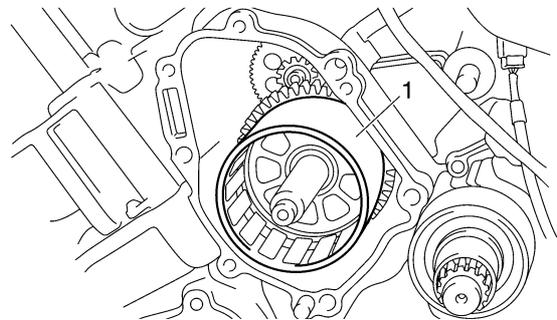
1. Install:
  - Idle gear shaft
  - Idle gear "1"
  - Washer
  - Idle gear shaft bolt "2"



**Idle gear shaft bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**



2. Install:
  - Generator rotor and starter clutch assembly "1"



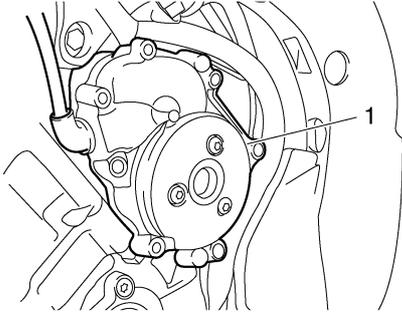
3. Install:
  - Generator rotor cover gasket **New**
  - Generator rotor cover "1"

# GENERATOR

---



**Generator rotor cover bolt (M6)**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**  
**Generator rotor cover bolt (M8)**  
**22 Nm (2.2 m·kg, 16 ft·lb)**



**NOTE:**

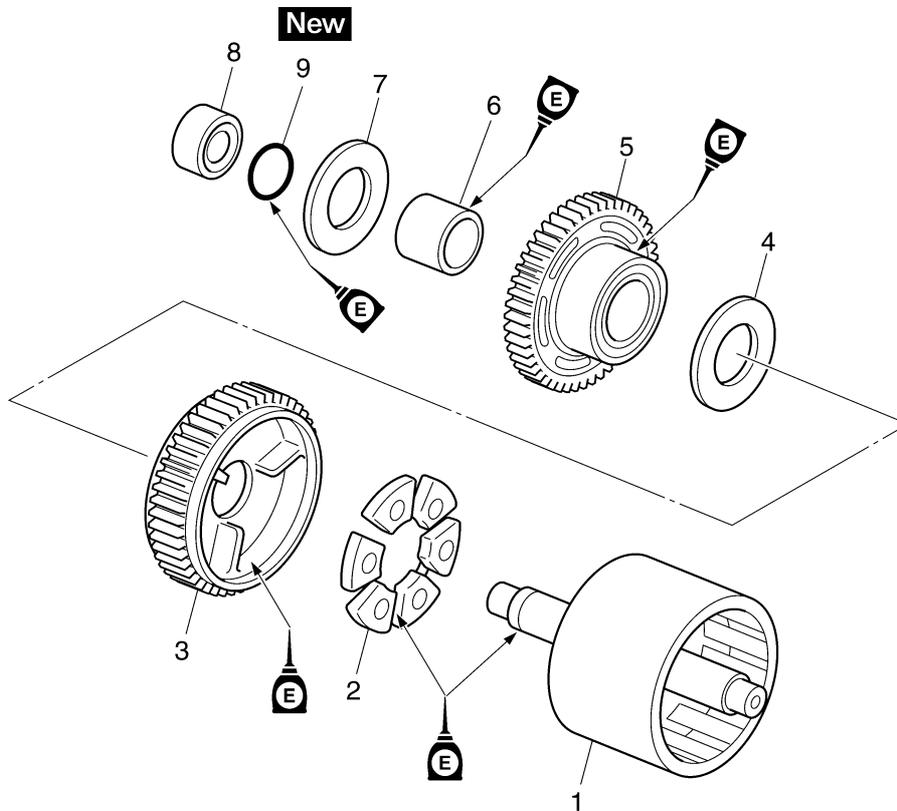
- First tighten the M8 bolts and then tighten the M6 bolts.
  - Tighten the generator rotor cover bolts in stages and in a crisscross pattern.
-

# STARTER CLUTCH

EAS24550

## STARTER CLUTCH

Removing the starter clutch



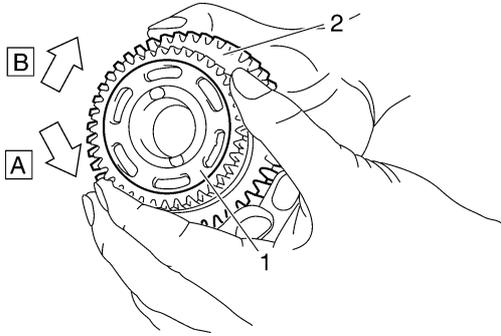
Order	Job/Parts to remove	Q'ty	Remarks
1	Generator rotor	1	
2	Damper	3	
3	Driven gear	1	
4	Washer	1	
5	Starter clutch drive gear	1	
6	Collar	1	
7	Washer	1	
8	Spacer	1	
9	O-ring	1	
			For assembly, reverse the removal procedure.



# STARTER CLUTCH

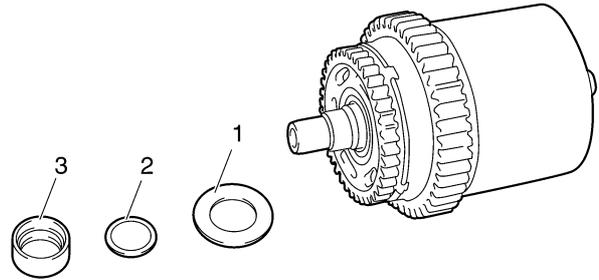
otherwise the starter clutch is faulty and must be replaced.

- c. When turning the starter clutch drive gear clockwise "B", it should turn freely, otherwise the starter clutch is faulty and must be replaced.



3. Install:
- Washer "1"
  - O-ring "2" **New**
  - Spacer "3"

**NOTE:** \_\_\_\_\_  
Lubricate the engine oil to O-ring.

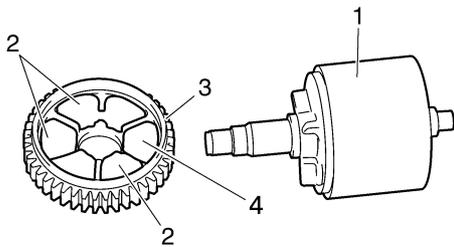


EAS24600

## INSTALLING THE STARTER CLUTCH

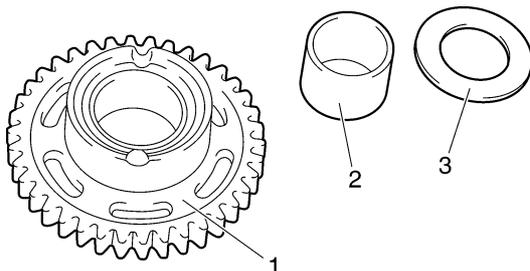
1. Install:
- Generator rotor "1"
  - Damper "2"
  - Driven gear "3"

**NOTE:** \_\_\_\_\_  
• The hole side of the damper is installed to the generator side.  
• Lubricate the engine oil "4".



2. Install
- Starter clutch drive gear "1"
  - Collar "2"
  - Washer "3"

Refer to "CHECKING THE STARTER CLUTCH" on page 5-36.

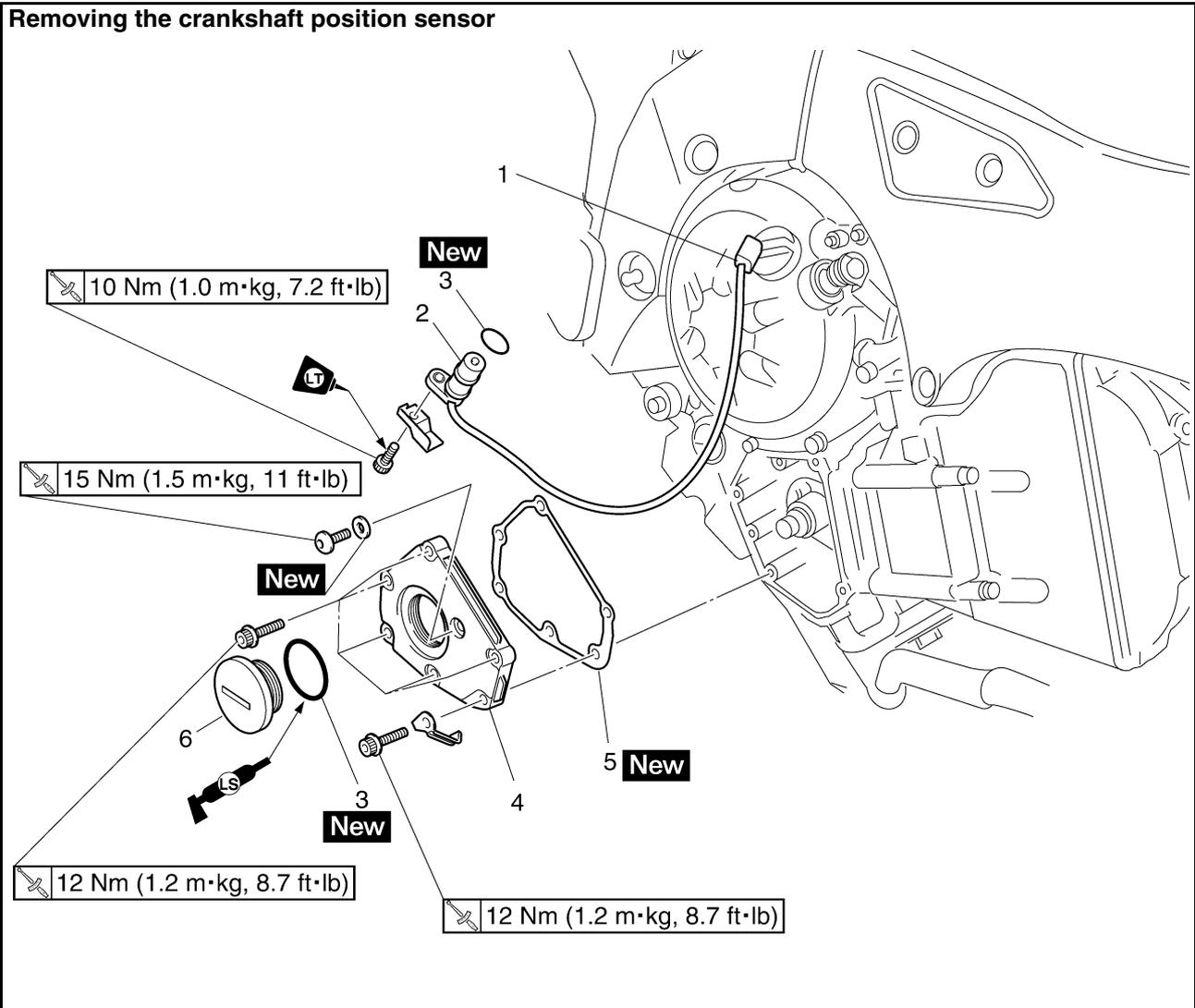


# CRANKSHAFT POSITION SENSOR

EAS24520

## CRANKSHAFT POSITION SENSOR

### Removing the crankshaft position sensor



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
1	Crankshaft position sensor lead coupler	1	Disconnect.
2	Crankshaft position sensor	1	
3	O-ring	1	
4	Pickup rotor cover	1	
5	Gasket	1	
6	Cover	1	
			For assembly, reverse the removal procedure.

# CRANKSHAFT POSITION SENSOR

EAS24530

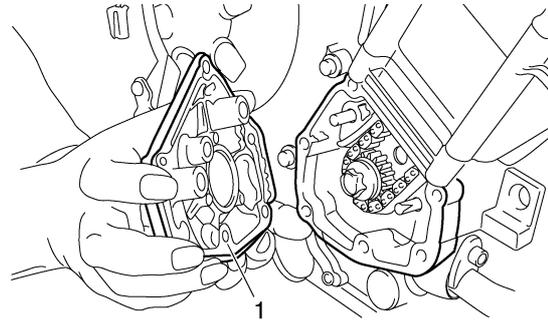
## REMOVING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:
  - Crankshaft position sensor lead coupler
2. Remove:
  - Crankshaft position sensor
  - O-ring
  - Pickup coil rotor cover "1"

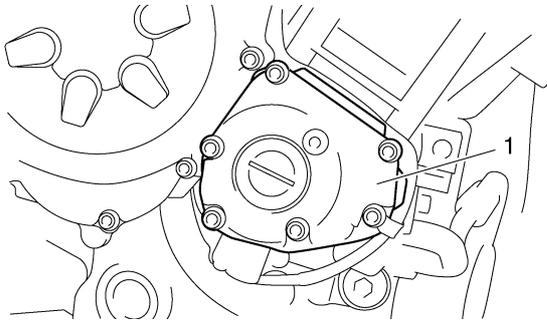
### NOTE:

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.

After all of the bolts are fully loosened, remove them.



2. Connect
  - Crankshaft position sensor lead coupler



EAS24540

## INSTALLING THE CRANKSHAFT POSITION SENSOR

1. Install:
  - Gasket **New**
  - Pickup rotor cover "1"

	<b>Pickup rotor cover</b> 12 Nm (1.2 m·kg, 8.7 ft·lb)
---	--

- O-ring **New**
- Crankshaft position sensor

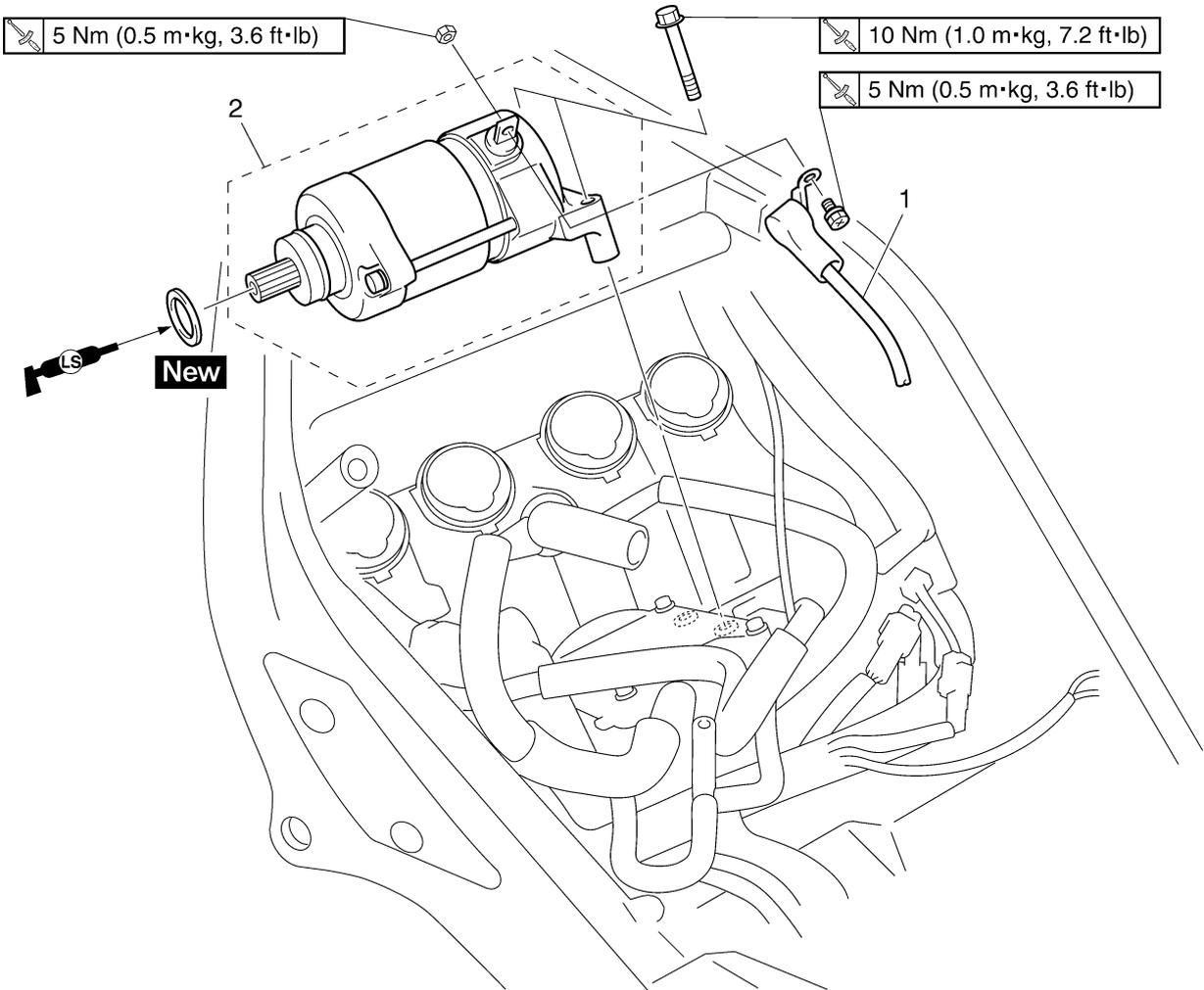
	<b>Crankshaft position sensor bolt</b> 10 Nm (1.0 m·kg, 7.2 ft·lb) LOCTITE®
---	---

# ELECTRIC STARTER

EAS24780

## ELECTRIC STARTER

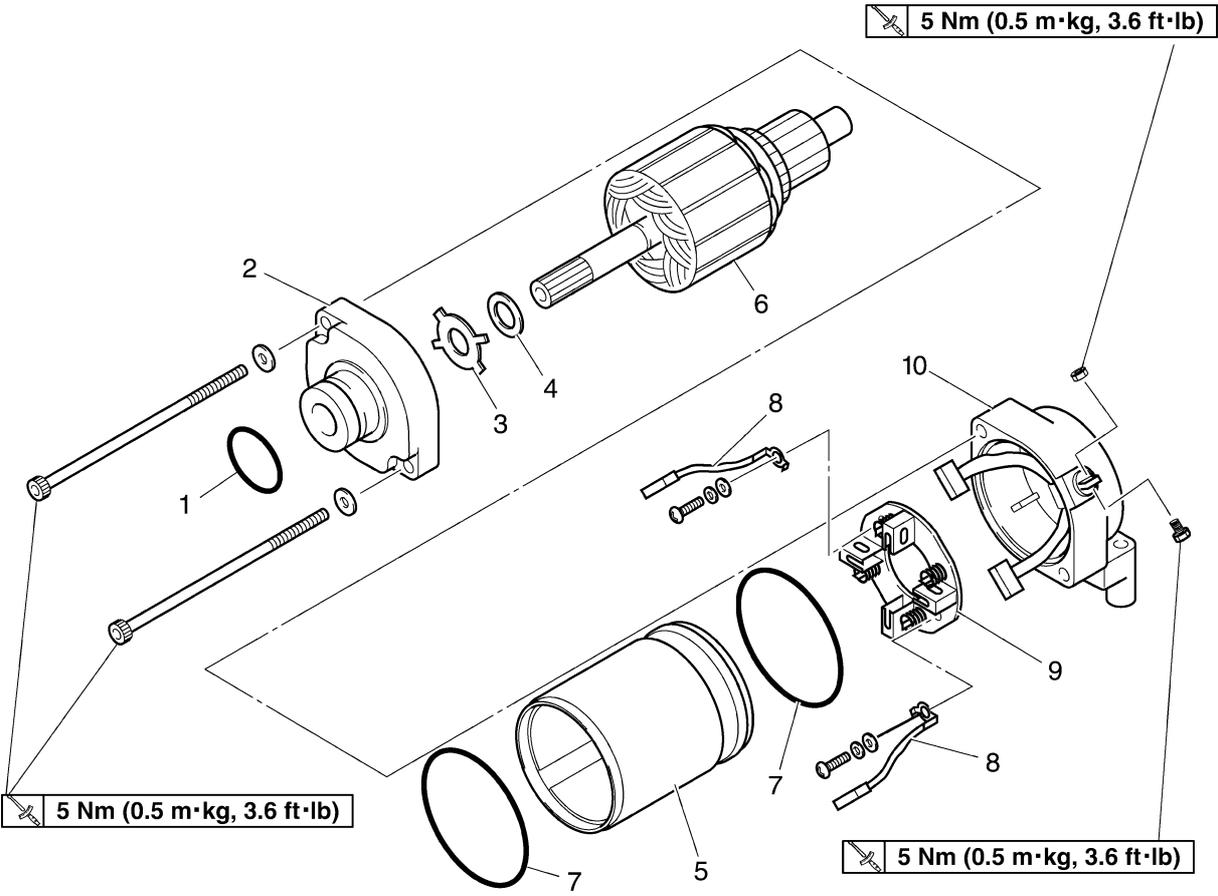
### Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Throttle body assembly		Refer to "THROTTLE BODIES" on page 7-4.
1	Starter motor lead	1	
2	Starter motor	1	
			For assembly, reverse the removal procedure.

# ELECTRIC STARTER

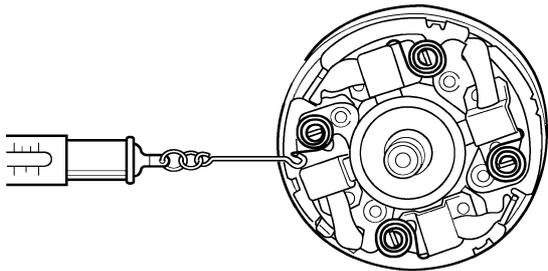
## Disassembling the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Front cover	1	
3	Lock washer	1	
4	Washer	1	
5	Starter motor yoke	1	
6	Armature assembly	1	
7	O-ring	2	
8	Starter motor lead	2	
9	Brush holder	1	
10	Rear cover	1	
			For assembly, reverse the disassembly procedure.



# ELECTRIC STARTER



18210602

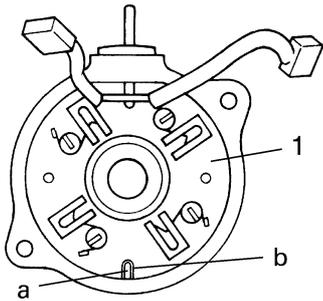
7. Check:
- Gear teeth  
Damage/wear → Replace the gear.

EAS24800

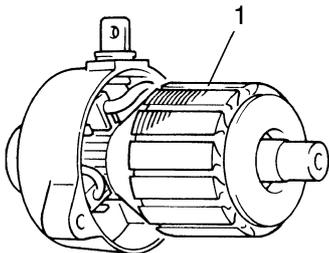
### ASSEMBLING THE STARTER MOTOR

1. Install:
- Brush seat "1"

**NOTE:**  
Align the tab "a" on the brush seat with the tab "b" in the starter motor rear cover.



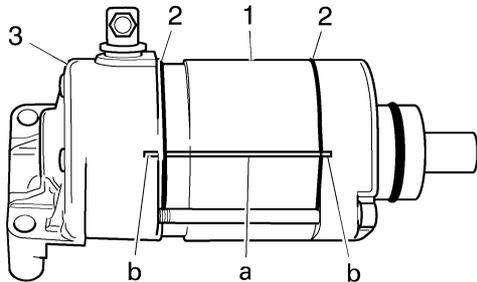
2. Install:
- Armature "1"



3. Install:
- Starter motor yoke "1"
  - O-rings "2" **New**
  - Starter motor rear cover "3"
  - Starter motor assembling bolts

	<b>Starter motor assembling bolt</b> 5 Nm (0.5 m·kg, 3.6 ft·lb)
---	--

**NOTE:**  
Align the match marks "a" on the starter motor yoke with the match marks "b" on the front and starter motor rear covers.



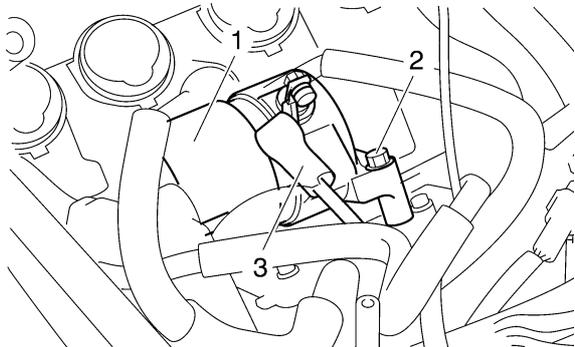
EAS24810

### INSTALLING THE STARTER MOTOR

1. Install:
- Starter motor "1"
  - Starter motor bolts "2"

	<b>Starter motor bolt</b> 10 Nm (1.0 m·kg, 7.2 ft·lb)
--	--

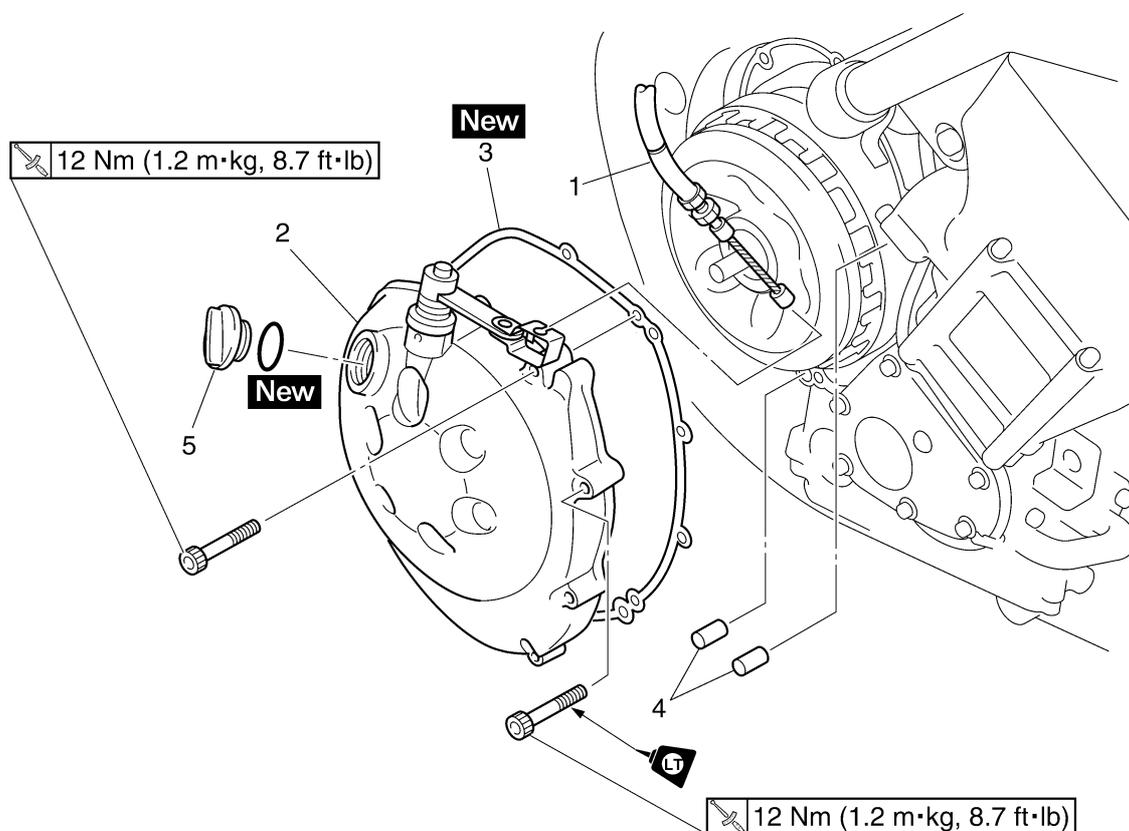
2. Connect:
- Starter motor lead "3"



EAS25060

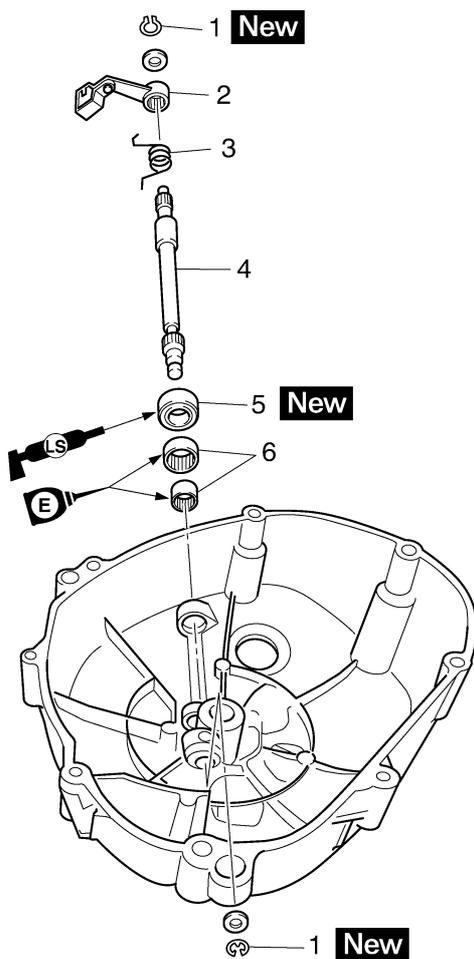
## CLUTCH

### Removing the clutch cover



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
1	Clutch cable	1	
2	Clutch cover	1	
3	Clutch cover gasket	1	
4	Dowel pin	2	
5	Oil filler cap	1	
			For installation, reverse the removal procedure.

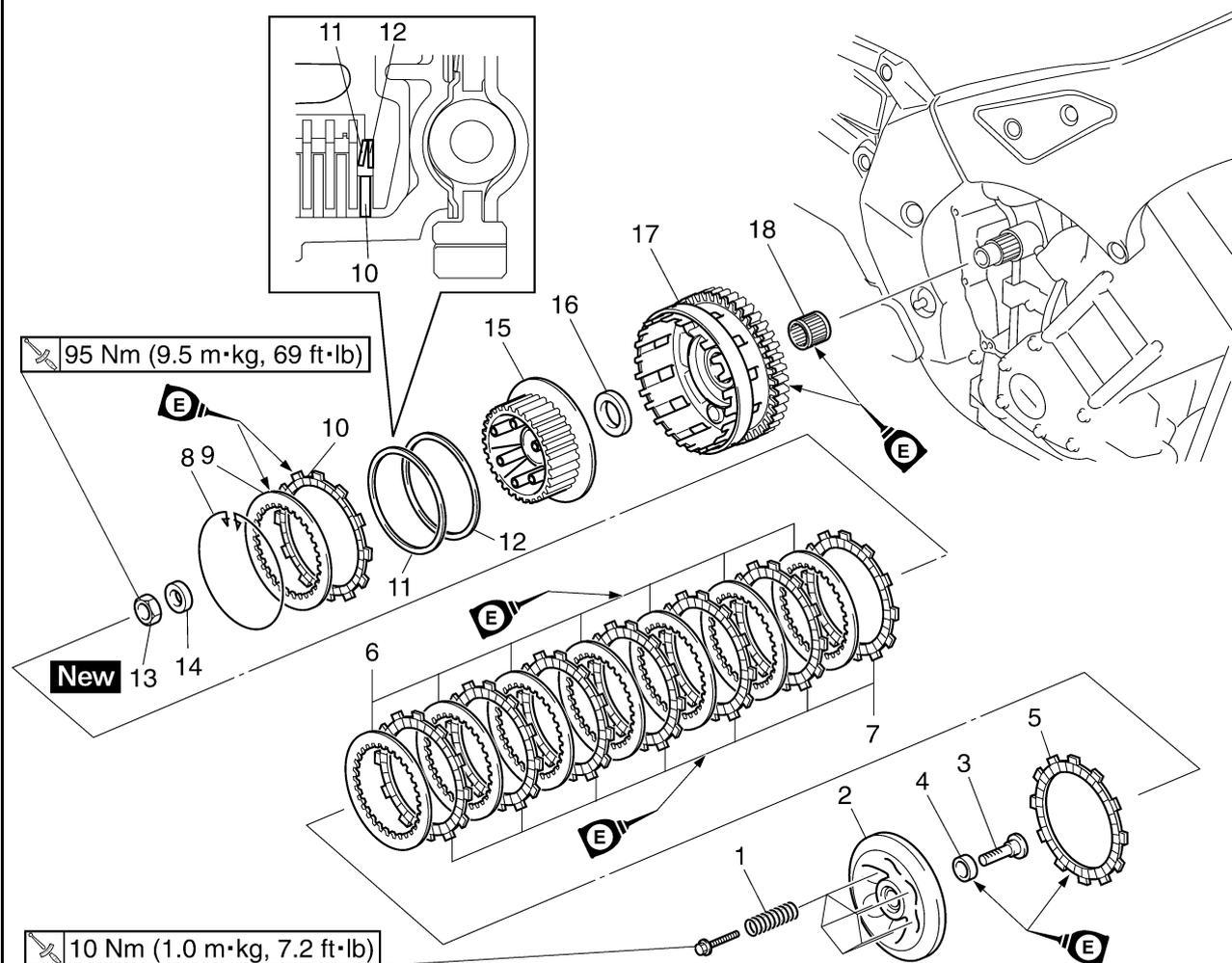
## Removing the pull lever shaft



Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	2	
2	Pull lever	1	
3	Pull lever spring	1	
4	Pull lever shaft	1	
5	Oil seal	1	
6	Bearing	2	
			For installation, reverse the removal procedure.

# CLUTCH

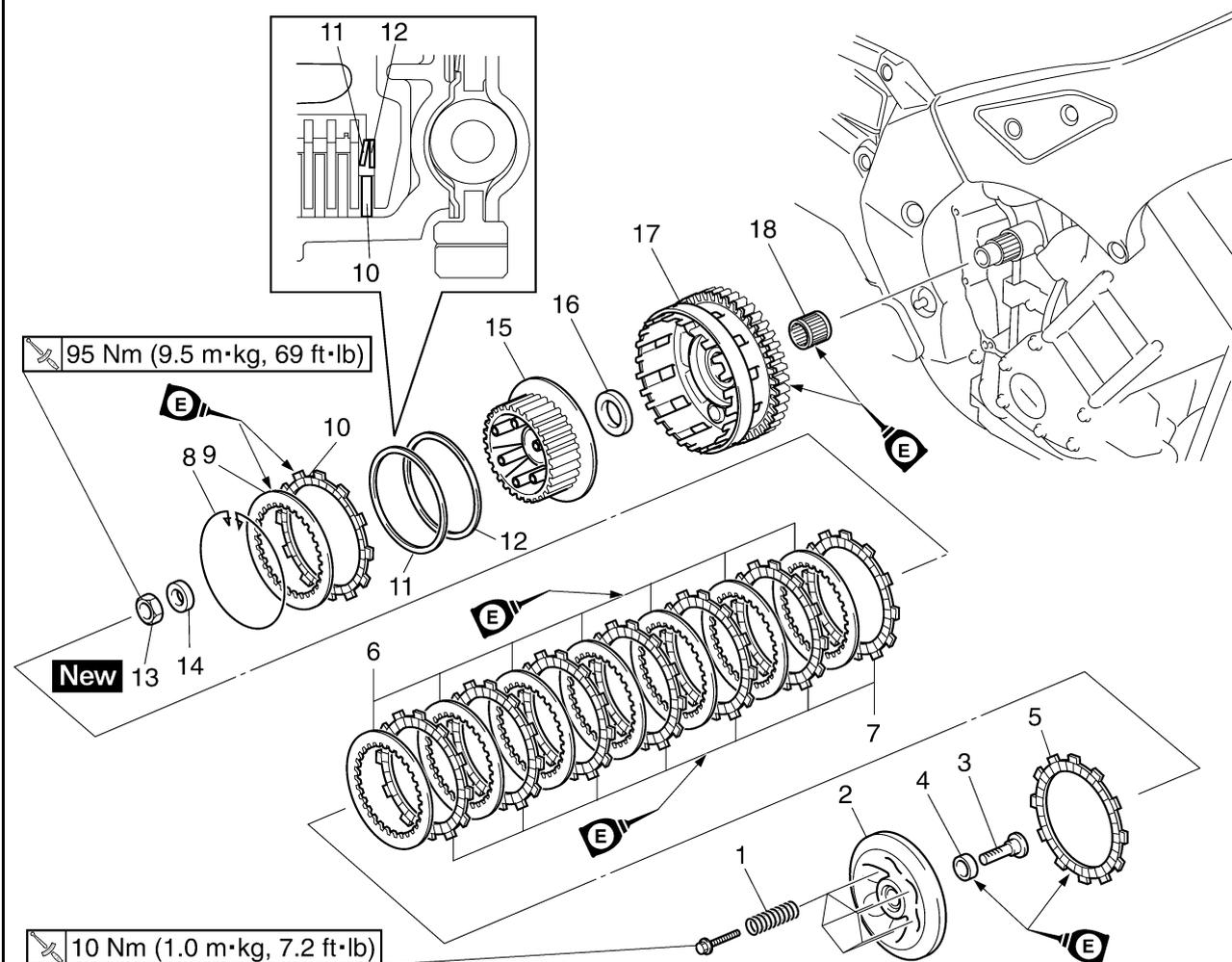
## Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Compression spring	6	
2	Pressure plate	1	
3	Pull rod	1	
4	Bearing	1	
5	Friction plate 1	1	
6	Clutch plate 1	7	
7	Friction plate 2	7	
8	Wire circlip	1	
9	Clutch plate 2	1	
10	Friction plate 3	1	
11	Clutch damper spring	1	
12	Clutch damper spring seat	1	
13	Clutch boss nut	1	
14	Washer	1	
15	Clutch boss assembly	1	
16	Thrust plate	1	
17	Clutch housing	1	
18	Bearing	1	

# CLUTCH

## Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
			For assembly, reverse the removal procedure.

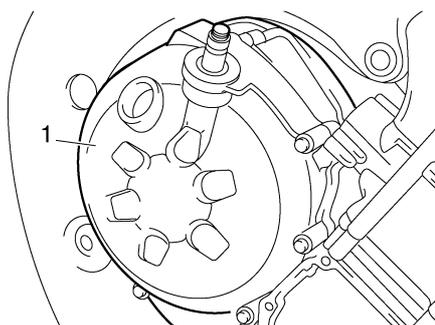
EAS25080

## REMOVING THE CLUTCH

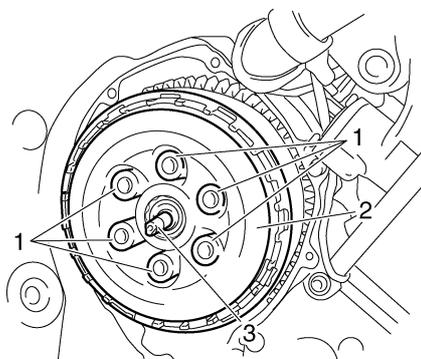
- Remove:
  - Clutch cover "1"
  - Gasket

### NOTE:

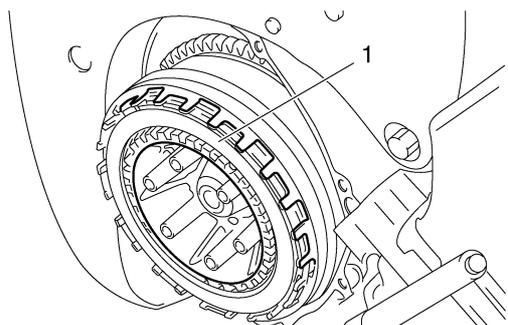
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



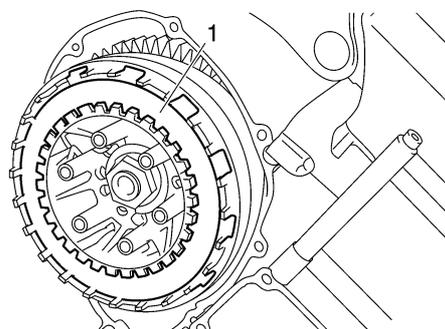
- Remove:
  - Compression spring bolts "1"
  - Compression springs
  - Pressure plate "2"
  - Pull rod "3"



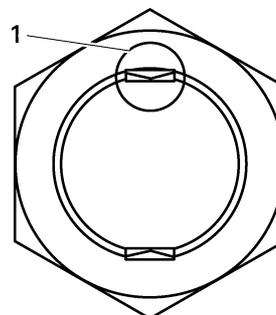
- Remove:
  - Friction plate 1 "1"



- Remove:
  - Clutch plate 1 "1"
  - Friction plate 2



- Straighten the clutch boss nut rib "1".



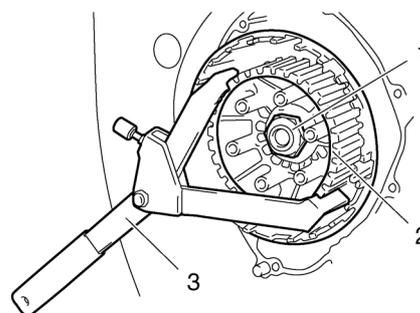
- Loosen:
  - Clutch boss nut "1"

### NOTE:

While holding the clutch boss "2" with the universal clutch holder "3", loosen the clutch boss nut.



**Universal clutch holder**  
90890-04086  
YM-91042

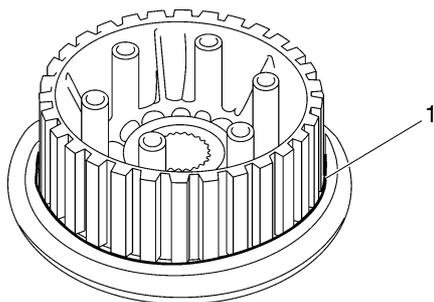


- Remove:
  - Clutch boss nut
  - Washer
  - Clutch boss assembly

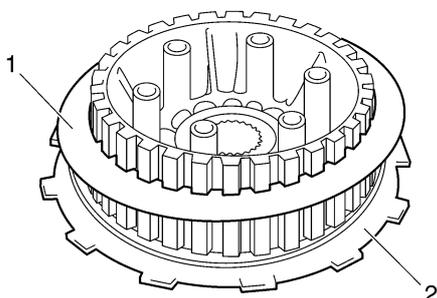
- Thrust plate
8. Remove:
- Wire circlip “1”

**NOTE:**

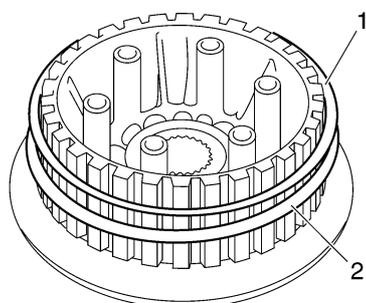
There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip “1” and disassemble the built-in damper unless there is serious clutch chattering.



9. Remove:
- Clutch plate 2 “1”
  - Friction plate 3 “2”



10. Remove:
- Clutch damper spring “1”
  - Clutch damper spring seat “2”



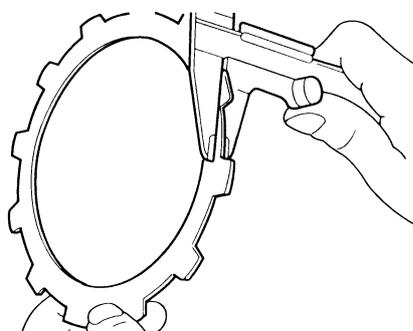
1. Check:
- Friction plate  
Damage/wear → Replace the friction plates as a set.
2. Measure:
- Friction plate thickness  
Out of specification → Replace the friction plates as a set.

**NOTE:**

Measure the friction plate at four places.



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



1411101

EAS25110

**CHECKING THE CLUTCH PLATES**

The following procedure applies to all of the clutch plates.

1. Check:
- Clutch plate  
Damage → Replace the clutch plates as a set.
2. Measure:
- Clutch plate warpage  
(with a surface plate and thickness gauge “1”)  
Out of specification → Replace the clutch plates as a set.

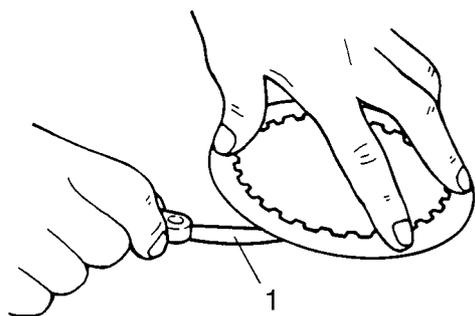


**Clutch plate warpage limit**  
0.1 mm (0.0039 in)

ET2D1010

**CHECKING THE FRICTION PLATES**

The following procedure applies to all of the friction plates.



EAS25140

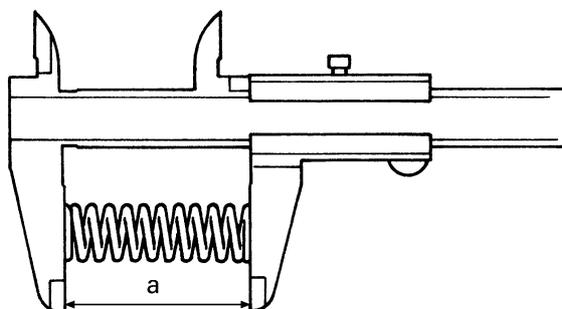
## CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

1. Check:
  - Clutch spring  
Damage → Replace the clutch springs as a set.
2. Measure:
  - Clutch spring free length “a”  
Out of specification → Replace the clutch springs as a set.



**Clutch spring free length**  
52.5 mm (2.07 in)  
**Limit**  
49.9 mm (1.96 in)



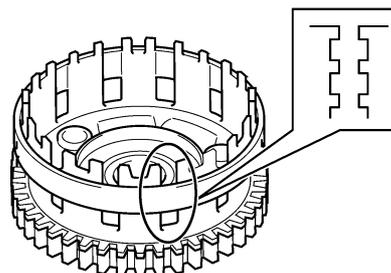
EAS25150

## CHECKING THE CLUTCH HOUSING

1. Check:
  - Clutch housing dogs  
Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

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

Pitting on the clutch housing dogs will cause erratic clutch operation.



2. Check:

- Bearing  
Damage/wear → Replace the bearing and clutch housing.

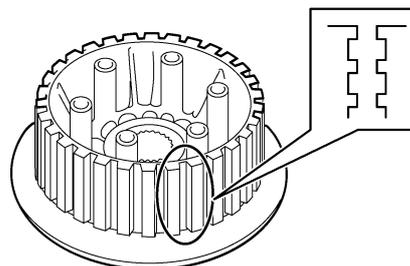
EAS25160

## CHECKING THE CLUTCH BOSS

1. Check:
  - Clutch boss splines  
Damage/pitting/wear → Replace the clutch boss.

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

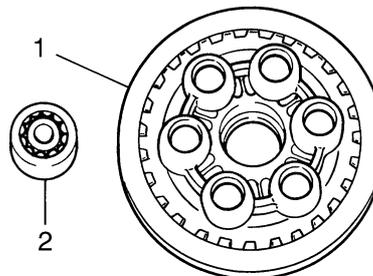
Pitting on the clutch boss splines will cause erratic clutch operation.



EAS25170

## CHECKING THE PRESSURE PLATE

1. Check:
  - Pressure plate “1”  
Cracks/damage → Replace.
  - Bearing “2”  
Damage/wear → Replace.

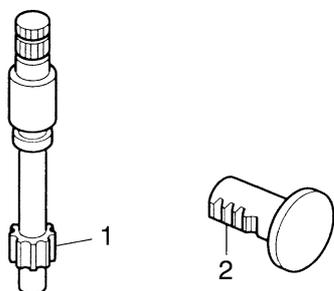


EAS25220

## CHECKING THE PULL LEVER SHAFT AND PULL ROD

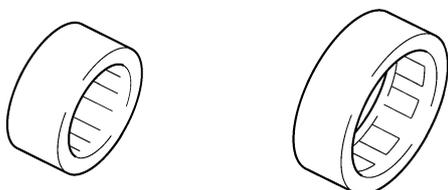
1. Check:

- Pull lever shaft pinion gear teeth “1”
  - Pull rod teeth “2”
- Damage/wear → Replace the pull rod and pull lever shaft pinion gear as a set.



11-112102

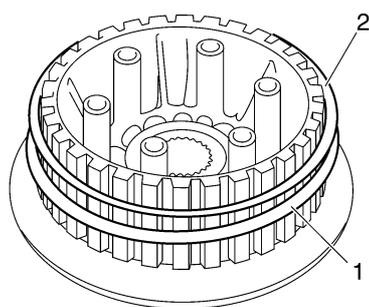
2. Check:
- Pull rod bearing
- Damage/wear → Replace.



EAS25240

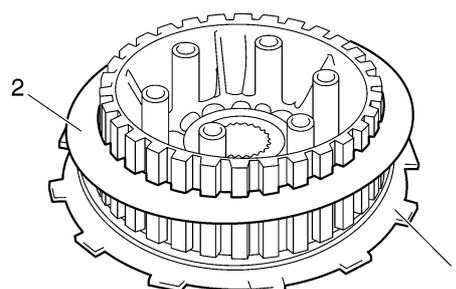
## INSTALLING THE CLUTCH

1. Install:
- Clutch damper spring seat “1”
  - Clutch damper spring “2”

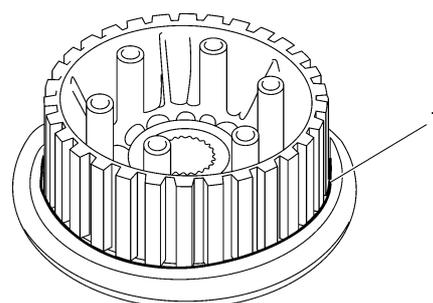


2. Install:
- Friction plate 3 “1”
  - Clutch plate 2 “2”

**NOTE:** \_\_\_\_\_  
Lubricate the engine oil.

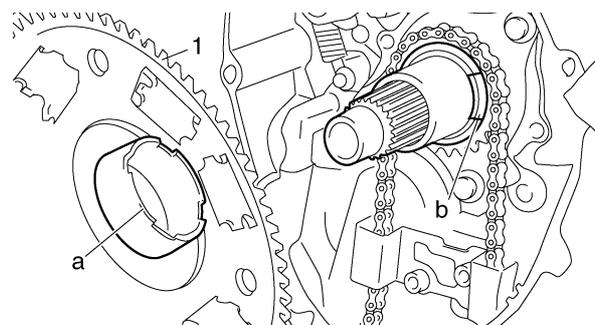


3. Install:
- Wire circlip “1”



4. Install:
- Clutch housing “1”

**NOTE:** \_\_\_\_\_  
Align the projection of clutch housing “a” and hollow of the oil pump drive gear “b”.



5. Install:
- Thrust plate
  - Clutch boss assembly “1”
  - Washer
  - Clutch boss nut “2” **New**



**Clutch boss nut**  
**95 Nm (9.5 m·kg, 69 ft·lb)**

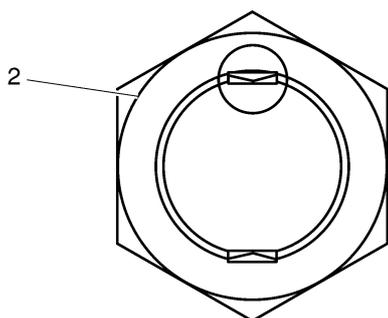
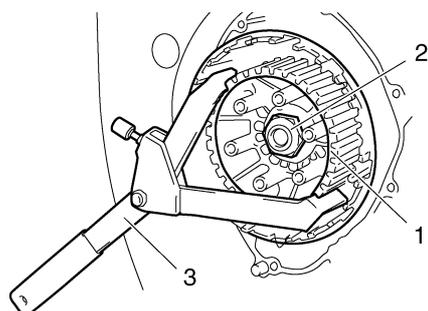
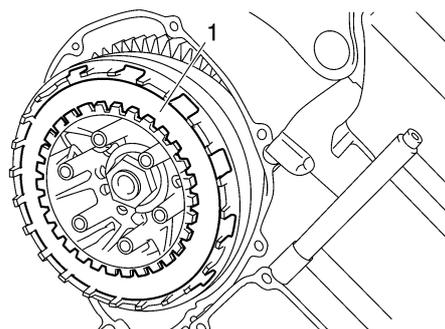
**NOTE:** \_\_\_\_\_  
• Install the washer on the main axle with the “OUT” mark facing away from the vehicle.

# CLUTCH

- Lock the threads on the clutch boss nut by staking them with a drift punch at the point aligned with the groove in the axle.
- While holding the clutch boss assembly "1" with the clutch holding tool "3", tighten the clutch boss nut.



**Universal clutch holder**  
**90890-04086**  
**YM-91042**



6. Lubricate
- Friction plates
  - Clutch plates
- (with the recommended lubricant)

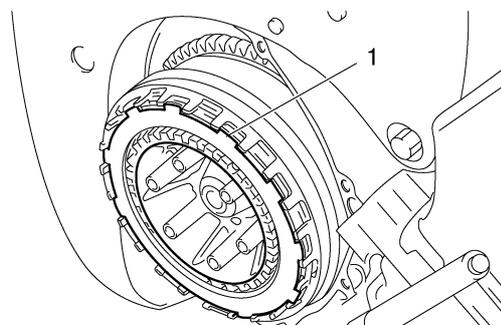


**Recommended lubricant**  
**Engine oil**

7. Install:
- Friction plate 2
  - Clutch plate 1 "1"

8. Install:
- Friction plate 1 "1"

**NOTE:**  
Install the last friction plate shifting half phase.

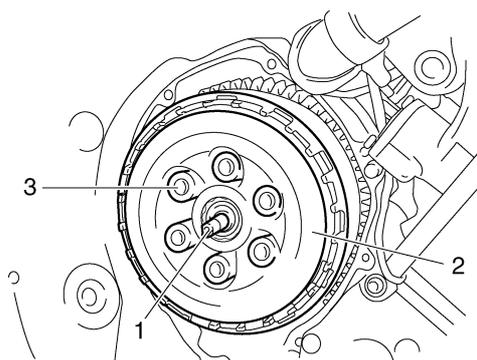


9. Install:
- Bearing
  - Pull rod "1"
  - Pressure plate "2"
  - Clutch springs
  - Clutch spring bolts "3"



**Clutch spring bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**

**NOTE:**  
Tighten the clutch spring bolts in stages and in a crisscross pattern.

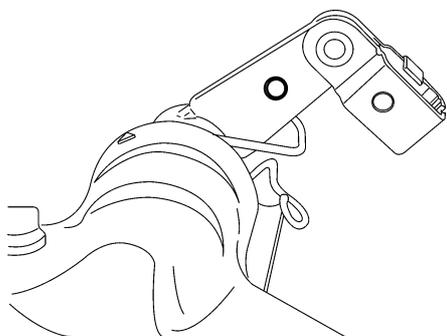


10. Install:

- Pull lever

**NOTE:**

Install the pull lever with the “O” mark facing toward lower side.

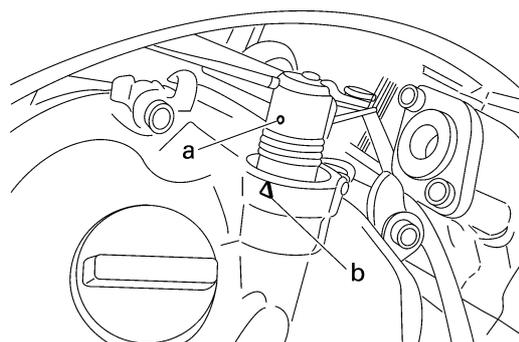


11. Install:

- Clutch cover
- Clutch cover gasket **New**

**NOTE:**

- Install the pull rod so that the teeth face towards the rear of the vehicle. Then, install the clutch cover.
- Apply oil onto the bearing.
- Apply molybdenum disulfide grease onto the pull rod.
- When installing the clutch cover, push the pull lever and check that the punch mark “a” on the pull lever aligns with the mark “b” on the clutch cover. Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.



12. Tighten

- Clutch cover bolts “1”



**Clutch cover bolt**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**

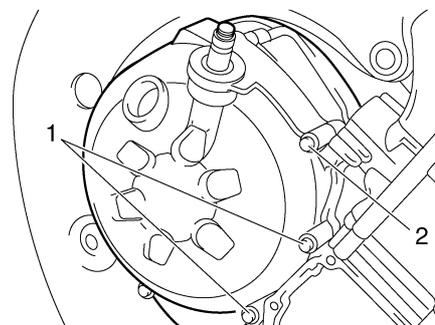
- Clutch cover bolt “2”



**Clutch cover bolt**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**  
**LOCTITE®**

**NOTE:**

Tighten the clutch cover bolts in a stages and in a crisscross pattern.



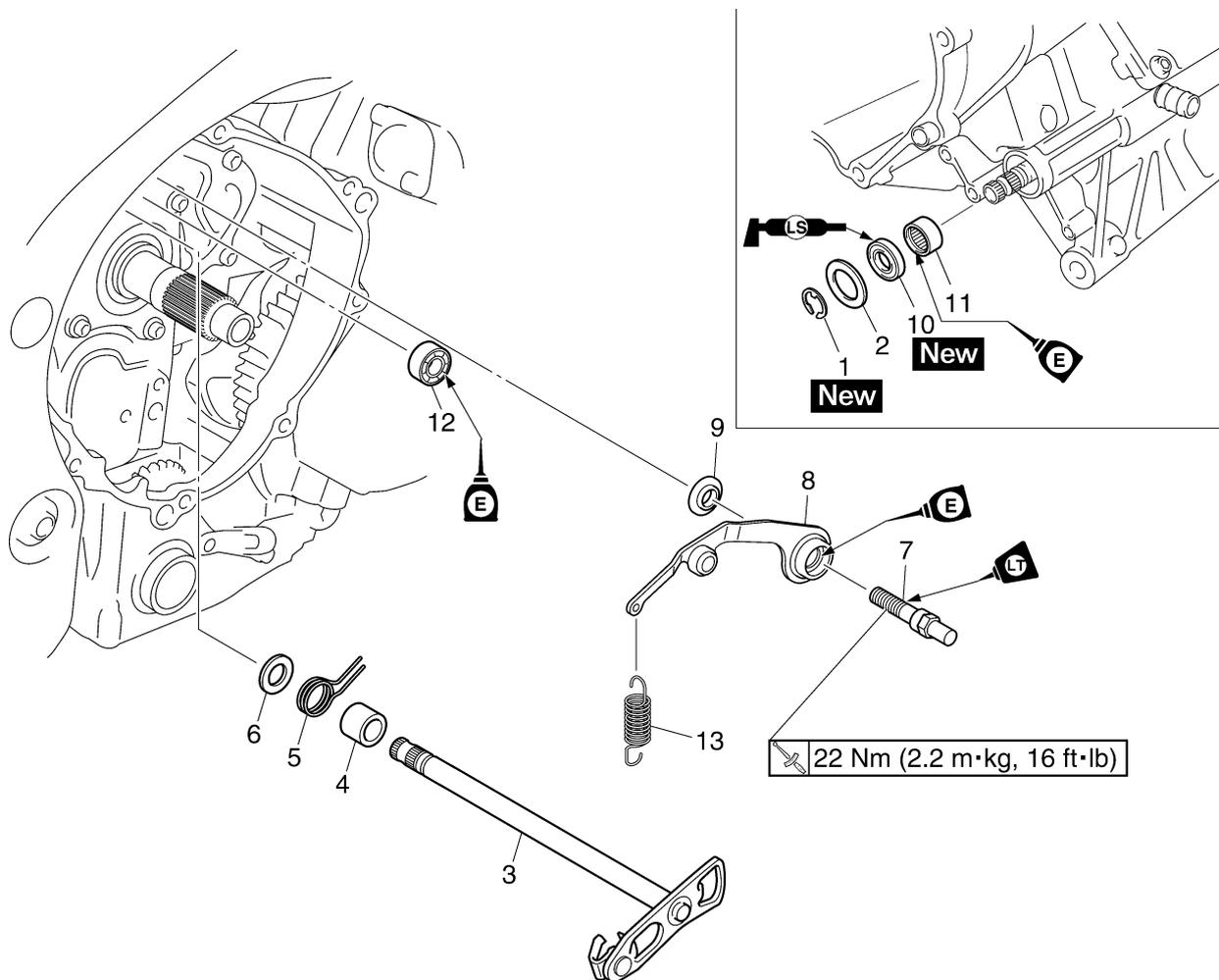
13. Adjust:

- Clutch cable free play  
Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" on page 3-14.

EAS25410

## SHIFT SHAFT

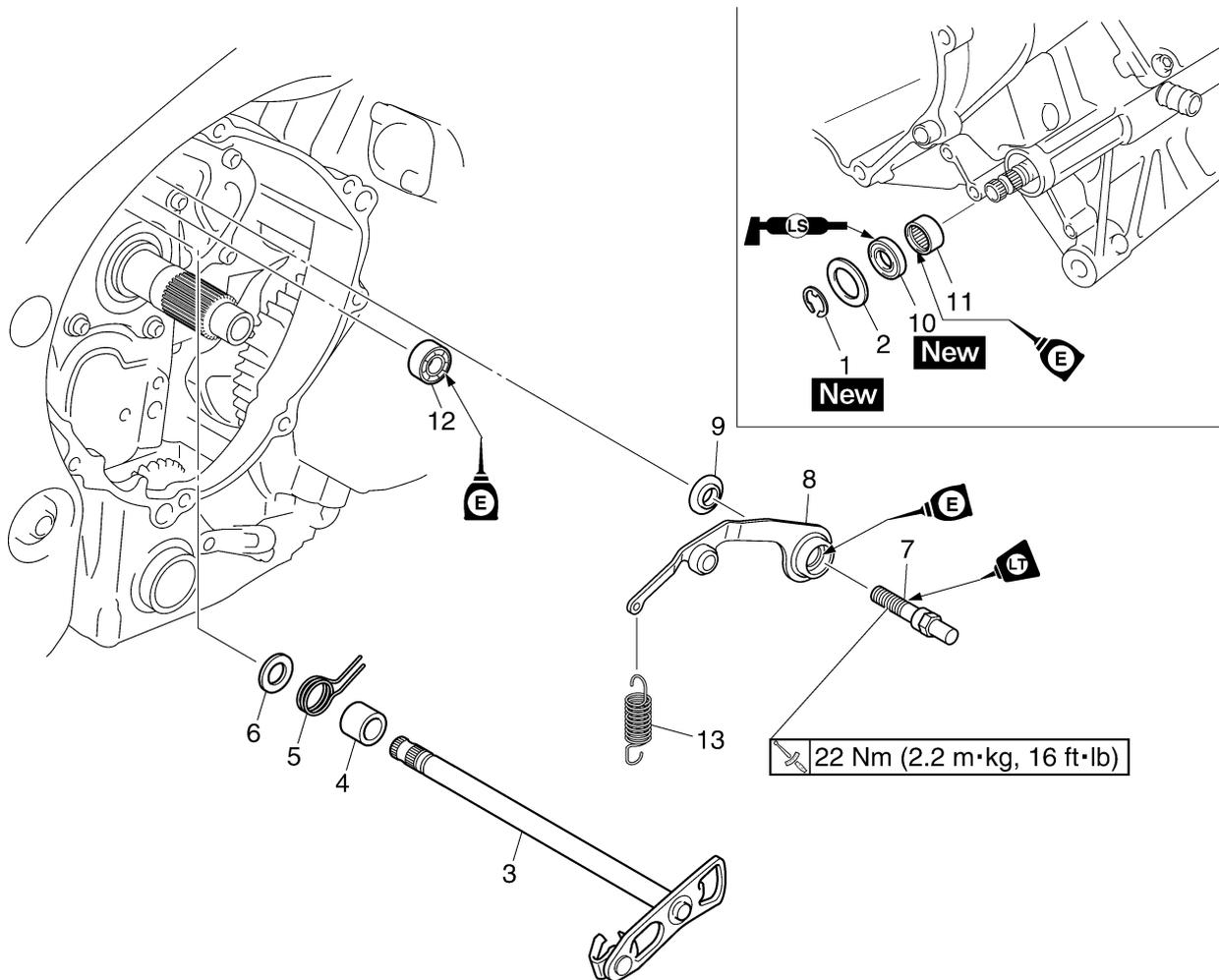
### Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch assembly		Refer to "CLUTCH" on page 5-44.
	Shift arm and shift rod		Refer to "ENGINE REMOVAL" on page 5-2.
1	Circlip	1	
2	Washer	1	
3	Shift shaft	1	
4	Collar	1	
5	Shift shaft spring	1	
6	Washer	1	
7	Stopper screw	1	
8	Stopper lever	1	
9	Washer	1	
10	Oil seal	1	
11	Bearing	1	
12	Bearing	1	
13	Stopper lever spring	1	

# SHIFT SHAFT

## Removing the shift shaft and stopper lever



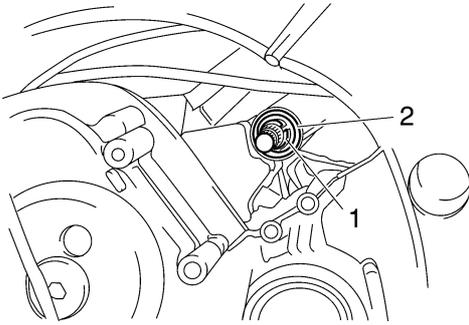
Order	Job/Parts to remove	Q'ty	Remarks
			For installation, reverse the removal procedure.

# SHIFT SHAFT

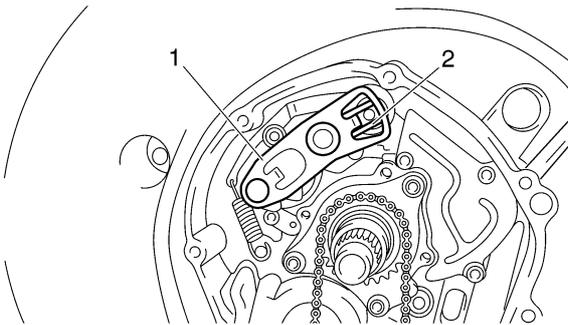
ET2D1011

## REMOVING THE SHIFT SHAFT

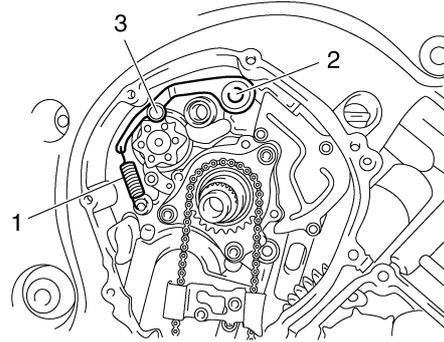
1. Remove:
  - Clutch assembly  
Refetr to "CLUTCH" on page 5-44
2. Remove:
  - Shift arm
  - Shift rod  
Refetr to "ENGINE REMOVAL" on page 5-2
3. Remove:
  - Circlip "1"
  - Washer "2"  
(left side of the engine)



4. Remove
  - Shift shaft "1"
  - Shift shaft spring "2"
  - Collar
  - Washer



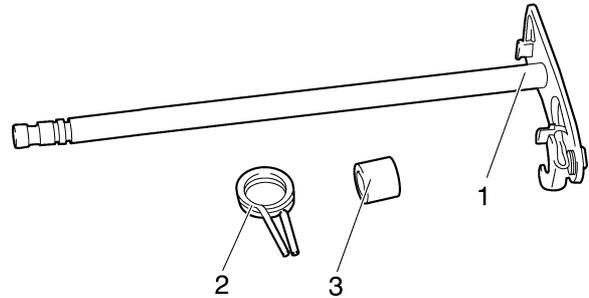
5. Remove:
  - Stopper lever spring "1"
  - Stopper screw "2"
  - Stopper lever "3"
  - Washer



EAS25420

## CHECKING THE SHIFT SHAFT

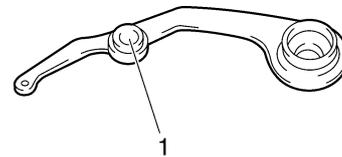
1. Check:
  - Shift shaft "1"  
Bends/damage/wear → Replace.
  - Shift shaft spring "2"
  - Collar "3"  
Damage/wear → Replace.



EAS25430

## CHECKING THE STOPPER LEVER

1. Check:
  - Stopper lever "1"  
Bends/damage → Replace.  
Roller turns roughly → Replace the stopper lever.



EAS25450

## INSTALLING THE SHIFT SHAFT

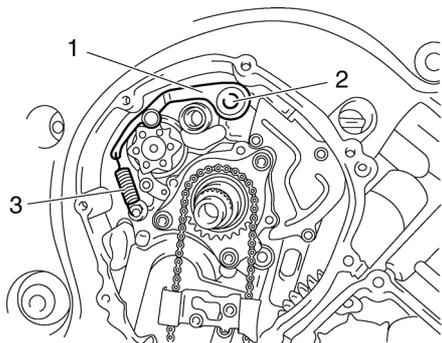
1. Install:
  - Washer
  - Stopper lever "1"
  - Stopper screw "2"



Stopper screw  
22 Nm (2.2 m.kg, 16 ft.lb)  
LOCTITE®

## SHIFT SHAFT

- Stopper lever spring "3"



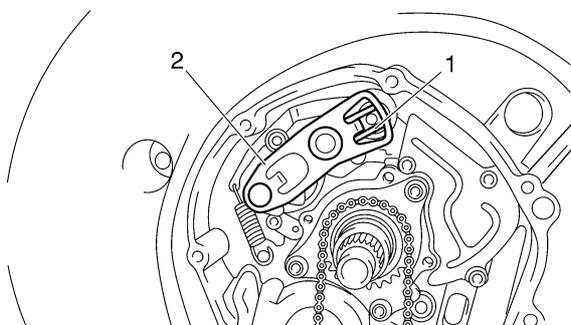
- Shift rod
  - Shift arm  
Refer to "ENGINE REMOVAL" on page 5-2.
5. Install:
- Clutch assembly  
Refer to "CLUTCH" on page 5-44.

2. Install:

- Washer
- Collar
- Shift shaft spring "1"
- Shift shaft "2"

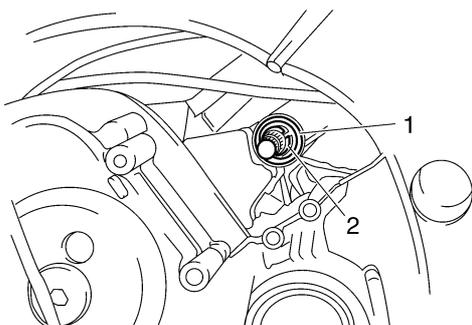
**NOTE:**

- Mesh the stopper lever with the shift drum segment assembly.
- Lubricate the oil seal lips with lithium soap base grease.
- Install the end of the shift shaft spring onto the shift shaft spring stopper.



3. Install:

- Washer "1"
- Circlip "2" **New**

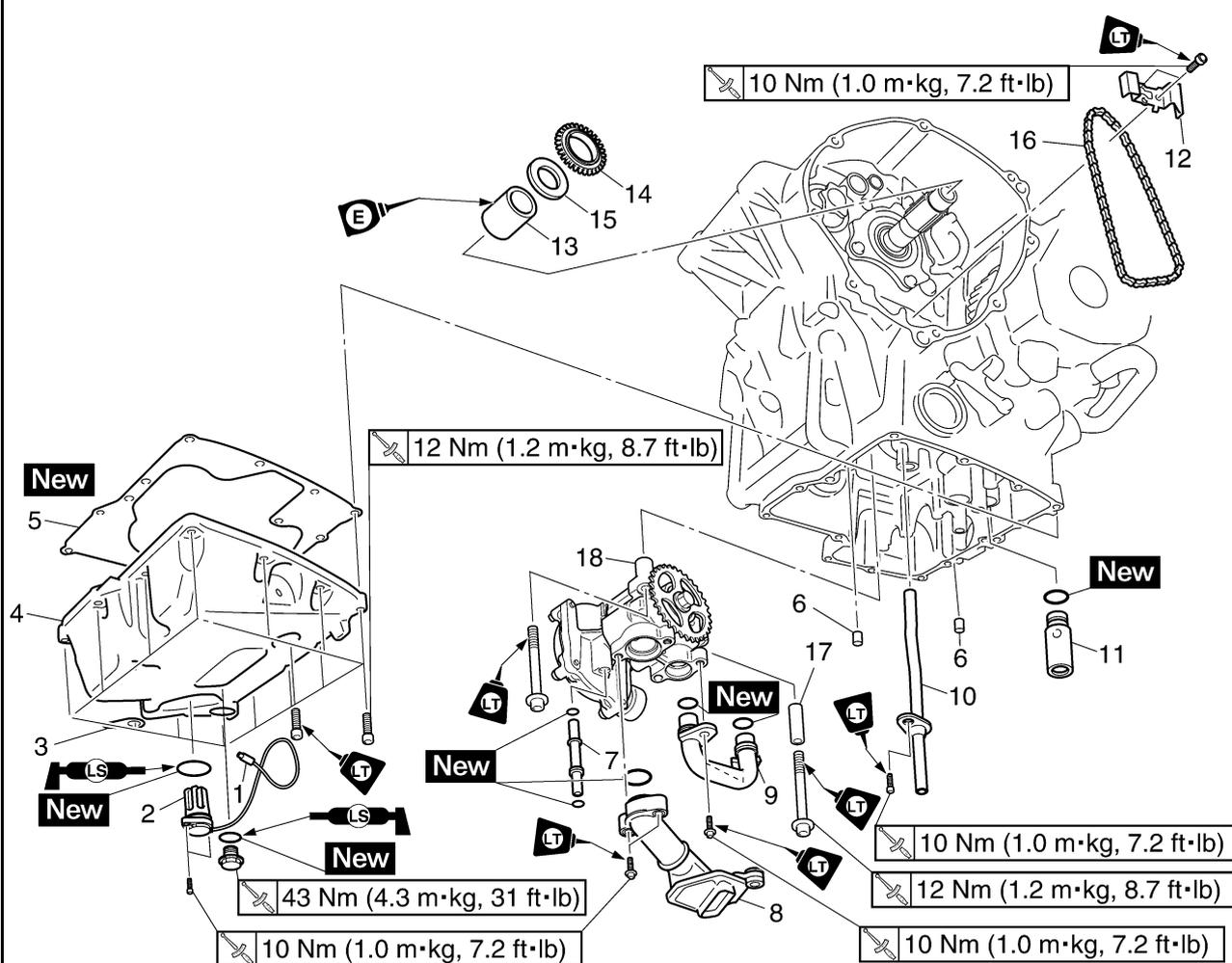


4. Install:

EAS24920

## OIL PUMP

### Removing the oil pan and oil pump



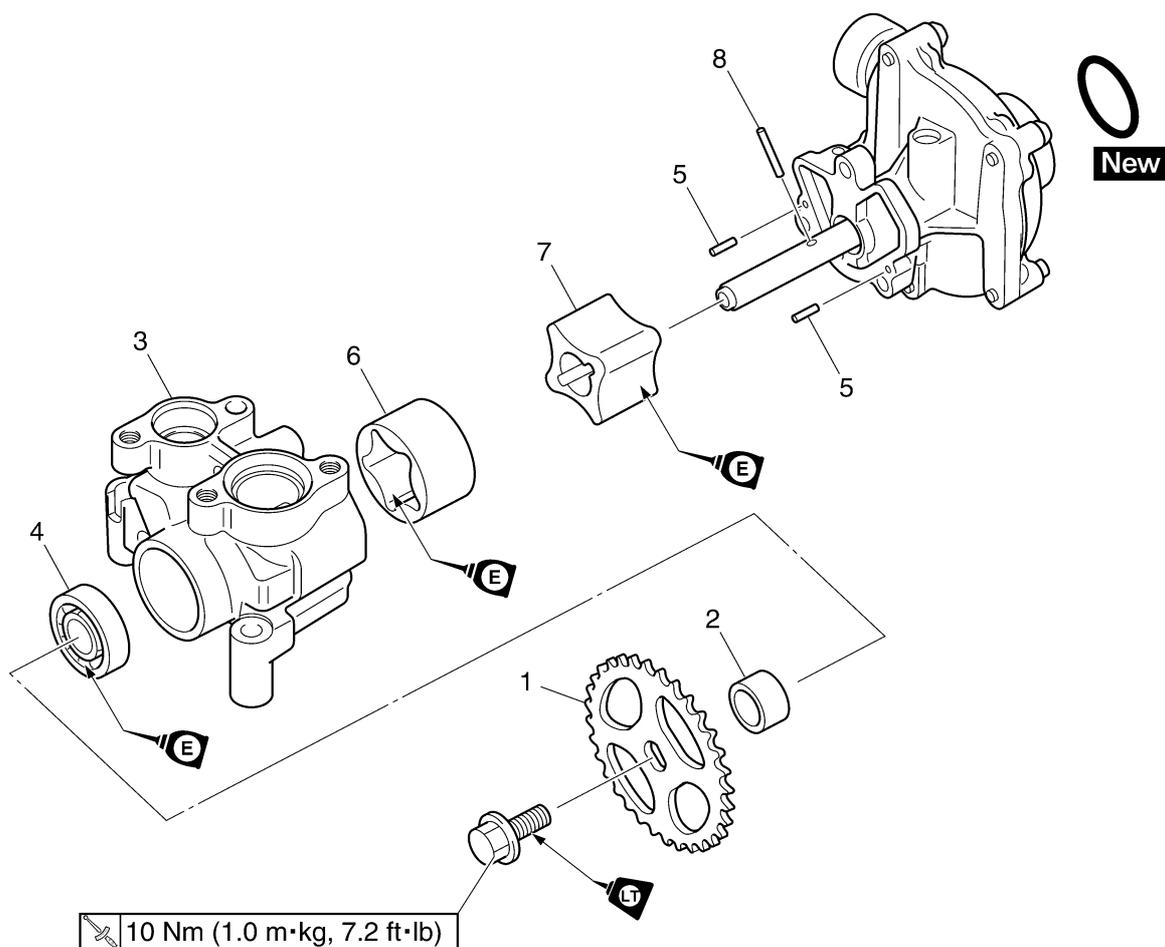
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
	EXUP cables		Refer to "ENGINE REMOVAL" on page 5-2.
	O <sub>2</sub> sensor		Refer to "ENGINE REMOVAL" on page 5-2.
	Muffler		Refer to "ENGINE REMOVAL" on page 5-2.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-2.
	Clutch assembly		Refer to "CLUTCH" on page 5-44.
	Water pump inlet pipe		Refer to "OIL COOLER" on page 6-4.
	Water pump outlet pipe		Refer to "OIL COOLER" on page 6-4.
1	Oil level switch lead coupler	1	Disconnect.





# OIL PUMP

## Disassembling the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil/water pump driven sprocket	1	
2	Collar	1	
3	Oil pump housing	1	
4	Bearing	1	
5	Pin	2	
6	Oil pump outer rotor	1	
7	Oil pump inner rotor	1	
8	Pin	1	
			For assembly, reverse the disassembly procedure.

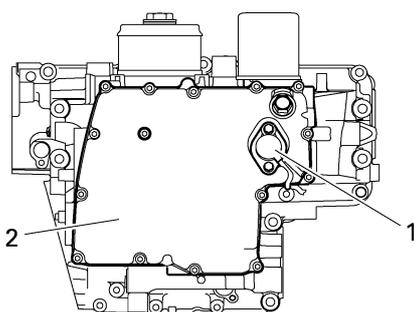
EAS24930

## REMOVING THE OIL PAN

- Remove:
  - Oil level switch "1"
  - Oil pan "2"
  - Oil pan gasket
  - Dowel pins

### NOTE:

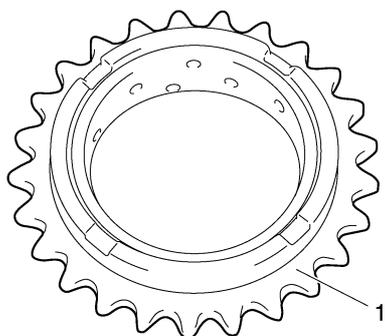
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



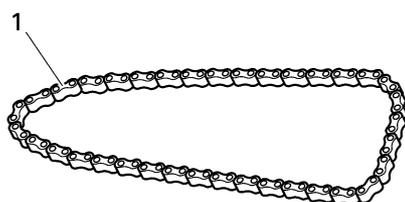
ET2D1012

## CHECKING THE SPROCKET AND CHAIN

- Check:
  - Oil/water pump assembly drive sprocket "1"  
Cracks/damage/wear → Replace the defective part(-s).



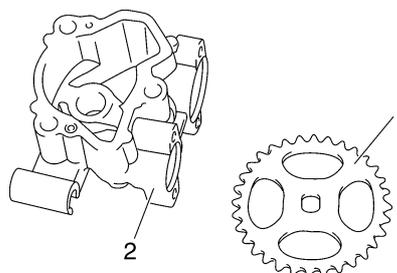
- Check:
  - Oil/water pump assembly drive chain "1"  
Damag/stiffness → Replace the oil/water pump assembly drive chain and oil/water pump assembly drive sprocket as a set.



EAS24960

## CHECKING THE OIL PUMP

- Check:
  - Oil pump driven gear "1"
  - Oil pump rotor housing "2"
  - Oil pump cover  
Cracks/damage/wear → Replace the defective part(s).



- Measure:
  - Inner-rotor-to-outer-rotor-tip clearance "a"
  - Outer-rotor-to-oil-pump-housing clearance "b"



### Inner-rotor-to-outer-rotor-tip-clearance

0.01–0.10 mm  
(0.0004–0.0039 in)

### Limit

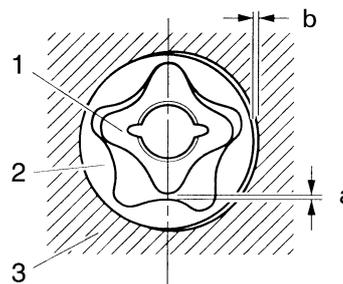
0.18 mm (0.0071 in)

### Outer-rotor-to-oil-pump-housing-clearance

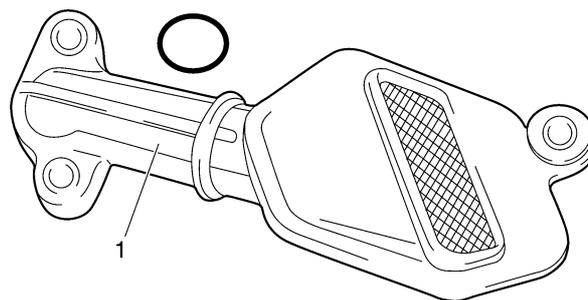
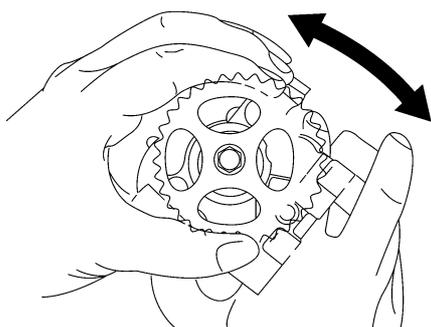
0.09–0.15 mm  
(0.0035–0.0059 in)

### Limit

0.22 mm (0.0087 in)



- Oil pump inner rotor
- Oil pump outer rotor
- Oil pump housing
- Check:
  - Oil pump operation  
Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



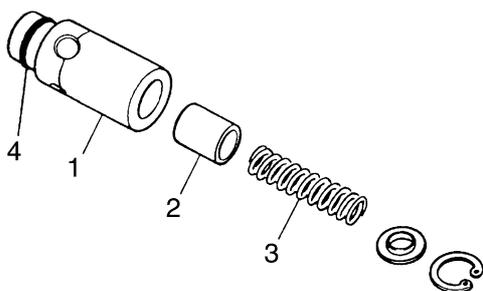
EAS24970

## CHECKING THE RELIEF VALVE

1. Check:

- Relief valve body "1"
- Relief valve "2"
- Spring "3"
- O-ring "4"

Damage/wear → Replace the defective part(s).



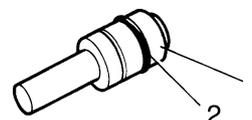
ET2D1013

## CHECKING THE OIL NOZZLES

The following procedure applies to all of the oil nozzles.

1. Check:

- Oil nozzle "1"  
Damage/wear → Replace the oil nozzles.
- O-ring "2"  
Damage/wear → Replace.
- Oil nozzle passage  
Obstruction → Blow out with compressed air.



EAS24980

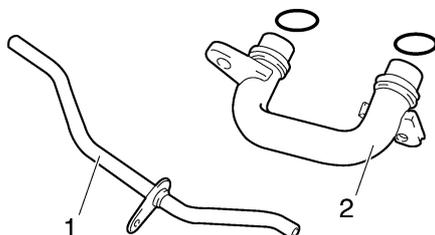
## CHECKING THE OIL DELIVERY PIPES

1. Check:

- Oil delivery pipe "1"
- Oil pipe "2"

Damage → Replace.

Obstruction → Wash and blow out with compressed air.



EAS25010

## ASSEMBLING THE OIL PUMP

1. Lubricate:

- Inner rotor
- Outer rotor
- Oil pump shaft  
(with the recommended lubricant)



2. Install:

- Pin "1"
- Inner rotor "2"
- Outer rotor "3"
- Oil pump housing "4"

EAS24990

## CHECKING THE OIL STRAINER

1. Check:

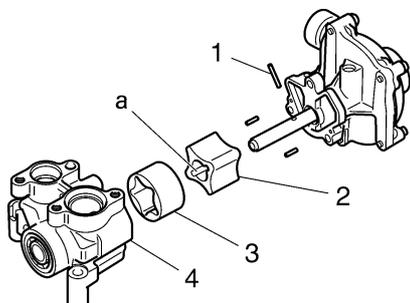
- Oil strainer "1"

Damage → Replace.

Contaminants → Clean with solvent.

**NOTE:**

When installing the inner rotor, align the pin “1” in the oil pump shaft with the groove in the inner rotor “2”.



3. Install:

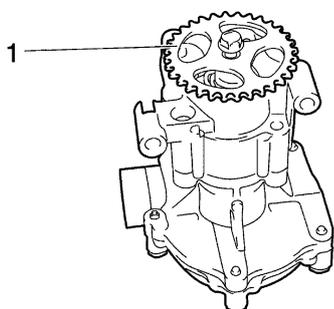
- Oil/water pump driven sprocket “1”



**Oil/water pump driven sprocket bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**  
**LOCTITE®**

**NOTE:**

5VY mark of the oil/water pump driven gear is installed at oil pump side.



4. Check:

- Oil pump operation  
Refer to "CHECKING THE OIL PUMP" on page 5-62.

EAS25030

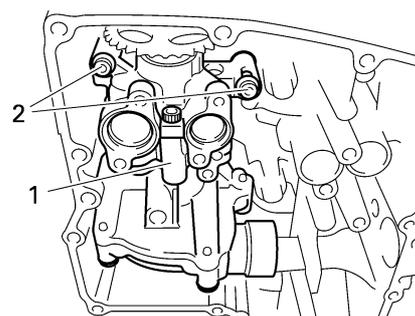
**INSTALLING THE OIL/WATER PUMP ASSEMBLY**

1. Install:

- Oil ring **New**
- Oil/water pump assembly “1”
- Dowel pin
- Bolts “2”



**Oil/water pump assembly bolt**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**  
**LOCTITE®**



2. Install:

- Washer
- Oil/water pump assembly drive chain “1”
- Oil/water pump assembly drive sprocket “2”
- Collar

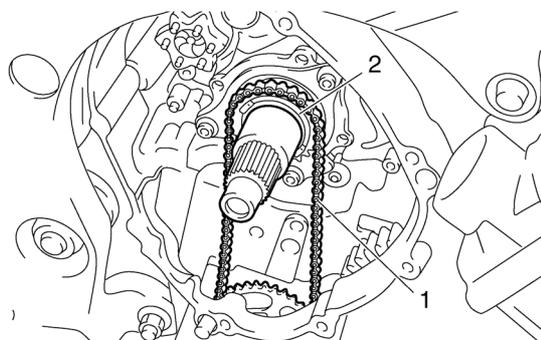
**NOTE:**

Install the oil/water pump assembly drive chain “1” onto the oil/water pump assembly drive sprocket “2”.

EC2D1008

**CAUTION:**

**After installing the oil/water pump assembly drive chain and drive sprocket, make sure the oil/water pump turns smoothly.**



3. Install:

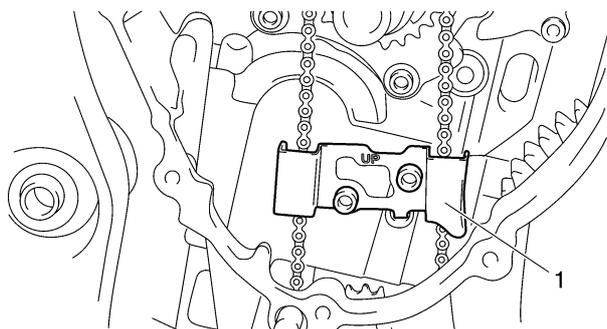
- Oil/water pump assembly drive chain guide “1”



**Oil/water pump assembly drive chain guide bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**  
**LOCTITE®**

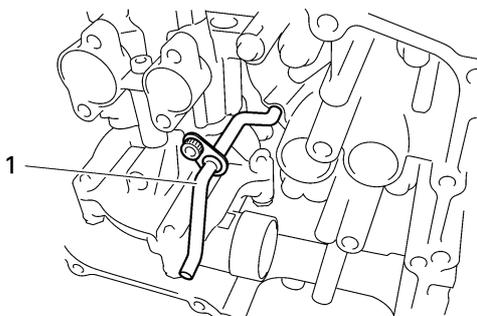
**NOTE:**

“UP” mark of the oil/water pump assembly drive chain guide is upward.



4. Install:
- Oil delivery pipe "1"

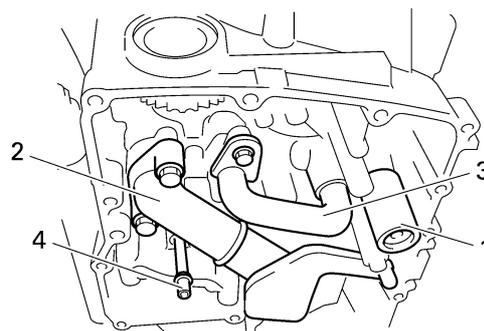
	<p><b>Oil delivery pipe bolt</b>  <b>10 Nm (1.0 m·kg, 7.2 ft·lb)</b>  <b>LOCTITE®</b></p>
---	---



5. Install:
- Relief valve "1"
  - O-ring **New**
  - Oil strainer "2"

	<p><b>Oil strainer bolt</b>  <b>10 Nm (1.0 m·kg, 7.2 ft·lb)</b>  <b>LOCTITE®</b></p>
---	--

- O-ring **New**
- Oil pipe "3"
- O-ring **New**
- Drain pipe "4"
- O-ring **New**



EAS25050  
**INSTALLING THE OIL PAN**

1. Install:
- Dowel pins
  - Gasket **New**
  - Oil pan "1"

	<p><b>Oil pan bolt</b>  <b>12 Nm (1.2 m·kg, 8.7 ft·lb)</b></p>
---	--

- Oil level switch "2"

	<p><b>Oil level switch bolt</b>  <b>10 Nm (1.0 m·kg, 7.2 ft·lb)</b></p>
--	---

- Engine oil drain bolt "3"

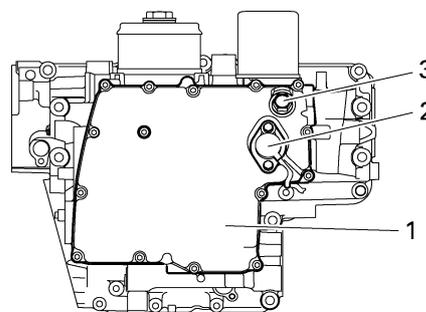
	<p><b>Engine oil drain bolt</b>  <b>43 Nm (4.3 m·kg, 31 ft·lb)</b></p>
---	--

EWA12820  
**⚠ WARNING**

**Always use new copper washers.**

**NOTE:**

- Tighten the oil pan bolts in stages and in a crisscross pattern.
- Lubricate the oil level switch O-ring with engine oil.

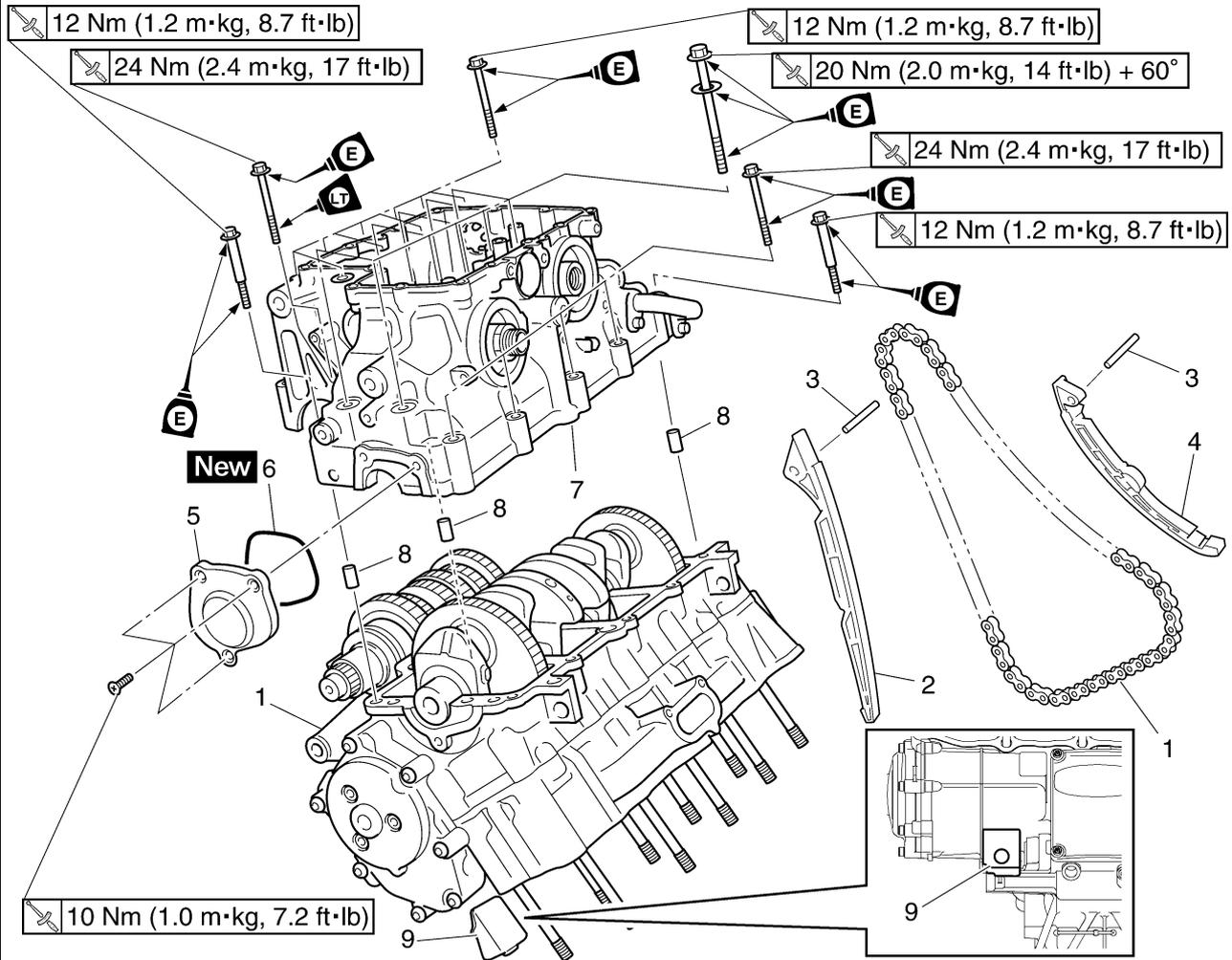


# CRANKCASE

EAS25540

## CRANKCASE

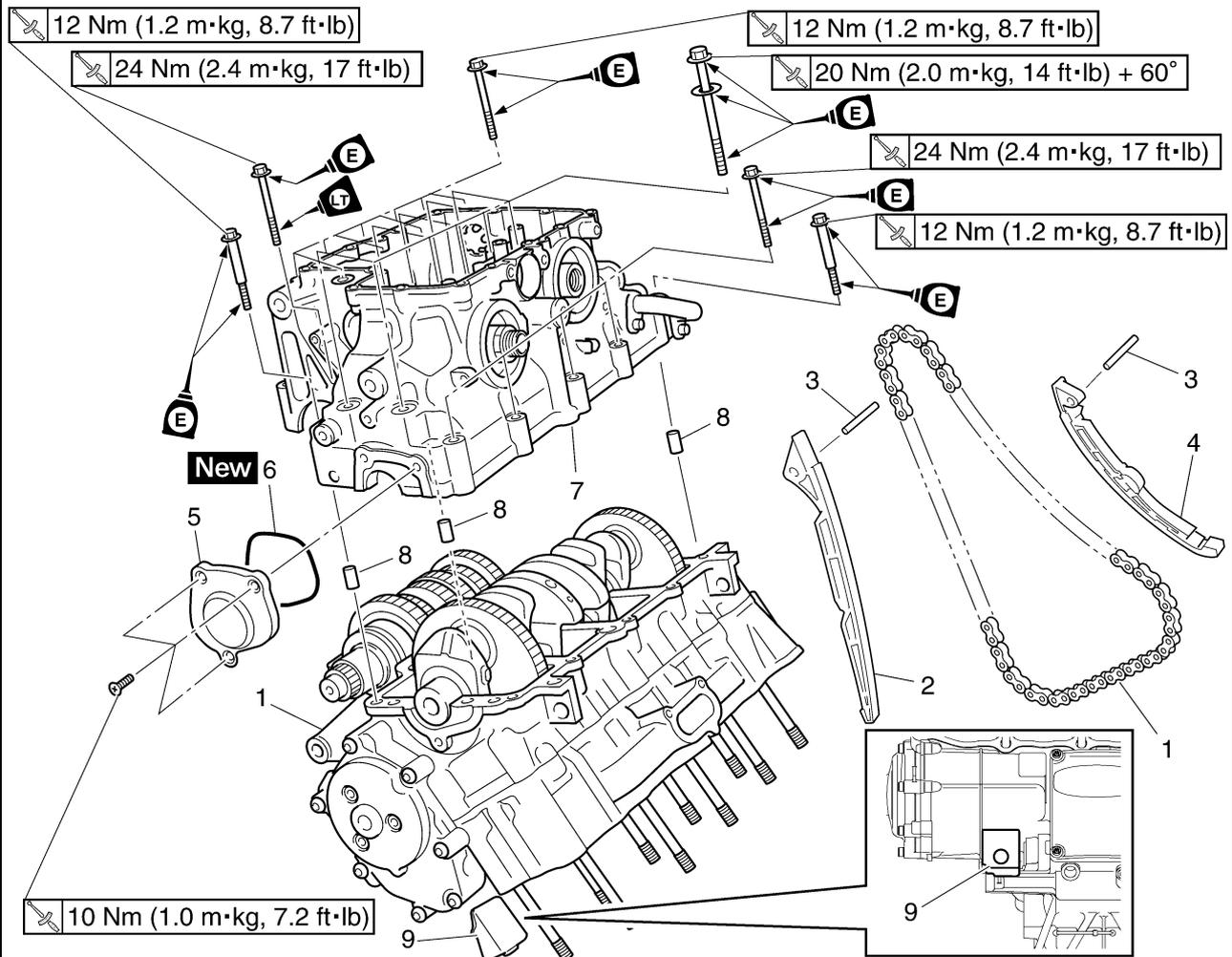
### Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Throttle body assembly		Refer to "THROTTLE BODIES" on page 7-4.
	Engine		Refer to "ENGINE REMOVAL" on page 5-2.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-19.
	Generator		Refer to "GENERATOR" on page 5-31.
	Starter clutch		Refer to "STARTER CLUTCH" on page 5-35.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-54.
	Crankshaft position sensor		Refer to "CRANKSHAFT POSITION SENSOR" on page 5-38.
	Clutch		Refer to "CLUTCH" on page 5-44.

# CRANKCASE

## Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Oil pump		Refer to "OIL PUMP" on page 5-58.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-40.
1	Timing chain	1	
2	Timing chain guide (intake side)	1	
3	Pin	2	
4	Timing chain guide (exhaust side)	1	
5	Left side cover	1	
6	O-ring	1	
7	Lower crankcase	1	
8	Dowel pin	3	
9	Damper	1	
			For assembly, reverse the removal procedure.

EAS25550

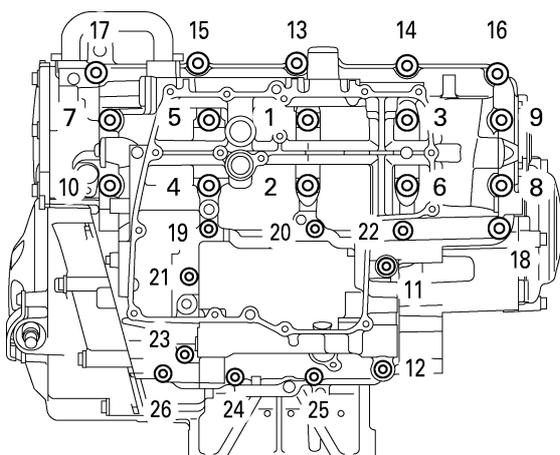
## DISASSEMBLING THE CRANKCASE

1. Place the engine upside down.
2. Remove:
  - Crankcase bolts

### NOTE:

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.

M9 x 105 mm (4.1 in) bolts: "1" – "10"  
 M8 x 60 mm (2.4 in) bolt: "11" LOCTITE®  
 M8 x 60 mm (2.4 in) bolts: "12", "16"  
 M6 x 70 mm (2.8 in) bolts: "19", "21", "23"  
 M6 x 65 mm (2.5 in) bolts: "17", "18"  
 M6 x 60 mm (2.4 in) bolt and washer: "22"  
 M6 x 60 mm (2.4 in) bolts: "24", "25"  
 M6 x 50 mm (2.0 in) bolts: "20", "26"  
 M8 x 50 mm (2.0 in) bolts: "13" – "15"



3. Remove:
  - Lower crankcase

ECA13900

### CAUTION:

**Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.**

4. Remove:
  - Dowel pins
5. Remove:
  - Crankshaft journal lower bearing (from the lower crankcase)

### NOTE:

Identify the position of each crankshaft journal lower bearing so that it can be reinstalled in its original place.

EAS25580

## CHECKING THE CRANKCASE

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
  - Crankcase  
Cracks/damage → Replace.
  - Oil delivery passages  
Obstruction → Blow out with compressed air.

ET2D1014

## CHECKING THE BEARING AND OIL SEALS

1. Check:
  - Bearings  
Clean and lubricate the bearings, then rotate the inner race with your finger.  
Rough movement → Replace.
2. Check:
  - Oil seals  
Damage/wear → Replace.

EAS25650

## ASSEMBLING THE CRANKCASE

1. Lubricate:
  - Crankshaft journal bearings (with the recommended lubricant)

	<b>Recommended lubricant Engine oil</b>
---	---

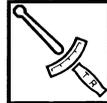
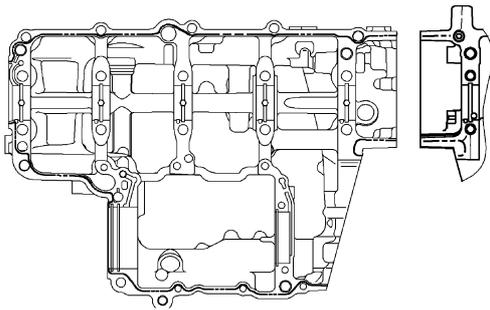
2. Apply:
  - Sealant

	<b>Yamaha bond No. 1215 (Three Bond No.1215®) 90890-85505</b>
---	---

### NOTE:

Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2–3 mm (0.08–0.12 in) of the crankshaft journal bearings.

# CRANKCASE



## Crankcase bolt

### Bolt "1" – "10"

1st: 20 Nm (2.0 m·kg, 14 ft·lb)

2nd\*: 20 Nm (2.0 m·kg, 14 ft·lb)

3rd: +60°

### Bolt "11" – "16"

24 Nm (2.4 m·kg, 17 ft·lb)

### Bolt "17" – "26"

12 Nm (1.2 m·kg, 8.7 ft·lb)

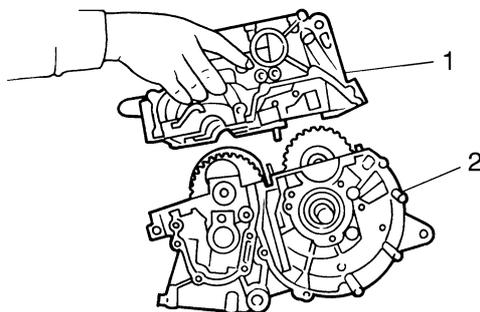
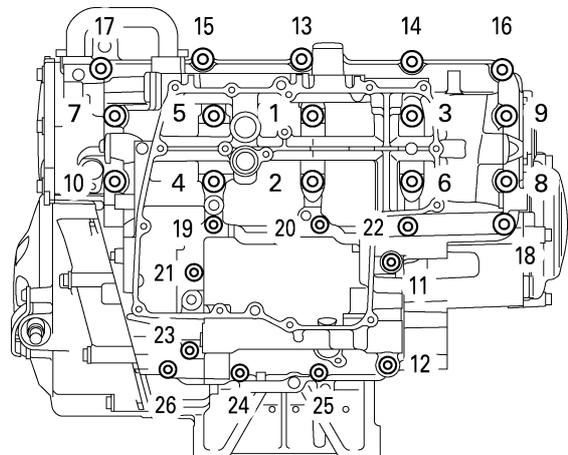
3. Install:
  - Dowel pin
4. Set the shift drum assembly and transmission gears in the neutral position.
5. Install:
  - Lower crankcase "1" (onto the upper crankcase "2")

ECA13980

### CAUTION:

**Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.**

\*Following the tightening order, loosen the bolt one by one and then retighten it to the specific torque.



6. Install:
  - Crankcase bolts

### NOTE:

- Lubricate the bolt threads with engine oil.
- Install a washer on bolts "1" – "10" and "22".
- Seal bolt "18"
- Tighten the bolts in the tightening sequence cast on the crankcase.

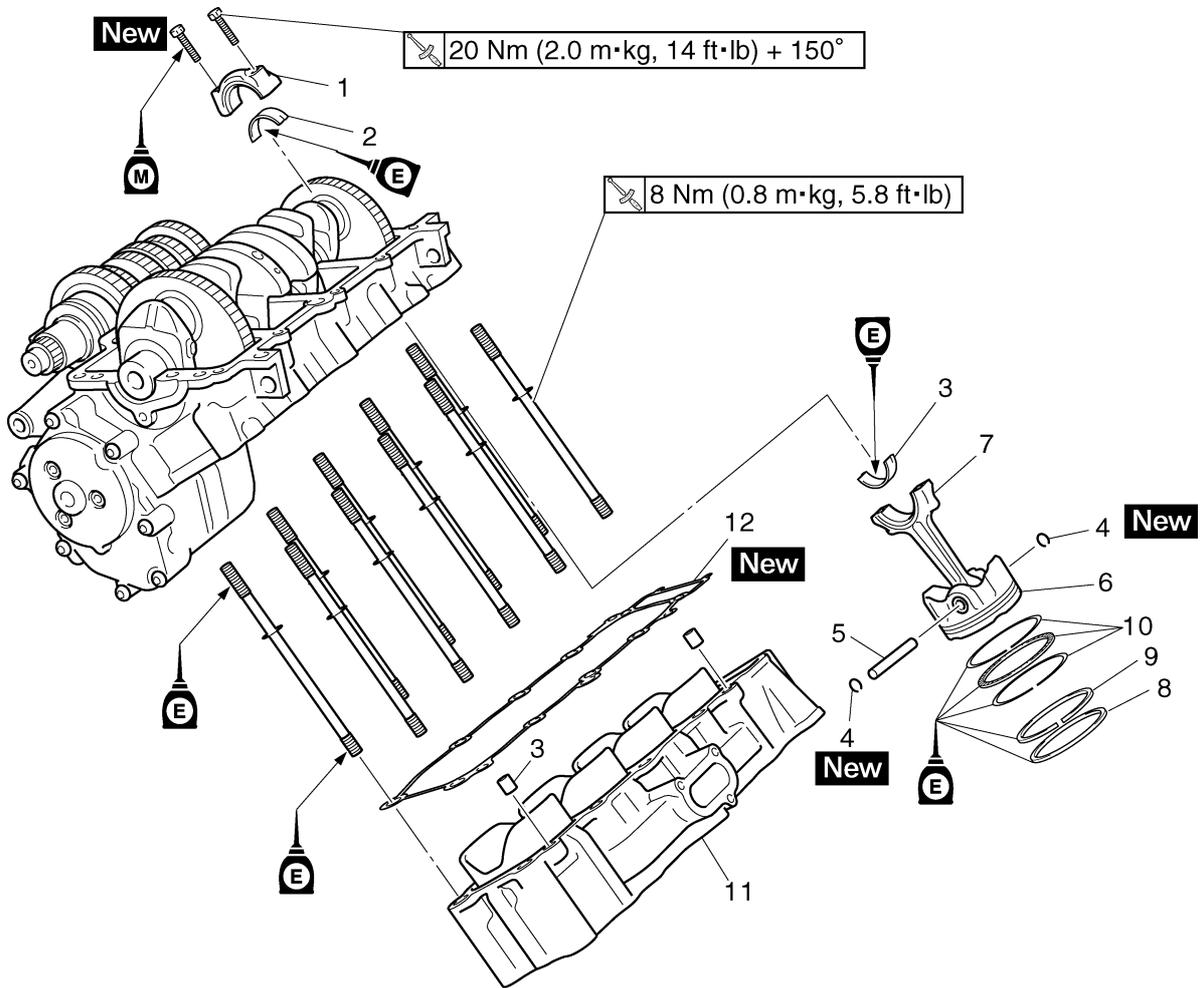
M9 x 105 mm (4.1 in) bolts: "1" – "10"  
 M8 x 60 mm (2.4 in) bolt: "11" LOCTITE®  
 M8 x 60 mm (2.4 in) bolts: "12", "16"  
 M6 x 70 mm (2.8 in) bolts: "19", "21", "23"  
 M6 x 65 mm (2.5 in) bolts: "17", "18"  
 M6 x 60 mm (2.4 in) bolt and washer: "22"  
 M6 x 60 mm (2.4 in) bolts: "24", "25"  
 M6 x 50 mm (2.0 in) bolts: "20", "26"  
 M8 x 50 mm (2.0 in) bolts: "13" – "15"

# CRANKSHAFT

EAS25950

## CRANKSHAFT

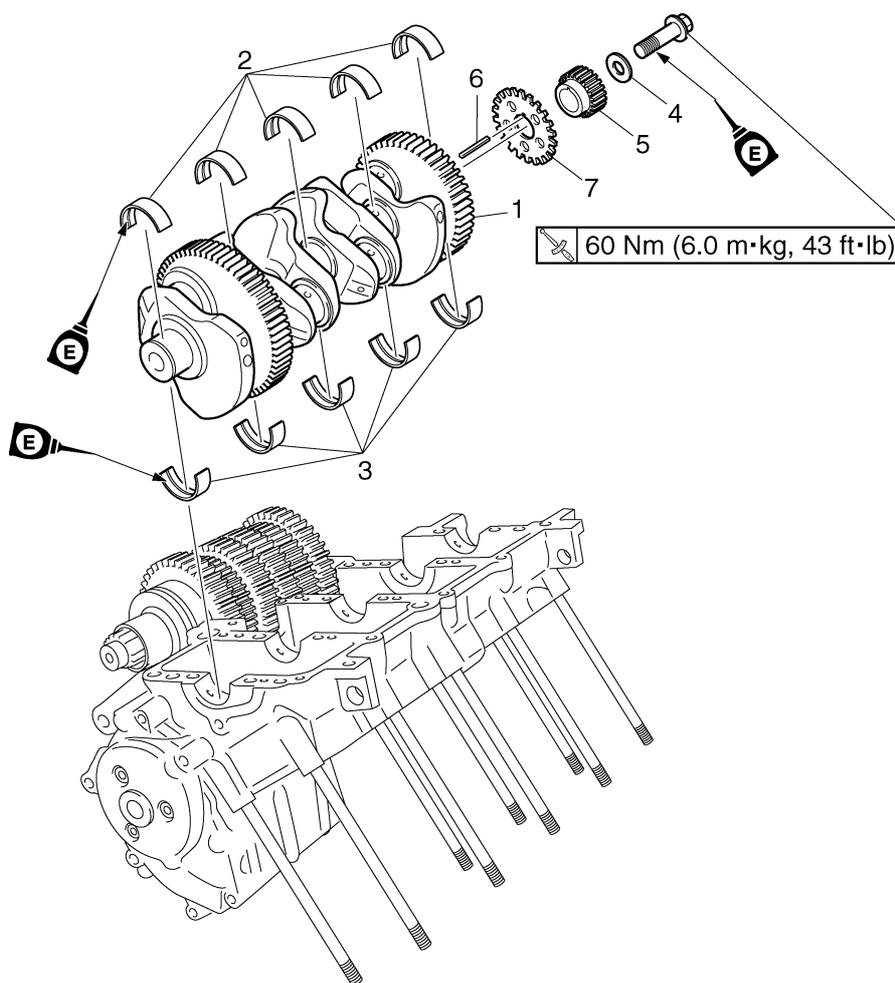
### Removing the connecting rods and pistons



Order	Job/Parts to remove	Q'ty	Remarks
	Lower crankcase		Refer to "CRANKCASE" on page 5-66.
1	Connecting rod cap	4	
2	Big end lower bearing	4	
3	Big end upper bearing	4	
4	Piston pin clip	8	
5	Piston pin	4	
6	Piston	4	
7	Connecting rod	4	
8	Top ring	4	
9	2nd ring	4	
10	Oil ring	4	
11	Cylinder	1	
12	Cylinder gasket	1	
			For installation, reverse the removal procedure.

# CRANKSHAFT

## Removing the crankshaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-66.
	Connecting rod and connecting rod caps		Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-72.
1	Crankshaft	1	
2	Crankshaft journal lower bearing	5	
3	Crankshaft journal upper bearing	5	
4	Washer	1	
5	Crankshaft drive gear	1	
6	Pin	1	
7	Pickup rotor	1	
			For assembly, reverse the disassembly procedure.

# CRANKSHAFT

EAS26030

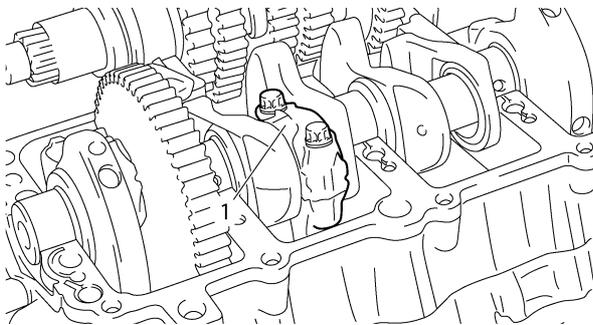
## REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

1. Remove:
  - Connecting rod cap "1"
  - Big end bearings

### NOTE:

- Identify the position of each big end bearing so that it can be reinstalled in its original place.
- After removing the connecting rods and connecting rod caps, care should be taken not to damage the mating surfaces of the connecting rods and connecting rod caps.



2. Remove:
  - Cylinder
  - Cylinder gasket
  - Cylinder stud bolts
3. Remove:
  - Piston pin clips "1"
  - Piston pin "2"
  - Piston "3"

EC2D1006

### CAUTION:

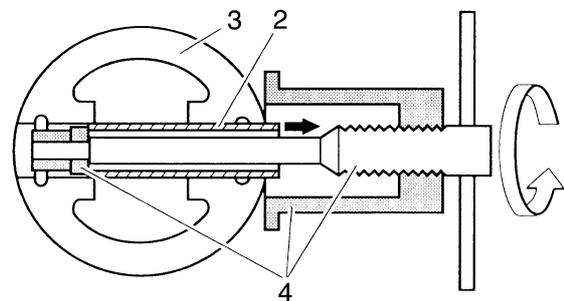
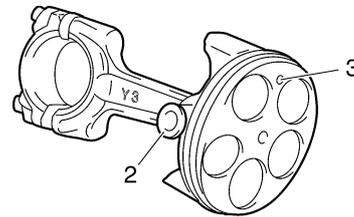
**Do not use a hammer to drive the piston pin out.**

### NOTE:

- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are debarred and the piston pin is still difficult to remove, remove it with the piston pin puller set "4".



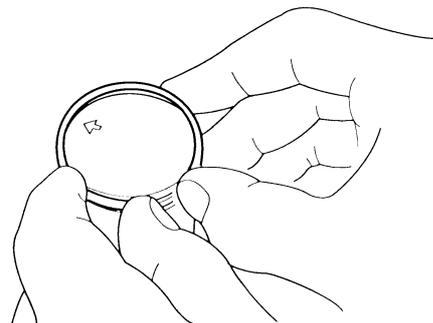
**Piston pin puller set**  
**90890-01304**  
**Piston pin puller**  
**YU-01304**



4. Remove:
  - Top ring
  - 2nd ring
  - Oil ring

### NOTE:

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EAS25980

## REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:
  - Crankshaft assembly
  - Crankshaft journal upper bearings (from the upper crankcase)

Refer to "CRANKSHAFT" on page 5-70.

# CRANKSHAFT

**NOTE:**

Identify the position of each crankshaft journal upper bearing so that it can be reinstalled in its original place.

ET2D1032

**CHECKING THE CYLINDER AND PISTON**

1. Check:

- Piston wall
- Cylinder wall  
Vertical scratches → Replace the cylinder, and the piston and piston rings as a set.

2. Measure:

- Piston-to-cylinder clearance



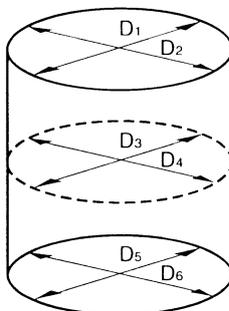
a. Measure cylinder bore "C" with the cylinder bore gauge.

**NOTE:**

Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

Cylinder bore "C"	77.00 – 77.01 mm (3.0315 – 3.0319 in)
Wear limit	77.06 mm (3.03 in)
Taper limit "T"	0.005 mm (0.0002 in)
Out of round "R"	0.005 mm (0.0002 in)

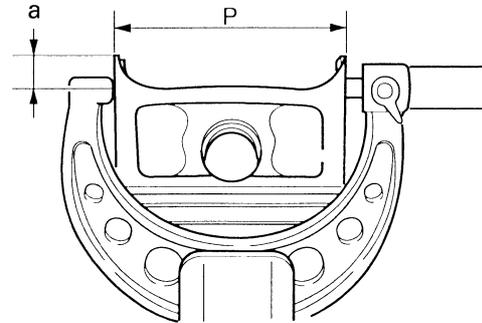
"C"	= maximum of D <sub>1</sub> – D <sub>6</sub>
"T"	= maximum of D <sub>1</sub> or D <sub>2</sub> – maximum of D <sub>5</sub> or D <sub>6</sub>
"R"	= maximum of D <sub>1</sub> D <sub>3</sub> or D <sub>5</sub> – minimum of D <sub>2</sub> D <sub>4</sub> or D <sub>6</sub>



- b. If out of specification, replace the cylinder, and the pistons and piston rings as a set.
- c. Measure piston skirt diameter "P" with the micrometer.

4 mm (0.16 in) "a" from the bottom edge of the piston

**Piston size "P"**  
76.975 - 76.990 mm  
(3.0305 - 3.0311 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**  
0.010–0.035 mm  
(0.0004–0.0014 in)  
Limit: 0.120 mm (0.0047 in)

- f. If out of specification, replace the cylinder, and the piston and piston rings as a set.



ET2D1015

**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

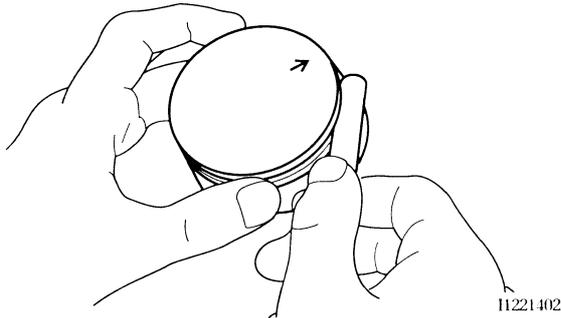
0.115 mm (0.0045 in)

### 2nd ring

0.020–0.055 mm  
(0.0008–0.0022 in)

### Limit

0.115 mm (0.0045 in)



11221402

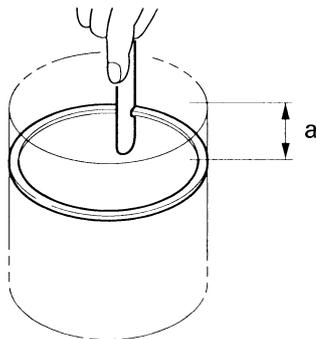
## 2. Install:

- Piston ring  
(into the cylinder)

### NOTE:

Level the piston ring into the cylinder with the piston crown.

5 mm (0.20 in) "a"



11221401

## 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

0.30–0.45 mm  
(0.0118–0.0177 in)

### Limit

0.80 mm (0.0315 in)

### Oil ring

0.10–0.40 mm  
(0.0039–0.0157 in)

ET2D1016

## CHECKING THE PISTON PINS

The following procedure applies to all of the piston pins.

## 1. Check:

- Piston pin  
Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.

## 2. Measure:

- Piston pin outside diameter "a"  
Out of specification → Replace the piston pin.

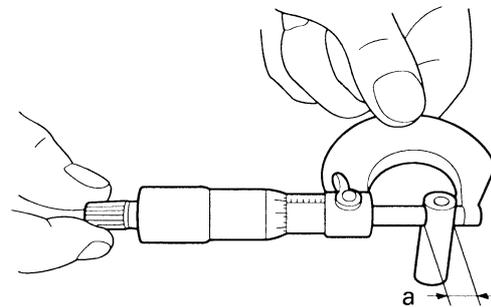


## Piston pin bore outside diameter

16.991–17.000 mm  
(0.6689–0.6693 in)

### Limit

16.971 mm (0.6682 in)

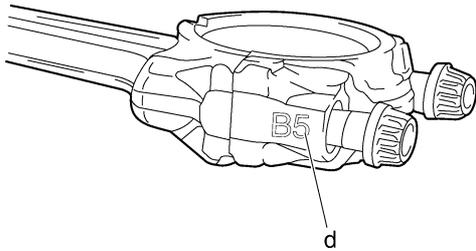
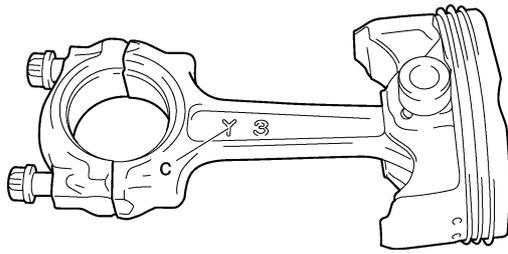


## 3. Measure:

- Piston pin bore inside diameter "b"  
Out of specification → Replace the piston.



# CRANKSHAFT



e. Tighten the connecting rod bolts.

**NOTE:**

Install by carrying out the following procedures in order to assemble in the most suitable condition.



**Connecting rod bolt**  
29.4 Nm (3.0 m·kg, 21 ft·lb)

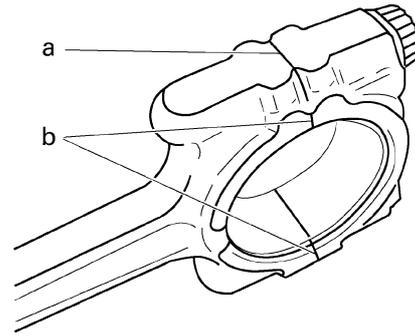
**NOTE:**

- First, tighten the bolts to 15 Nm (1.5 m·kg, 11 ft·lb).
- Retighten the bolts to 29.4 Nm (3.0 m·kg, 21 ft·lb).

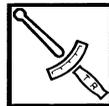
- f. Replace the connecting rod bolts with new ones.
- g. Clean the connecting rod bolts.
- h. After installing big end bearing, assemble the connecting rod and connecting rod cap once using a single unit of the connecting rod.
- i. Tighten the connecting rod bolt while checking that the sections shown "a" and "b" are flush with each other by touching the surface.
- Side machined face "a"
  - Thrusting faces (4 places at front and rear) "b"

**NOTE:**

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



- j. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.
- k. Tighten the connecting rod bolts.



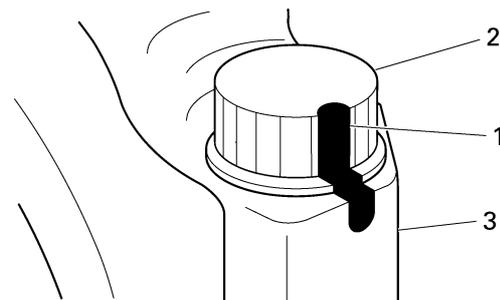
**Connecting rod bolt**  
20 Nm (2.0 m·kg, 14 ft·lb)  
+150°

EC2D1014

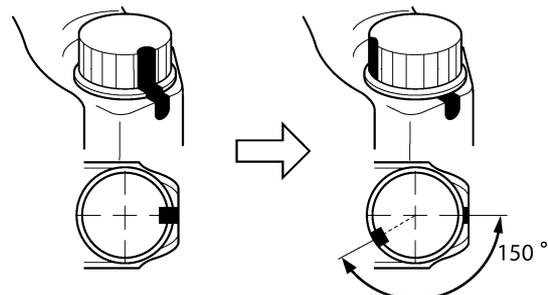
**CAUTION:**

**Tighten the connecting rod bolts using the plastic-region tightening angle method.**

- l. Clean the connecting rod bolts.
- m. Tighten the connecting rod bolts.
- n. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod "3".



- o. Tighten the bolt further to reach the specified angle (150°).



# CRANKSHAFT

p. After the installation, check that the section shown "a" is flush with each other by touching the surface.

- Side machined face "a"

EWA13120

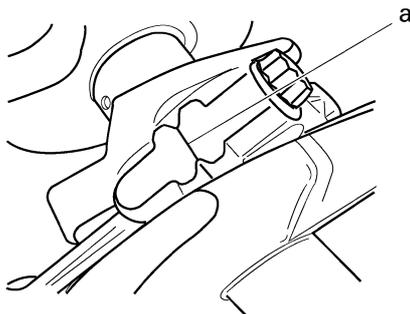
## ⚠ WARNING

- **When the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Replace the bolt with a new one and perform the procedure again.**
- **If they are not flush with each other, remove the connecting rod bolt and big end bearing and restart from step "e". In this case, make sure to replace the connecting rod bolt.**

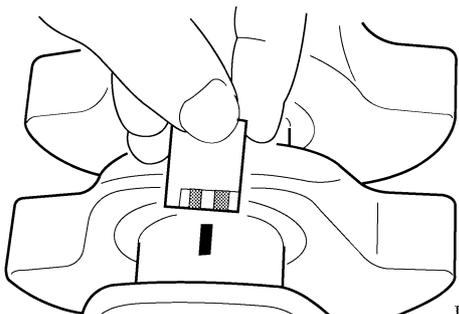
EC2D1015

## CAUTION:

- **Do not use a torque wrench to tighten the nut to the specified angle.**
- **Tighten the bolt until it is at the specified angles.**



- q. Remove the connecting rod and big end bearings.  
Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-72.
- r. Measure the compressed Plastigauge® width on the crankshaft pin.  
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



11630702



2. Select:

- Big end bearings (P1 – P4)

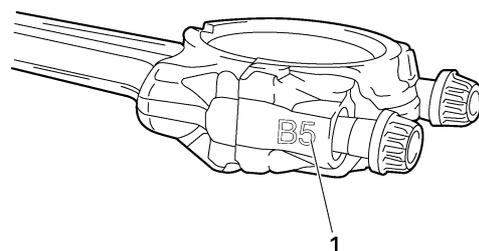
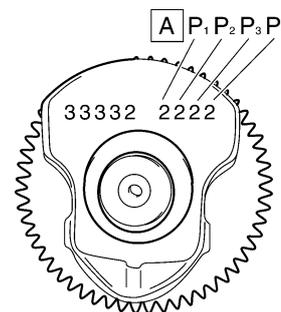
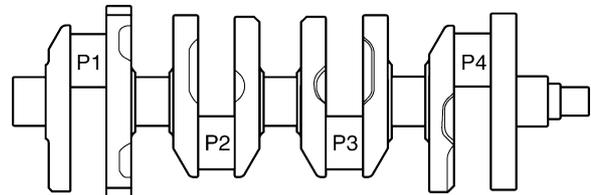
## NOTE:

- The numbers "A" stamped into the crankshaft web and the numbers "1" on the connecting rods are used to determine the replacement big end bearings sizes.
- "P1" - "P4" refer to the bearings shown in the crankshaft illustration.

For example, if the connecting rod "P<sub>1</sub>" and the crankshaft web "P<sub>1</sub>" numbers are "5" and "2" respectively, then the bearing size for "P<sub>1</sub>" is:

"P <sub>1</sub> " (connecting rod) – "P <sub>1</sub> " (crankshaft) = 5 – 2 = 3 (brown)
---

BIG END BEARING COLOR CODE	
1	Blue
2	Black
3	Brown
4	Green



# CRANKSHAFT

EAS26190

## INSTALLING THE CONNECTING ROD AND PISTON

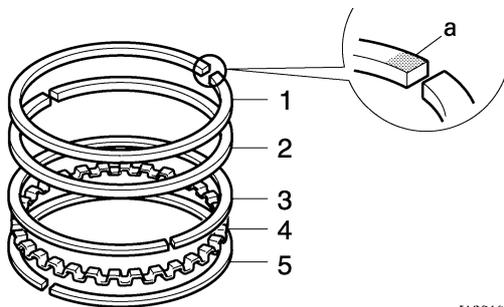
The following procedure applies to all of the connecting rods and pistons.

### 1. Install:

- Top ring "1"
- 2nd ring "2"
- Upper oil ring rail "3"
- Oil ring expander "4"
- Lower oil ring rail "5"

### NOTE:

Be sure to install the piston rings so that the manufacturer's marks or numbers "a" face up.



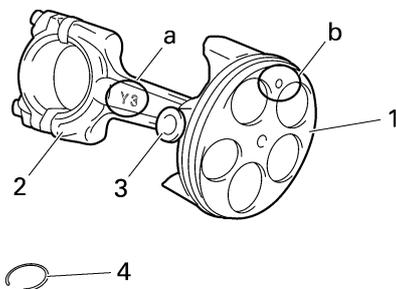
I1221301

### 2. Install:

- Piston "1"
- (onto the respective connecting rod "2")
- Piston pin "3"
- Piston pin clip "4" **New**

### NOTE:

- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark "a" on the connecting rod faces left when the arrow mark "b" on the piston is pointing up as shown.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).



### 3. Lubricate:

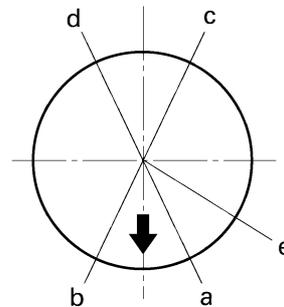
- Piston
- Piston rings
- Cylinder

(with the recommended lubricant)



### 4. Offset:

- Piston ring end gaps



I1221202

- a. Top ring
- b. Lower oil ring rail
- c. Upper oil ring rail
- d. 2nd ring
- e. Oil ring expander

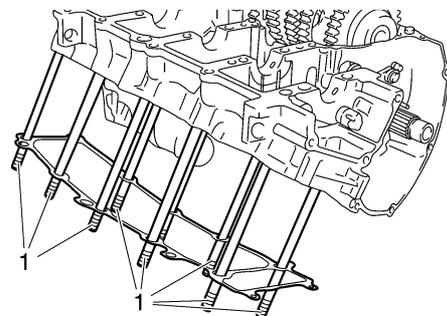
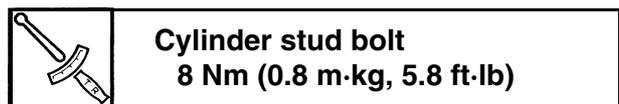
### 5. Lubricate:

- Crankshaft pins
- Big end bearings
- Connecting rod big end inner surface (with the recommended lubricant)



### 6. Check:

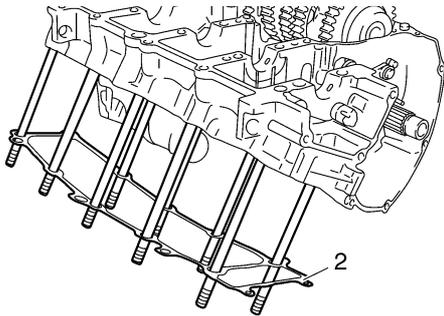
- Cylinder stud bolts "1"



### 7. Install:

- Cylinder gasket "2" **New**

# CRANKSHAFT

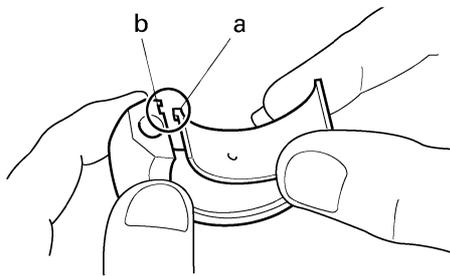


## 8. Install:

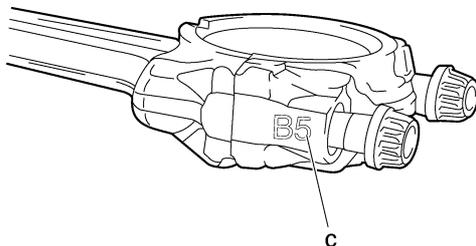
- Big end bearings  
(onto the connecting rods and connecting rod caps)

### NOTE:

- Align the projections “a” on the big end bearings with the notches “b” in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- Make sure that the characters “c” on both the connecting rod and connecting rod cap are aligned.



11630301



## 9. Tighten:

- Connecting rod bolts

	<p><b>Connecting rod bolt</b> <b>29.4 Nm (3.0 m·kg, 21 ft·lb)</b></p>
---	---

### NOTE:

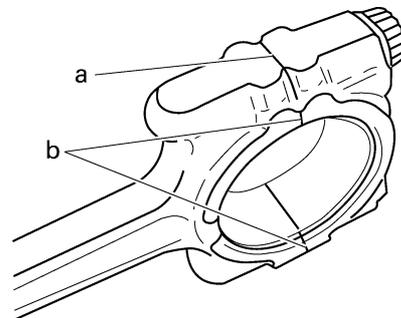
- Install by carrying out the following procedures in order to assemble in the most suitable condition.
- First tighten the bolts to 15 Nm (1.5 m·kg, 11 ft·lb)
- Retighten the bolts to 29.4 Nm (3.0 m·kg, 21 ft·lb)



- Replace the connecting rod bolts with new ones.
- Clean the connecting rod bolts.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap once using a single unit of the connecting rod.
- Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.

### NOTE:

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



- Side machined face
- Thrusting faces (4 places at front and rear)
- Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.



## 10. Install:

- Piston assemblies “1”  
(into the cylinder)

### NOTE:

While compressing the piston rings with one hand, install the connecting rod assembly into the cylinder with the other hand.

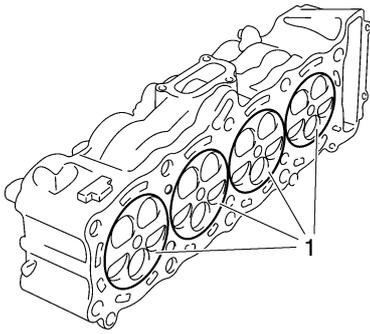
# CRANKSHAFT

ECA14980

**CAUTION:**

**Tighten the connecting rod bolts using the plastic-region tightening angle method.**

- Clean the connecting rod bolts.
- Tighten the connecting rod bolts.
- Put a mark "1" on the connecting rod bolt "2" and the connecting rod cap "3".

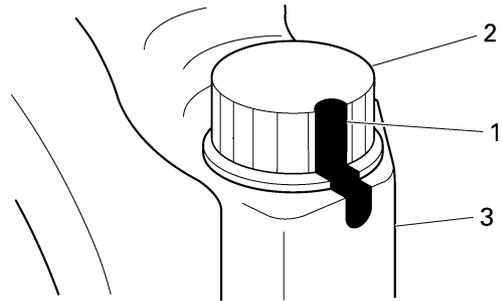


**11. Install:**

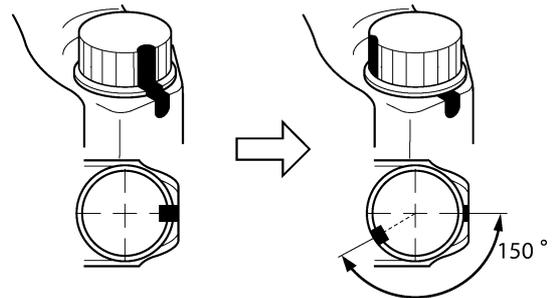
- Cylinder assembly "1"
- Connecting rod caps "2"

**NOTE:**

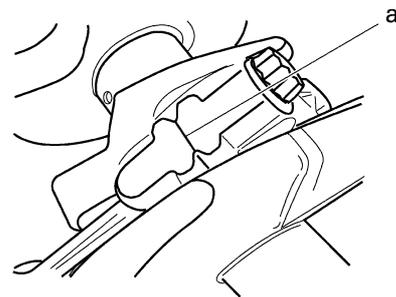
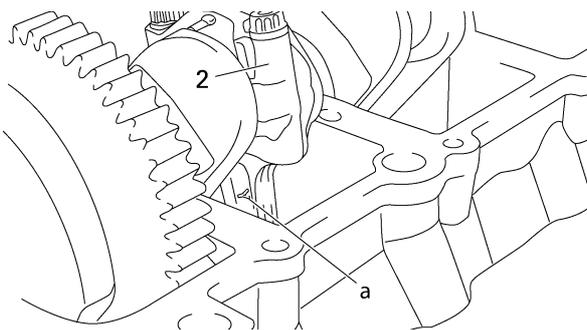
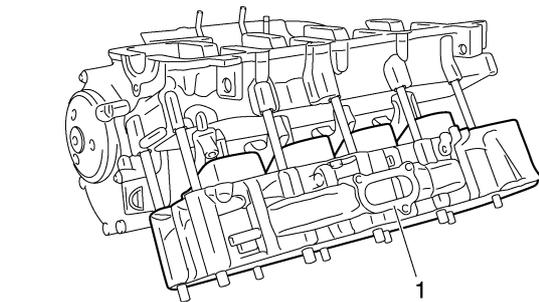
- Make sure that the "Y" marks "a" on the connecting rods face towards the left side of the crankshaft.
- Make sure that the characters on both the connecting rod and connecting rod cap are aligned.



- Tighten the bolt further to reach the specified angle (150°).



- After the installation, check that the section shown "a" is flush with each other by touching the surface.



**12. Tighten:**

- Connecting rod bolts

	<p><b>Connecting rod bolt</b>  <b>20 Nm (2.0 m·kg, 14 ft·lb)+150°</b></p>
---	---

a. Side machined face

EWA13990

**WARNING**

- When the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Replace the bolt with a new one and perform the procedure again.

- If they are not flush with each other, remove the connecting rod bolt and big end bearing and restart from step “9”. In this case, make sure to replace the connecting rod bolt.

ECA14680

**CAUTION:**

- Do not use a torque wrench to tighten the bolt to the specified angle.
- Tighten the bolt until it is at the specified angles.



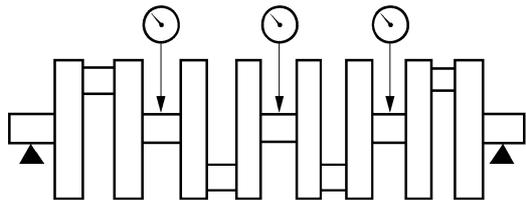
ET2D1018

**CHECKING THE CRANKSHAFT**

1. Measure:
  - Crankshaft runout  
Out of specification → Replace the crankshaft.



**Crankshaft runout**  
Less than 0.03 mm (0.0012 in)



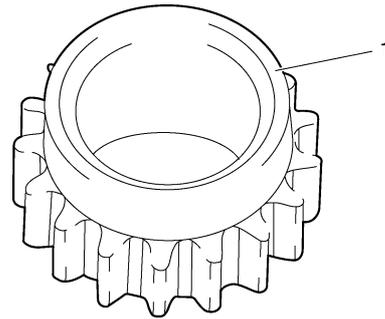
11631006

2. Check:
  - Crankshaft journal surfaces
  - Crankshaft pin surfaces
  - Bearing surfaces  
Scratches/wear → Replace the crankshaft.

ET2D1019

**CHECKING THE CRANKSHAFT DRIVE SPROCKET**

1. Check:
  - Crankshaft drive sprocket “1”  
Cracks/damage/wear → Replace the defective part(s).



ET2D1020

**CHECKING THE CRANKSHAFT JOURNAL BEARINGS**

1. Measure:
  - Crankshaft-journal-to-crankshaft-journal-bearing clearance  
Out of specification → Replace the crankshaft journal bearings.



**Crankshaft-journal-to-crankshaft-journal-bearing clearance**  
0.014–0.037 mm  
(0.0006–0.0015 in)  
**Limit**  
0.10 mm (0.0039 in)

EC2D1008

**CAUTION:**

**Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.**

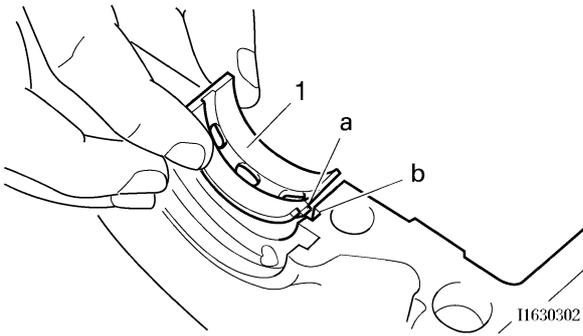


- a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
- b. Place the upper crankcase upside down on a bench.
- c. Install the crankshaft journal upper bearings “1” and the crankshaft into the upper crankcase.

**NOTE:**

Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the upper crankcase.

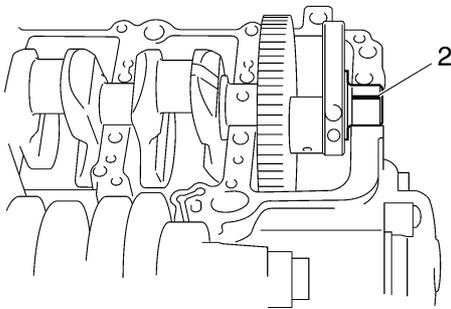
# CRANKSHAFT



- d. Put a piece of Plastigauge® “2” on each crankshaft journal.

**NOTE:**

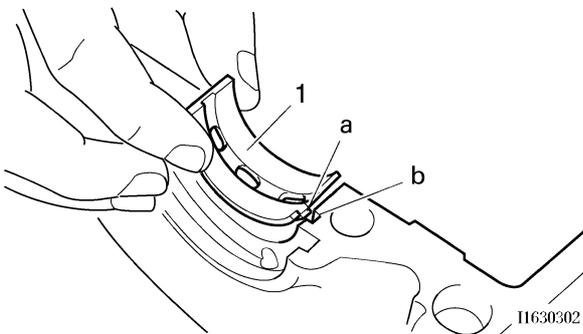
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



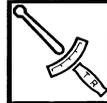
- e. Install the crankshaft journal lower bearings “1” into the lower crankcase and assemble the crankcase halves.

**NOTE:**

- Align the projections “a” of the crankshaft journal lower bearings with the notches “b” in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



- f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.



**Crankcase bolt**

**Bolt “1”–“10”**

**1st: 20 Nm (2.0 m·kg, 14 ft·lb)**

**2nd: 20 Nm (2.0 m·kg, 14 ft·lb)**

**3rd: +60°**

**Bolt “11”–“16”**

**24 Nm (2.4m·kg, 17 ft·lb)**

**Bolt “17”–“26”**

**12 Nm (1.2m·kg, 8.7 ft·lb)**

M9 x 105 mm (4.1 in) bolts: “1”–“10”

M8 x 60 mm (2.4 in) bolt: “11” LOCTITE®

M8 x 60 mm (2.4 in) bolts: “12”, “16”

M6 x 70 mm (2.8 in) bolts: “19”, “21”, “23”

M6 x 65 mm (2.5 in) bolts: “17”, “18”

M6 x 60 mm (2.4 in) bolt and washer: “22”

M6 x 60 mm (2.4 in) bolts: “24”, “25”

M6 x 50 mm (2.0 in) bolts: “20”, “26”

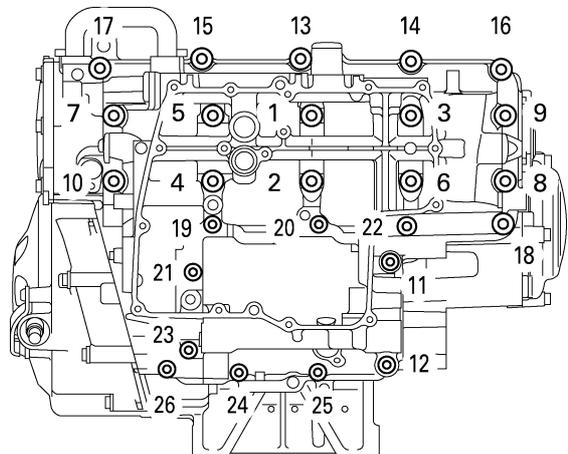
M8 x 50 mm (2.0 in) bolts: “13”–“15”

\* Following the tightening order, loosen the bolt one by one and then retighten it to the specific torque.

**NOTE:**

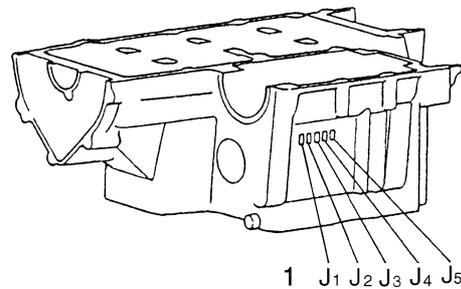
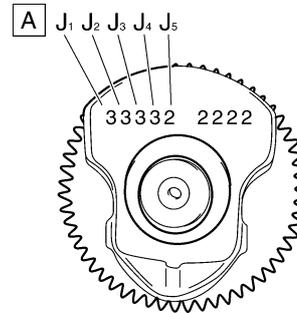
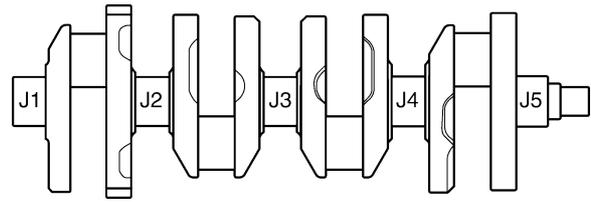
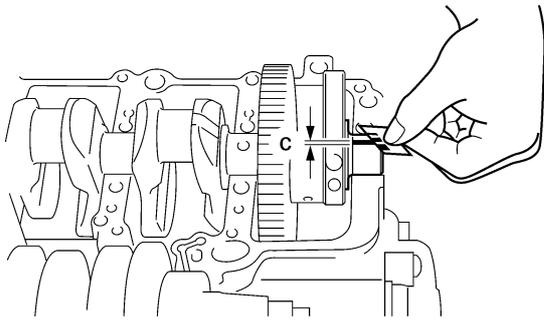
Lubricate the crankcase bolt threads with engine oil.

Refer to "CRANKCASE" on page 5-66.



- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- h. Measure the compressed Plastigauge® width “c” on each crankshaft journal. If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.

# CRANKSHAFT



## 2. Select:

- Crankshaft journal bearings (J1–J5)

### NOTE:

- The numbers “A” stamped into the crankshaft web and the numbers “1” stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- “J1–J5” refer to the bearings shown in the crankshaft illustration.
- If “J1–J5” are the same, use the same size for all of the bearings.
- If the size is the same for all “J<sub>1</sub> to J<sub>5</sub>” one digit for that size is indicated. (Crankcase side only)

For example, if the crankcase “J<sub>1</sub>” and crankshaft web “J<sub>1</sub>” numbers are “6” and “2” respectively, then the bearing size for “J<sub>1</sub>” is:

“J<sub>1</sub>” (crankcase) – “J<sub>1</sub>”  
(crankshaft web) – 1 =  
6 – 2 – 1 = 3 (brown)

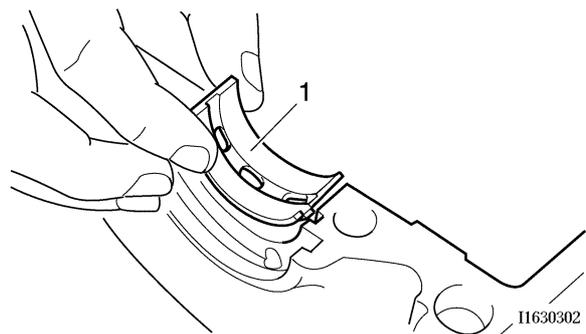
CRANKSHAFT JOURNAL BEARING COLOR CODE	
0	White
1	Blue
2	Black
3	Brown
4	Green

ET2D1021

## INSTALLING THE CRANKSHAFT

### 1. Install:

- Crankshaft journal upper bearings “1” (into the upper crankcase)



### 2. Lubricate:

- Crankshaft journal upper bearings (with the recommended lubricant)

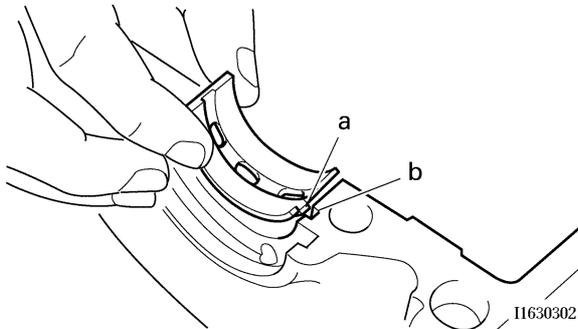
**Recommended lubricant**  
**Engine oil**

# CRANKSHAFT

---

**NOTE:**

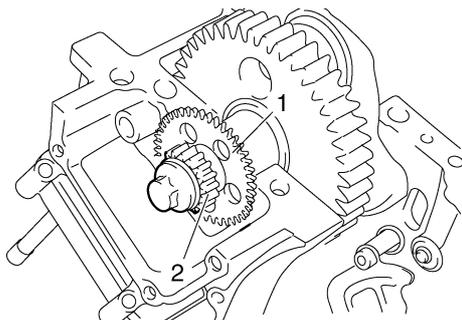
- Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the upper crankcase.
  - Be sure to install each crankshaft journal upper bearing in its original place.
- 



3. Install:
  - Crankshaft
4. Install:
  - Crankcase (lower)  
Refer to "CRANKCASE" on page 5-66.
5. Install:
  - Pin
  - Pickup rotor “1”
  - Drive sprocket “2”



**Drive sprocket bolt**  
**60 Nm (6.0 m·kg, 43 ft·lb)**

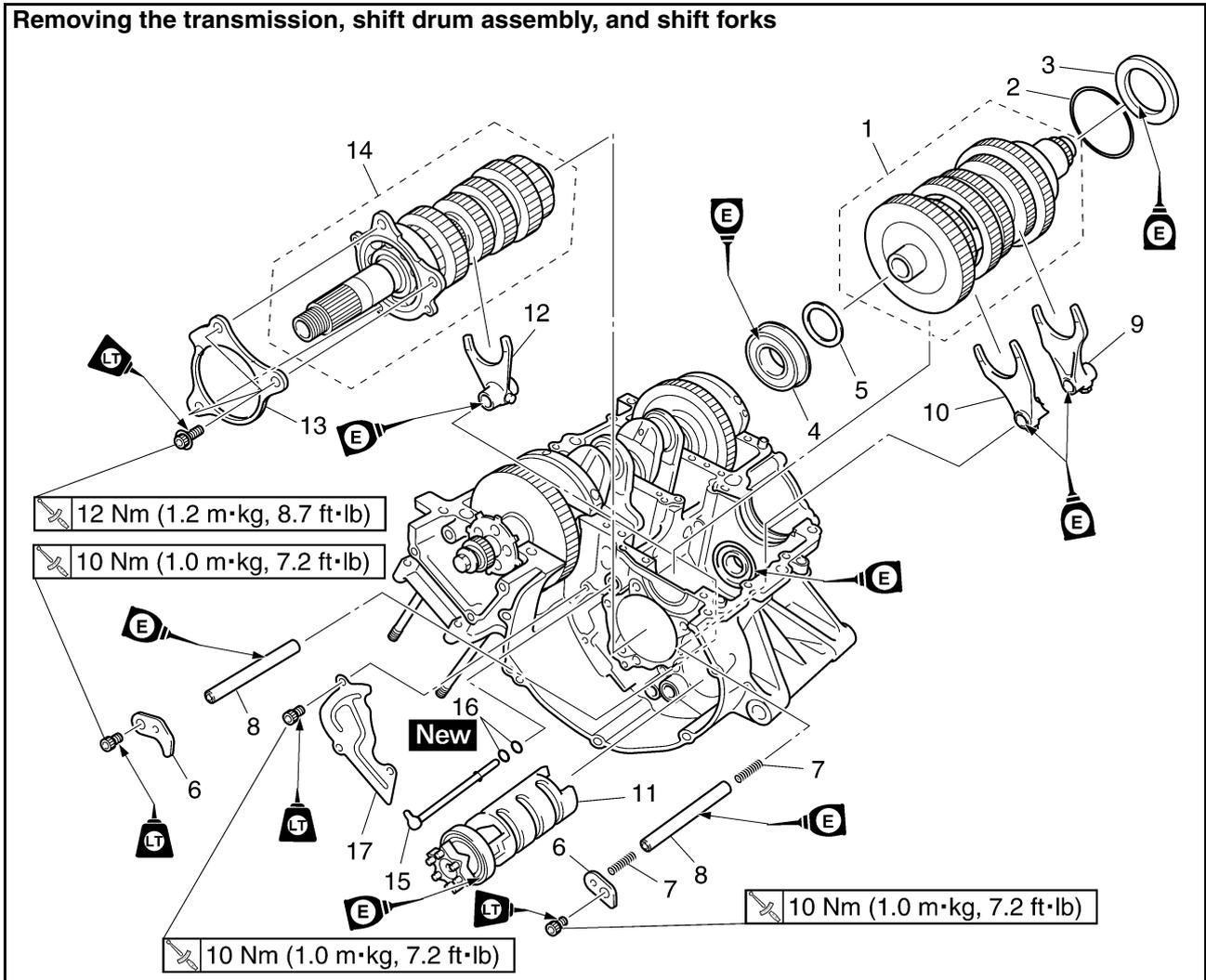


# TRANSMISSION

EAS26240

## TRANSMISSION

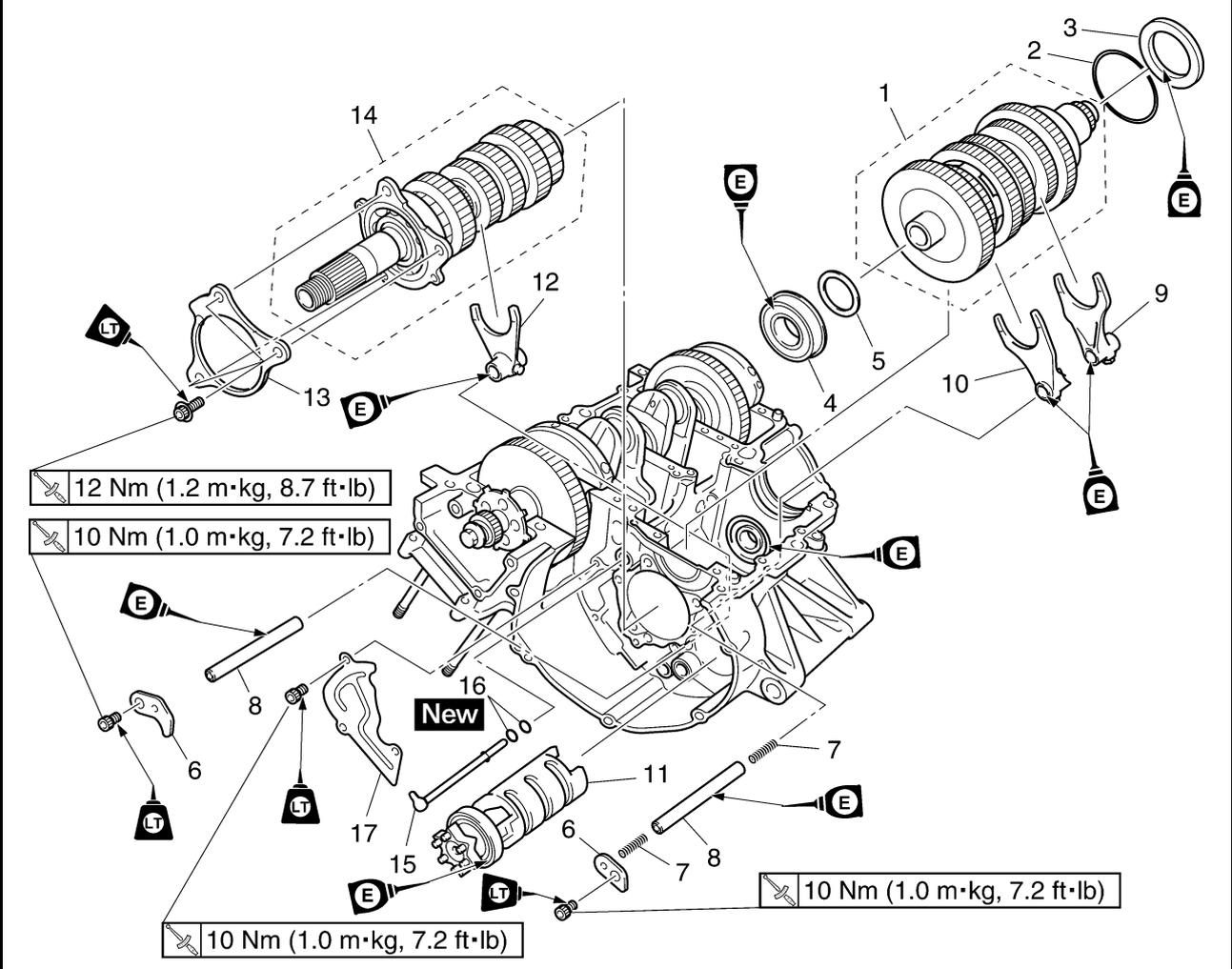
### Removing the transmission, shift drum assembly, and shift forks



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase lower		Separate. Refer to "CRANKCASE" on page 5-66.
1	Drive axle assembly	1	
2	Circlip	1	
3	Oil seal	1	
4	Bearing	1	
5	Washer	1	
6	Shift fork guide bar retainer	2	
7	Spring	2	
8	Shift fork guide bar	2	
9	Shift fork "L"	1	
10	Shift fork "R"	1	
11	Shift drum assembly	1	
12	Shift fork "C"	1	
13	Main axle retainer	1	

# TRANSMISSION

## Removing the transmission, shift drum assembly, and shift forks

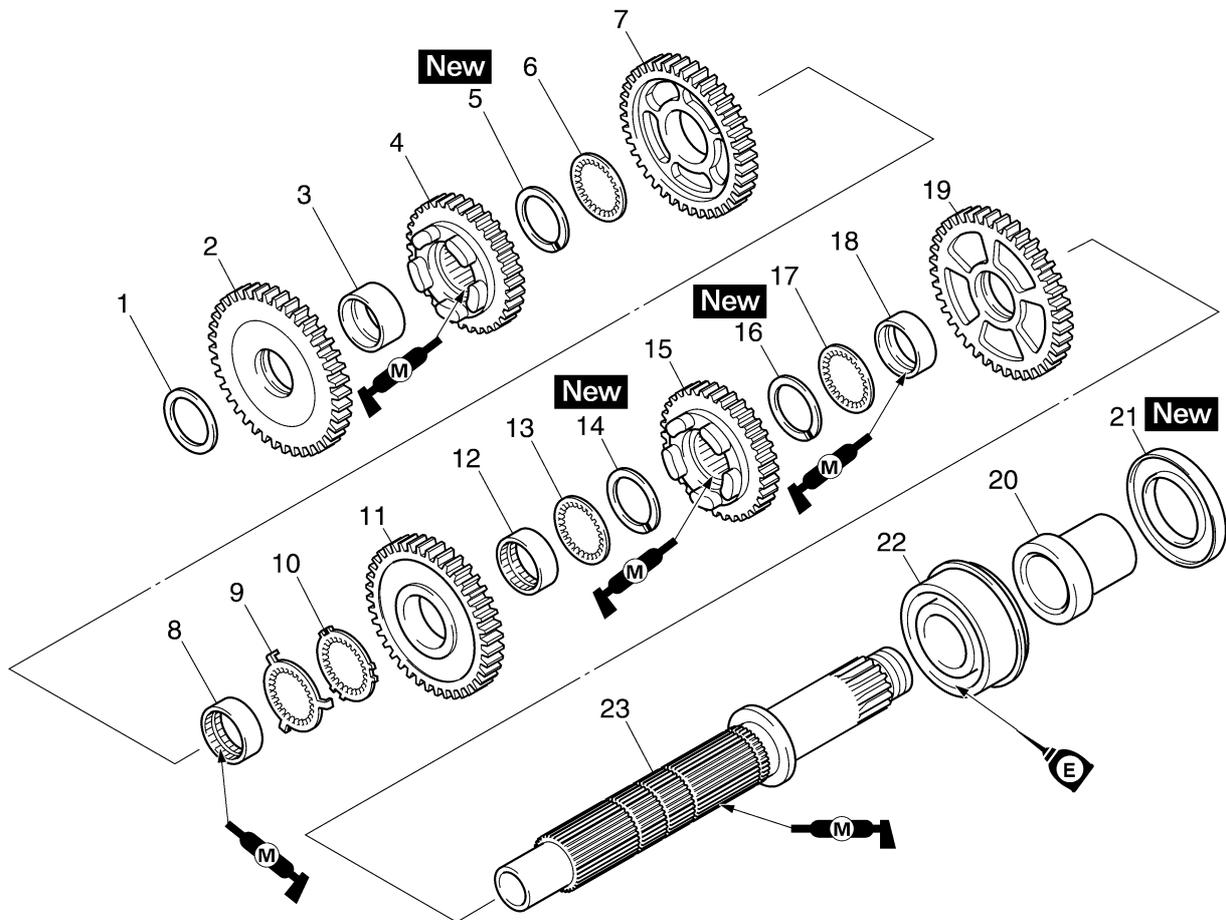


Order	Job/Parts to remove	Q'ty	Remarks
14	Main axle assembly	1	
15	Oil pipe	1	
16	O-ring	2	
17	Oil baffle plate	1	
			For installation, reverse the removal procedure.



# TRANSMISSION

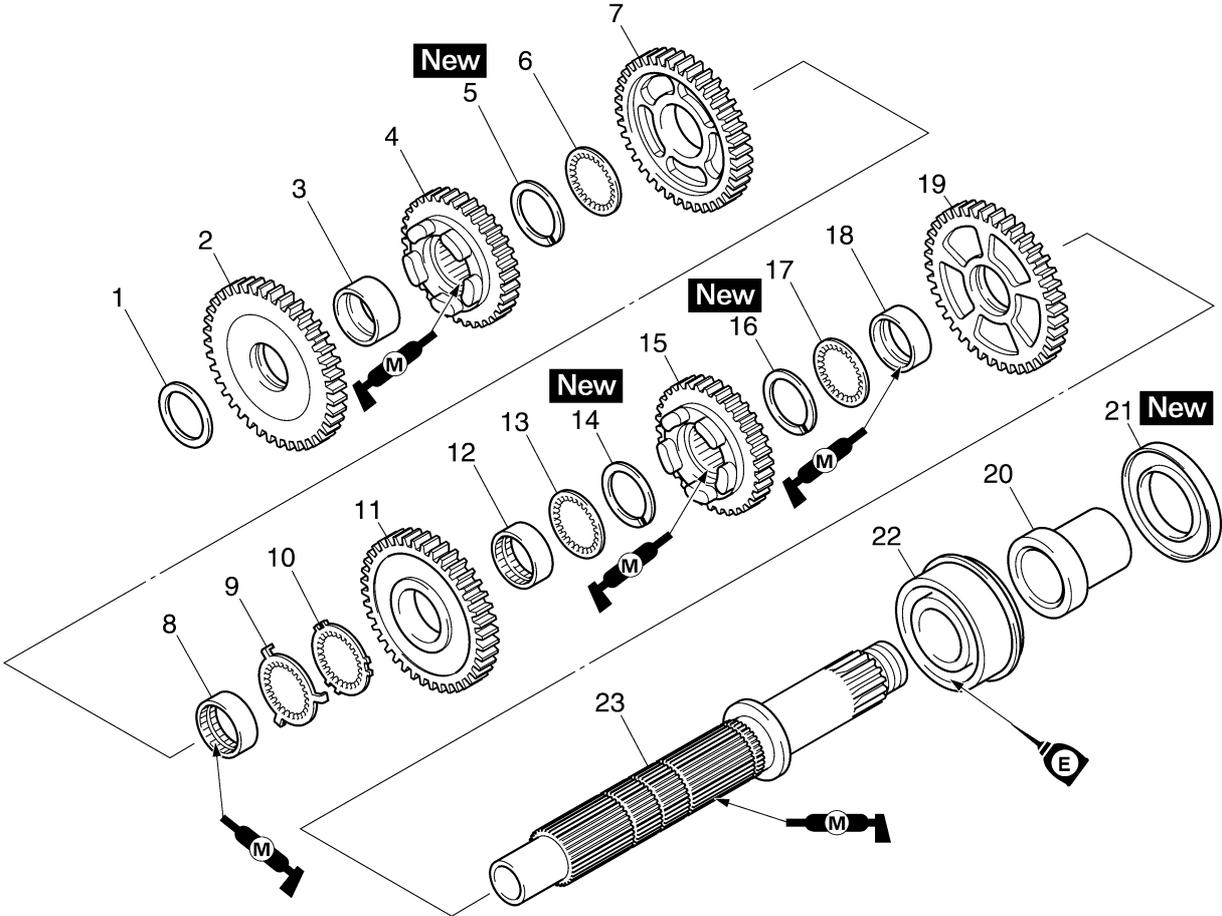
## Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Washer	1	
2	1st wheel gear	1	
3	Collar	1	
4	5th wheel gear	1	
5	Circlip	1	
6	Washer	1	
7	3rd wheel gear	1	
8	Collar	1	
9	Toothed lock washer	1	
10	Toothed lock washer retainer	1	
11	4th wheel gear	1	
12	Collar	1	
13	Washer	1	
14	Circlip	1	
15	6th wheel gear	1	
16	Circlip	1	
17	Washer	1	
18	Collar	1	
19	2nd wheel gear	1	
20	Collar	1	

# TRANSMISSION

## Disassembling the drive axle assenbly

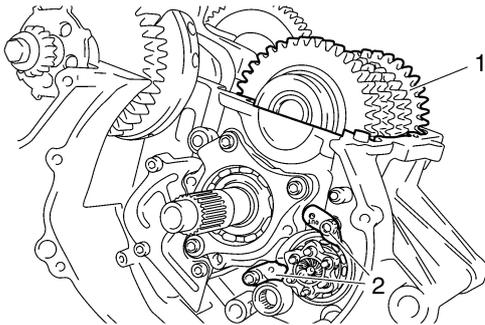
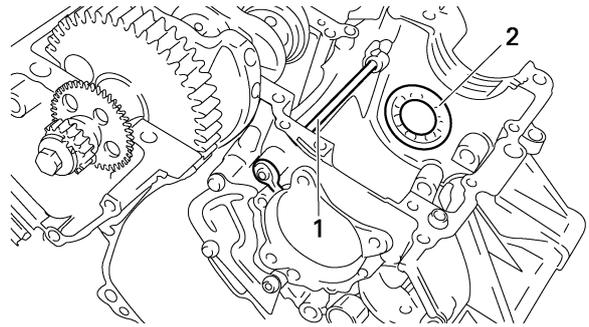


Order	Job/Parts to remove	Q'ty	Remarks
21	Oil seal	1	
22	Bearing	1	
23	Drive axle	1	
			For assembly, reverse the disassembly procedure.

EAS26250

## REMOVING THE TRANSMISSION

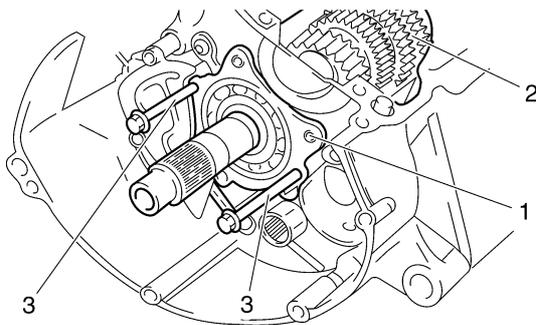
1. Remove:
  - Drive axle asseembly "1"
  - Shift drum retainers "2"
  - Shift fork guide bars
  - Shift fork "L" and "R"
  - Shift drum assembly
  - Shift fork "C"



2. Remove:
  - Bearing housing "1"
  - Main axle assembly "2"



- a. Insert two bolts "3" of the proper size, as shown in the illustration, into the main axle assembly bearing housing.



- b. Tighten the bolts until they contact the crankcase surface.
- c. Continue tightening the bolts until the main axle assembly comes free from the upper crankcase.



3. Remove:
  - Oil pipe "1"
  - Bearing "2"

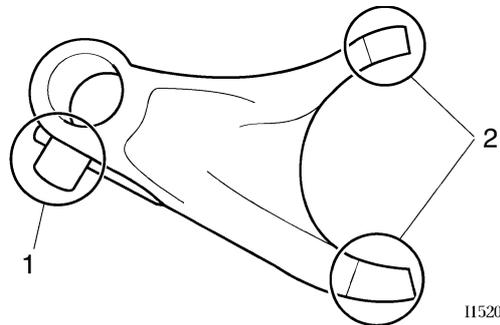
EAS26260

## CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

1. Check:
  - Shift fork cam follower "1"
  - Shift fork pawl "2"

Bends/damage/scoring/wear → Replace the shift fork.



I1520202

2. Check:
  - Shift fork guide bar

Roll the shift fork guide bar on a flat surface.

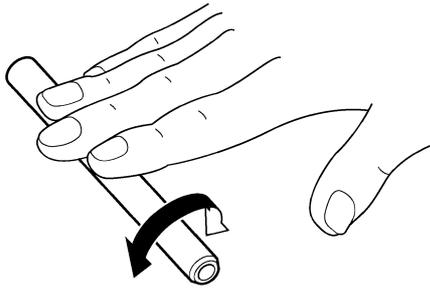
Bends → Replace.

EWA12840



**Do not attempt to straighten a bent shift fork guide bar.**

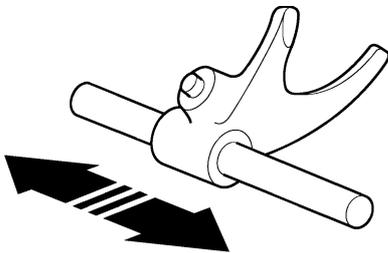
# TRANSMISSION



I1520401

### 3. Check:

- Shift fork movement (along the shift fork guide bar)  
Rough movement → Replace the shift forks and shift fork guide bar as a set.



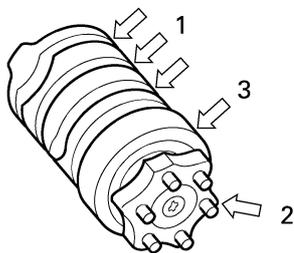
I1520101

EAS26270

## CHECKING THE SHIFT DRUM ASSEMBLY

### 1. Check:

- Shift drum grooves "1"  
Damage/scratches/wear → Replace the shift drum assembly.
- Shift drum segment "2"  
Damage/wear → Replace the shift drum assembly.
- Shift drum bearing "3"  
Damage/pitting → Replace the shift drum assembly.



EAS26280

## CHECKING THE TRANSMISSION

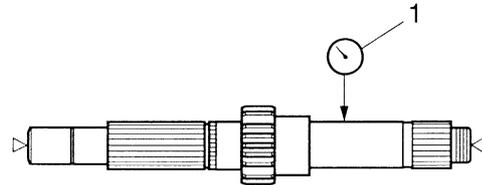
### 1. Measure:

- Main axle runout (with a centering device and dial gauge "1")

Out of specification → Replace the main axle.



**Main axle runout limit**  
**0.08 mm (0.0032 in)**



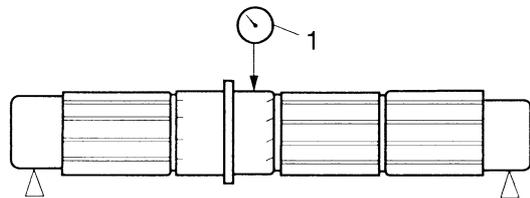
I1650702

### 2. Measure:

- Drive axle runout (with a centering device and dial gauge "1")  
Out of specification → Replace the drive axle.



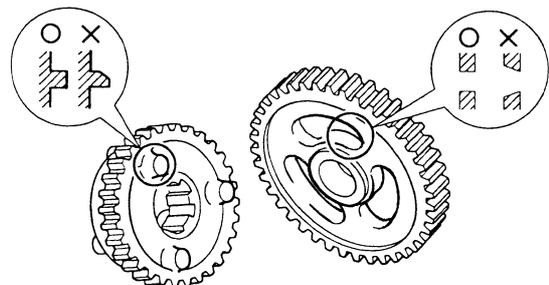
**Drive axle runout limit**  
**0.08 mm (0.0032 in)**



I1650701

### 3. Check:

- Transmission gears  
Blue discoloration/pitting/wear → Replace the defective gear(s).
- Transmission gear dogs  
Cracks/damage/rounded edges → Replace the defective gear(s).



# TRANSMISSION

ET2D1022

## INSTALLING THE TRANSMISSION

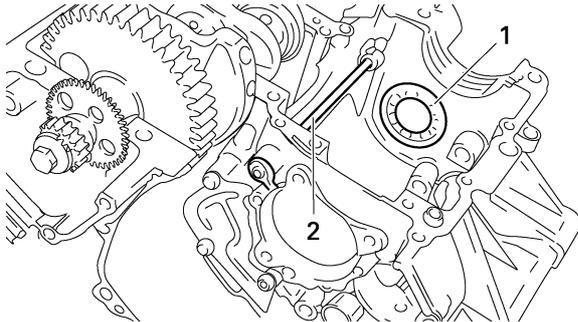
### 1. Install:

- Bearing "1"

### NOTE:

Make the seal side of bearing face to the outside and install it close to the right end face of the crankcase.

- Oil pipe "2"



### 2. Install:

- Main axle assembly "1"
- Bearing housing "2"



**Bearing housing bolt**  
**12 Nm (1.2 m·kg, 8.7 ft·lb)**  
**LOCTITE®**

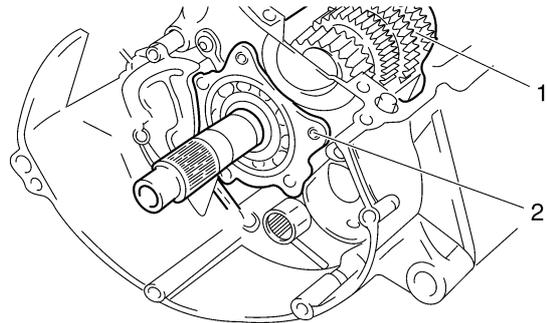
- Shift fork "C"
- Shift drum assembly
- Shift fork guide bar
- Shift fork guide bar retainer



**Shift fork guide bar retainer bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**  
**LOCTITE®**

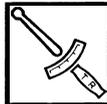
### NOTE:

- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: "R", "C", "L".
- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork "C" into the groove in the 3rd and 4th pinion gear on the main axle.



### 3. Install:

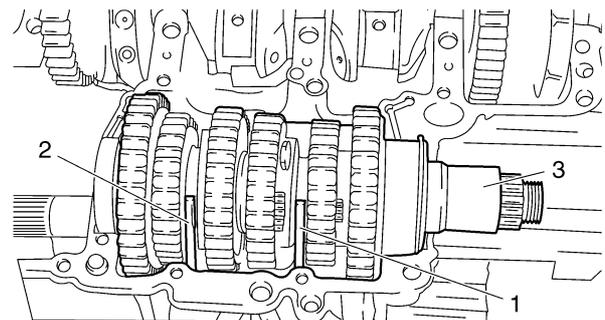
- Shift fork "L" "1" and "R" "2"
- Drive axle assembly "3"
- Shift fork guide bar
- Shift fork guide bar retainer "4"

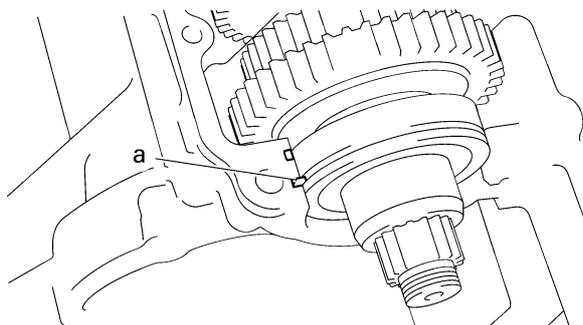
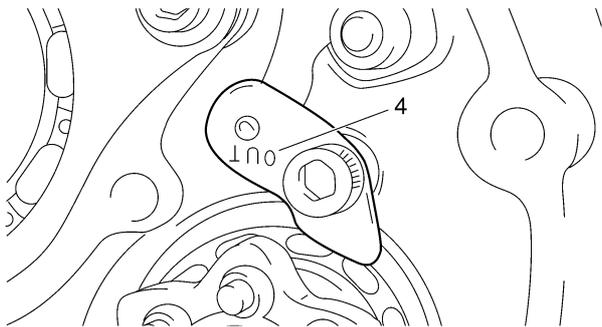


**Shift fork guide bar retainer bolt**  
**10 Nm (1.0 m·kg, 7.2 ft·lb)**  
**LOCTITE®**

### NOTE:

- Install shift fork "L" into the groove in the 6th wheel gear and shift fork "R" into the groove in the 5th wheel gear on the drive axle.
- Make sure that the drive axle bearing circlip "a" is inserted into the grooves in the upper crankcase.





4. Check:
- Transmission  
Rough movement → Repair.

**NOTE:** \_\_\_\_\_  
Oil each gear, shaft, and bearing thoroughly.

---

---

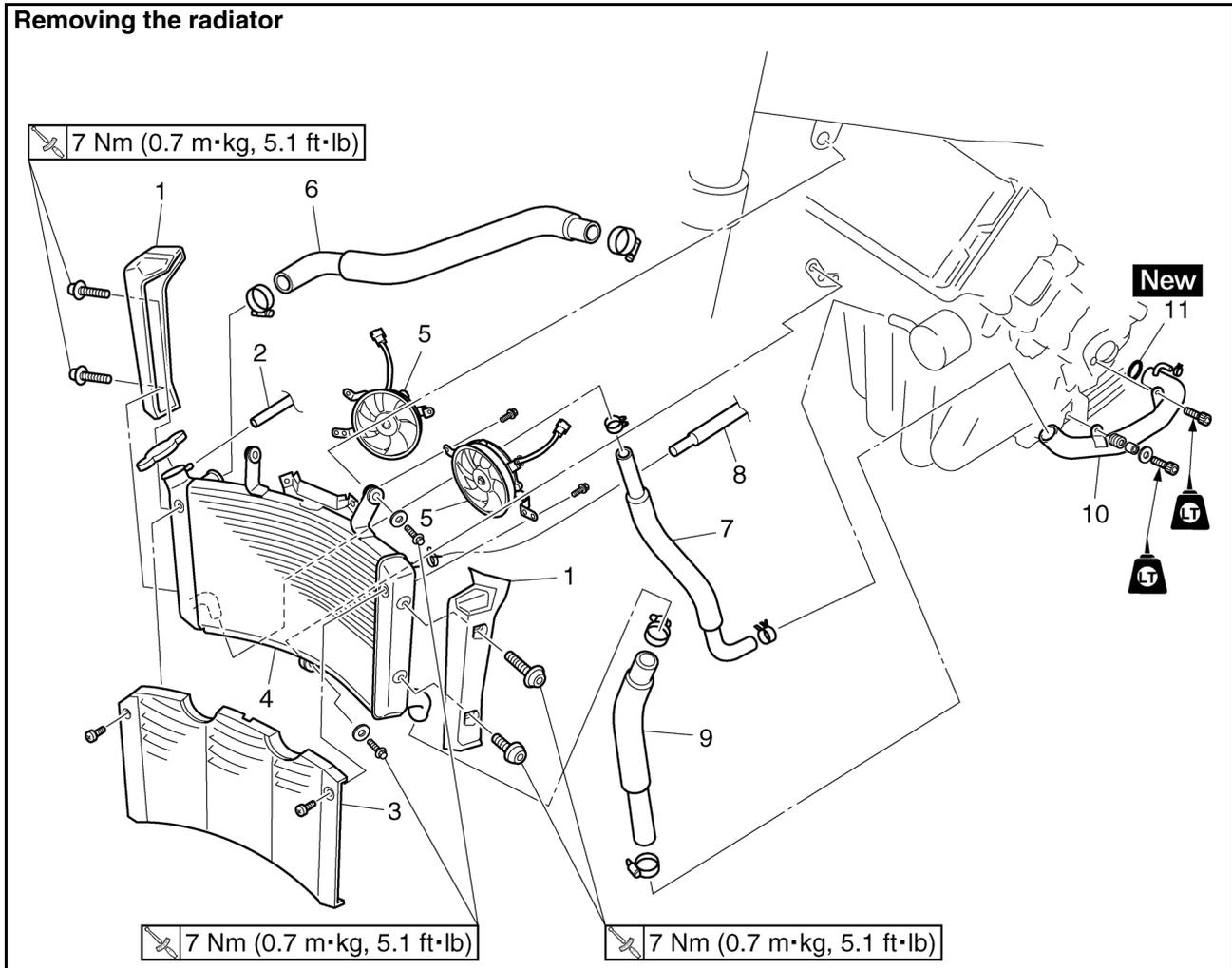
## COOLING SYSTEM

<b>RADIATOR</b> .....	6-1
CHECKING THE RADIATOR.....	6-3
INSTALLING THE RADIATOR.....	6-3
<b>OIL COOLER</b> .....	6-4
CHECKING THE OIL COOLER.....	6-5
INSTALLING THE OIL COOLER.....	6-5
<b>THERMOSTAT</b> .....	6-6
CHECKING THE THERMOSTAT.....	6-8
ASSEMBLING THE THERMOSTAT ASSEMBLY.....	6-8
INSTALLING THE THERMOSTAT ASSEMBLY.....	6-8
<b>WATER PUMP</b> .....	6-10
DISASSEMBLING THE WATER PUMP.....	6-11
CHECKING THE WATER PUMP.....	6-11
ASSEMBLING THE WATER PUMP.....	6-11

EAS26380

## RADIATOR

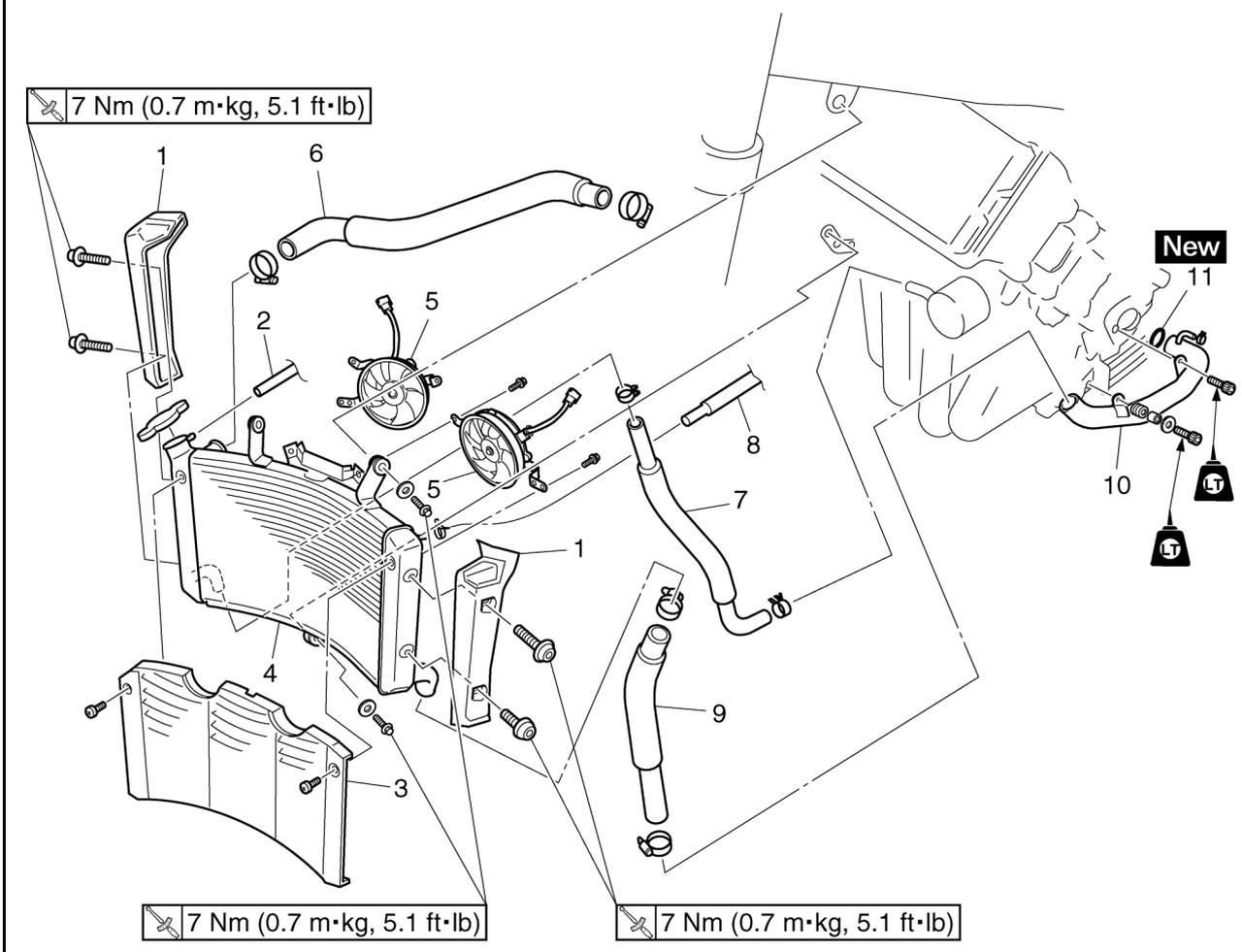
### Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
1	Radiator side covers	2	
2	Coolant reservoir hose	1	
3	Radiator front cover	1	
4	Radiator	1	
5	Radiator fan motor	2	
6	Radiator inlet hose	1	
7	Oil cooler outlet hose	1	
8	Water pump breather hose	1	
9	Radiator outlet hose	1	

# RADIATOR

## Removing the radiator



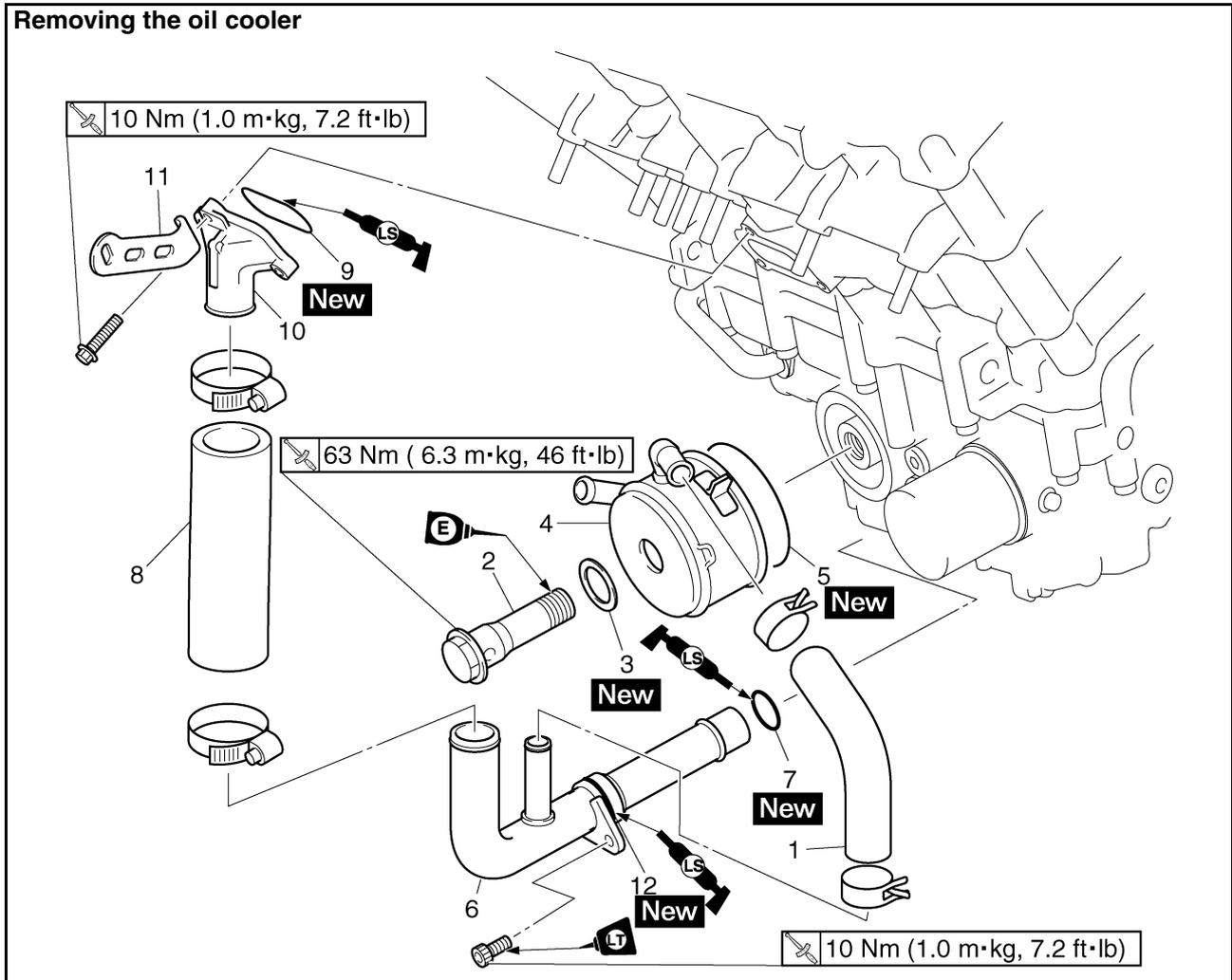
Order	Job/Parts to remove	Q'ty	Remarks
10	Water pump inlet pipe	1	
11	O-ring	1	
			For installation, reverse the removal procedure.



EAS26410

## OIL COOLER

### Removing the oil cooler

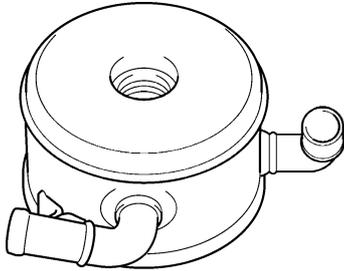


Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-12.
1	Oil cooler inlet hose	1	
2	Oil cooler bolt	1	
3	Washer	1	
4	Oil cooler	1	
5	O-ring	1	
6	Water pump outlet pipe	1	
7	O-ring	1	
8	Water jacket joint inlet hose	1	
9	O-ring	1	
10	Water jacket joint	1	
11	Stay	1	
12	O-ring	1	
			For assembly, reverse the removal procedure.

EAS26420

## CHECKING THE OIL COOLER

1. Check:
  - Oil cooler  
Cracks/damage → Replace.



2. Check:
  - Oil cooler inlet hose
  - Oil cooler outlet hose  
Cracks/damage/wear → Replace.

EAS26430

## INSTALLING THE OIL COOLER

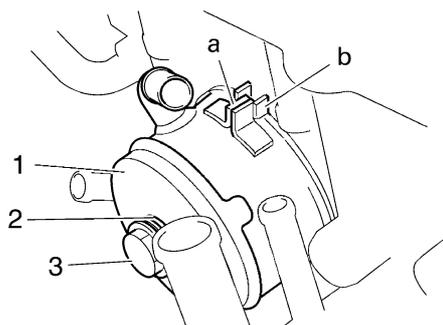
1. Clean:
  - Mating surfaces of the oil cooler and the crankcase  
(with a cloth dampened with lacquer thinner)
2. Install:
  - O-ring **New**
  - Oil cooler "1"
  - Washer "2" **New**
  - Oil cooler bolt "3"



**Oil cooler bolt**  
**63 Nm (6.3 m·kg, 46 ft·lb)**

### NOTE:

- Before installing the oil cooler, lubricate the oil cooler bolt and O-ring with a thin coat of engine oil.
- Make sure the O-ring is positioned properly.
- Align the projection "a" on the oil cooler with the slot "b" in the crankcase.

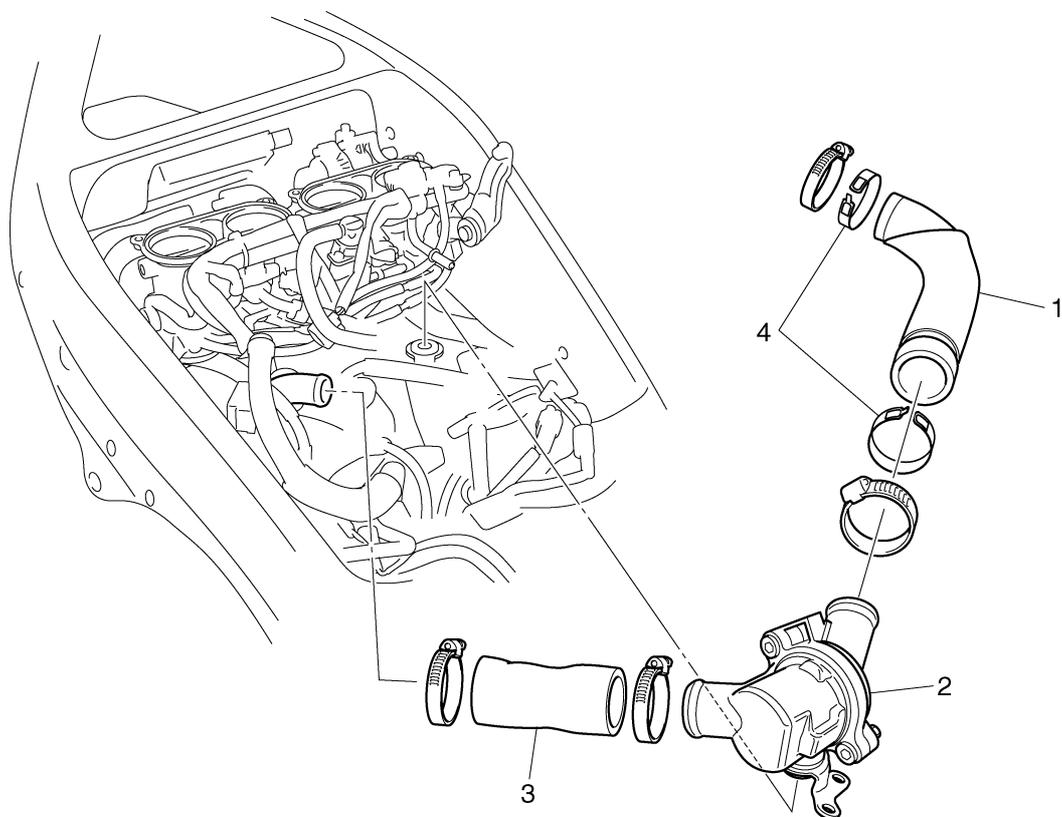


3. Fill:
  - Cooling system  
(with the specified amount of the recommended coolant)  
Refer to "CHANGING THE COOLANT" on page 3-19.
  - Crankcase  
(with the specified amount of the recommended engine oil)  
Refer to "CHANGING THE ENGINE OIL" on page 3-12.
4. Check:
  - Cooling system  
Leaks → Repair or replace any faulty part.
5. Measure:
  - Radiator cap opening pressure  
Below the specified pressure → Replace the radiator cap.  
Refer to "CHECKING THE RADIATOR" on page 6-3.

EAS26440

## THERMOSTAT

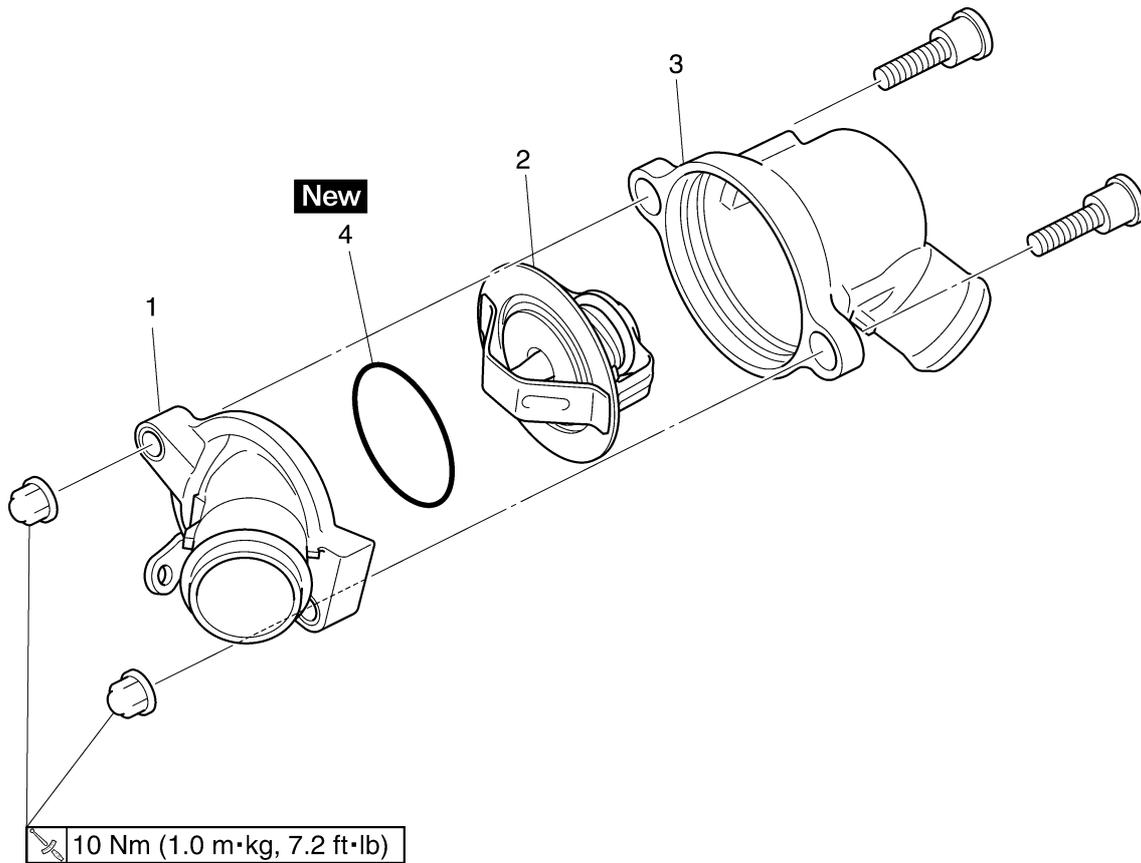
### Removing the thermostat assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Coolant		Drain. Refer to "CHANGING THE COOL-ANT" on page 3-19.
1	Thermostat assembly outlet hose	1	
2	Thermostat assembly	1	
3	Thermostat assembly inlet hose	1	
4	Band	2	
			For installation, reverse the removal procedure.

# THERMOSTAT

## Disassembling the thermostat assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Thermostat housing cover	1	
2	Thermostat	1	
3	Thermostat housing	1	
4	O-ring	1	
			For assembly, reverse the disassembly procedure.

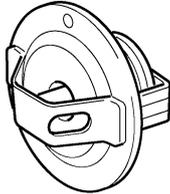
# THERMOSTAT

EAS26450

## CHECKING THE THERMOSTAT

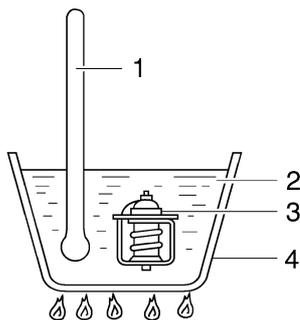
### 1. Check:

- Thermostat  
Does not open at 71 – 85°C (160 – 185°F)  
→ Replace.

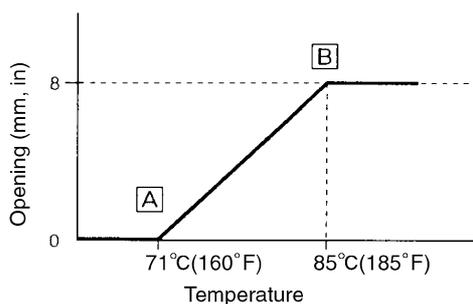


I4250202

- Suspend the thermostat "3" in a container "4" filled with water.
- Slowly heat the water "2".
- Place a thermometer "1" in the water.
- While stirring the water, observe the thermostat and thermometer's indicated temperature.



I4250201



- A. Fully closed  
B. Fully open

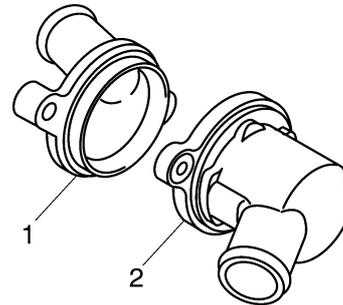
### NOTE:

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

### 2. Check:

- Thermostat housing cover "1"

- Thermostat housing "2"  
Cracks/damage → Replace.



EAS26460

## ASSEMBLING THE THERMOSTAT ASSEMBLY

### 1. Install:

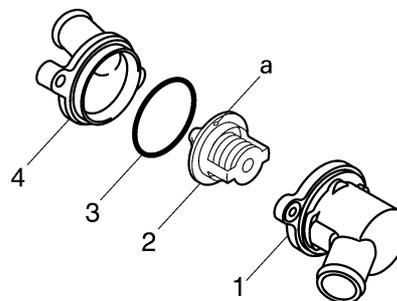
- Thermostat housing "1"
- Thermostat "2"
- O-ring "3" **New**
- Thermostat housing cover "4"



**Thermostat housing cover nut  
10 Nm (1.0 m·kg, 7.2 ft·lb)**

### NOTE:

Install the thermostat with its breather hole "a" facing up.



EAS26480

## INSTALLING THE THERMOSTAT ASSEMBLY

### 1. Fill:

- Cooling system  
(with the specified amount of the recommended coolant)  
Refer to "CHANGING THE COOLANT" on page 3-19.

### 2. Check:

- Cooling system  
Leaks → Repair or replace any faulty part.

### 3. Measure:

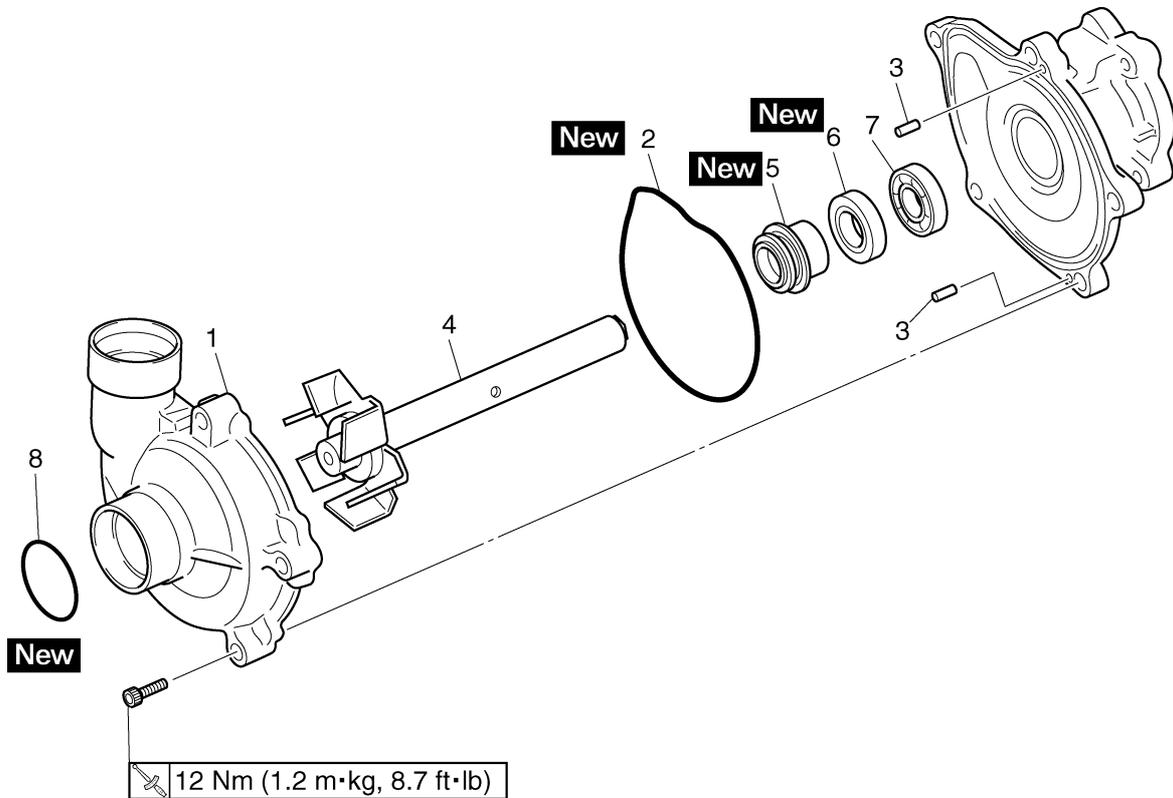
- Radiator cap opening pressure

Below the specified pressure → Replace the radiator cap.  
Refer to "CHECKING THE RADIATOR" on page 6-3.

EAS26500

## WATER PUMP

### Removing the impeller shaft



Order	Job/Parts to remove	Q'ty	Remarks
	Oil/water pump assembly		Refer to "OIL PUMP" on page 5-58.
	Oil pump roter		Refer to "OIL PUMP" on page 5-58.
1	Water pump cover	1	
2	O-ring	1	
3	Pin	2	
4	Impeller shaft (along with the impeller)	1	
5	Water pump seal	1	
6	Oil seal	1	
7	Bearing	1	
8	O-ring	1	
			For installation, reverse the removal procedure.

# WATER PUMP

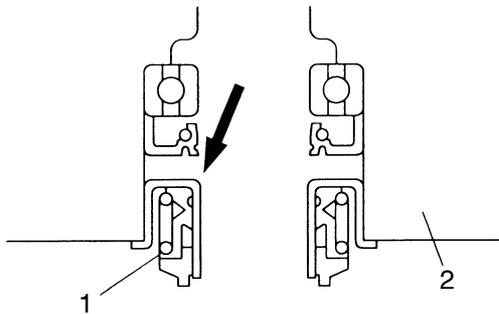
EAS26520

## DISASSEMBLING THE WATER PUMP

1. Remove:
  - Water pump seal "1"
  - Water pump housing "2"

### NOTE:

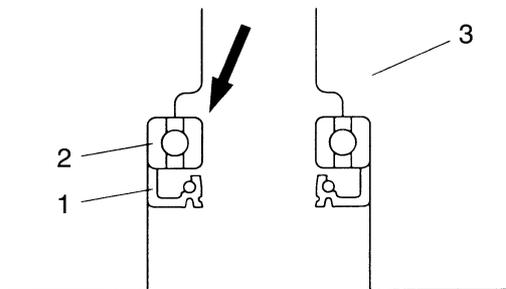
Tap out the water pump seal from the inside of the water pump housing.



2. Remove:
  - Oil seal "1"
  - Bearing "2"
  - Water pump housing "3"

### NOTE:

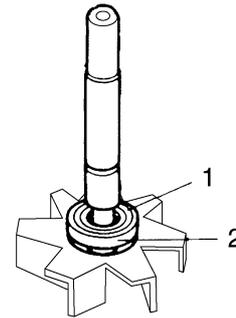
Tap out the bearing and oil seal from the outside of the water pump housing.



3. Remove:
  - Rubber damper holder "1"
  - Rubber damper "2"(from the impeller, with a thin, flat-head screwdriver)

### NOTE:

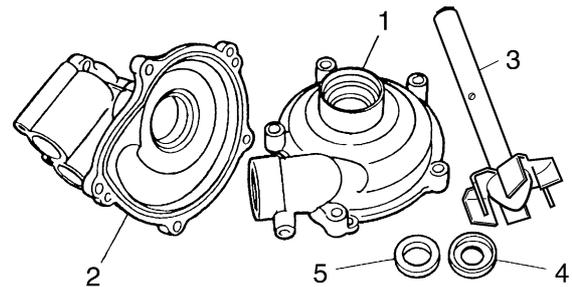
Do not scratch the impeller shaft.



EAS26540

## CHECKING THE WATER PUMP

1. Check:
  - Water pump housing cover "1"
  - Water pump housing "2"
  - Impeller "3"
  - Rubber damper "4"
  - Rubber damper holder "5"
  - Water pump seals
  - Oil sealCracks/damage/wear → Replace.



2. Check:
  - BearingRough movement → Replace.
3. Check:
  - Water pump outlet pipeCracks/damage/wear → Replace.

EAS26560

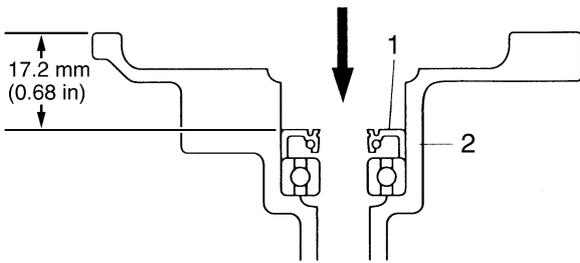
## ASSEMBLING THE WATER PUMP

1. Install:
  - Oil seal "1" **New**(into the water pump housing "2")

### NOTE:

- Before installing the oil seal, apply tap water or coolant onto its out surface.
- Install the oil seal with a socket that matches its outside diameter.

# WATER PUMP



2. Install:

- Water pump seal "1" **New**

ECA14080

**CAUTION:**

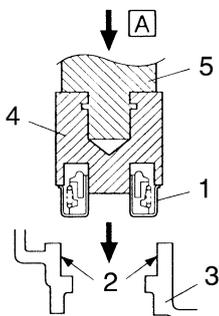
**Never lubricate the water pump seal surface with oil or grease.**

**NOTE:**

- Install the water pump seal with the special tools.
- Before installing the water pump seal, apply Yamaha bond No.1215 (Three Bond No.1215®) "2" to the water pump housing "3".



**Mechanical seal installer "4"**  
90890-04078  
**Water pump seal installer**  
YM-33221-A  
**Middle driven shaft bearing driver "5"**  
90890-04058  
**Bearing driver 40 mm**  
YM-04058  
**Yamaha bond No. 1215 (Three Bond No.1215®)**  
90890-85505



I4150501

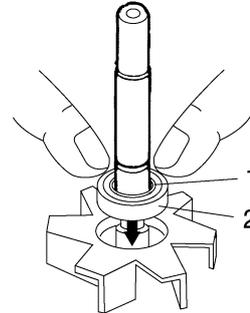
A. Push down.

3. Install:

- Rubber damper holder "1" **New**
- Rubber damper "2" **New**

**NOTE:**

Before installing the rubber damper, apply tap water or coolant onto its outer surface.



4. Measure:

- Impeller shaft tilt  
Out of specification → Repeat steps (3) and (4).

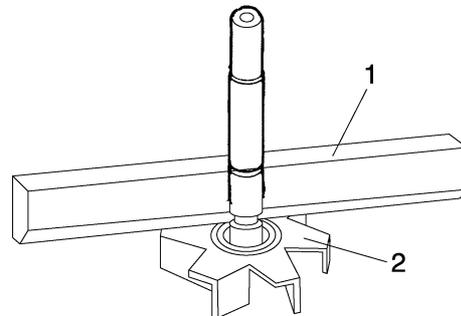
ECA14090

**CAUTION:**

**Make sure the rubber damper and rubber damper holder are flush with the impeller.**



**Impeller shaft tilt limit**  
0.15 mm (0.006 in)



1. Straightedge
2. Impeller



---

## FUEL SYSTEM

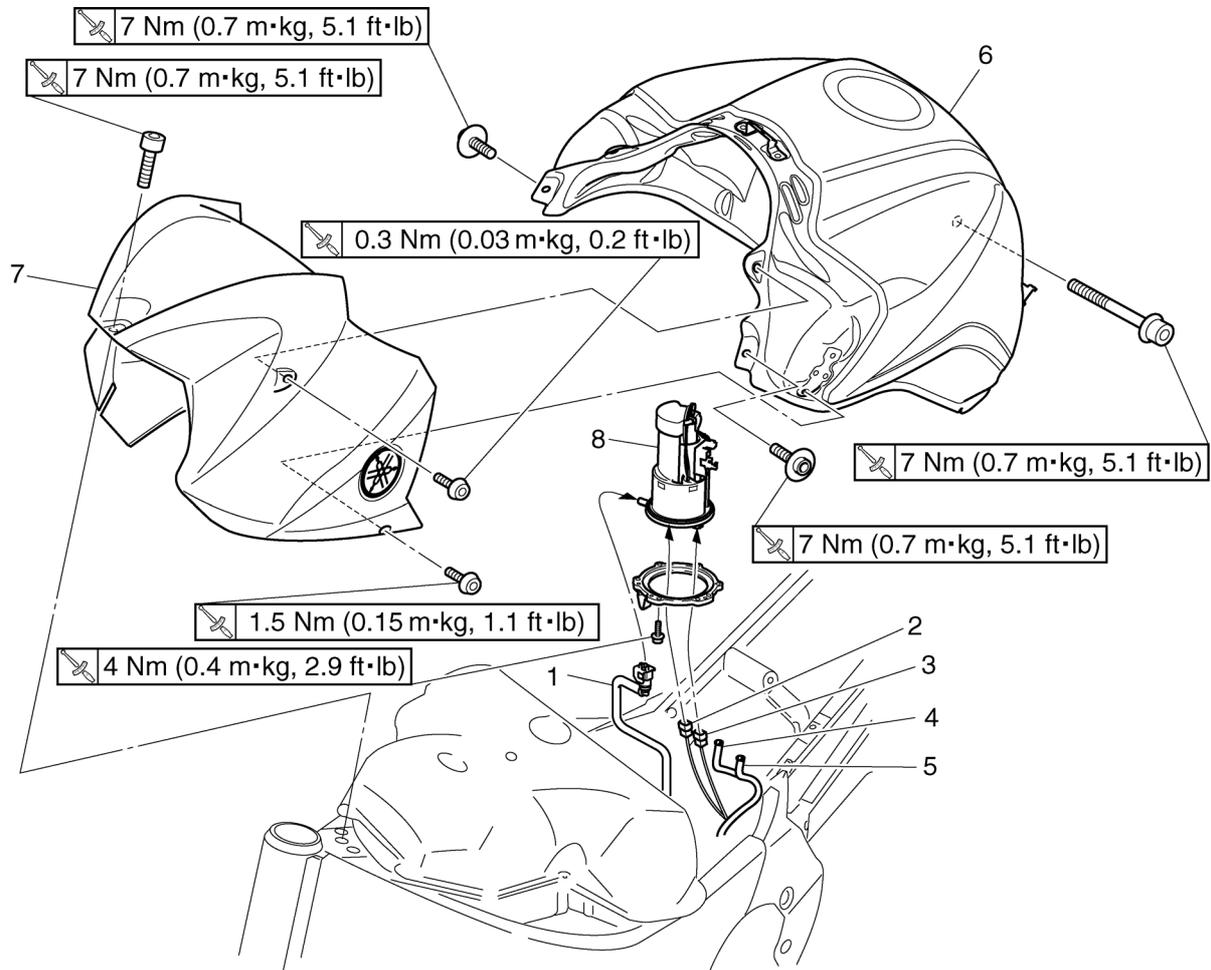
<b>FUEL TANK</b> .....	7-1
REMOVING THE FUEL TANK .....	7-2
REMOVING THE FUEL PUMP .....	7-2
CHECKING THE FUEL PUMP BODY .....	7-2
CHECKING THE FUEL PUMP OPERATION .....	7-2
INSTALLING THE FUEL PUMP .....	7-2
INSTALLING THE FUEL TANK .....	7-3
<b>THROTTLE BODIES</b> .....	7-4
CHECKING THE INJECTORS .....	7-8
CHECKING THE THROTTLE BODIES .....	7-8
CHECKING THE FUEL PRESSURE .....	7-8
ADJUSTING THE THROTTLE POSITION SENSOR .....	7-8
ADJUSTING THE SUB-THROTTLE POSITION SENSOR .....	7-9
CHECKING THE SUB-THROTTLE SERVO MOTOR .....	7-10
CHECKING THE THERMO WAX .....	7-11
ADJUSTING THE THERMO WAX .....	7-11
<b>AIR INDUCTION SYSTEM</b> .....	7-13
CHECKING THE AIR INDUCTION SYSTEM .....	7-14
INSTALLING THE AIR INDUCTION SYSTEM .....	7-15

# FUEL TANK

EAS26620

## FUEL TANK

### Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Fuel hose	1	Disconnect.
2	Fuel sender coupler	1	Disconnect.
3	Fuel pump coupler	1	Disconnect.
4	Fuel tank drain hose	1	Disconnect.
5	Fuel tank breather hose	1	Disconnect.
6	Fuel tank	1	
7	Fuel tank cover	1	
8	Fuel pump	1	
			For installation, reverse the removal procedure.

EAS26630

## REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
  - Fuel hose connector cover
  - Fuel hose
  - Fuel sender coupler
  - Fuel pump coupler
  - Fuel tank breather hose
  - Fuel tank drain hose

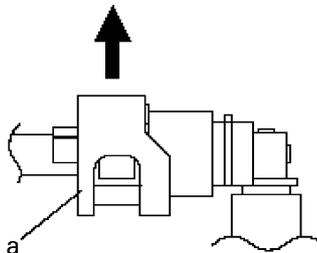
EC2D1009

### CAUTION:

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

### NOTE:

- To remove the fuel hose from the fuel injection pipe, slide the cover "a" on the end of the hose in the direction of the arrow shown and then remove the hose.
- Before removing the hoses, place a few rags in the area under where it will be removed.



3. Remove:
  - Fuel tank

### NOTE:

Do not set the fuel tank down so that the installation surface of the fuel pump is directly under the tank. Be sure to lean the fuel tank in an upright position.

EAS26640

## REMOVING THE FUEL PUMP

1. Remove:
  - Fuel pump

ECA14720

### CAUTION:

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

EAS26670

## CHECKING THE FUEL PUMP BODY

1. Check:
  - Fuel pump body  
Obstruction → Clean.  
Cracks/damage → Replace fuel pump assembly.
2. Check:
  - Diaphragms and gaskets  
Turn/fatigue/cracks → Replace fuel pump assembly.
3. Check:
  - Valves  
Cracks/damage → Replace fuel pump assembly.

EAS26690

## CHECKING THE FUEL PUMP OPERATION

1. Check:
  - Fuel pump operation  
Refer to "CHECKING THE FUEL PRESSURE" on page 7-8.

EAS26710

## INSTALLING THE FUEL PUMP

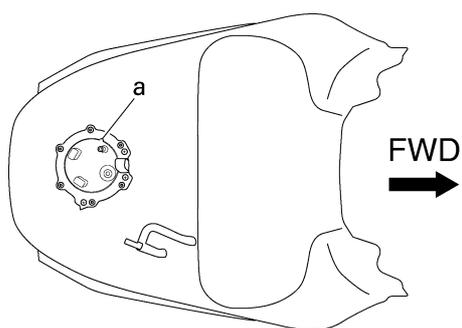
1. Install:
  - Fuel pump



**Fuel pump bolt**  
**4 Nm (0.4 m·kg, 2.9 ft·lb)**

### NOTE:

- Do not damage the installation surface of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump as shown in the illustration.
- Align the projection "a" on the fuel pump with the slot in the fuel pump bracket.
- Tighten the fuel pump bolts in stages in a crisscross pattern and to the specified torque.



ET2D1023

## INSTALLING THE FUEL TANK

### 1. Install:

- Fuel hose
- Fuel hose connector cover

ECA14740

### CAUTION:

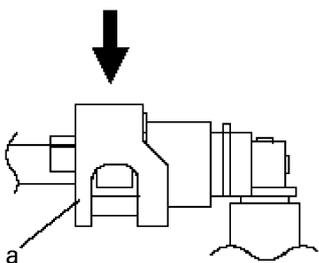
**When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holders are in the correct position, otherwise the fuel hose will not be properly installed.**

---

### NOTE:

Install the fuel hose connector securely onto the fuel tank until a distinct “click” is heard, and then make sure that it does not come loose. To install the fuel hose from the fuel injection hose, slide the cover “a” on the end of the hose in the direction of arrow shown.

---



### 2. Install:

- Fuel sender coupler
- Fuel pump coupler
- Fuel tank breather hose
- Fuel tank drain hose

### NOTE:

There is white paint mark on the fuel tank breather hose. Refer to "CABLE ROUTING" on page 2-39.

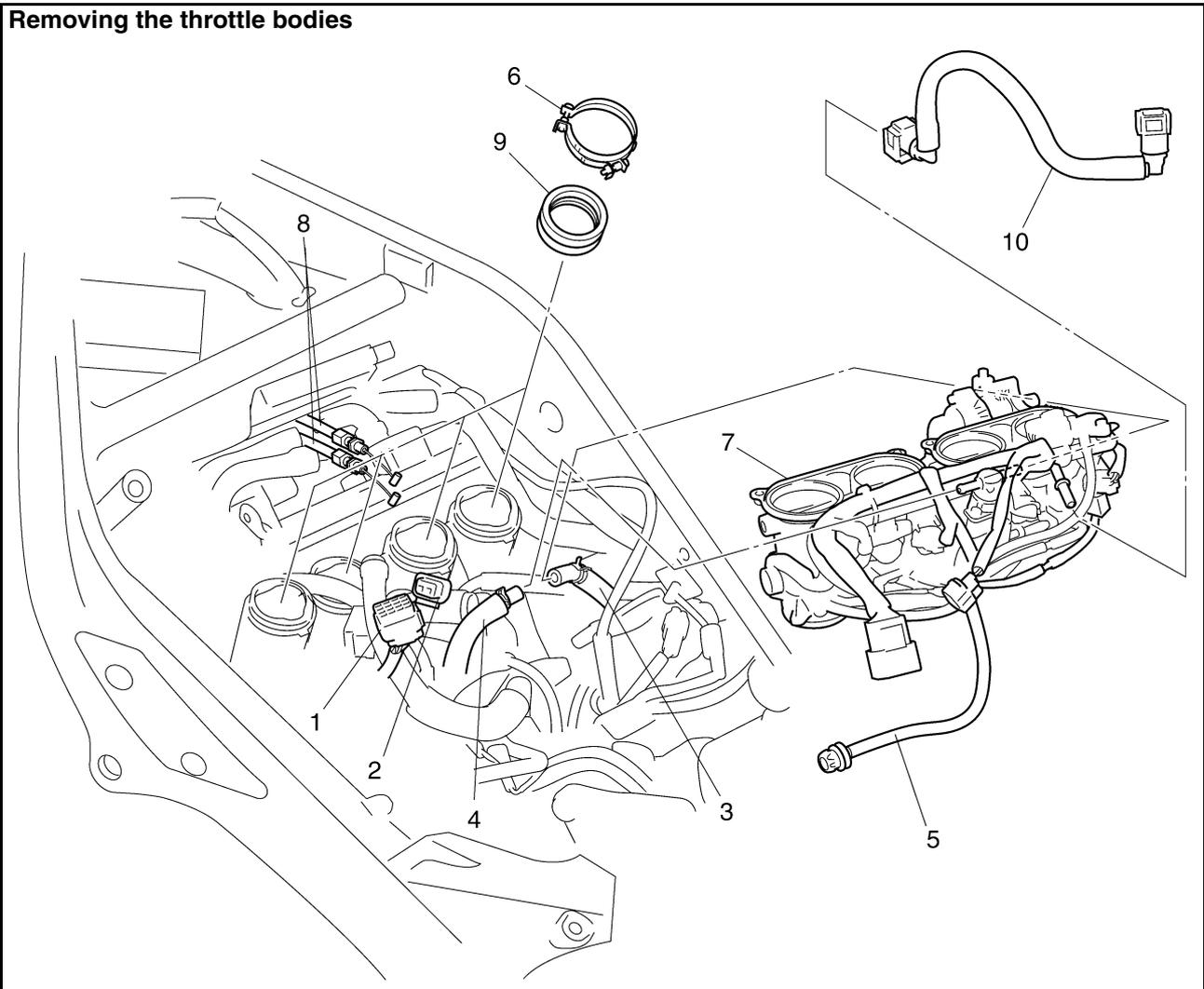
---

# THROTTLE BODIES

EAS26970

## THROTTLE BODIES

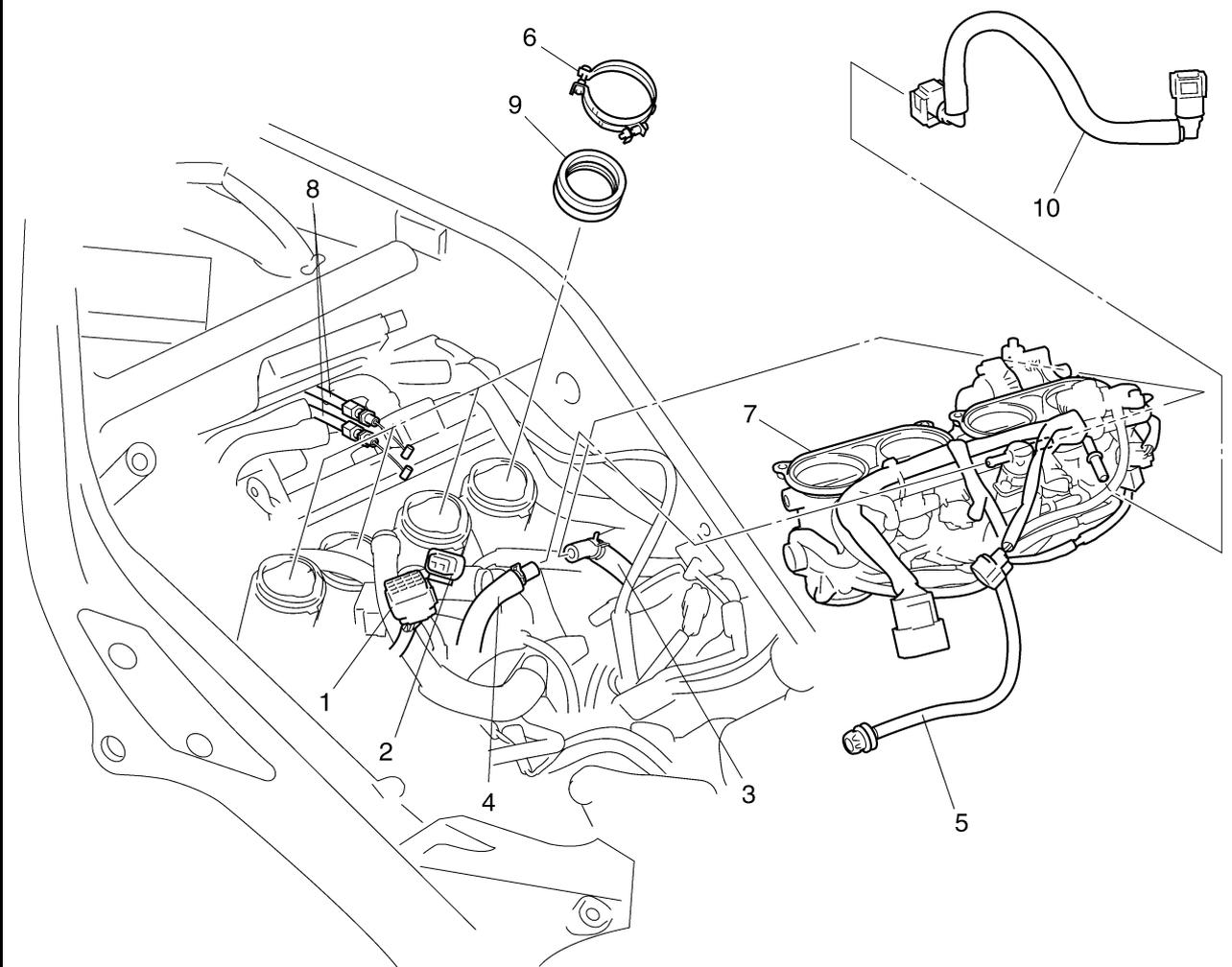
### Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
	Rider and passenger seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
1	Sub-wire harness coupler	2	Disconnect.
2	Coolant temperature sensor coupler	1	Disconnect.
3	Thermo wax inlet hose	1	Disconnect.
4	Thermo wax outlet hose	1	Disconnect.
5	Idle adjust screw wire	1	
6	Throttle body joint clamp	4	Loosen.
7	Throttle bodies	1	
8	Throttle cables	2	Disconnect.
9	Throttle body joint	4	
10	Fuel hose	1	Disconnect.

# THROTTLE BODIES

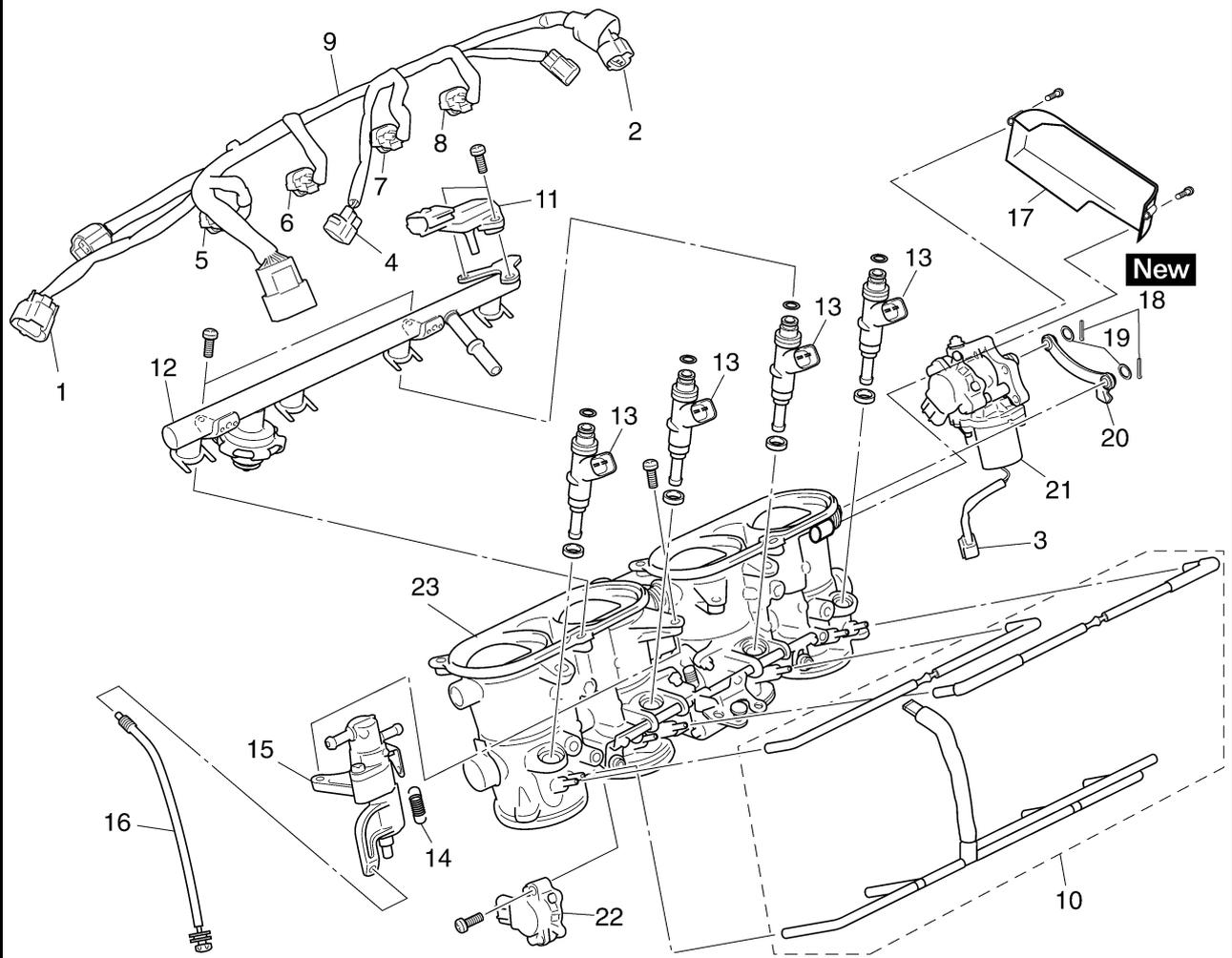
## Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
			For installation, reverse the removal procedure.

# THROTTLE BODIES

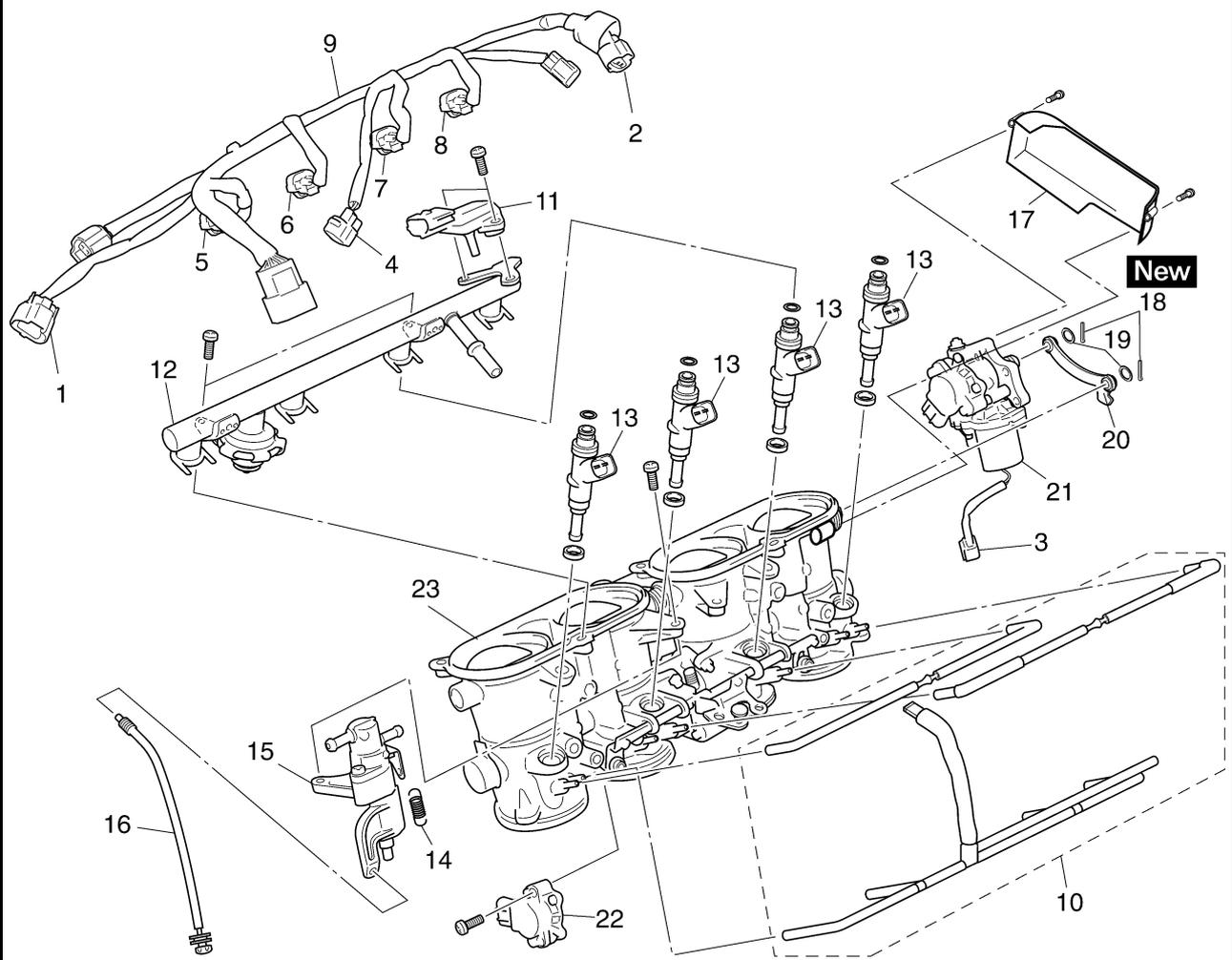
## Removing the injectors



Order	Job/Parts to remove	Q'ty	Remarks
1	Throttle position sensor coupler	1	Disconnect.
2	Sub-throttle position sensor coupler	1	Disconnect.
3	Sub-throttle motor assembly coupler	1	Disconnect.
4	Intake air pressure sensor coupler	1	Disconnect.
5	Cylinder #1-injector coupler	1	Disconnect.
6	Cylinder #2-injector coupler	1	Disconnect.
7	Cylinder #3-injector coupler	1	Disconnect.
8	Cylinder #4-injector coupler	1	Disconnect.
9	Sub-wire harness	1	
10	Negative pressure hose	1	Disconnect.
11	Intake air pressure sensor	1	
12	Fuel distributor	1	
13	Injector	4	
14	Spring	1	
15	Thermo wax assembly	1	
16	Idle adjust screw wire	1	
17	Link cover	1	Loosen.
18	Cotter pin	2	

# THROTTLE BODIES

## Removing the injectors



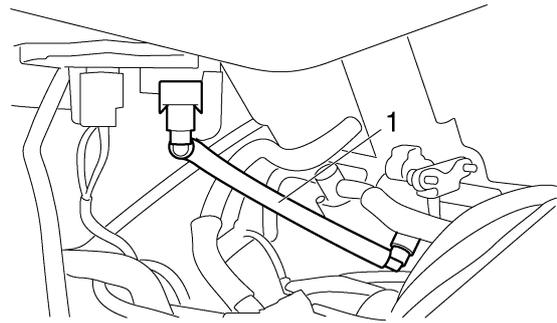
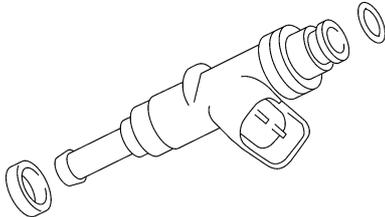
Order	Job/Parts to remove	Q'ty	Remarks
19	Washer	2	
20	Link	1	
21	Sub-throttle servo motor assembly	1	
22	Throttle position sensor	1	
23	Throttle body assembly	1	
			For installation, reverse the removal procedure.

# THROTTLE BODIES

EAS26980

## CHECKING THE INJECTORS

1. Check:
  - Injectors  
Damage → Replace.



- c. Connect the pressure gauge "2" and adapter "3" to the fuel hose (fuel tank to primary injector fuel rail).

EAS26990

## CHECKING THE THROTTLE BODIES

1. Check:
  - Throttle bodies  
Cracks/damage → Replace the throttle bodies as a set.
2. Check:
  - Fuel passages  
Obstructions → Clean.



- a. Wash the throttle bodies in a petroleum-based solvent.  
Do not use any caustic carburetor cleaning solution.
- b. Blow out all of the passages with compressed air.



ET2D1033

## CHECKING THE FUEL PRESSURE

1. Check:
  - Fuel pressure



- a. Remove the rider and passenger seat.  
Refer to "GENERAL CHASSIS" on page 4-1.
- b. Disconnect the fuel hose (fuel tank to primary injector fuel rail) "1" from the primary injector fuel rail.

EW2C01008



**WARNING**

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.



**Vacuum/pressure pump gauge set**

**90890-06756**

**Pressure gauge**

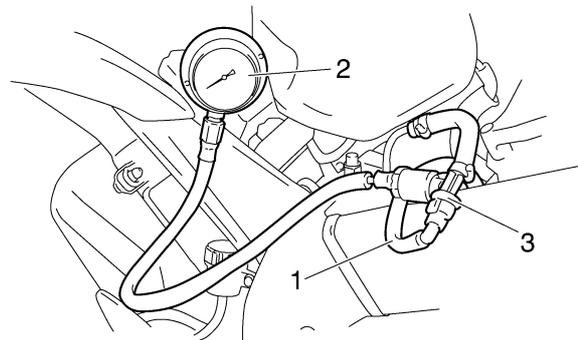
**90890-03153**

**YU-03153**

**Fuel pressure adapter**

**90890-03176**

**YM-03176**



- d. Start the engine.
- e. Measure the fuel pressure.



**Fuel pressure**

**324 kPa (46.1 psi) (3.24 kg/cm<sup>2</sup>)**

Faulty → Replace the fuel pump.



EAS27020

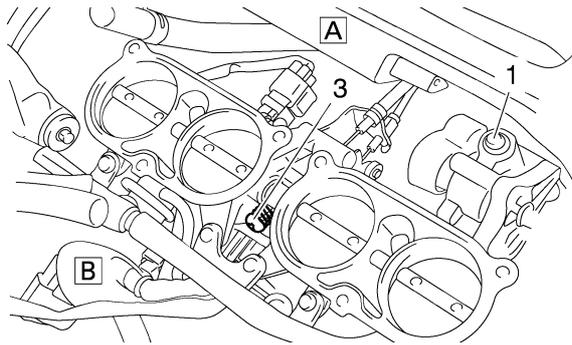
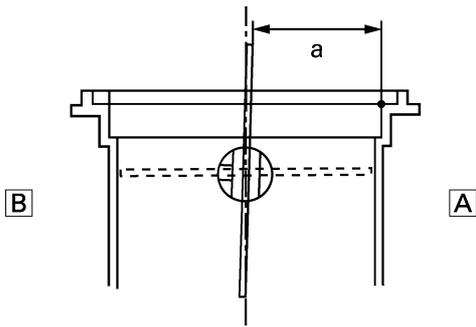
## ADJUSTING THE THROTTLE POSITION SENSOR

**NOTE:**

Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.



# THROTTLE BODIES



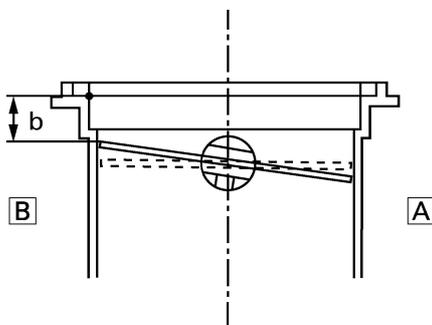
- A. Front side
- B. Rear side

3. Adjust:
- Primary opening

- a. After performing the full open angle of the sub-throttle position sensor, turn the nut of the worm shaft clockwise, measure the dimension of "b" section with a micrometer caliper or other device and adjust so that the dimension is in a range from 8.1 to 8.5 mm (0.32 to 0.33 in).



**Sub-throttle dimension "b"**  
8.1–8.5 mm (0.32–0.33 in)



- A. Front side
- B. Rear side

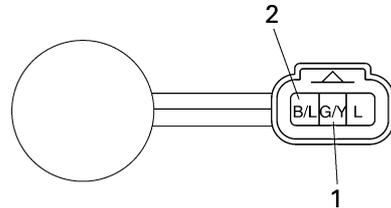
4. Adjust:
- Sub-throttle position sensor voltage

- a. Connect the sub-throttle position sensor coupler to the wire harness.  
b. Connect the digital circuit tester to the sub-throttle position sensor.

- Positive tester probe  
Green/Yellow terminal "1"
- Negative tester probe  
Black/Blue terminal "2"



**Digital circuit tester**  
90890-03174



- c. Move the sub-throttle position sensor to adjust to be in the specified range.



**Sub-throttle position sensor voltage**  
0.97–1.07 V

- d. After adjusting the sub-throttle position sensor voltage, tighten the sub-throttle position sensor screws.

**NOTE:**

- After setting up the sub-throttle position sensor, check that the sub-throttle position sensor output voltage is 0.4 V or more with the nut of worm shaft turned to the full close side until it stops.
- When the sub-throttle position sensor output voltage is 0.4 V or more, check that the sub-throttle position sensor output voltage is 4.6 V or less with the nut of worm shaft turned to the full open side until it stops.

5. Connect
- Sub-throttle motor assembly coupler

EAS2D1011  
**CHECKING THE SUB-THROTTLE SERVO MOTOR**

1. Check:
- Sub-throttle servo motor operation

# THROTTLE BODIES

Out of specification → Replace.



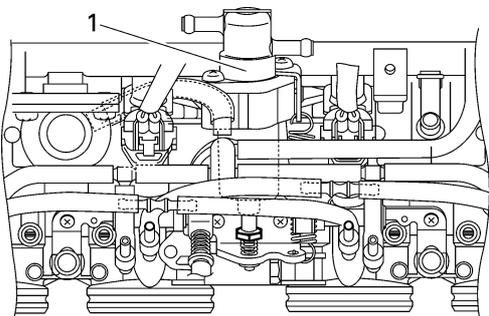
- a. Check whether or not the sub-throttle valve is seized.
  - 1 Turn the nut of worm shaft of the sub-throttle servo motor by hand to check that the sub-throttle valve is moved smoothly by hand.
  - 2 If it is not moved smoothly, disconnect the link between the sub-throttle servo motor and sub-throttle valve, and then check whether or not the sub-throttle valve is moved smoothly by hand.  
Refer to "THROTTLE BODIES" on page 7-4.
  - 3 When the sub-throttle valve is not moved smoothly, repair or replace it since the cause is the seizure of sub-throttle valve body itself.  
When it moved smoothly at Step (1) and (2), replace the sub-throttle servo motor.
- b. Perform the self-diagnosis mode and check the operation of sub-throttle valve by visual inspection (Code No: 56).  
The operation should be carried out as 5-second drive in the full open direction, 2-second stop and 5-second drive in the full close direction.



EAT2D1004

## CHECKING THE THERMO WAX

1. Check:
  - Thermo wax "1"
 Damage → Replace the thermo wax assembly.



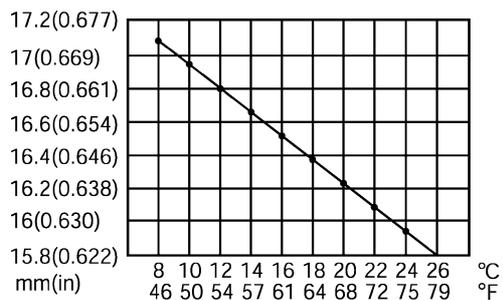
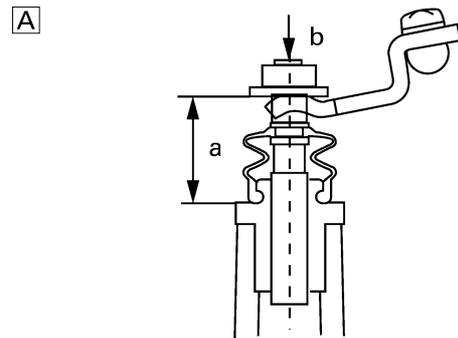
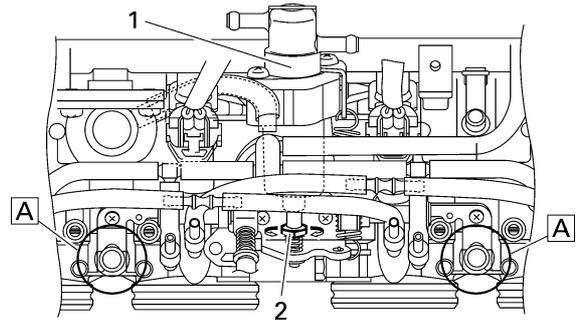
ET2D1025

## ADJUSTING THE THERMO WAX

1. Adjust:
  - Thermo wax the end face distance "a"



- a. Before adjusting the distance, push the rod "b" in order to be fitted in several times by hand.
- b. Measure the outside air temperature, and adjust the distance "a" by turning the adjusting screw "2". Refer to the thermo wax tolerance table based on the measured outside air temperature for correct adjustment.



### NOTE:

- Setup tolerance of the longitudinal axis should be  $\pm 0.2$  mm ( $\pm 0.008$  in).
- After adjusting the thermo wax, check that the first idling is released at the coolant temperature around 60°C (140°F) by idling.
- If the first idling is not released around 60°C (140°F), make sure to set it again. (When the coolant temperature is low, adjust the distance between the end faces longer or adjust

## THROTTLE BODIES

---

it shorter when the coolant temperature is high.)

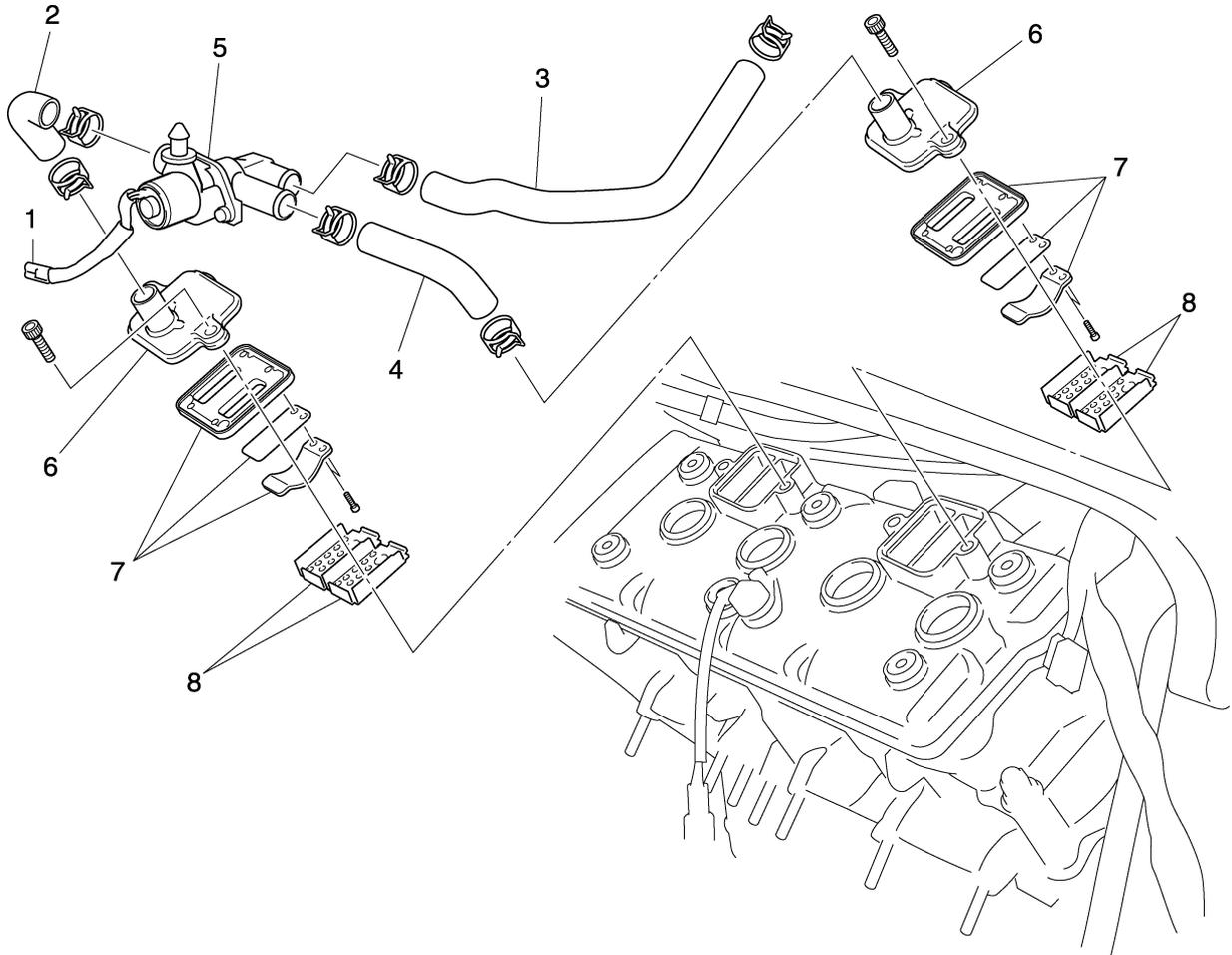
- In case of turning the adjusting bolt two-third turn, the temperature varies about 10°C (50°F).
-

# AIR INDUCTION SYSTEM

EAS27040

## AIR INDUCTION SYSTEM

### Removing the air cut-off valve assembly and hoses



Order	Job/Parts to remove	Q'ty	Remarks
1	Air cut-off valve coupler	1	Disconnect.
2	Air cut-off valve hose 1	1	Disconnect.
3	Air cut-off valve hose 2	1	Disconnect.
4	Air cut-off valve hose 3	1	Disconnect.
5	Air cut-off valve	1	
6	Reed valve cap	2	
7	Reed valve assembly	2	
8	Plate	4	
			For assembly, reverse the removal procedure.

# AIR INDUCTION SYSTEM

EAS27060

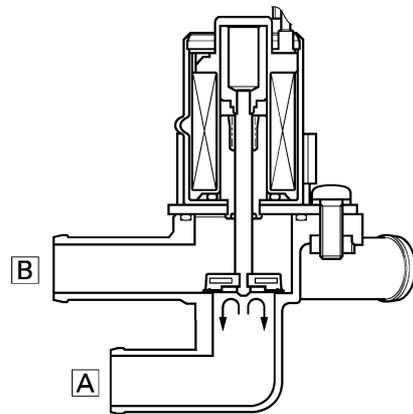
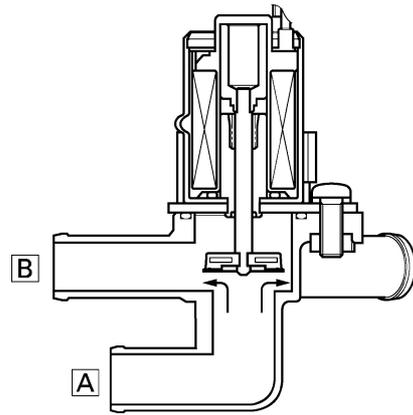
## CHECKING THE AIR INDUCTION SYSTEM

### Air injection

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons. When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700°C.

### Air cut-off valve

The air cut-off valve is controlled by the signals from the ECU in accordance with the combustion conditions. Ordinarily, the air cut-off valve opens to allow the air to flow during idle and closes to cut-off the flow when the vehicle is being driven. However, if the coolant temperature is below the specified value, the air cut-off valve remains open and allows the air to flow into the exhaust pipe until the temperature becomes higher than the specified value.



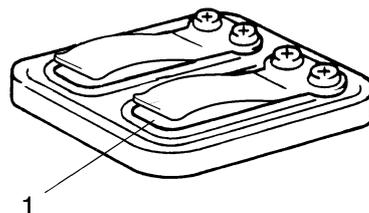
- A. From the air cleaner
- B. To the cylinder head

#### 1. Check:

- Hoses  
Loose connections → Connect properly.  
Cracks/damage → Replace.
- Pipes  
Cracks/damage → Replace.

#### 2. Check:

- Reed valve "1"
- Reed valve stopper
- Reed valve seat  
Cracks/damage → Replace the reed valve.



#### 3. Measure:

- Reed valve bending limit "a"



---

## ELECTRICAL SYSTEM

<b>IGNITION SYSTEM</b> .....	8-1
CIRCUIT DIAGRAM.....	8-1
TROUBLESHOOTING.....	8-3
<b>ELECTRIC STARTING SYSTEM</b> .....	8-5
CIRCUIT DIAGRAM.....	8-5
STARTING CIRCUIT CUT-OFF SYSTEM OPERATION.....	8-7
TROUBLESHOOTING.....	8-9
<b>CHARGING SYSTEM</b> .....	8-11
CIRCUIT DIAGRAM.....	8-11
TROUBLESHOOTING.....	8-13
<b>LIGHTING SYSTEM</b> .....	8-15
CIRCUIT DIAGRAM (FZ1-N).....	8-15
CIRCUIT DIAGRAM (FZ1-S).....	8-17
TROUBLESHOOTING.....	8-19
<b>SIGNALING SYSTEM</b> .....	8-21
CIRCUIT DIAGRAM.....	8-21
TROUBLESHOOTING.....	8-23
<b>COOLING SYSTEM</b> .....	8-27
CIRCUIT DIAGRAM.....	8-27
TROUBLESHOOTING.....	8-29
<b>FUEL INJECTION SYSTEM</b> .....	8-31
CIRCUIT DIAGRAM.....	8-31
TROUBLESHOOTING.....	8-33
ECU SELF-DIAGNOSTIC FUNCTION.....	8-37
SELF-DIAGNOSTIC FUNCTION TABLE.....	8-38
TROUBLESHOOTING METHOD.....	8-41
DIAGNOSTIC MODE.....	8-42
TROUBLESHOOTING DETAILS.....	8-50
<b>FUEL PUMP SYSTEM</b> .....	8-75
CIRCUIT DIAGRAM.....	8-75
TROUBLESHOOTING.....	8-77
<b>IMMOBILIZER SYSTEM</b> .....	8-79
CIRCUIT DIAGRAM.....	8-79
GENERAL INFORMATION.....	8-81
KEY CODES REGISTRATION METHOD.....	8-81
TROUBLESHOOTING.....	8-85
SELF-DIAGNOSIS ERROR CODE INDICATION.....	8-85

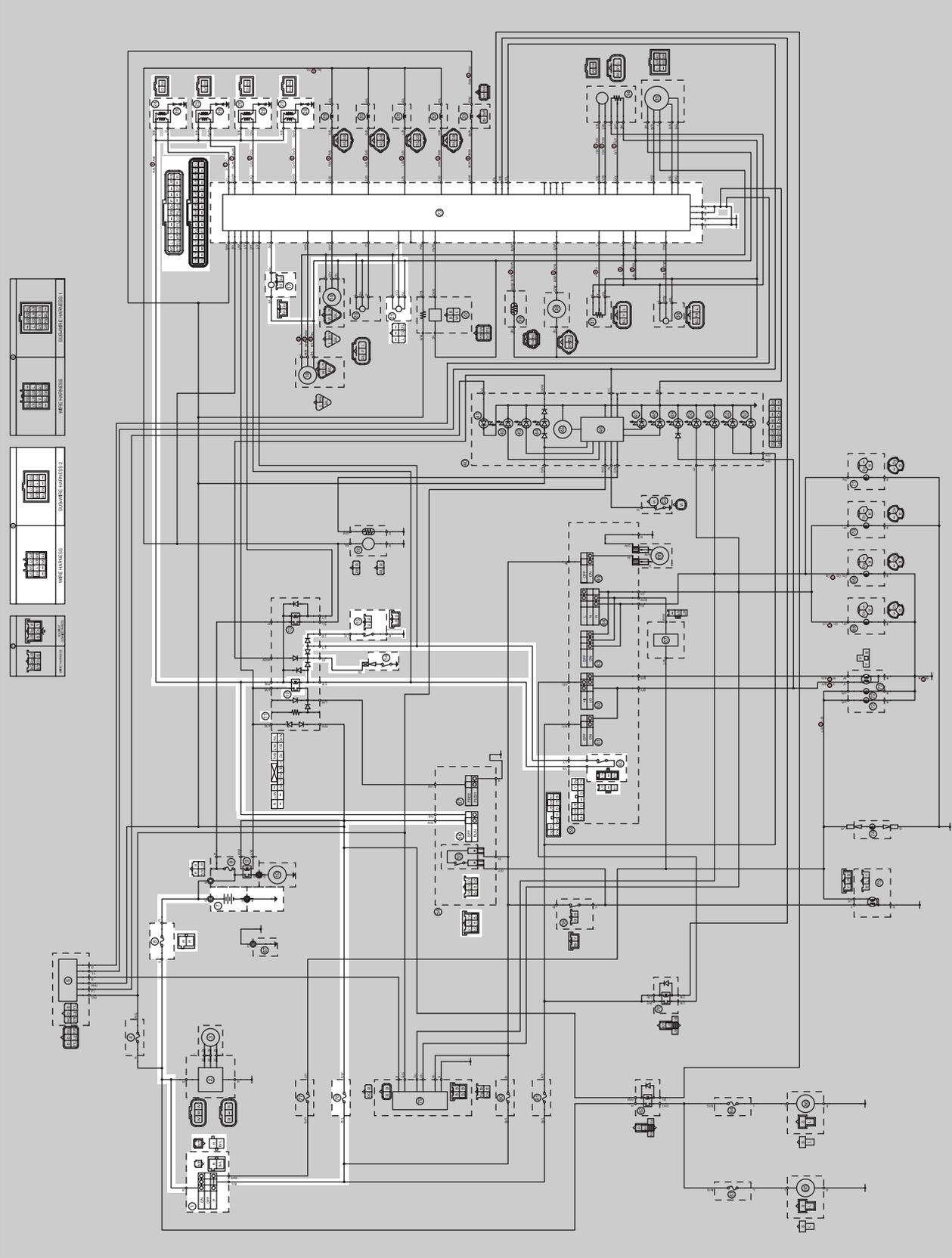
---

<b>ELECTRICAL COMPONENTS</b> .....	8-89
CHECKING THE SWITCHES.....	8-93
CHECKING THE BULBS AND BULB SOCKETS.....	8-96
CHECKING THE FUSES.....	8-97
CHECKING AND CHARGING THE BATTERY.....	8-97
CHECKING THE RELAYS.....	8-100
CHECKING THE TURN SIGNAL/HAZARD RELAY .....	8-102
CHECKING THE RELAY UNIT (DIODE) .....	8-102
CHECKING THE IGNITION COILS.....	8-103
CHECKING THE CRANKSHAFT POSITION SENSOR.....	8-104
CHECKING THE LEAN ANGLE SENSOR.....	8-105
CHECKING THE STARTOR MOTOR OPERATION .....	8-105
CHECKING THE STARTOR COIL.....	8-106
CHECKING THE RECTIFIER/REGULATOR.....	8-106
CHECKING THE HORN .....	8-106
CHECKING THE FUEL SENDER .....	8-107
CHECKING THE SPEED SENSOR .....	8-107
CHECKING THE RADIATOR FAN MOTOR.....	8-108
CHECKING THE COOLANT TEMPERATURE SENSOR .....	8-108
CHECKING THE THROTTLE POSITION SENSOR .....	8-109
CHECKING THE SUB-THROTTLE POSITION SENSOR.....	8-110
CHECKING THE AIR INDUCTION SYSTEM SOLENOID .....	8-110
CHECKING THE ATMOSPHERIC PRESSURE SENSOR.....	8-111
CHECKING THE CYLINDER IDENTIFICATION SENSOR .....	8-111
CHECKING THE INTAKE AIR PRESSURE SENSOR .....	8-112
CHECKING THE INTAKE AIR TEMPERATURE SENSOR .....	8-112

---

EAS27090  
**IGNITION SYSTEM**

EAS27110  
**CIRCUIT DIAGRAM**



# IGNITION SYSTEM

---

- 1. Main switch
- 6. Fuse (main)
- 7. Battery
- 11. Relay unit
- 12. Starting circuit cut-off relay
- 14. Neutral switch
- 15. Sidestand switch
- 17. Crankshaft position sensor
- 21. Lean angle sensor
- 23. ECU
- 24. Ignition coil #1
- 25. Ignition coil #2
- 26. Ignition coil #3
- 27. Ignition coil #4
- 28. Spark plug
- 56. Engine stop switch
- 60. Clutch switch
- 78. Fuse (ignition)

# IGNITION SYSTEM

EAS27150

## TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

### NOTE:

- Before troubleshooting, remove the following part(s):

1 Rider and passenger seat

2 Fuel tank

1 Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 8-97.	NG→	Replace the fuse(s).
OK↓		
2 Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-97.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3 Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-10.	NG→	Re-gap or replace the spark plugs.
OK↓		
4 Check the ignition spark gap. Refer to "CHECKING THE IGNI- TION COILS" on page 8-103.	OK→	Ignition system is OK.
NG↓		
5 Check the ignition coils. Refer to "CHECKING THE IGNI- TION COILS" on page 8-103.	NG→	Replace the ignition coils.
NG↓		
6 Check the crankshaft position sen- sor. Refer to "CHECKING THE CRANKSHAFT POSITION SEN- SOR" on page 8-104.	NG→	Replace the crankshaft position sen- sor
OK↓		
7 Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the immobilizer kit.
OK↓		

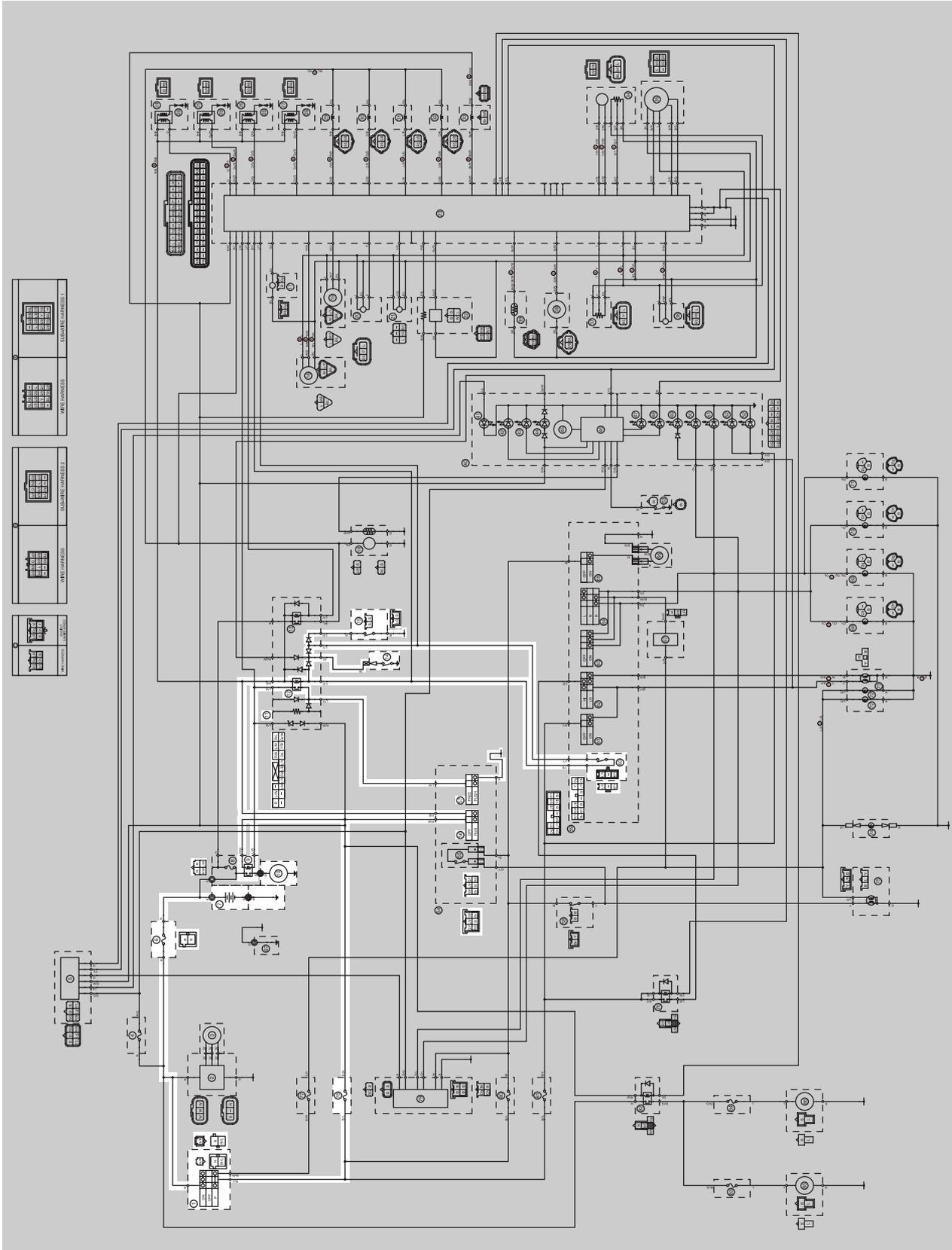
## IGNITION SYSTEM

8 Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the right handlebar switch.
OK↓		
9 Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the neutral switch.
OK↓		
10 Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the sidestand switch.
OK↓		
11 Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the clutch switch.
OK↓		
12 Check the starting circuit cut-off relay. Refer to "CHECKING THE RELAYS" on page 8-100.	NG→	Replace the relay unit.
OK↓		
13 Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-105.	NG→	Replace the lean angle sensor.
OK↓		
14 Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-1.	NG→	Properly connect or repair the ignition system's wiring
OK↓		
Replace the ECU		

# ELECTRIC STARTING SYSTEM

## EAS27160 ELECTRIC STARTING SYSTEM

## EAS27170 CIRCUIT DIAGRAM



# ELECTRIC STARTING SYSTEM

---

1. Main switch
6. Fuse (main)
7. Battery
9. Starter relay
10. Starter motor
11. Relay unit
12. Starting circuit cut-off relay
14. Neutral switch
15. Sidestand switch
56. Engine stop switch
57. Start switch
60. Clutch switch
78. Fuse (ignition)



## ELECTRIC STARTING SYSTEM

---

- a. WHEN THE TRANSMISSION IS IN NEUTRAL
  - b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR
1. Battery
  2. Main fuse
  3. Main switch
  4. Ignition fuse
  5. Engine stop switch
  6. Starting circuit cut-off relay
  7. Diode
  8. Clutch switch
  9. Sidestand switch
  10. Neutral switch
  11. Start switch
  12. Starter relay
  13. Starter motor

# ELECTRIC STARTING SYSTEM

EAS27190

## TROUBLESHOOTING

The starter motor fails to turn.

### NOTE:

- Before troubleshooting, remove the following part(s):

1 Rider and passenger seat

2 Fuel tank

3 Air filter case

1 Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 8-97.	NG→	Replace the fuse(s).
OK↓		
2 Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-97.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3 Check the starter motor operation. Refer to "CHECKING THE STAR- TOR MOTOR OPERATION" on page 8-105.	NG→	Replace the starter motor.
OK↓		
4 Check the starter motor. Refer to "CHECKING THE STARTER MOTOR" on page 5-42.	NG→	Repair or replace the starter motor.
OK↓		
5 Check the relay unit (starting circuit cut-off relay). Refer to "CHECKING THE RELAYS" on page 8-100.	NG→	Replace the relay unit.
OK↓		
6 Check the relay unit (diode). Refer to "CHECKING THE RELAYS" on page 8-100.	NG→	Replace the relay unit.
OK↓		
7 Check the starter relay. Refer to "CHECKING THE RELAYS" on page 8-100.	NG→	Replace the starter relay.
OK↓		

## ELECTRIC STARTING SYSTEM

8 Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the immobilizer kit.
OK↓		
9 Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the right handlebar switch.
OK↓		
10 Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the neutral switch.
OK↓		
11 Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the sidestand switch.
OK↓		
12 Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the clutch switch.
OK↓		
13 Check the start switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the right handlebar switch.
OK↓		
14 Check the entire starting system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-5.	NG→	Properly connect or repair the starting system's wiring
OK↓		
The starting system circuit is OK.		

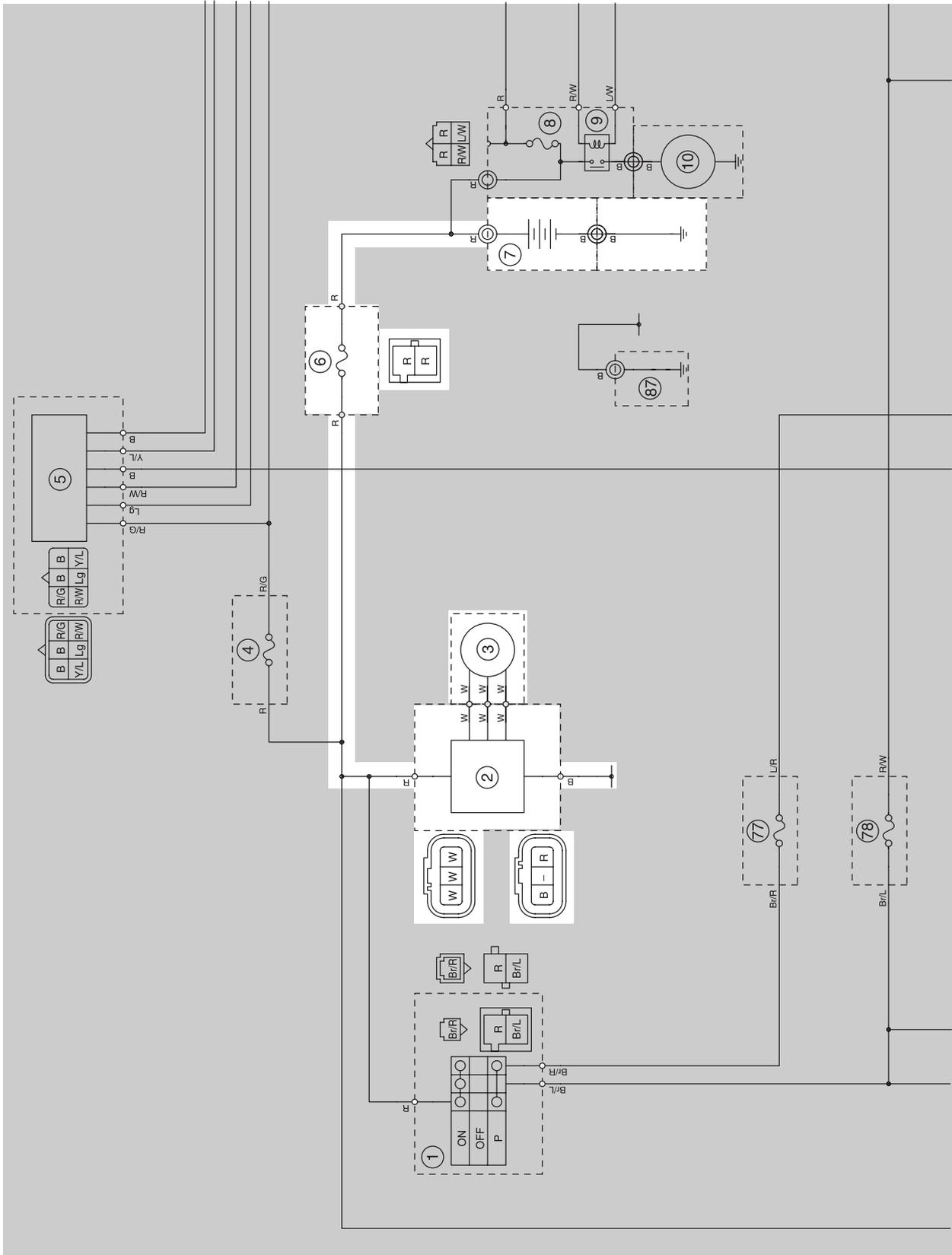
# CHARGING SYSTEM

EAS27200

## CHARGING SYSTEM

EAS27210

## CIRCUIT DIAGRAM



## CHARGING SYSTEM

---

2. Rectifier/regulator
3. A.C.magneto
6. Fuse (main)
7. Battery

# CHARGING SYSTEM

EAS27230

## TROUBLESHOOTING

The battery is not being charged.

### NOTE:

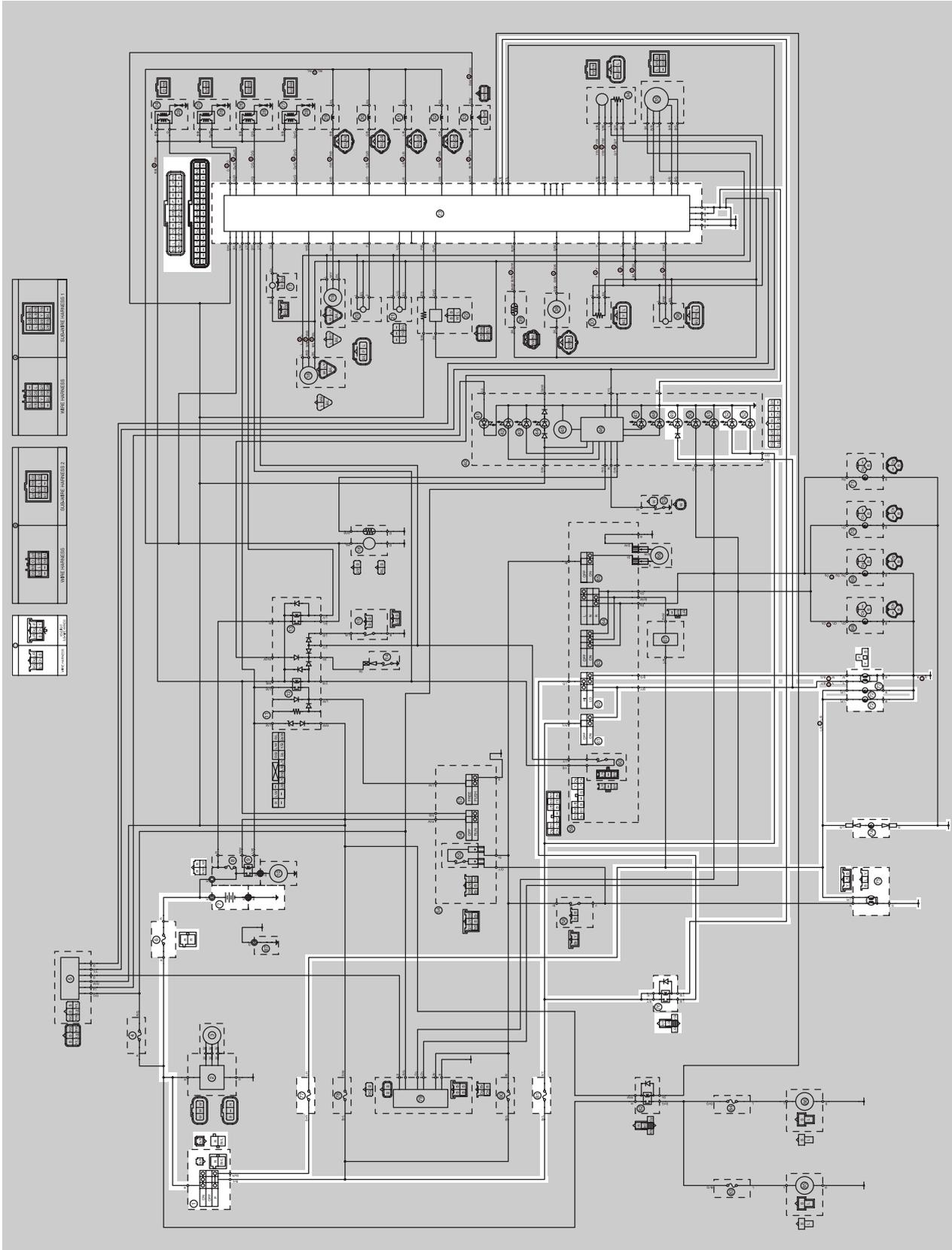
- Before troubleshooting, remove the following part(s):  
1 Rider and passenger seat

1 Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 8-97.	NG→	Replace the fuse.
OK↓		
2 Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-97.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3 Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-106.	NG→	<ul style="list-style-type: none"><li>• Replace the startor assembly.</li></ul>
OK↓		
4 Check the rectifier/regulator. Refer to "CHECKING THE RECTI- FIER/REGULATOR" on page 8- 106.	NG→	Replace the rectifier/regulator.
OK↓		
5 Check the entire charging system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-11.	NG→	Properly connect or repair the charg- ing system's wiring.
OK↓		
This circuit is OK.		



EAS27240  
**LIGHTING SYSTEM**

EAS27250  
**CIRCUIT DIAGRAM (FZ1-N)**



## LIGHTING SYSTEM

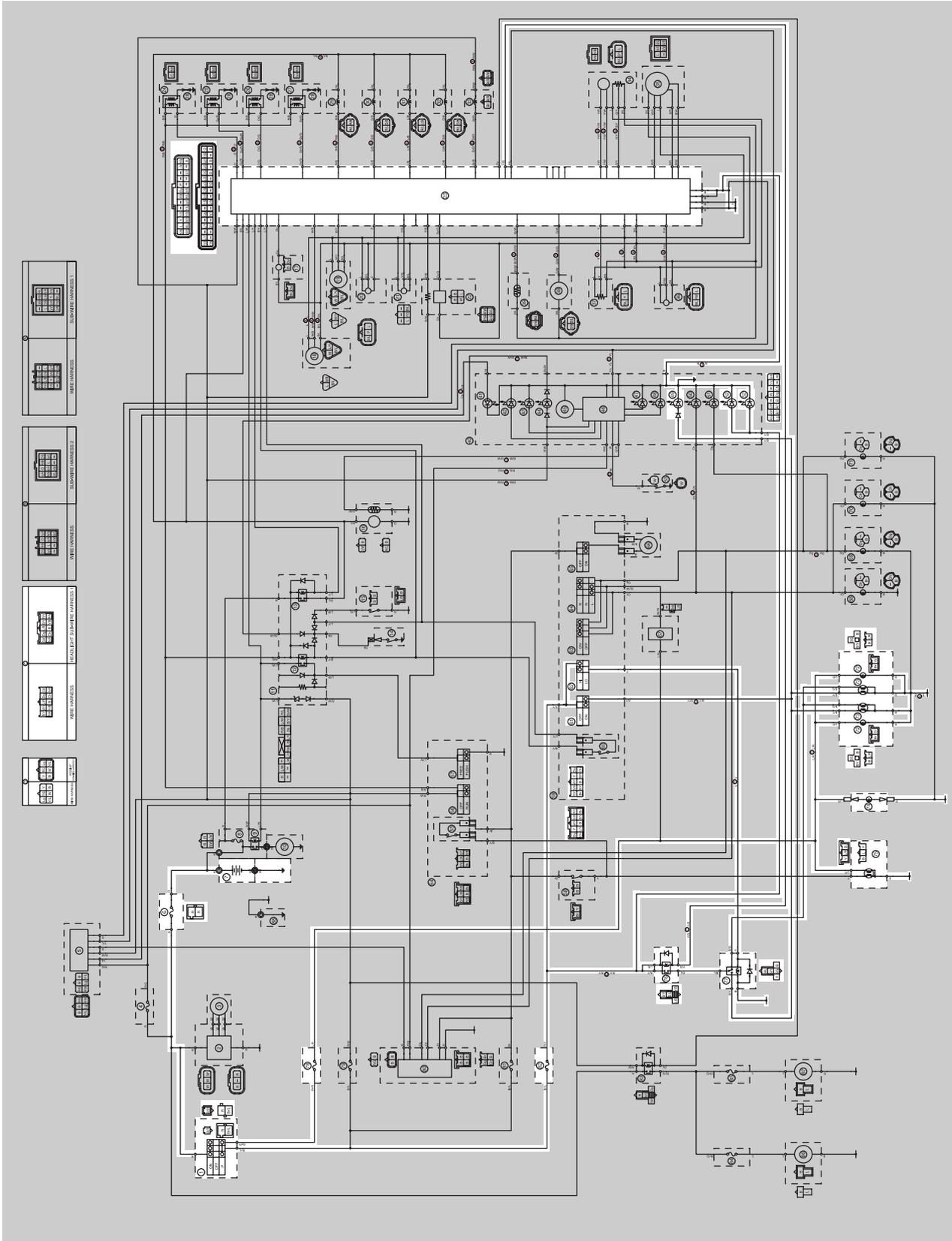
---

- 1. Main switch
- 6. Fuse (main)
- 7. Battery
- 23. ECU
- 49. High beam indicator light
- 52. Meter light
- 61. Pass switch
- 62. Dimmer switch
- 72. Auxiliary light
- 73. Headlight
- 74. License plate light
- 75. Tail/brake light
- 76. Headlight relay (on/off)
- 77. Fuse (tail light)
- 81. Fuse (headlight)

# LIGHTING SYSTEM

ET2D1026

## CIRCUIT DIAGRAM (FZ1-S)



## LIGHTING SYSTEM

---

- 1. Main switch
- 6. Fuse (main)
- 7. Battery
- 23.ECU
- 49.High beam indicator light
- 52.Meter light
- 61.Pass switch
- 62.Dimmer switch
- 72.Auxiliary light
- 73.Headlight
- 74.License plate light
- 75.Tail/brake light
- 76.Headlight relay (on/off)
- 77.Headlight relay (dimmer)
- 78.Fuse (tail light)
- 82.Fuse (headlight)

# LIGHTING SYSTEM

EAS27260

## TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, license light or meter light.

### NOTE:

- Before troubleshooting, remove the following part(s):
  - 1 Rider and passenger seat
  - 2 Fuel tank
  - 3 Air filter case

<p>1 Check the each bulbs and bulb sockets condition. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-96.</p>	NG→	<p>Replace the bulb(s) and bulb socket(s).</p>
OK↓		
<p>2 Check the fuses. (Main, headlight and tail/beake light) Refer to "CHECKING THE FUSES" on page 8-97.</p>	NG→	<p>Replace the fuse(s).</p>
OK↓		
<p>3 Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-97.</p>	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
<p>4 Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-93.</p>	NG→	<p>Replace the immobilizer kit.</p>
OK↓		
<p>5 Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 8-93.</p>	NG→	<p>The dimmer switch is faulty. Replace the left handlebar switch.</p>
OK↓		
<p>6 Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 8-93.</p>	NG→	<p>The pass switch is faulty. Replace the left handlebar switch.</p>
OK↓		
<p>7 Check the rear brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-93.</p>	NG→	<p>The rear brake light switch is faulty. Replace the rear brake light switch.</p>
OK↓		

## LIGHTING SYSTEM

8 Check the headlight relay (on/off).  
Refer to "CHECKING THE RELAYS" on page 8-100.

NG→

Replace the headlight relay.

OK↓

9 Check the headlight relay (dimmer) (FZ1-S).  
Refer to "CHECKING THE RELAYS" on page 8-100.

NG→

Replace the headlight relay.

OK↓

10 Check the entire lighting system's wiring.  
Refer to "CIRCUIT DIAGRAM (FZ1-N)" on page 8-15.

NG→

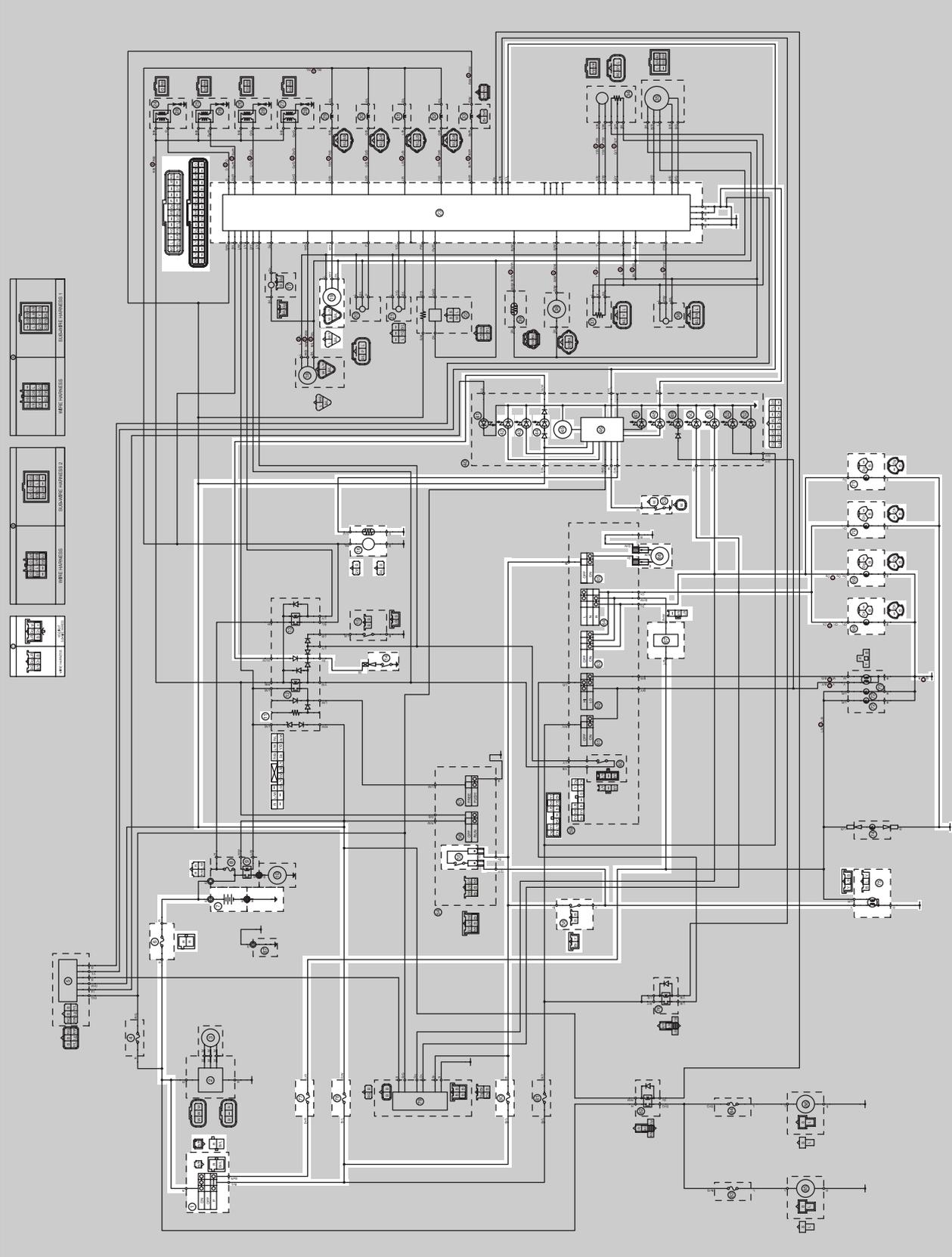
Properly connect or repair the lighting system's wiring.

OK↓

This circuit is OK.

EAS27270  
**SIGNALING SYSTEM**

EAS27280  
**CIRCUIT DIAGRAM**



## SIGNALING SYSTEM

---

1. Main switch
6. Fuse (main)
7. Battery
11. Relay unit
14. Neutral switch
16. Fuel pump
19. Speed sensor
23. ECU
42. Fuel level warning light
43. Oil level warning light
44. Neutral indicator light
45. Tacho meter
46. Multi function meter
48. Coolant temperature indicator light
50. Turn signal indicator light (left)
51. Turn signal indicator light (right)
53. Oil level switch
55. Front brake light switch
58. Rear brake light switch
63. Hazard switch
64. Turn signal switch
65. Horn switch
66. Horn
67. Turn signal/hazard relay
68. Front turn signal light (left)
69. Front turn signal light (right)
70. Rear turn signal light (left)
71. Rear turn signal light (right)
75. Tail/brake light
77. Fuse (tail/brake light)
78. Fuse (ignition)
80. Fuse (signal)

# SIGNALING SYSTEM

EAS27290

## TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.

### NOTE:

- Before troubleshooting, remove the following part(s):
  - 1 Rider and passenger seat
  - 2 Fuel tank
  - 3 Air filter case

1 Check the fuses. (Main, ignition, signal and tail/brake light) Refer to "CHECKING THE FUSES" on page 8-97.	NG→	Replace the fuse(s).
OK↓		
2 Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-97.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3 Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the immobilizer kit.
OK↓		
4 Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		
<b>Check the signaling system</b>		
The horn fails to sound.		
1 Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the left handlebar switch.
OK↓		
2 Check the horn. Refer to "CHECKING THE HORN" on page 8-106.	NG→	Replace the horn.
OK↓		

## SIGNALING SYSTEM

3 Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG→

Properly connect or repair the signaling system wiring.

OK↓

This circuit is OK.

The tail/brake light fails to come on.

1 Check the tail/brake light bulb and socket.  
Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-96.

NG→

Replace the tail/brake light bulb, socket or both.

OK↓

2 Check the front brake light switch.  
Refer to "CHECKING THE SWITCHES" on page 8-93.

NG→

Replace the front brake light switch.

OK↓

3 Check the rear brake light switch.  
Refer to "CHECKING THE SWITCHES" on page 8-93.

NG→

Replace the rear brake light switch.

OK↓

4 Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-21.

NG→

Properly connect or repair the signaling system's wiring.

OK↓

This circuit is OK.

The turn signal light, turn signal indicator light or both fail to blink.

1 Check the turn signal bulb.  
Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-96.

NG→

Replace the turn signal bulb.

OK↓

2 Check the turn signal switch.  
Refer to "CHECKING THE SWITCHES" on page 8-93.

NG→

Replace the left handlebar switch.

OK↓

## SIGNALING SYSTEM

3 Check the hazard switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the left handlebar switch.
OK↓		
4 Check the turn signal/hazard relay. Refer to "CHECKING THE RELAYS" on page 8-100.	NG→	Replace the turn signal/hazard relay.
OK↓		
5 Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		
The neutral indicator light fails to come on.		
1 Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the neutral switch.
OK↓		
2 Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		
The oil level warning light fails to come on.		
1 Check the oil level switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the oil level switch.
OK↓		
2 Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		

The fuel level warning light fails to come on.

## SIGNALING SYSTEM

1 Check the fuel sender.  
Refer to "CHECKING THE FUEL  
SENDER" on page 8-107.

NG→

Replace the fuel pump assembly.

OK↓

2 Check the entire signaling system's  
wiring.  
Refer to "CIRCUIT DIAGRAM" on  
page 8-21.

NG→

Properly connect or repair the signal-  
ing system's wiring.

OK↓

This circuit is OK.

The speedometer fails to operate.

1 Check the speed sensor.  
Refer to "CHECKING THE SPEED  
SENSOR" on page 8-107.

NG→

Replace the speed sensor.

OK↓

2 Check the entire signaling system's  
wiring.  
Refer to "CIRCUIT DIAGRAM" on  
page 8-21.

NG→

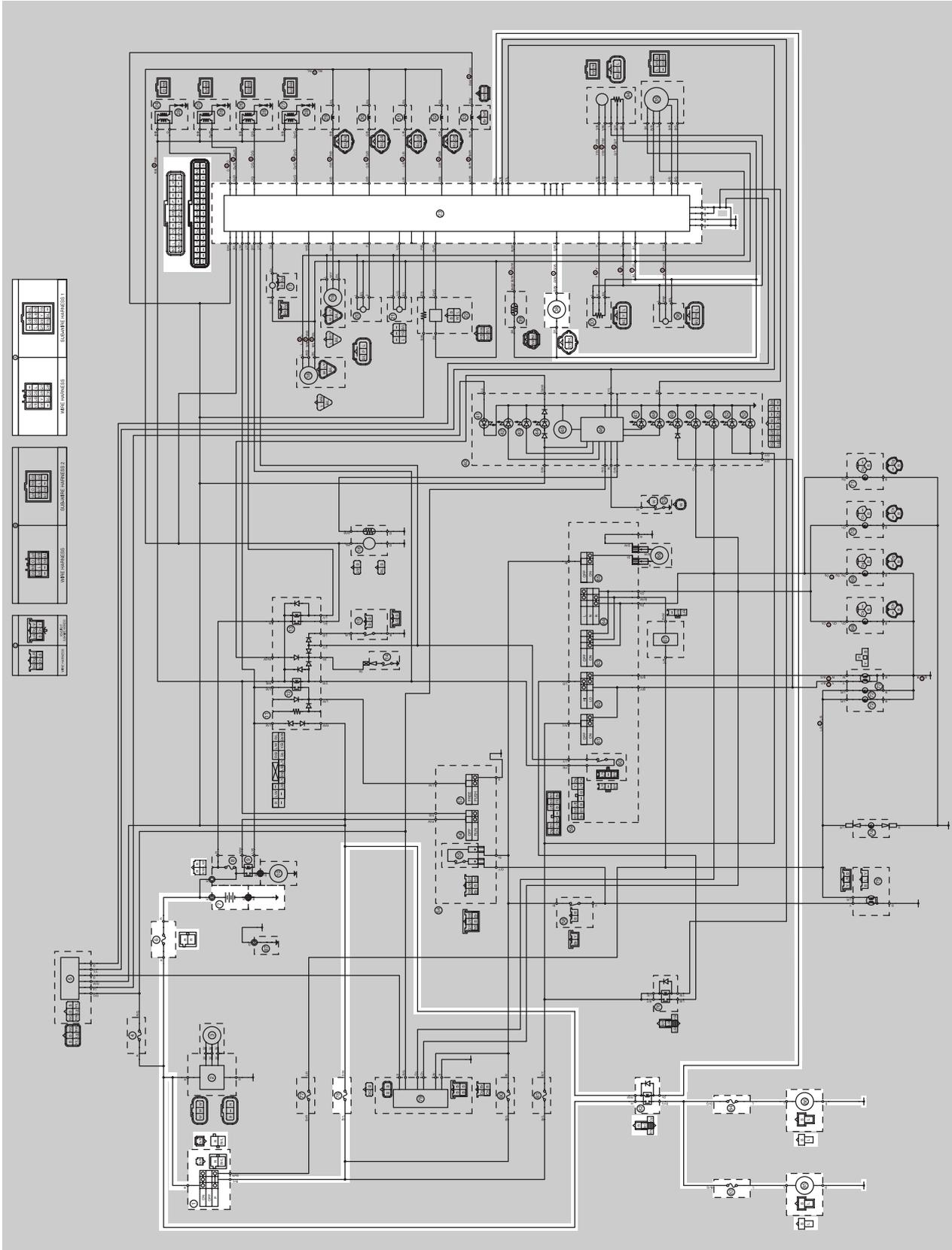
Properly connect or repair the signal-  
ing system's wiring.

OK↓

Replace the meter assembly.

EAS27300  
**COOLING SYSTEM**

EAS27310  
**CIRCUIT DIAGRAM**



## COOLING SYSTEM

---

- 1. Main switch
- 6. Fuse (main)
- 7. Battery
- 23. ECU
- 38. Coolant temperature sensor
- 78. Fuse (ignition)
- 82. Radiator fan motor relay
- 83. Fuse (radiator fan motor left)
- 84. Fuse (radiator fan motor right)
- 85. Radiator fan motor (left)
- 86. Radiator fan motor (right)

# COOLING SYSTEM

EAS27320

## TROUBLESHOOTING

### NOTE:

- Before troubleshooting, remove the following part(s):

1 Rider and passenger seat

2 Fuel tank

3 Air filter case

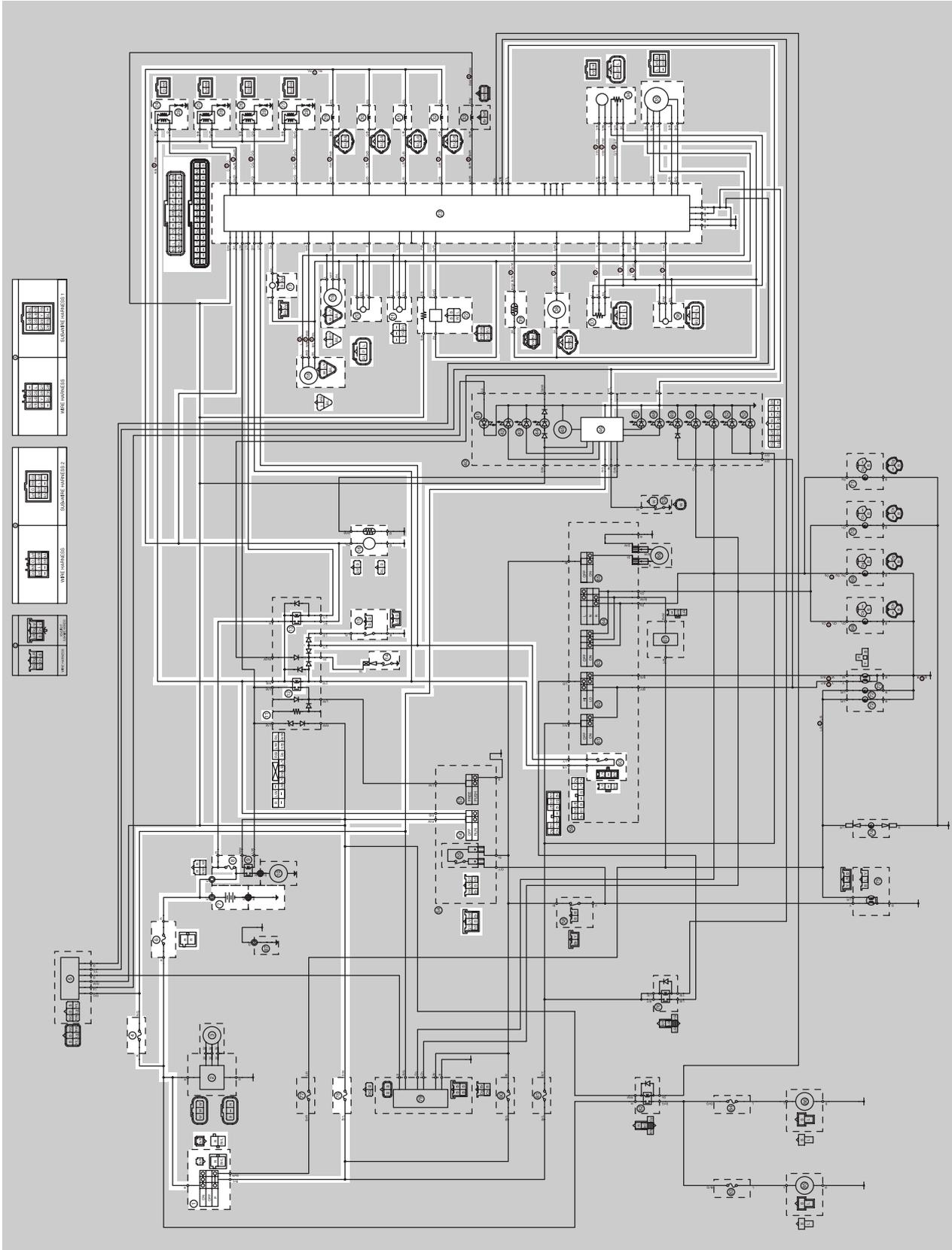
<p>1 Check the fuses. (Main, ignition and radiator fan motor) Refer to "CHECKING THE FUSES" on page 8-97.</p>	NG→	<p>Replace the fuse(s).</p>
OK↓		
<p>2 Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-97.</p>	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
<p>3 Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-93.</p>	NG→	<p>Replace the immobilizer kit.</p>
OK↓		
<p>4 Check the radiator fan motor (left and right). Refer to "CHECKING THE RADIATOR FAN MOTOR" on page 8-108.</p>	NG→	<p>The radiator fan motor is faulty and must be replaced.</p>
OK↓		
<p>5 Check the radiator fan motor relay. Refer to "CHECKING THE RELAYS" on page 8-100.</p>	NG→	<p>Replace the radiator fan motor relay.</p>
OK↓		
<p>6 Check the coolant temperature. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-108.</p>	NG→	<p>Replace the coolant temperature sensor.</p>
OK↓		
<p>7 Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-27.</p>	NG→	<p>Properly connect or repair the cooling system's wiring.</p>
OK↓		
<p>This circuit is OK.</p>		



# FUEL INJECTION SYSTEM

## EAS27330 FUEL INJECTION SYSTEM

## EAS27340 CIRCUIT DIAGRAM



# FUEL INJECTION SYSTEM

---

1. Main switch
4. Fuse (backup)
6. Fuse (main)
7. Battery
8. Fuse (fuel injection)
11. Relay unit
12. Starting circuit cut-off relay
13. Fuel pump relay
14. Neutral switch
15. Sidestand switch
16. Fuel pump
17. Crankshaft position sensor
18. Cylinder identification sensor
19. Speed sensor
20. Atmospheric pressure sensor
21. Lean angle sensor
22. O<sub>2</sub> sensor
23. ECU
24. Ignition coil #1
25. Ignition coil #2
26. Ignition coil #3
27. Ignition coil #4
28. Spark plug
29. Injector #1
30. Injector #2
31. Injector #3
32. Injector #4
34. Sub-throttle position sensor
35. EXUP servo motor
36. Intake air pressure sensor
37. Throttle position sensor
38. Coolant temperature sensor
39. Air temperature sensor
46. Multi function meter
56. Engine stop switch
78. Fuse (ignition)

# FUEL INJECTION SYSTEM

EAS27370

## TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

### NOTE:

- Before troubleshooting, remove the following part(s):

1 Rider and passenger seat

2 Fuel tank

3 Air filter case

1 Check the fuses. (Main, backup, fuel injection and ignition) Refer to "CHECKING THE FUSES" on page 8-97.	NG→	Replace the fuse(s).
OK↓		
2 Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-97.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3 Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-10.	NG→	Re-gap or replace the spark plugs.
OK↓		
4 Check the ignition coils. Refer to "CHECKING THE IGNITION COILS" on page 8-103.	NG→	Replace the ignition coils.
OK↓		
5 Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-104.	NG→	Replace the crankshaft position sensor.
OK↓		
6 Check the relay unit (fuel pump relay). Refer to "CHECKING THE RELAYS" on page 8-100.	NG→	Replace the relay unit.
OK↓		
7 Check the fuel pump. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the fuel pump.
OK↓		

## FUEL INJECTION SYSTEM

8 Check the main switch.  
Refer to "CHECKING THE SWITCHES" on page 8-93.

NG→

Replace the immobilizer kit.

OK↓

9 Check the engine stop switch.  
Refer to "CHECKING THE SWITCHES" on page 8-93.

NG→

Replace the right handlebar switch.

OK↓

10 Check the neutral switch.  
Refer to "CHECKING THE SWITCHES" on page 8-93.

NG→

Replace the neutral switch.

OK↓

11 Check the sidestand switch.  
Refer to "CHECKING THE SWITCHES" on page 8-93.

NG→

Replace the sidestand switch.

OK↓

12 Check the clutch switch.  
Refer to "CHECKING THE SWITCHES" on page 8-93.

NG→

Replace the clutch switch.

OK↓

13 Check the relay unit (starting circuit cut-off relay).  
Refer to "CHECKING THE RELAYS" on page 8-100.

NG→

Replace the relay unit.

OK↓

14 Check the lean angle sensor.  
Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-105.

NG→

Replace the lean angle sensor.

OK↓

15 Check the cylinder identification sensor.  
Refer to "CHECKING THE CYLINDER IDENTIFICATION SENSOR" on page 8-111.

NG→

Replace the cylinder identification sensor.

OK↓

16 Check the speed sensor.  
Refer to "CHECKING THE SPEED SENSOR" on page 8-107.

NG→

Replace the speed sensor.

OK↓

## FUEL INJECTION SYSTEM

<p>17 Checking the atmospheric pressure sensor. Refer to "CHECKING THE ATMOSPHERIC PRESSURE SENSOR" on page 8-111.</p>	NG→	<p>Replace the atmospheric pressure sensor.</p>
OK↓		
<p>18 Check the injector. Refer to "CHECKING THE INJECTORS" on page 7-8.</p>	NG→	<p>Replace the injector.</p>
OK↓		
<p>19 Check the throttle position sensor. Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-109.</p>	NG→	<p>Replace the throttle position sensor.</p>
OK↓		
<p>20 Check the sub-throttle position sensor. Refer to "CHECKING THE SUBTHROTTLE POSITION SENSOR" on page 8-110.</p>	NG→	<p>Replace the sub-throttle position sensor.</p>
OK↓		
<p>21 Check the intake air pressure sensor. Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-112.</p>	NG→	<p>Replace the intake air pressure sensor</p>
OK↓		
<p>22 Check the coolant temperature sensor. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-108.</p>	NG→	<p>Replace the coolant temperature sensor.</p>
OK↓		
<p>23 Check the intake air temperature sensor. Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-112.</p>	NG→	<p>Replace the intake air temperature sensor.</p>
OK↓		

## FUEL INJECTION SYSTEM

---

24 Check the entire ignition system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-1.

OK↓

Replace the ECU.

NG→

Properly connect or repair the ignition system's wiring

# FUEL INJECTION SYSTEM

EAS27350

## ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, the ECU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the odometer/tripmeter/fuel reserve tripmeter LCD. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

### Engine trouble warning light indication and FI system operation

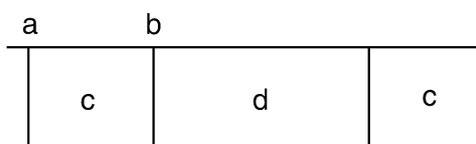
Warning light indication	ECU operation	FI operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Can or cannot be operated depending on the fault code

\* The warning light flashes when any one of the conditions listed below is present and the start switch is pushed:

- |  |  |
|--|--|
| 11: Cylinder identification sensor                         | 30: Lean angle sensor (latch up detected)        |
| 12: Crankshaft position sensor                             | 41: Lean angle sensor (open or short-circuit)    |
| 19: Sidestand switch (open circuit in the wire to the ECU) | 50: ECU internal malfunction (faulty ECU memory) |

### Checking the engine trouble warning light

The engine trouble warning light comes on for 1.4 seconds after the main switch has been turned to "ON" and it comes on while the start switch is being pushed. If the warning light does not come on under these conditions, the warning light (LED) may be defective.



## FUEL INJECTION SYSTEM

- a. Main switch "OFF"
- b. Main switch "ON"
- c. Engine trouble warning light off
- d. Engine trouble warning light on for 1.4 seconds

ET2D1027

### SELF-DIAGNOSTIC FUNCTION TABLE

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue to operate or stop operating, depending on the conditions.

#### Self-Diagnostic Function table

Fault code No.	Item	Symptom	Able/ unable to start	Able/ unable to drive
11	Cylinder identification sensor	No normal signals are received from the cylinder identification sensor when the engine is started or while the vehicle is being driven.	Unable	Able
12	Crankshaft position sensor	No normal signals are received from the crankshaft position sensor.	Unable	Unable
13	Intake air pressure sensor (open or short circuit)	Intake air pressure sensor: open or short circuit detected.	Able	Able
14	Intake air pressure sensor hose line (piping system)	Intake air pressure sensor: faulty intake air pressure sensor system.	Able	Able
15	Throttle position sensor (open or short circuit)	Throttle position sensor: open or short circuit detected.	Able	Able
16	Throttle position sensor (stuck)	Throttle position sensor is stuck.	Able	Able
17	EXUP servo motor potention circuit (open or short circuit)	EXUP servo motor potension circuit: open or short circuit detected.	Able	Able
18	EXUP servo motor (stuck)	EXUP servo motor is stuck.	Able	Able
19	Sidestand switch (open circuit in the wire to the ECU)	Open circuit in the input line of ECU No.24 terminal is detected when start switch is pressed from the sidestand switch to the ECU.	Unable	Unable
20	Intake air pressure sensor or atmospheric pressure sensor	When the main switch is turned to "ON", the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly.	Able	Able

## FUEL INJECTION SYSTEM

Fault code No.	Item	Symptom	Able/ unable to start	Able/ unable to drive
21	Coolant temperature sensor (open or short circuit)	Coolant temperature sensor: open or short circuit detected.	Able	Able
22	Intake air temperature sensor (open or short circuit)	Intake air temperature sensor: open or short circuit detected.	Able	Able
23	Atmospheric pressure sensor (open or short circuit)	Atmospheric pressure sensor: open or short circuit detected.	Able	Able
24	O <sub>2</sub> sensor	No normal signal is received from the O <sub>2</sub> sensor.	Able	Able
30	Lean angle sensor (latch up detected)	No normal signal is received from the lean angle sensor.	Unable	Unable
33	Cylinder-#1 ignition coil (open circuit)	Primary lead of the cylinder-#1 ignition coil: open circuit detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
34	Cylinder-#2 ignition coil (open circuit)	Primary lead of the cylinder-#2 ignition coil: open circuit detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
35	Cylinder-#3 ignition coil (open circuit)	Primary lead of the cylinder-#3 ignition coil: open circuit detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
36	Cylinder-#4 ignition coil (open circuit)	Primary lead of the cylinder-#4 ignition coil: open circuit detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)

## FUEL INJECTION SYSTEM

Fault code No.	Item	Symptom	Able/ unable to start	Able/ unable to drive
39	Injector (open circuit)	Injector: open circuit detected.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
41	Lean angle sensor (open or short-circuit)	Lean angle sensor: open or short circuit detected.	Unable	Unable
42	Speed sensor	No normal signals are received from the speed sensor.	Able	Able
	Neutral switch	Neutral switch: open or short circuit detected.		
43	Fuel system voltage (monitoring voltage)	Power supply to the injectors and the fuel pump is not normal.	Able	Able
44	Error in writing the amount of CO adjustment on EEPROM	An error is detected while reading or writing on EEPROM (CO adjustment value).	Able	Able
46	Vehicle system power supply (monitoring voltage)	Power supply to the fuel injection system is not normal.	Able	Able
47	Sub-throttle servo motor potention (open or short circuit)	sub-throttle servo motor potention: open or short circuit detected.	Able	Able
48	Sub-throttle servo motor (lock)	A lock of the sub-throttle servo motor is detected.	Able	Able
50	ECU internal malfunction (memory check error)	ECU memory is faulty. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	Unable	Unable
-	Start unable warning	Relay is not turned ON even if the crank signal is input while the start switch is turned ON. When the start switch is turned ON while an error is detected with the fault code of No.11, 12, 19, 30, 41 or 50.	Unable	Unable

### Communication error with the meter

Fault code No.	Item	Symptom	Able/ unable to start	Able/ unable to drive
Er-1	ECU internal malfunction (output signal error)	No signals are received from the ECU.	Unable	Unable



## FUEL INJECTION SYSTEM

If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.

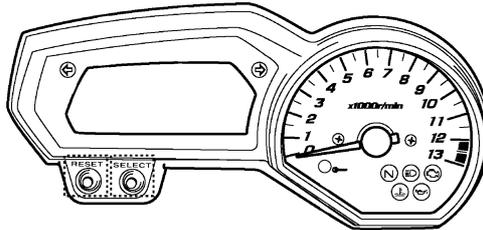
If no malfunction is detected in the sensors and actuators, check and repair inner parts of the engine.

EAS27420

### DIAGNOSTIC MODE

Setting the diagnostic mode

1. Turn the main switch to "OFF" and set the engine stop switch to "○".
2. Disconnect the wire harness coupler from the fuel pump.
3. Press and hold the "SELECT" and "RESET" buttons, turn the main switch to "ON", and continue to press the buttons for 8 seconds or more.



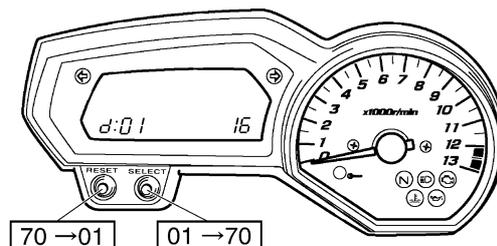
#### NOTE:

- All displays on the meter disappear except the odometer/tripmeter/fuel reserve tripmeter display.
- "dl" appears on the odometer/tripmeter/fuel reserve tripmeter LCD.

4. Press the "SELECT" button to select the diagnostic mode "dl".
5. After selecting "dl", simultaneously press the "SELECT" and "RESET" buttons for 2 seconds or more to activate the diagnostic mode. The diagnostic code number "d01" appears on the clock LCD.
6. Set the engine stop switch to "⊗".
7. Select the diagnostic code number corresponding to the fault code number by pressing the "SELECT" and "RESET" buttons.

#### NOTE:

- The diagnostic code number appears on the LCD meter (d01–70).
- To decrease the selected diagnostic code number, press the "RESET" button. Press the "RESET" button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the "SELECT" button. Press the "SELECT" button for 1 second or longer to automatically increase the diagnostic code numbers.



8. Verify the operation of the sensor or actuator.
  - Sensor operation

## FUEL INJECTION SYSTEM

The data representing the operating conditions of the sensor appears on the odometer/tripmeter/fuel reserve tripmeter LCD.

- Actuator operation

Set the engine stop switch to “○” to operate the actuator.

**NOTE:**

If the engine stop switch is set to “○”, set it to “⊗”, and then set it to “○” again.

9. Turn the main switch to “OFF” to cancel the diagnostic mode.

**Fault code table**

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
11	<ul style="list-style-type: none"> <li>• No normal signals are received from the cylinder identification sensor when the engine is started or while the vehicle is being driven.</li> </ul>	<ul style="list-style-type: none"> <li>• Open or short circuit in sub wire harness.</li> <li>• Open or short circuit in wire harness.</li> <li>• Defective cylinder identification sensor.</li> <li>• Improperly installed sensor.</li> <li>• Malfunction in ECU.</li> </ul>	—
12	No normal signals are received from the crankshaft position sensor.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective crankshaft position sensor.</li> <li>• Malfunction in pickup rotor.</li> <li>• Improperly installed sensor.</li> <li>• Malfunction in ECU.</li> </ul>	—
13	Intake air pressure sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Open or short circuit in sub wire harness.</li> <li>• Defective intake air pressure sensor.</li> <li>• Malfunction in ECU.</li> </ul>	03
14	Intake air pressure sensor: faulty intake air pressure sensor system.	<ul style="list-style-type: none"> <li>• Intake air pressure sensor hose is detached, clogged, kinked, or pinched.</li> <li>• Malfunction in ECU.</li> </ul>	03
15	Throttle position sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Open or short circuit in sub wire harness.</li> <li>• Defective throttle position sensor.</li> <li>• Improperly installed throttle position sensor.</li> <li>• Malfunction in ECU.</li> </ul>	01
16	Throttle position sensor: stuck	<ul style="list-style-type: none"> <li>• Stuck throttle position sensor.</li> <li>• Malfunction in ECU.</li> </ul>	01
17	EXUP servo motor potentiation circuit: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in sub wire harness.</li> <li>• Defective EXUP servo motor (potentiation circuit).</li> </ul>	53
18	EXUP servo motor is stuck.	<ul style="list-style-type: none"> <li>• Open or short circuit in sub wire harness.</li> <li>• Stuck EXUP servo motor (mechanism).</li> <li>• Stuck EXUP servo motor (motor).</li> </ul>	53
19	Open circuit is detected in the input line of ECU No.24 terminal is detected when the start switch is pressed.	<ul style="list-style-type: none"> <li>• Open circuit in wire harness (ECU Coupler).</li> <li>• Malfunction in ECU.</li> </ul>	20

## FUEL INJECTION SYSTEM

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
20	When the main switch is turned to "ON", the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly.	<ul style="list-style-type: none"> <li>• Atmospheric pressure sensor hose is clogged.</li> <li>• Intake air pressure sensor hose is clogged, kinked, or pinched.</li> <li>• Malfunction of the atmospheric pressure sensor in the intermediate electrical potential.</li> <li>• Malfunction of the intake air pressure sensor in the intermediate electrical potential.</li> <li>• Malfunction in ECU.</li> </ul>	02 03
21	Coolant temperature sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective coolant temperature sensor.</li> <li>• Improperly installed coolant temperature sensor.</li> <li>• Malfunction in ECU.</li> </ul>	06
22	Intake air temperature sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective intake air temperature sensor.</li> <li>• Improperly installed intake air temperature sensor.</li> <li>• Malfunction in ECU.</li> </ul>	05
23	Atmospheric pressure sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in sub wire harness.</li> <li>• Defective atmospheric pressure sensor.</li> <li>• Improperly installed atmospheric pressure sensor.</li> <li>• Malfunction in ECU.</li> </ul>	02
24	No normal signal is received from the O <sub>2</sub> sensor.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective O<sub>2</sub> sensor.</li> <li>• Improperly installed O<sub>2</sub> sensor.</li> <li>• Malfunction in ECU.</li> </ul>	—
30	No normal signal is received from the lean angle sensor.	<ul style="list-style-type: none"> <li>• Vehicle has overturned.</li> <li>• Defective lean angle sensor.</li> <li>• Improperly installed lean angle sensor.</li> <li>• Malfunction in ECU.</li> </ul>	08
33	Open circuit detected in the primary lead of the cylinder-#1 ignition coil.	<ul style="list-style-type: none"> <li>• Open circuit in wire harness.</li> <li>• Malfunction in ignition coil.</li> <li>• Malfunction in a component of ignition cut-off circuit system.</li> <li>• Malfunction in ECU.</li> </ul>	30
34	Open circuit detected in the primary lead of the cylinder-#2 ignition coil.	<ul style="list-style-type: none"> <li>• Open circuit in wire harness.</li> <li>• Malfunction in ignition coil.</li> <li>• Malfunction in a component of ignition cut-off circuit system.</li> <li>• Malfunction in ECU.</li> </ul>	31
35	Open circuit detected in the primary lead of the cylinder-#3 ignition coil.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Malfunction in ignition coil.</li> <li>• Malfunction in a component of ignition cut-off circuit system.</li> <li>• Malfunction in ECU.</li> </ul>	32

## FUEL INJECTION SYSTEM

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
36	Open circuit detected in the primary lead of the cylinder-#4 ignition coil.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Malfunction in ignition coil.</li> <li>• Malfunction in a component of ignition cut-off circuit system.</li> <li>• Malfunction in ECU.</li> </ul>	33
39	Open circuit detected in a injector.	<ul style="list-style-type: none"> <li>• Open or short circuit sub-wire- harness.</li> <li>• Open or short circuit in wire harness.</li> <li>• Improperly installed injector.</li> <li>• Defective injector.</li> </ul>	36 37 38 39
41	Lean angle sensor: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective lean angle sensor.</li> <li>• Malfunction in ECU.</li> </ul>	08
42	No normal signals are received from the speed sensor.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Malfunction in speed sensor.</li> <li>• Malfunction in ECU.</li> </ul>	07
	Neutral switch: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Malfunction in neutral switch.</li> <li>• Malfunction in ECU.</li> </ul>	21
43	Power supply to the injectors and the fuel pump is not normal.	<ul style="list-style-type: none"> <li>• Open circuit in wire harness.</li> <li>• Malfunction in ECU.</li> </ul>	09
44	An error is detected while reading or writing on EEPROM (CO adjustment value).	<ul style="list-style-type: none"> <li>• Malfunction in ECU. (The CO adjustment value is not properly written on or read from the internal memory).</li> </ul>	60
46	Power supply to the fuel injection system relay is not normal.	<ul style="list-style-type: none"> <li>• Malfunction in the charging system. Refer to "CHARGING SYSTEM" on page 8-11.</li> </ul>	—
47	Sub-throttle servo motor potentiation circuit: open or short circuit detected.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Defective Sub-throttle servo motor (potentiation circuit).</li> </ul>	56
48	Sub-throttle servo motor is stuck.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Stuck Sub-throttle servo motor (mechanism).</li> <li>• Stuck Sub-throttle servo motor (motor).</li> </ul>	56
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	<ul style="list-style-type: none"> <li>• Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.)</li> </ul>	—
Er-1	No signals are received from the ECU.	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Malfunction in meter.</li> <li>• Defective wire connection of the ECU coupler.</li> <li>• Malfunction in ECU.</li> </ul>	—

## FUEL INJECTION SYSTEM

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
Er-2	No signals are received from the ECU within the specified duration.	<ul style="list-style-type: none"> <li>• Improper connection in wire harness.</li> <li>• Malfunction in meter.</li> <li>• Malfunction in ECU.</li> </ul>	—
Er-3	Data from the ECU cannot be received correctly.	<ul style="list-style-type: none"> <li>• Improper connection in wire harness.</li> <li>• Malfunction in meter.</li> <li>• Malfunction in ECU.</li> </ul>	—
Er-4	Non-registered data has been received from the meter.	<ul style="list-style-type: none"> <li>• Improper connection in wire harness.</li> <li>• Malfunction in meter.</li> <li>• Malfunction in ECU.</li> </ul>	—

**Sensor operation table**

Diagnostic code No.	Item	Meter display	Checking method
01	Throttle position sensor signal <ul style="list-style-type: none"> <li>• Fully closed position</li> <li>• Fully opened position</li> </ul>	15–18  95–100	Check with throttle valve fully closed.  Check with throttle valve fully opened.
02	Atmospheric pressure	Displays the atmospheric pressure.	Compare the actually measured atmospheric pressure with the meter display value.
03	Intake air pressure	Displays the cylinder-#1 intake air pressure.	Set the engine stop switch to “○” then operate the throttle while pushing the start switch “⊗”. (If the display value changes, the performance is OK.)
05	Intake air temperature	Displays the intake air temperature.	Compare the actually measured air temperature with the meter display value.
06	Coolant temperature	Displays the coolant temperature.	Compare the actually measured coolant temperature with the meter display value.
07	Vehicle speed pulse	0–999	Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
08	Lean angle sensor <ul style="list-style-type: none"> <li>• Upright</li> <li>• Overturned</li> </ul>	0.4–1.4 3.7–4.4	Remove the lean angle sensor and incline it more than 65 degrees.

## FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Meter display	Checking method
09	Fuel system voltage (battery voltage)	Approximately 12.0	Set the engine stop switch to “○” and then compare with the actually measured battery voltage. (If the battery voltage is lower, recharge the battery.)
20	Sidestand switch <ul style="list-style-type: none"> <li>• Stand retracted</li> <li>• Stand extended</li> </ul>	ON OFF	Set ON/OFF the sidestand switch (with the transmission in gear).
21	Neutral switch <ul style="list-style-type: none"> <li>• Neutral</li> <li>• In gear</li> </ul>	ON OFF	Set ON/OFF the neutral switch (shift the transmission).
60	EEPROM fault cylinder No <ul style="list-style-type: none"> <li>• No fault</li> <li>• Fault detected</li> </ul>	00 01–04 (fault cylinder No.) <ul style="list-style-type: none"> <li>• (If more than one cylinder is defective, the display changes every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats.)</li> </ul>	—
61	Malfunction history code <ul style="list-style-type: none"> <li>• No history</li> <li>• History exists</li> </ul>	00 Fault codes 11–50 <ul style="list-style-type: none"> <li>• (If more than one code number is detected, the display changes every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats.)</li> </ul>	—
62	Malfunction history code erasure <ul style="list-style-type: none"> <li>• No history</li> <li>• History exists</li> </ul>	00 Fault codes 01-28 <ul style="list-style-type: none"> <li>• (If more than one code number is detected, the display alternates every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.)</li> </ul>	—  To erase the history, set the engine stop switch to “○” .

## FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Meter display	Checking method
63	Malfunction code reinstate • No malfunction code • Malfunction code exists	00 Fault code 24 • (If more than one code number is detected, the display changes every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats.)	—
			To reinstate, set the engine stop switch to “○”.
70	Control number	0-255	—

### Actuator operation table

Diagnostic code No.	Item	Actuation	Checking method
30	Cylinder-#1 ignition coil	Actuates the cylinder-#1 ignition coil five times at one second intervals. Illuminates the engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
31	Cylinder-#2 ignition coil	Actuates the cylinder-#2 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
32	Cylinder-#3 ignition coil	Actuates the cylinder-#3 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
33	Cylinder-#4 ignition coil	Actuates the cylinder-#4 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
36	Injector #1	Actuates the injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #1 five times.
37	Injector #2	Actuates the injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #2 five times.

## FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Actuation	Checking method
38	Injector #3	Actuates the injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #3 five times.
39	Injector #4	Actuates the injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #4 five times.
48	Air induction system solenoid	Actuates the Air induction system solenoid five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the Air induction system solenoid five times.
50	Fuel injection system relay	Actuates the fuel injection system relay five times at one-second intervals. Illuminates the engine trouble warning light. (The engine trouble warning light is OFF when the relay is ON, and the engine trouble warning light is ON when the relay is OFF).	Check the operating sound of the fuel injection system relay five times.
51	Radiator fan motor relay	Actuates the radiator fan motor relay five times at one-second intervals. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the Radiator fan motor relay five times.
52	Headlight relay	Actuates the headlight relay for five times every five-second. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the headlight relay five times.
53	Exup servo motor	Actuate the servo motor turns to close side and to open side. Illuminates the engine trouble warning light only while the motor is running.	Check the operating sound of the EXUP servo motor.

## FUEL INJECTION SYSTEM

Diagnostic code No.	Item	Actuation	Checking method
56	Sub-throttle servo motor	Actuate the servo motor turns to close side and to open side. Illuminates the engine trouble warning light only while the motor is running.	Check the operating sound of the Sub-throttle servo motor.

EAS27460

### TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Check and service the items or components that are the probable cause of the malfunction following the order given.

After the check and service of the malfunctioning part has been completed, reset the meter display according to the reinstatement method.

Fault code No.:

Code number displayed on the meter when the engine failed to work normally. Refer to Self-Diagnostic Function table.

Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "DIAGNOSTIC MODE" on page 8-42.

Fault code No.	11	Symptom	<b>No normal signals are received from the cylinder identification sensor when the engine is started or while the vehicle is being driven.</b>	
Diagnostic code No.	—	—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed condition of cylinder identification sensor.		Check for looseness or pinching.	Starting the engine and operate it at idle.
2	Connections <ul style="list-style-type: none"> <li>• Cylinder identification sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between the cylinder identification sensor coupler and ECU coupler (Blue-Blue) (White/Black-White/Black) (Black/Blue-Black/Blue)</li> </ul>	
4	Defective cylinder identification sensor.		<ul style="list-style-type: none"> <li>• Replace if defective.</li> </ul> Refer to "CHECKING THE CYLINDER IDENTIFICATION SENSOR" on page 8-111.	

## FUEL INJECTION SYSTEM

Fault code No.	12	Symptom	No normal signals are received from the crankshaft position sensor.	
Diagnostic code No.	—		—	
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	Installed condition of crankshaft position sensor	Check for looseness or pinching.	Cranking the engine.	
2	Connections <ul style="list-style-type: none"> <li>• Crankshaft position sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>	<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may have pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>		
3	Open or short circuit in wire harness.	<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between the crankshaft position sensor coupler and ECU coupler. (Gray–Gray) (Black/Blue–Black/Blue)</li> </ul>		
4	Defective crankshaft position sensor.	<ul style="list-style-type: none"> <li>• Replace if defective. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-104.</li> </ul>		

## FUEL INJECTION SYSTEM

Fault code No.	13	Symptom	Intake air pressure sensor:open or short circuit detected.	
Diagnostic code No.		03	Intake air pressure sensor	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Intake air pressure sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may have pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turn the main switch to ON.
2	Open or short circuit in wire harness and/or sub wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between intake air pressure sensor coupler and ECU coupler (Black/Blue–Black/Blue) (Pink/White–Pink/White) (Blue–Blue)</li> </ul>	
3	Defective intake air pressure sensor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.03)</li> <li>• Replace if defective. Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-112.</li> </ul>	

Fault code No.	14	Symptom	Intake air pressure sensor: faulty intake air pressure sensor system.	
Diagnostic code No.		03	Intake air pressure sensor	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Intake air pressure sensor hose		<ul style="list-style-type: none"> <li>• Check the intake air pressure sensor hose condition.</li> <li>• Repair or replace the sensor hose.</li> </ul>	Starting the engine and operate it at idle.
2	Connections <ul style="list-style-type: none"> <li>• Intake air pressure sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
3	Defective intake air pressure sensor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.03)</li> <li>• Replace if defective. Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-112.</li> </ul>	

## FUEL INJECTION SYSTEM

Fault code No.	15	Symptom	Throttle position sensor:open or short circuit detected.			
Diagnostic code No.		01	Throttle position sensor			
Order	Item/components and probable cause		Check or maintenance job		Reinstatement method	
1	Installed condition of throttle position sensor.		<ul style="list-style-type: none"> <li>• Check for looseness or pinching.</li> <li>• Check that is installed in the specified position.</li> </ul>		Turning the main switch to "ON".	
2	Connections <ul style="list-style-type: none"> <li>• Throttle position sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>			
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between throttle position sensor coupler and ECU coupler (Black/Blue–Black/Blue) (Yellow–Yellow) (Blue–Blue)</li> </ul>			
4	Throttle position sensor lead wire open circuit output voltage check.		<ul style="list-style-type: none"> <li>• Check for open circuit and replace the throttle position sensor. (Black/Blue–Yellow)</li> </ul>			
			Open circuit item	Output voltage		
			Ground wire open circuit	5 V		
			Output wire open circuit	0 V		
		Power supply wire open circuit	0 V			
5	Defective throttle position sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.01)</li> <li>• Replace if defective. Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-109.</li> </ul>			

## FUEL INJECTION SYSTEM

Fault code No.	16	Symptom	Stuck throttle position sensor detected.	
Diagnostic code No.	01	Throttle position sensor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed condition of throttle position sensor.		<ul style="list-style-type: none"> <li>• Check the installed area for looseness or pinching.</li> <li>• Check that is installed in the specified position. Refer to "THROTTLE BODIES" on page 7-4 section.</li> </ul>	Reinstated by starting the engine, operating it at idle, and then racing it.
2	Defective throttle position sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.01)</li> <li>• Replace if defective. Refer to "THROTTLE BODIES" on page 7-4 section.</li> </ul>	

Fault code No.	17	Symptom	EXUP servo motor circuit:open or short circuit detected.	
Diagnostic code No.	53	EXUP servo motor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• EXUP servo motor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between EXUP servo motor coupler and ECU coupler (Blue-Blue) (White/Red-White/Red) (Black/Blue-Black/Blue)</li> </ul>	
3	Defective EXUP servo motor (potention circuit).		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.53)</li> <li>• Replace if defective. Refer to "CHECKING THE EXUP SERVO MOTOR" on page 3-18.</li> </ul>	

## FUEL INJECTION SYSTEM

Fault code No.	18	Symptom	EXUP servo motor is stuck.	
Diagnostic code No.	53	EXUP servo motor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• EXUP servo motor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between EXUP servo motor coupler and ECU coupler. (Black/Green–Black/Green) (Black/Red–Black/Red)</li> </ul>	
3	Defective EXUP servo motor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.53)</li> <li>• Replace if defective. Refer to "CHECKING THE EXUP SERVO MOTOR" on page 3-18.</li> </ul>	
4	Defective EXUP valve, pulley, and cables		Replace if defective.	

Fault code No.	19	Symptom	Open circuit is detected in the input line of ECU No.24 terminal is difected when the start switch is pressed.	
Diagnostic code No.	20	Sidestand switch		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.20)</li> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	If the transmission is in gear, retracting the sidestand. If the transmission is in neutral, reconnecting the wiring.
2	Open or short circuit in wire harness or sub lead.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between sidestand switch coupler and ECU coupler (Black–Black)</li> </ul>	
3	Defective sidestand switch		<ul style="list-style-type: none"> <li>• Replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-93.</li> </ul>	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>20</b>	<b>Symptom</b>	<b>When the main switch is turned to "ON", the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly.</b>	
<b>Diagnostic code No.</b>	<b>02 03</b>	<b>Atmospheric pressure sensor Intake air pressure sensor</b>		
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Defective intake air pressure sensor or atmospheric pressure sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code Nos. 02, 03)</li> <li>• Replace if defective.</li> </ul> Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-112 or "CHECKING THE ATMOSPHERIC PRESSURE SENSOR" on page 8-111.	Turning the main switch to "ON".

<b>Fault code No.</b>	<b>21</b>	<b>Symptom</b>	<b>Coolant temperature sensor:open or short circuit detected.</b>	
<b>Diagnostic code No.</b>	<b>06</b>	<b>Coolant temperature sensor</b>		
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Connections <ul style="list-style-type: none"> <li>• Coolant temperature sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between coolant temperature sensor coupler and ECU coupler. (Green/White–Green/White) (Black/Blue–Black/Blue)</li> </ul>	
3	Defective coolant temperature sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.06)</li> <li>• Replace if defective.</li> </ul> Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-108.	

## FUEL INJECTION SYSTEM

Fault code No.	22	Symptom	Intake air temperature sensor:open or short circuit detected.	
Diagnostic code No.	05	Intake air temperature sensor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Intake air temperature sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between intake air temperature sensor coupler and ECU coupler. (Brown/White–Brown/White) (Black/Blue–Black/Blue)</li> </ul>	
3	Defective intake air temperature sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.05)</li> <li>• Replace if defective. Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-112.</li> </ul>	

## FUEL INJECTION SYSTEM

Fault code No.	23	Symptom	Atmospheric pressure sensor:open or short circuit detected.	
Diagnostic code No.	02		Atmospheric pressure sensor	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Atmospheric pressure sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness and/or sub wire harness 2.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between atmospheric pressure sensor coupler and ECU coupler. (Black/Blue–Black/Blue) (Pink–Pink) (Blue–Blue)</li> </ul>	
3	Defective atmospheric pressure sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.02)</li> <li>• Replace if defective. Refer to "CHECKING THE ATMOSPHERIC PRESSURE SENSOR" on page 8-111.</li> </ul>	

## FUEL INJECTION SYSTEM

Fault code No.	24	Symptom	No normal signal is received from the O <sub>2</sub> sensor.	
Diagnostic code No.	—		—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed state of O <sub>2</sub> sensor.		Check for looseness or pinching.	Start and warm up the engine until the coolant temperature rises over 60 °C. when accelerating the throttle, the warning light is turned off, or it is reset by the diagnostic mode (Code No.63).
2	Connections <ul style="list-style-type: none"> <li>• O<sub>2</sub> sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between O<sub>2</sub> sensor coupler and ECU coupler. (Gray/Green–Gray/Green) (Black/Blue–Black/Blue) (Pink/Black–Pink/Black) (Red/White–Red/White)</li> </ul>	
4	Check fuel pressure.		<ul style="list-style-type: none"> <li>• Refer to "THROTTLE BODIES" on page 7-4.</li> </ul>	
5	Defective O <sub>2</sub> sensor.		<ul style="list-style-type: none"> <li>• Replace if defective.</li> </ul>	

Fault code No.	30	Symptom	No normal signal is received from the lean angle sensor.	
Diagnostic code No.	08		Lean angle sensor	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	The vehicle has overturned.		Raise the vehicle upright.	Turning the main switch to "ON" (however, the engine cannot be restarted unless the main switch is first turned to "OFF").
2	Installed state of the lean angle sensor		Check the installed direction and condition of the sensor.	
3	Connections <ul style="list-style-type: none"> <li>• Lean angle sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
4	Defective lean angle sensor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.08)</li> <li>• Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-105.</li> </ul>	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>33</b>	<b>Symptom</b>	<b>Open circuit detected in the primary lead of the cylinder-#1 ignition coil.</b>	
<b>Diagnostic code No.</b>	<b>30</b>	<b>Cylinder-#1 ignition coil</b>		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Cylinder-#1 ignition coil coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness 1 coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub-wire harness 1.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between cylinder-#1 ignition coil coupler and ECU coupler. (Red/Black–Red/Black) (Orange–Orange)</li> </ul>	
3	Defective cylinder-#1 ignition coil		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.30)</li> <li>• Test the primary and secondary coils for continuity.</li> <li>• Replace if defective. Refer to "CHECKING THE IGNITION COILS" on page 8-103.</li> </ul>	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>34</b>	<b>Symptom</b>	<b>Open circuit detected in the primary lead of the cylinder-#2 ignition coil</b>	
<b>Diagnostic code No.</b>	<b>31</b>	<b>Cylinder-#2 ignition coil</b>		
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Connections <ul style="list-style-type: none"> <li>• Cylinder-#2 ignition coil coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness 1 coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub-wire harness 1.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between cylinder-#2 ignition coil coupler and ECU coupler. (Red/Black–Red/Black) (Gray/Red–Gray/Red)</li> </ul>	
3	Defective cylinder-#2 ignition coil.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.31)</li> <li>• Test the primary and secondary coils for continuity.</li> <li>• Replace if defective.</li> </ul> Refer to "CHECKING THE IGNITION COILS" on page 8-103.	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>35</b>	<b>Symptom</b>	<b>Open circuit detected in the primary lead of the cylinder-#3 ignition coil</b>	
<b>Diagnostic code No.</b>	<b>32</b>	<b>Cylinder-#3 ignition coil</b>		
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
1	Connections <ul style="list-style-type: none"> <li>• Cylinder-#3 ignition coil coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness 1 coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub-wire harness 1.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between cylinder-#3 ignition coil coupler and ECU coupler. (Red/Black–Red/Black) (Orange/Green–Orange/Green)</li> </ul>	
3	Defective cylinder-#3 ignition coil.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.32)</li> <li>• Test the primary and secondary coils for continuity.</li> <li>• Replace if defective. Refer to "CHECKING THE IGNITION COILS" on page 8-103.</li> </ul>	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	<b>36</b>	<b>Symptom</b>	<b>Open circuit detected in the primary lead of the cylinder-#4 ignition coil</b>	
<b>Diagnostic code No.</b>	<b>33</b>	<b>Cylinder-#4 ignition coil</b>		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Cylinder-#4 ignition coil coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness 1 coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub-wire harness 1.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between cylinder-#4 ignition coil coupler and ECU coupler. (Red/Black–Red/Black) (Gray/Green–Gray/Green)</li> </ul>	
3	Defective cylinder-#4 ignition coil.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.33)</li> <li>• Test the primary and secondary coils for continuity.</li> <li>• Replace if defective. Refer to "CHECKING THE IGNITION COILS" on page 8-103.</li> </ul>	

## FUEL INJECTION SYSTEM

Fault code No.	39	Symptom	Open circuit detected in a injector.	
Diagnostic code No.		36 37 38 39	Injector #1 Injector #2 Injector #3 Injector #4	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Injector coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Start the engine and operating it at idle.
2	Open or short circuit in wire harness and/or sub-wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between primary injector coupler and ECU coupler. (Red/Blue-Red/Blue) #1: (Red/Black-Red/Black) #2: (Green/Black-Green/Black) #3: (Blue/Black-Blue/Black) #4: (Orange/Black-Orange/Black)</li> </ul>	
3	Defective primary injector.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code Nos.36, 37, 38, 39)</li> <li>• Replace if defective. Refer to "CHECKING THE INJECTORS" on page 7-8.</li> </ul>	

## FUEL INJECTION SYSTEM

Fault code No.	41	Symptom	Lean angle sensor:open or short circuit detected.	
Diagnostic code No.	08	Lean angle sensor		
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	Connections <ul style="list-style-type: none"> <li>• Lean angle sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>	<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".	
2	Open or short circuit in lead.	<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between lean angle sensor coupler and ECU coupler. (Blue–Blue) (Yellow/Green–Yellow/Green) (Black/Blue–Black/Blue)</li> </ul>		
3	Defective lean angle sensor.	<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.08)</li> <li>• Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-105.</li> </ul>		

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	42	<b>Symptom</b>	<b>A. No normal signals are received from the speed sensor.</b> <b>B. Open circuit is detected in the neutral switch.</b>	
<b>Diagnostic code No.</b>	<b>A</b>	<b>07</b>	<b>Speed sensor</b>	
	<b>B</b>	<b>21</b>	<b>Neutral switch</b>	
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
A-1	Installed state of speed sensor.		<ul style="list-style-type: none"> <li>• Check for looseness or pinching.</li> </ul>	Starting the engine, and activating the speed sensor by operating the vehicle at 20 to 30 km/h.
A-2	Connections <ul style="list-style-type: none"> <li>• Speed sensor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
A-3	Open or short circuit in lead.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between speed sensor coupler and ECU coupler. (Blue–Blue) (White/Yellow–White/Yellow) (Black/Blue–Black/Blue)</li> </ul>	
A-4	Defective speed sensor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.07)</li> <li>• Replace if defective. Refer to "CHECKING THE SPEED SENSOR" on page 8-107.</li> </ul>	

## FUEL INJECTION SYSTEM

<b>Fault code No.</b>	42	<b>Symptom</b>	<b>A. No normal signals are received from the speed sensor.</b> <b>B. Open circuit is detected in the neutral switch.</b>	
<b>Diagnostic code No.</b>	A	07	Speed sensor	
	B	21	Neutral switch	
<b>Order</b>	<b>Item/components and probable cause</b>		<b>Check or maintenance job</b>	<b>Reinstatement method</b>
B-1	Installed state of neutral switch.		<ul style="list-style-type: none"> <li>• Check for looseness or pinching.</li> </ul>	Starting the engine, and activating the speed sensor by operating the vehicle at 20 to 30 km/h.
B-2	Connections <ul style="list-style-type: none"> <li>• Neutral switch coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
B-3	Open circuit in neutral switch lead.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between neutral switch coupler and relay unit coupler (Sky blue–Sky blue)</li> <li>• Between relay unit coupler and ECU coupler. (Blue/Yellow–Blue/Yellow)</li> </ul>	
B-4	Defective neutral switch.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No.21)</li> <li>• Replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-93.</li> </ul>	
B-5	Faulty shift drum (neutral detection area).		<ul style="list-style-type: none"> <li>• Replace if defective. Refer to "TRANSMISSION" on page 5-85.</li> </ul>	

## FUEL INJECTION SYSTEM

Fault code No.	43	Symptom	Power supply to the injectors and fuel pump is not normal.	
Diagnostic code No.	09	Fuel system voltage (battery voltage)		
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	Connections <ul style="list-style-type: none"> <li>• Relay unit coupler (fuel pump relay)</li> <li>• Main wire harness ECU coupler</li> </ul>	<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect it securely.</li> </ul>	Starting the engine and operating it at idle.	
2	Open or short circuit in wire harness.	<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between relay unit coupler and ECU coupler. (Blue/Yellow–Blue/Yellow) (Red/Blue–Red/Blue)</li> <li>• Between relay unit coupler and battery terminal. (Red–Red)</li> <li>• Between relay unit coupler and engine stop switch coupler. (Red/Black–Red/Black)</li> </ul>		
3	Malfunction or open circuit in fuel pump relay	<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No. 09)</li> <li>• Replace if defective.</li> <li>• If there is no malfunction with the fuel pump relay, replace the ECU.</li> </ul>		

## FUEL INJECTION SYSTEM

Fault code No.	44	Symptom	An error is detected while reading or writing on EEPROM (CO adjustment value).	
Diagnostic code No.	60	EEPROM fault cylinder No.		
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	Malfunction in ECU	<ul style="list-style-type: none"> <li>• Set the faulty cylinder's exhaust gas volume.               <ol style="list-style-type: none"> <li>1 Execute the diagnostic mode (Code No. 60) to check the faulty cylinder number. (If multiple cylinders are defective, the numbers of the faulty cylinders are displayed alternately at 2-second intervals.)</li> <li>2 Execute the CO adjustment mode and set the exhaust gas volume of the faulty cylinder to "0".</li> </ol> <p>If "0" is displayed, set the numerical value other than "0". When the malfunction is recovered, reset "0". Refer to "ADJUSTING THE EXHAUST GAS VOLUME" on page 3-8.</p> </li> <li>• Replace ECU if it does not recover from the malfunction.</li> </ul>	Turning the main switch to "ON". (Readjust the exhaust gas volume after it is reinstated.)	

## FUEL INJECTION SYSTEM

Fault code No.	46	Symptom	Power supply to the fuel injection system relay is not normal.	
Diagnostic code No.	—		—	
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method	
1	Connections. <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> </ul>	<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Starting the engine and operating it at idle.	
2	Faulty battery	<ul style="list-style-type: none"> <li>• Replace or change the battery Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-97.</li> </ul>		
3	Malfunction in rectifier/regulator	<ul style="list-style-type: none"> <li>• Replace if defective. Refer to "CHARGING SYSTEM" on page 8-11.</li> </ul>		
4	Open or short circuit in wire harness.	<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between battery and main switch (Red-Red)</li> <li>• Between main switch and ignition fuse (Brown/Blue-Brown/Blue)</li> <li>• Between ignition fuse and ECU (Red/White-Red/White)</li> </ul>		

## FUEL INJECTION SYSTEM

Fault code No.	47	Symptom	Sub-throttle position sensor:open or short circuit detected.	
Diagnostic monitoring code No.	56	Sub-throttle servo motor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed state of sub-throttle position sensor.		<ul style="list-style-type: none"> <li>• Check for looseness or pinching.</li> <li>• Check that the sensor is installed in the specified position.</li> </ul>	Turning the main switch to "ON".
2	Connections <ul style="list-style-type: none"> <li>• Sub-throttle position sensor coupler</li> <li>• Main wire harness ECU coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	
3	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between sub-throttle position sensor coupler and ECU coupler. (Black/Blue–Black/Blue) (Green/Yellow–Green/Yellow) (Blue–Blue)</li> </ul>	
4	Defective sub-throttle position sensor.		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No. 56)</li> <li>• Replace if defective. Refer to "CHECKING THE SUB-THROTTLE POSITION SENSOR" on page 8-110.</li> </ul>	

## FUEL INJECTION SYSTEM

Fault code No.	48	Symptom	Sub-throttle servo motor:stuck.	
Diagnostic code No.	56	Sub-throttle servo motor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Sub-throttle servo motor coupler</li> <li>• Main wire harness ECU coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between sub-throttle servo motor coupler and ECU coupler (Yellow/Red–Yellow/Red) (Yellow/White–Yellow/White)</li> </ul>	
3	Defective sub-throttle servo motor		<ul style="list-style-type: none"> <li>• Execute the diagnostic mode. (Code No. 56)</li> <li>• Replace if defective. Refer to "CHECKING THE SUB-THROTTLE SERVO MOTOR" on page 7-10.</li> </ul>	

Fault code No.	50	Symptom	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	
Diagnostic code No.	—	—		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Malfunction in ECU.		Replace the ECU. <b>NOTE:</b> _____ Do not perform this procedure with the main switch turned to "ON". _____	Turning the main switch to "ON"

## FUEL INJECTION SYSTEM

Fault code No.	Er-1	Symptom	No signals are received from the ECU.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> <li>• Main wire harness meter assembly coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between meter assembly coupler and ECU coupler. (Yellow/Blue–Yellow/Blue)</li> </ul>	
3	Malfunction in meter assembly.		Replace the meter assembly.	
4	Malfunction in ECU.		Replace the ECU.	

Fault code No.	Er-2	Symptom	No signals are received from the ECU within the specified duration.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> <li>• Main wire harness meter assembly coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between meter assembly coupler and ECU coupler. (Yellow/Blue–Yellow/Blue)</li> </ul>	
3	Malfunction in meter assembly.		Replace the meter assembly.	
4	Malfunction in ECU.		Replace the ECU.	

## FUEL INJECTION SYSTEM

Fault code No.	Er-3	Symptom	Data from the ECU cannot be received correctly.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> <li>• Main wire harness meter assembly coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between meter assembly coupler and ECU coupler. (Yellow/Blue–Yellow/Blue)</li> </ul>	
3	Malfunction in meter assembly.		Replace the meter assembly.	
4	Malfunction in ECU.		Replace the ECU.	

Fault code No.	Er-4	Symptom	Non-registered data has been received from the meter.	
Diagnostic code No.		—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections <ul style="list-style-type: none"> <li>• Main wire harness ECU coupler</li> <li>• Main wire harness meter assembly coupler</li> <li>• Sub-wire harness coupler</li> </ul>		<ul style="list-style-type: none"> <li>• Check the couplers for any pins that may be pulled out.</li> <li>• Check the locking condition of the couplers.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>	Turning the main switch to "ON".
2	Open or short circuit in wire harness.		<ul style="list-style-type: none"> <li>• Repair or replace if there is an open or short circuit.</li> <li>• Between meter assembly coupler and ECU coupler. (Yellow/Blue–Yellow/Blue)</li> </ul>	
3	Malfunction in meter assembly.		Replace the meter assembly.	
4	Malfunction in ECU.		Replace the ECU.	

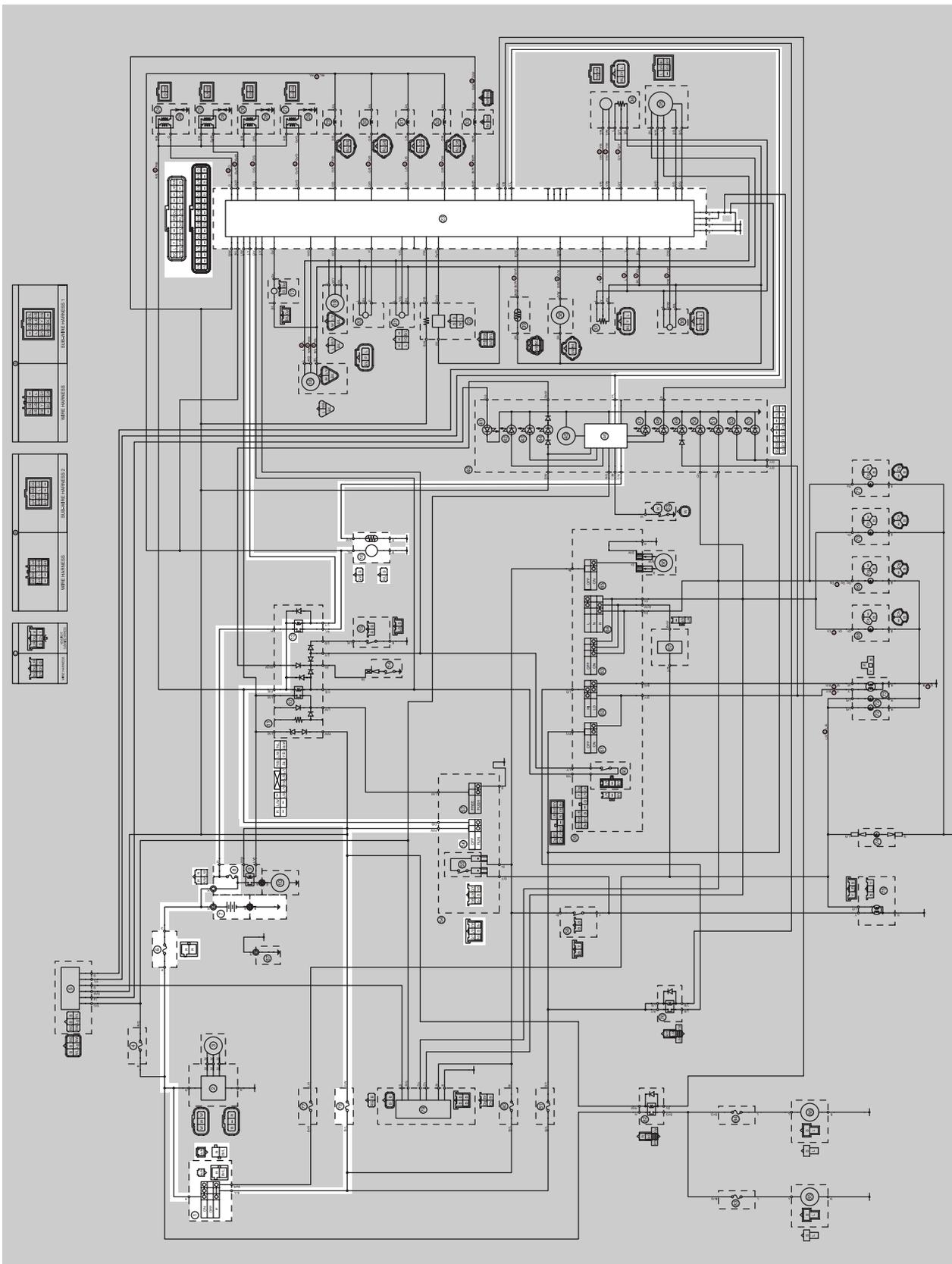
# FUEL PUMP SYSTEM

EAS27550

## FUEL PUMP SYSTEM

EAS27560

## CIRCUIT DIAGRAM



## FUEL PUMP SYSTEM

---

- 1. Main switch
- 6. Fuse (main)
- 7. Battery
- 8. Fuse (fuel injection)
- 13. Fuel pump relay
- 16. Fuel pump
- 23. ECU
- 46. Multi function meter
- 56. Engine stop switch
- 78. Fuse (ignition)

# FUEL PUMP SYSTEM

EAS27570

## TROUBLESHOOTING

If the fuel pump fails to operate.

### NOTE:

- Before troubleshooting, remove the following part(s):

1 Rider and passenger seat

2 Fuel tank

3 Air filter case

1 Check the fuses. (Main, ignition and fuel injection system) Refer to "CHECKING THE FUSES" on page 8-97.	NG→	Replace the fuse(s).
OK↓		
2 Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-97.	NG→	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK↓		
3 Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the immobilizer kit.
OK↓		
4 Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-93.	NG→	Replace the right handlebar switch.
OK↓		
5 Check the relay unit (fuel pump relay). Refer to "CHECKING THE RELAYS" on page 8-100.	NG→	Replace the relay unit.
OK↓		
6 Check the fuel pump. Refer to "CHECKING THE FUEL PRESSURE" on page 7-8.	NG→	Replace the fuel pump.
OK↓		
7 Check the entire fuel pump system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-75.	NG→	Properly connect or repair the fuel pump system's wiring.
OK↓		
Replace the ECU.		

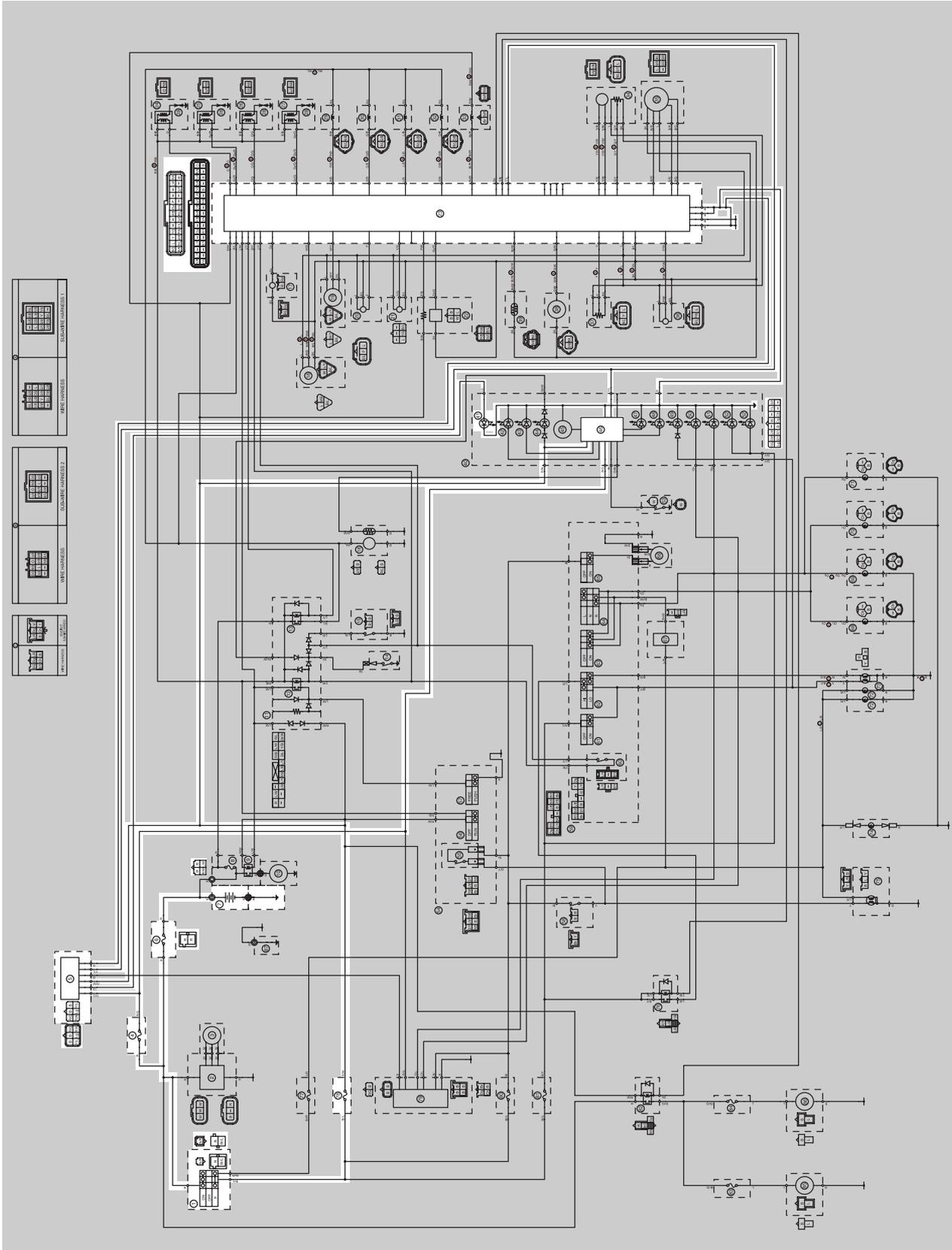
# FUEL PUMP SYSTEM

---

# IMMOBILIZER SYSTEM

## EAS27640 IMMOBILIZER SYSTEM

## EAS27650 CIRCUIT DIAGRAM



## IMMOBILIZER SYSTEM

---

- 1. Main switch
- 4. Fuse (backup)
- 5. Immobilizer unit
- 6. Fuse (main)
- 7. Battery
- 23.ECU
- 41.Immobilizer indicator
- 46.Multi function meter
- 78.Fuse (ignition)

# IMMOBILIZER SYSTEM

EAS27670

## GENERAL INFORMATION

This vehicle is equipped with an immobilizer system to help prevent theft by re-registering codes in the standard keys. This system consists of the following.

- A code re-registering key (with a red bow)
- Two standard keys (with a black bow) that can be re-registered with new codes
- A transponder (which is installed in each key bow)
- An immobilizer unit
- The ECU
- An immobilizer system indicator light

The key with the red bow is used to register codes in each standard key. Do not use the key with the red bow for driving. It should only be used for re-registering new codes in the standard keys. The immobilizer system cannot be operated with a new key until the key registered with a code. If you lose the code re-registering key, the ECU and main switch (included with an immobilizer unit) needs to be replaced.

Therefore, always use a standard key for driving. (See caution below.)

### NOTE:

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

ECA14970

### CAUTION:

- **DO NOT LOSE THE CODE RE-REGISTERING KEY!** If the code re-registering key is lost, registering new codes in the standard keys is impossible. The standard keys can still be used to start the vehicle, however if code re-registering is required (i.e., if a new standard key is made or all keys are lost) the entire immobilizer system must be replaced. Therefore, it is highly recommended to use either standard key after any code re-registering and keep the code re-registering key in a safe place.
- Do not submerge either of the keys in water.
- Do not expose the keys to excessively high temperatures.
- Do not place either of the keys close to magnets (this includes, but not limited to, products such as speakers, etc.).
- Do not place heavy items on either key.
- Do not grind either key or alter their shape.
- Do not disassemble the plastic part of either key.
- Keep other immobilizer keys away for this unit's code re-registering key and main switch.

EAS27691

## PART REPLACEMENT AND KEY CODE REGISTRATION REQUIREMENTS

In the course of use, you may encounter the following cases where replacement of parts and registration of code re-registering/standard keys are required.

### NOTE:

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

	Parts to be replaced				Key registration requirement	
	Main switch/immobilizer unit		Standard key	ECU		Accessory lock* and key
	Main switch	Immobilizer unit				
Standard key is lost			✓		New standard key	

## IMMOBILIZER SYSTEM

	Parts to be replaced				Key registration requirement	
	Main switch/immobilizer unit		Standard key	ECU		Accessory lock* and key
	Main switch	Immobilizer unit				
All keys have been lost (including code re-registering key)	✓		✓	✓	✓	Code re-registering key and standard keys
ECU is defective				✓		Code re-registering key and standard keys
Immobilizer unit is defective		✓				Code re-registering key and standard keys
Main switch is defective	✓		✓	✓	✓	Code re-registering key and standard keys
Accessory lock* is defective					✓	No required

\* Accessory locks mean the seat lock, fuel tank cap or the helmet holder.

### Code re-registering key registration:

When the immobilizer unit or ECU is replaced, the code re-registering key must be registered to the unit.

To register a code re-registering key:

1. Turn the main switch to "ON" with the code re-registering key.

#### NOTE:

Check that the immobilizer system indicator light comes on for one second, then goes off. When the immobilizer system indicator light goes off, the code re-registering key has been registered.

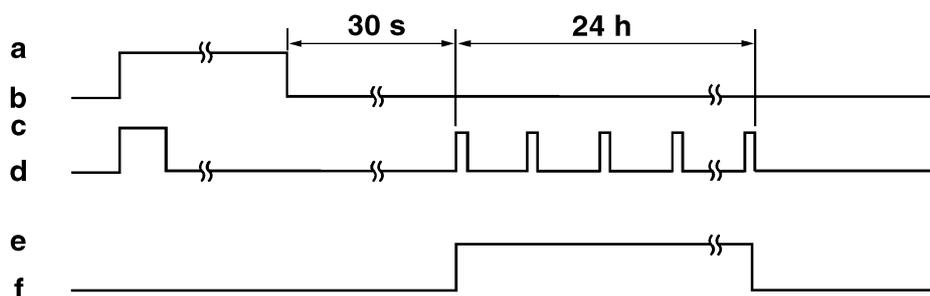
2. Check that the engine can be started.
3. Register the standard key, following the instructions in the section below.

### Standby mode:

To enable the immobilizer system, turn the ignition key to "OFF". 30 seconds later, the indicator light will start flashing continuously in the standby flashing mode pattern for up to 24 hours. After that time, the indicator light will stop flashing, but the immobilizer system is still enabled.

# IMMOBILIZER SYSTEM

## Standby mode



- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on

- d. LED off
- e. Standby mode on
- f. Standby mode off

### Standard key registration:

Standard key registration is required when a standard key is lost and needs to be replaced, or when the code re-registering key is re-registered after the immobilizer unit or ECU are replaced.

#### NOTE:

Do not start the engine with a standard key that has not been registered. If the main switch is turned "ON" with a standard key that has not been registered, the immobilizer system indicator light flashes to indicate fault code "52". (Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-85).

1. Check that the immobilizer system indicator light signals the standby mode.
2. Using the code re-registering key, turn the main switch "ON", then "OFF", and then remove the key within 5 seconds.
3. Insert the first standard key to be registered into the main switch, then turn the key to "ON" within 5 seconds to activate the key registration mode.

#### NOTE:

The existing standard key code is erased from the memory when the key registration mode is activated. When the key registration mode is activated, the immobilizer system indicator light flashes rapidly.

4. While the indicator light is flashing, turn the main switch to "OFF", remove the key, and within 5 seconds, insert the second standard key to be registered into the main switch.

#### NOTE:

If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the registration mode is deactivated. If this occurs, the second standard key cannot be registered, and steps 2 to 4 need to be repeated to register both standard keys.

5. Turn the main switch to "ON".

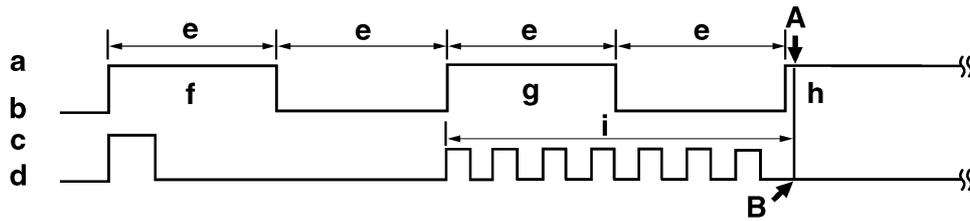
#### NOTE:

When the indicator light goes off, the registration is complete.

6. Check that the engine can be started with the two registered standard keys.

# IMMOBILIZER SYSTEM

## Standard key registration

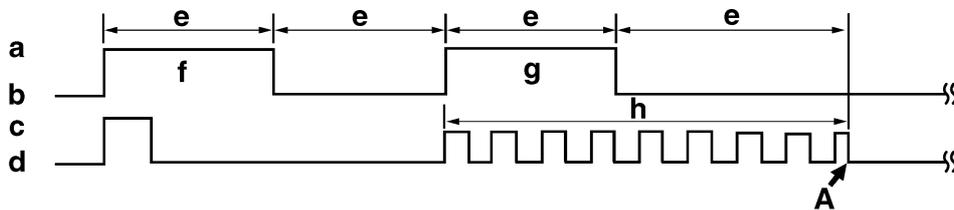


- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. First standard key
- h. Second standard key
- i. Registration mode
- A. Registration of the second standard key is complete.
- B. Immobilizer system indicator light stops flashing when the registration of the second standard key is complete.

## Voiding the standard key code:

If a standard key has been lost, it is possible to disable its use by re-registering the remaining standard key. Standard key registration erases the stored standard key code from the memory, thus disabling the lost standard key. To re-register, refer to "Standard key registration".

## Standard key code voiding method



- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. Remaining standard key
- h. Registration mode
- A. If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the second standard key cannot be registered.

# IMMOBILIZER SYSTEM

EAS27700

## TROUBLESHOOTING

When the main switch is turn "ON", the indicator light does not come on or flashing.

<p>1 Check the fuses. (Main, ignition and backup) Refer to "CHECKING THE FUSES" on page 8-97.</p>	<p>NG→</p>	<p>Replace the fuse(s).</p>
<p>OK↓</p>		
<p>2 Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-97.</p>	<p>NG→</p>	<ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul>
<p>OK↓</p>		
<p>3 Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-93.</p>	<p>NG→</p>	<p>Replace the immobilizer kit.</p>
<p>OK↓</p>		
<p>4 Check the entire immobilizer system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-79.</p>	<p>NG→</p>	<p>Properly connect or repair the immobilizer system's wiring.</p>
<p>OK↓</p>		
<ul style="list-style-type: none"> <li>• Check the condition of the each immobilizer system's circuits.</li> <li>• Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-85.</li> </ul>		

EAS27720

## SELF-DIAGNOSIS FAULT CODE INDICATION

When the system failure occurred, the error code number is indicated in the immobilizer system indicator light blinks at the same time. The pattern of blinking also shows the error code.

Error code	Detection	Symptoms	Trouble	Measures
<p>51</p>	<p>IMMOBILIZER UNIT</p>	<p>Cannot transmit code between the key and immobilizer unit.</p>	<p>1 Objects that may keep off radio waves exist around the keys and antennas. 2 Immobilizer unit failure. 3 Key failure.</p>	<p>1 Keep clear of magnets, metals and other keys form the surroundings of keys and antennas. 2 Replace the immobilizer unit. 3 Replace the key.</p>

## IMMOBILIZER SYSTEM

Error code	Detection	Symptoms	Trouble	Measures
52	IMMOBILIZER UNIT	Codes do not match between the key and immobilizer unit.	1 Disturbed by other transponder. Failed to verify continually for ten times. 2 Unregistered sub key was used.	1 Place the immobilizer unit away more than 50 mm from the transponder of other vehicle. 2 Register the standard key.
53	IMMOBILIZER UNIT	Cannot transmit code between the ECU and immobilizer unit.	Noise interference or disconnected lead/cable. 1 Obstruction due to radio wave noise. 2 Error by disconnection of the communication harness. 3 Immobilizer unit failure. 4 ECU failure.	1 Check the wire harness and connector. 2 Replace the immobilizer unit. 3 Replace the ECU.
54	IMMOBILIZER UNIT	Codes do not match between ECU and immobilizer unit.	Noise interference or disconnected lead/cable. 1 Obstruction due to radio wave noise. 2 Error by disconnection of the communication harness. 3 Immobilizer unit failure. 4 ECU failure. (When the used parts from other vehicles are used, the code re-registering key ID is not registered to the ECU.)	1 Register the code re-registering key ID. 2 Check the wire harness and connector. 3 Replace the immobilizer unit. 4 Replace the ECU.
55	IMMOBILIZER UNIT	Key code registration error.	Same standard key was attempted to continuously two times register.	Prepare the new standard key and register it.
56	ECU	Undefined code is received.	Noise interference or disconnected lead/cable. 1 Obstruction due to radio wave noise. 2 Error by disconnection of the communication harness. 3 Immobilizer unit failure 4 ECU failure	1 Check the wire harness and connector. 2 Replace the immobilizer unit. 3 Replace the ECU.

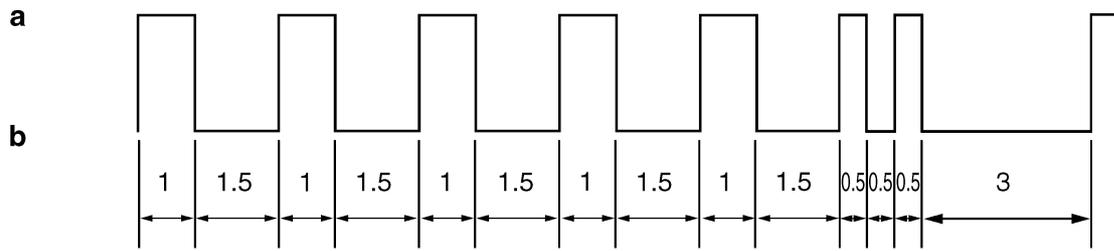
### Immobilizer system indicator light error code indication

Digit of 10 : Cycles of 1 sec. ON and 1.5 sec. OFF.

Digit of 1 : Cycles of 0.5 sec. ON and 0.5 sec. OFF.

# IMMOBILIZER SYSTEM

---



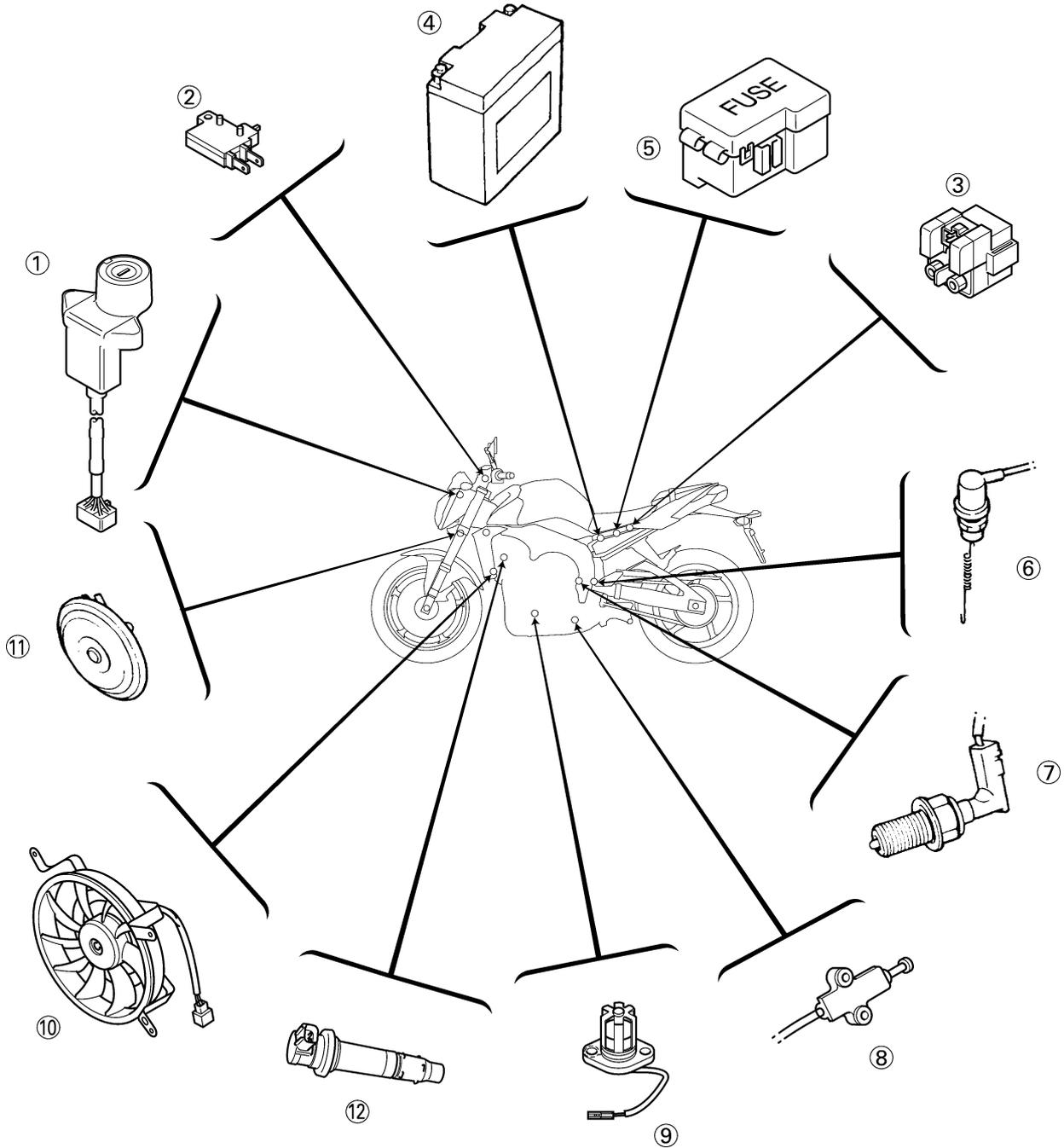
- a. Light on
- b. Light off



# ELECTRICAL COMPONENTS

EAS27970

## ELECTRICAL COMPONENTS



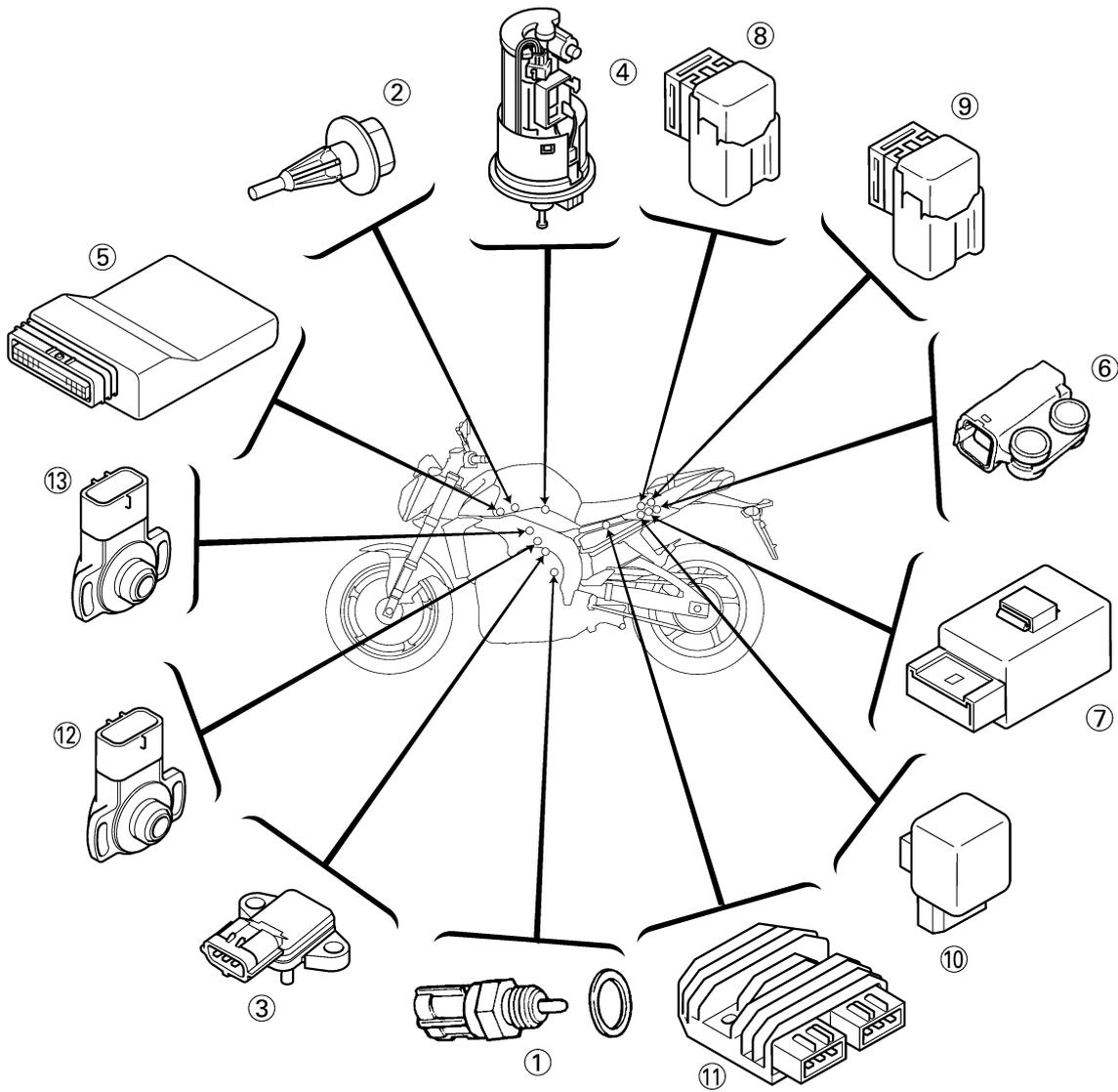
# ELECTRICAL COMPONENTS

---

1. Main switch (immobilizer unit)
2. Front brake light switch
3. Starter relay
4. Battery
5. Fuse box
6. Rear brake light switch
7. Neutral switch
8. Sidestand switch
9. Oil level switch
10. Radiator fan motor
11. Horn
12. Ignition coil

# ELECTRICAL COMPONENTS

---



## ELECTRICAL COMPONENTS

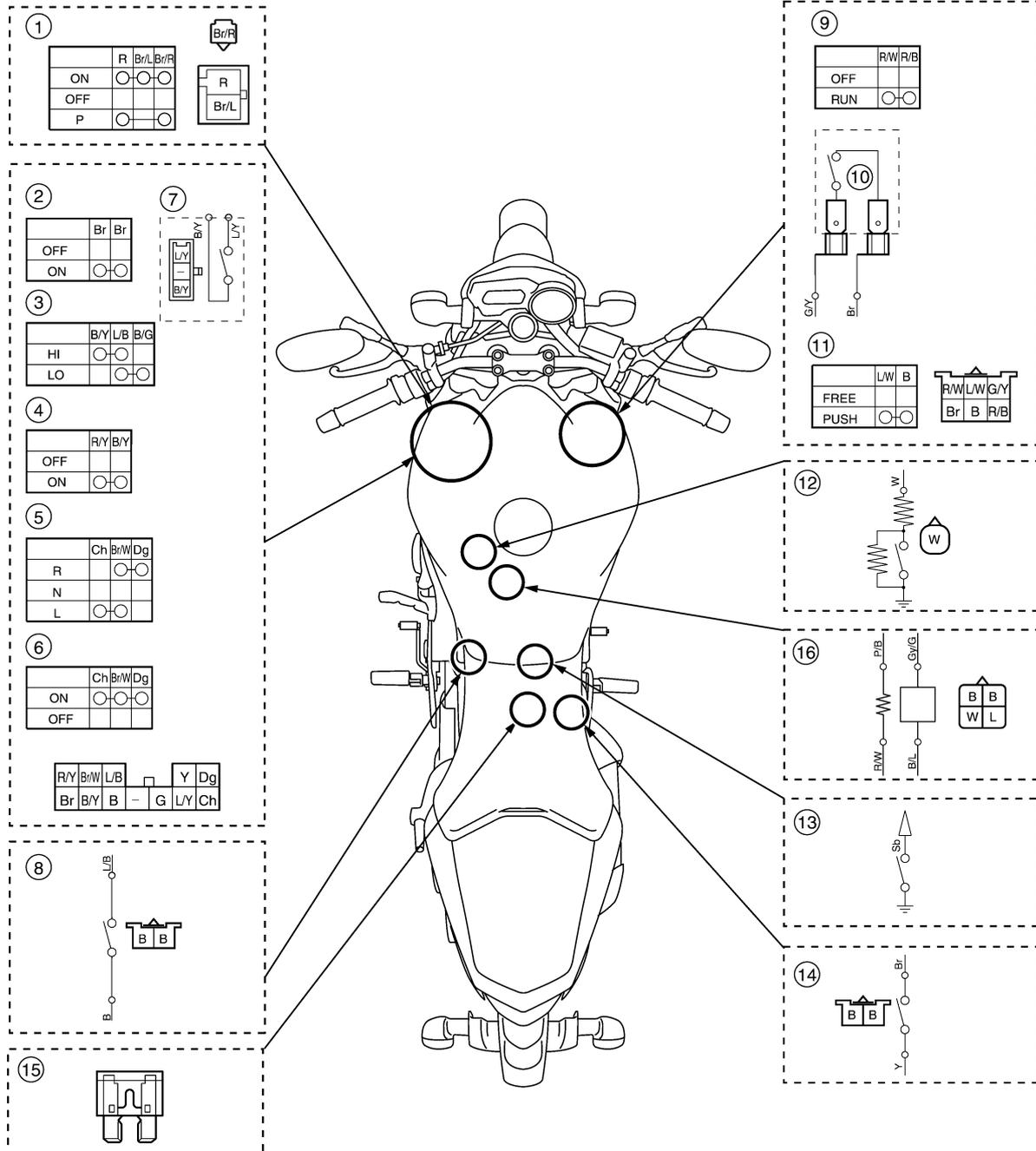
---

1. Coolant temperature sensor
2. Intake air temperature sensor
3. Intake air pressure sensor
4. Fuel pump
5. ECU
6. Lean angle sensor
7. Starting circuit cut-off relay
8. Headlight relay (on/off)
9. Radiator fan motor relay
10. Turn signal relay
11. Rectifier/regulator
12. Throttle position sensor
13. Sub-throttle position sensor

# ELECTRICAL COMPONENTS

EAS27980

## CHECKING THE SWITCHES



# ELECTRICAL COMPONENTS

---

1. Main switch
2. Horn switch
3. Dimmer switch
4. Pass switch
5. Turn signal switch
6. Hazard switch
7. Clutch switch
8. Sidestand switch
9. Engine stop switch
10. Front brake light switch
11. Start switch
12. Oil level switch
13. Neutral switch
14. Rear brake light switch
15. Fuse box
16. O<sub>2</sub> sensor

# ELECTRICAL COMPONENTS

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

ECA14370

**CAUTION:**

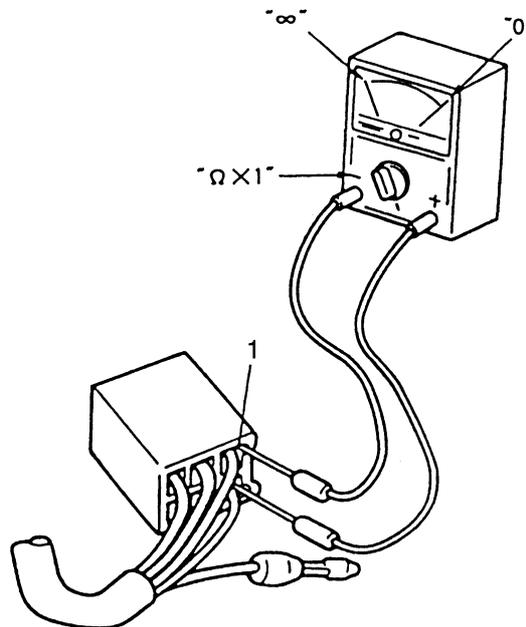
Never insert the tester probes into the coupler terminal slots "1". Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



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

**NOTE:**

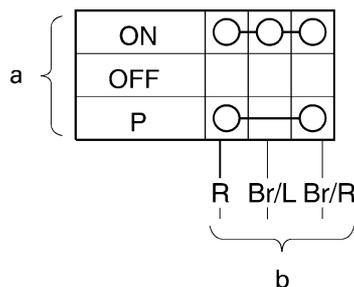
- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.
- When checking for continuity, switch back and forth between the switch positions a few times.



The switches and their terminal connections are illustrated as in the following example of the main switch.

The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row.

The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indication by "○—○". There is continuity between red, brown/blue, and brown/red when the switch is set to "ON" and between red and brown/red when the switch is set to "P".



# ELECTRICAL COMPONENTS

EAS27990

## 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 → Repair or replace the bulb, bulb socket or both.

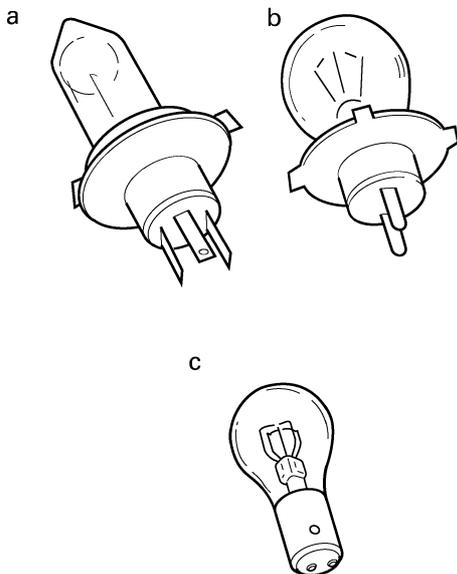
Improperly connected → Properly connect.

No continuity → Repair or replace the bulb, bulb socket or both.

### Types of bulbs

The bulbs used on this vehicle are shown in the following illustration.

- Bulbs “a” and “b” are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulbs “c” 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 condition of the bulbs

The following procedure applies to all of the bulbs.

1. Remove:
  - Bulb

EWA13320



**WARNING**

Since the headlight bulb gets extremely hot, keep flammable products and your

hands away from the bulb until it has cooled down.

ECA14380

### 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 it with a cloth moistened with alcohol or lacquer thinner.

2. Check:

- Bulb (for continuity)  
(with the pocket tester)  
No continuity → Replace.



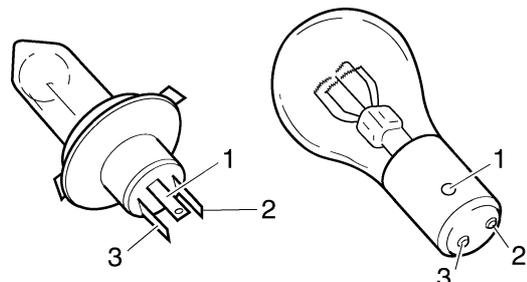
**Pocket tester**  
**90890-03112**

**Analog pocket tester**  
**YU-03112-C**

### NOTE:

Before checking for continuity, set the pocket tester to “0” and to the “Ω × 1” range.

- a. Connect the positive tester probe to terminal “1” and the negative tester probe to terminal “2”, and check the continuity.
- b. Connect the positive tester probe to terminal “1” and the negative tester probe to terminal “3”, and check the continuity.
- c. If either of the readings indicate no continuity, replace the bulb.



Checking the condition of the bulb sockets

# ELECTRICAL COMPONENTS

The following procedure applies to all of the bulb sockets.

1. Check:
  - Bulb socket (for continuity) (with the pocket tester)  
No continuity → Replace.



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

**NOTE:** \_\_\_\_\_  
Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

- a. Install a good bulb into the bulb socket.
- b. Connect the pocket tester probes to the respective leads of the bulb socket.
- c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

EAS28000

## CHECKING THE FUSES

The following procedure applies to all of the fuses.

ECA13680

### CAUTION:

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

1. Remove:
  - Rider and passenger seat
2. Check:
  - Fuse

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

**NOTE:** \_\_\_\_\_  
Set the pocket tester selector to “Ω × 1”.



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

- b. If the pocket tester indicates “∞”, replace the fuse.

3. Replace:
  - Blown fuse

- a. Set the main switch to “OFF”.
- b. Install a new fuse of the correct amperage rating.
- c. Set on the switches to verify if the electrical circuit is operational.
- d. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	50 A	1
Headlight (FZ1-N)	15 A	1
Headlight (FZ1-S)	25 A	1
Signaling system	10 A	1
Tail/brake light	10 A	1
Ignition	15 A	1
Buckup	10 A	1
Radiator fan motor	10 A	2
Reserve	10 A	1
Reserve (FZ1-N)	15 A	1
Reserve (FZ1-S)	25 A	1

EWA13310

### WARNING

**Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.**

4. Install:
  - Rider and passenger seat

EAS28030

## CHECKING AND CHARGING THE BATTERY

EWA13290

### WARNING

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

- Wear protective eye gear when handling or working near batteries.
- Charge batteries in a well-ventilated area.

# ELECTRICAL COMPONENTS

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

## FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

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

## INTERNAL

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

ECA13660

### CAUTION:

- This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
- Charging time, charging amperage and charging voltage for an MF battery are 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:

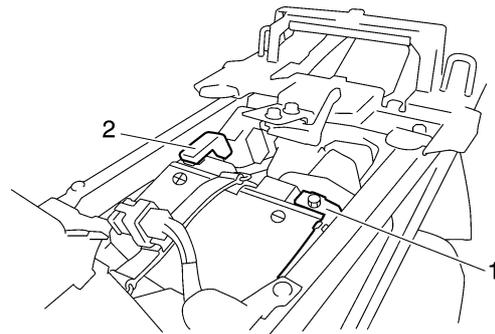
Since MF batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Remove:
  - Rider and passenger seat
2. Disconnect:
  - Battery leads (from the battery terminals)

ECA13640

### CAUTION:

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



3. Remove:
  - Battery
4. Check:
  - Battery charge



- a. Connect a pocket tester to the battery terminals.

- Positive tester probe → positive battery terminal
- Negative tester probe → negative battery terminal

### NOTE:

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

- b. Check the charge of the battery, as shown in the charts and the following example.

Example  
Open-circuit voltage = 12.0 V  
Charging time = 6.5 hours  
Charge of the battery = 20–30%



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

EWA13300

### WARNING

Do not quick charge a battery.

ECA13670

### CAUTION:

- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger since it forces a high-amperage current

# ELECTRICAL COMPONENTS

into the battery quickly and can cause battery overheating and battery plate damage.

- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative battery lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



## Charging method using a variable-current (voltage) charger

- a. Measure the open-circuit voltage prior to charging.

**NOTE:** \_\_\_\_\_  
Voltage should be measured 30 minutes after the machine is stopped.

- b. Connect a charged and AMP meter to the battery and start charging.

**NOTE:** \_\_\_\_\_  
Set the charging voltage at 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

- c. Make sure that the current is higher than the standard charging current written on the battery.

**NOTE:** \_\_\_\_\_  
If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

- |  |
|--|
| <ul style="list-style-type: none"><li>• Reach the standard charging current<br/>Battery is good.</li><li>• Does not reach the standard charging current<br/>Replace the battery.</li></ul> |
|--|

- d. Adjust the voltage so that the current is at the standard charging level.
- e. Set the time according to the charging time suitable for the open-circuit voltage. Refer to “Battery condition checking steps”.
- f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.
- g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

- |   |
|---|
| <ul style="list-style-type: none"><li>12.8 V or more --- Charging is complete.</li><li>12.7 V or less --- Recharging is required.</li><li>Under 12.0 V --- Replace the battery.</li></ul> |
|---|



## Charging method using a constant voltage charger

- a. Measure the open-circuit voltage prior to charging.

**NOTE:** \_\_\_\_\_  
Voltage should be measured 30 minutes after the machine is stopped.

- b. Connect a charger and AMP meter to the battery and start charging.
- c. Make sure that the current is higher than the standard charging current written on the battery.



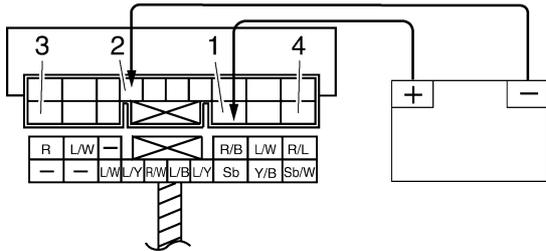
# ELECTRICAL COMPONENTS

2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

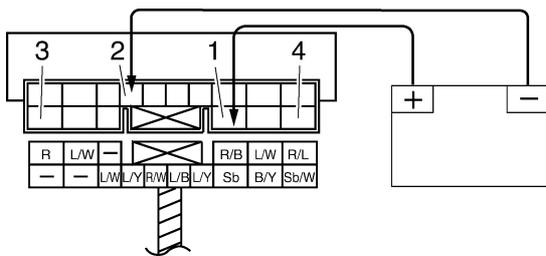


**Result**  
Continuity/No continuity  
(between "3" to "4")

## Relay unit (fuel pump relay) FZ1-N



## FZ1-S

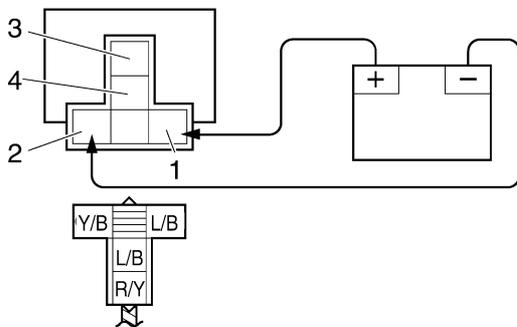


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



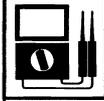
**Result**  
Continuity/No continuity  
(between "3" to "4")

## Headlight relay (on/off) (FZ1-N)



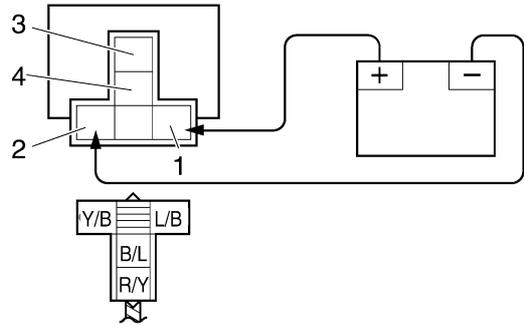
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe

4. Negative tester probe



**Result**  
Continuity/No continuity  
(between "3" to "4")

## Headlight relay (on/off) (FZ1-S)

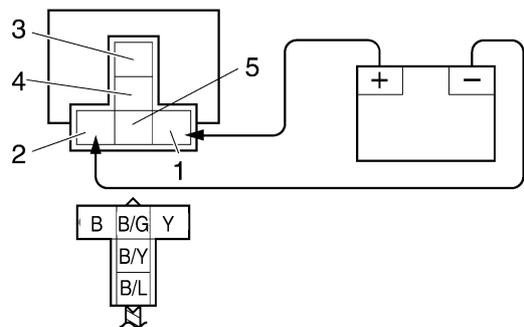


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



**Result**  
Continuity/No continuity  
(between "3" to "4")

## Headlight relay (dimmer) (FZ1-S)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



**Result**  
Continuity/No continuity  
(between "3" to "4")  
(between "3" to "5")

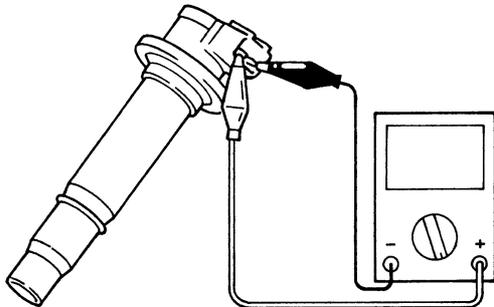
## Radiator fan motor relay





# ELECTRICAL COMPONENTS

- Positive tester probe  
Ignition coil terminal
- Negative tester probe  
Ignition coil terminal



c. Measure the primary coil resistance.

2. Check:

- Secondary coil resistance  
Out of specification → Replace.



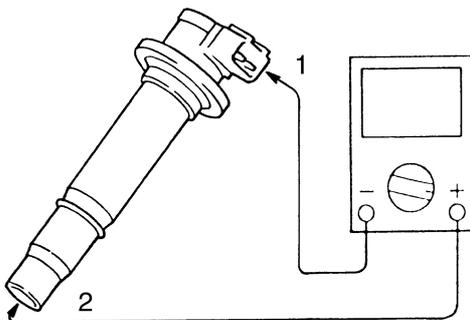
**Secondary coil resistance**  
8.5–11.5 k $\Omega$  at 20°C (68°F)

- Disconnect the ignition coil leads from the wire harness.
- Connect the pocket tester ( $\Omega \times 1k$ ) to the ignition coil as shown.



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

- Negative tester probe  
Ignition coil terminal “1”
- Positive tester probe  
Spark plug terminal “2”



c. Measure the secondary coil resistance.

- Check:
  - Ignition spark gap “a”  
Out of specification → Replace.

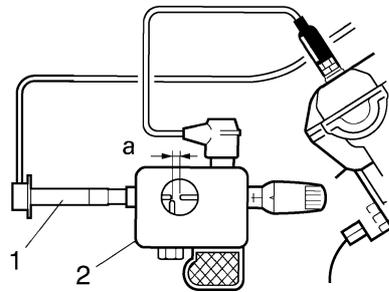


**Minimum ignition spark gap**  
6.0 mm (0.24 in)

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker/dynamic spark tester “2” as shown.



**Ignition checker**  
90890-06754  
**Opama pet-4000 spark checker**  
YM-34487



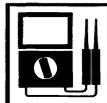
18110202

- Spark plug cap
- Set the main switch to “ON”.
- Measure the ignition spark gap “a”.
- Crank the engine by pushing the starter switch and gradually increase the spark gap until a misfire occurs.

EAS28120

## CHECKING THE CRANKSHAFT POSITION SENSOR

- Disconnect:
  - Crankshaft position sensor coupler  
(from the wire harness)
- Check:
  - Crankshaft position sensor resistance  
Out of specification → Replace the crankshaft position sensor.



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

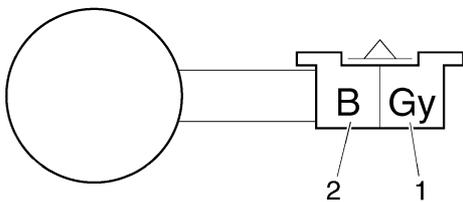
# ELECTRICAL COMPONENTS

- a. Connect the pocket tester ( $\Omega \times 100$ ) to the crankshaft position sensor coupler as shown.



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

- Positive tester probe  
Gray "1"
- Negative tester probe  
Black "2"



- b. Measure the crankshaft position sensor resistance.



EAS28130

## CHECKING THE LEAN ANGLE SENSOR

1. Remove:
  - Lean angle sensor
2. Check:
  - Lean angle sensor out put voltage  
Out of specification → Replace.



**Lean angle sensor output voltage**  
Less than 65°: 0.4–1.4 V  
More than 65°: 3.7–4.4 V

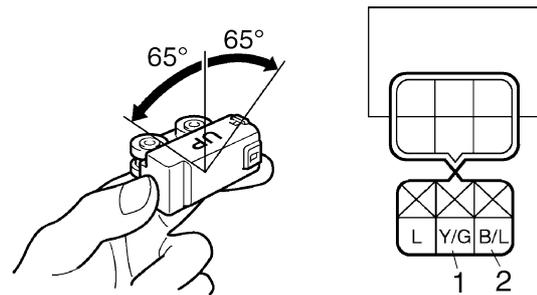


- a. Connect the lean angle sensor coupler to the wire harness.
- b. Connect the pocket tester (DC 20 V) to the lean angle sensor coupler as shown.



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

- Positive tester probe  
Yellow/Green "1"
- Negative tester probe  
Black/Blue "2"



- c. When turn the lean angle sensor to 65°.
- d. Measure the lean angle sensor output voltage.



ET2D1034

## CHECKING THE STARTOR MOTOR OPERATION

1. Check:
  - Starter motor operation  
Does not operate → Perform the electric starting system troubleshooting, starting with step5.  
Refer to "TROUBLESHOOTING" on page 8-9.

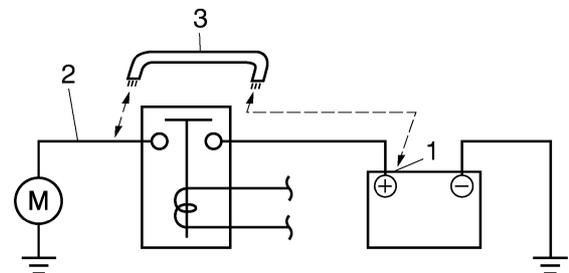


- a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

EWA13810

### WARNING

- A wire that is used as a jumper lead must have at least the same capacity of the battery, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.



18210801

- b. Check the starter motor operation.



2. Check:
  - Startor coil resistance

# ELECTRICAL COMPONENTS

Out of specification → Replace the stator coil.

EAS28150

## CHECKING THE STATOR COIL

1. Disconnect:
  - Stator coil coupler (from the wire harness)
2. Check:
  - Stator coil resistance  
Out of specification → Replace the stator coil.



**Stator coil resistance**  
0.14–0.18 Ω at 20°C (68°F)

- a. Connect the pocket tester (Ω × 1) to the stator coil coupler as shown.

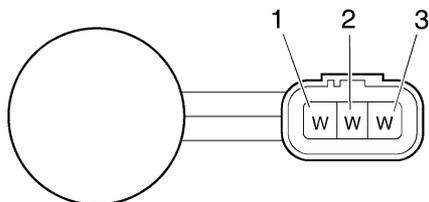


**Pocket tester**  
90890-03112  
**Analog pocket tester**  
YU-03112-C

- Positive tester probe  
White “1”
- Negative tester probe  
White “2”

- Positive tester probe  
White “1”
- Negative tester probe  
White “3”

- Positive tester probe  
White “2”
- Negative tester probe  
White “3”



- b. Measure the stator coil resistance.

EAS28170

## CHECKING THE RECTIFIER/REGULATOR

1. Check:

- Charging voltage  
Out of specification → Replace the rectifier/regulator.



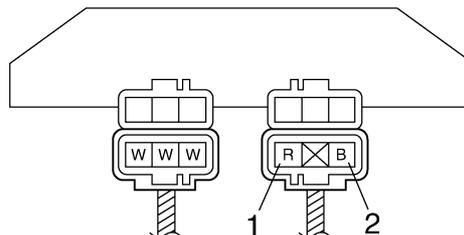
**Charging voltage**  
14 V at 5000 r/min

- a. Set the engine tachometer to the ignition coil of cylinder #1.
- b. Connect the pocket tester (AC 20 V) to the rectifier/regulator coupler as shown.



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

- Positive tester probe  
Red “1”
- Negative tester probe  
Black “2”



- c. Start the engine and let it run at approximately 5000 r/min.
- d. Measure the charging voltage.

EAS28180

## CHECKING THE HORN

1. Check:
  - Horn resistance  
Out of specification → Replace.



**Horn resistance**  
1.15–1.25 Ω at 20°C (68°F)

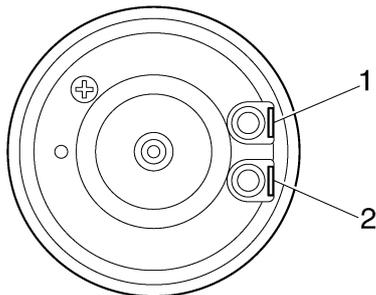
- a. Disconnect the horn leads from the horn terminals.
- b. Connect the pocket tester (Ω × 1) to the horn terminals.

# ELECTRICAL COMPONENTS



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

- Positive tester probe  
Horn terminal "1"
- Negative tester probe  
Horn terminal "2"



c. Measure the horn resistance.

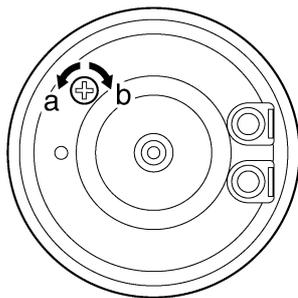


2. Check:

- Horn sound
- Faulty sound → Adjust or replace.



- Connect a battery (12 V) to the horn.
- Turn the adjusting screw in direction "a" or "b" until the specified horn sound is obtained.



EAS28230

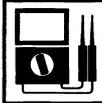
## CHECKING THE FUEL SENDER

- Remove:
  - Fuel tank
- Disconnect:
  - Fuel pump coupler
  - Fuel sender coupler (from the wire harness)
- Remove:
  - Fuel pump

(from the fuel tank)

4. Check:

- Fuel sender resistance



**Fuel sender resistance**  
**Full position of the float**  
**19–21Ω at 20°C (68°F)**  
**Empty position of the float**  
**139–141 Ω at 20°C (68°F)**

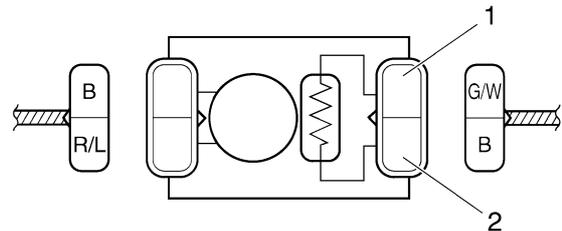


- Connect the pocket tester ( $\Omega \times 10$ ) to the fuel sender terminal as shown.



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

- Positive tester probe  
Green/white "1"
- Negative tester probe  
Black "2"



b. Measure the fuel sender resistance.

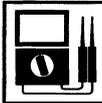


EAS28240

## CHECKING THE SPEED SENSOR

1. Check:

- Speed sensor output voltage
- Out of specification → Replace.



**Output voltage reading cycle**  
**0.6 V to 4.8 V to 0.6 V to 4.8 V**



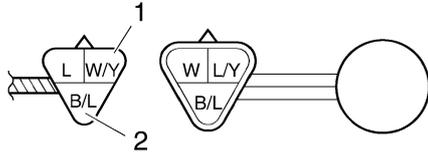
- Connect the pocket tester (DC 20 V) to the speed sensor coupler (wire harness side) as shown.



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

# ELECTRICAL COMPONENTS

- Positive tester probe  
White/Yellow "1"
- Negative tester probe  
Black/Blue "2"



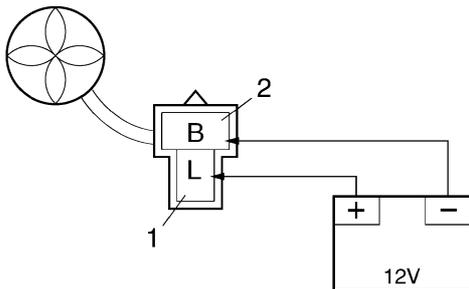
- Set the main switch to "ON".
- Elevate the rear wheel and slowly rotate it.
- Measure the voltage (DC 5 V) of White/Yellow and Blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.

EAS28250

## CHECKING THE RADIATOR FAN MOTOR

- Check:
    - Radiator fan motor  
Faulty/rough movement → Replace.
- Disconnect the radiator fan motor coupler from the wire harness.
  - Connect the battery (DC 12 V) as shown.

- Positive tester probe  
Blue "1"
- Negative tester probe  
Black "2"



- Measure the radiator fan motor movement.

EAS28260

## CHECKING THE COOLANT TEMPERATURE SENSOR

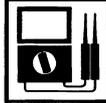
- Remove:
  - Coolant temperature sensor

EWA14130

### WARNING

- Handle the coolant temperature sensor with special care.
- Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.

- Check:
  - Coolant temperature sensor resistance  
Out of specification → Replace.



### Coolant temperature sensor resistance

0°C (32°F) : 5.21–6.37 kΩ

80°C (176°F) : 0.29–0.35 kΩ

- Connect the pocket tester ( $\Omega \times 1k$ ) to the coolant temperature sensor "1" as shown.



### Pocket tester

90890-03112

Analog pocket tester

YU-03112-C

- Positive tester probe  
Coolant temperature sensor terminal
- Negative tester probe  
Coolant temperature sensor terminal

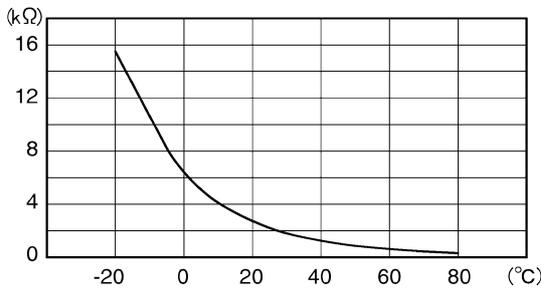
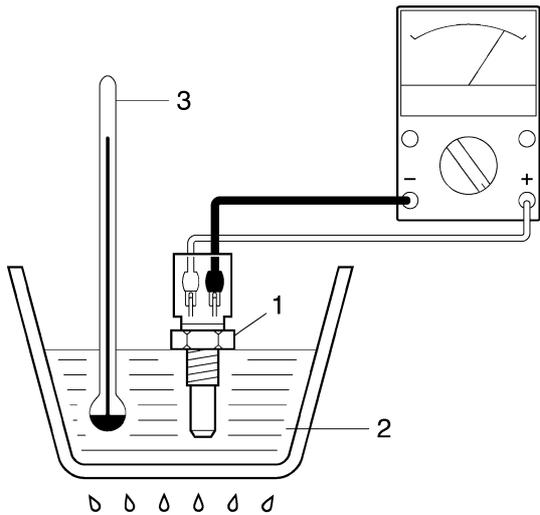
- Immerse the coolant temperature sensor in a container filled with coolant "2".

### NOTE:

Make sure the coolant temperature sensor terminals do not get wet.

- Place a thermometer "3" in the coolant.

# ELECTRICAL COMPONENTS



- d. Slowly heat the coolant, and then let it cool to the specified temperature indicated in the table.
- e. Check the coolant temperature sensor for continuity at the temperatures indicated in the table.

EAS28300

## CHECKING THE THROTTLE POSITION SENSOR

1. Remove:
  - Throttle position sensor (from the throttle body)
2. Check:
  - Throttle position sensor

- a. Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor as shown.

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

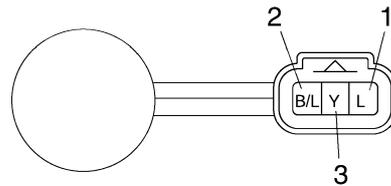
- Tester positive lead → Blue "1"
- Tester negative lead → Black/Blue "2"

- b. Check the throttle position sensor maximum resistance.  
Out of specification → Replace the throttle position sensor.

**Maximum throttle position sensor resistance**  
4–6 kΩ at 20°C (68°F)

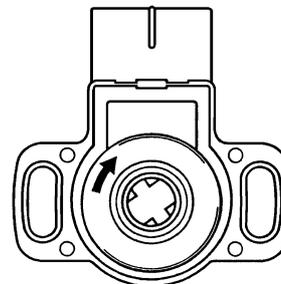
- c. Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor as shown.

- Tester positive lead → Yellow "3"
- Tester negative lead → Black/Blue "2"



- d. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.  
The resistance does not change or it changes abruptly → Replace the throttle position sensor.

**Throttle position sensor resistance**  
0–6 kΩ at 20°C (68°F)



3. Install:
  - Throttle position sensor



# ELECTRICAL COMPONENTS



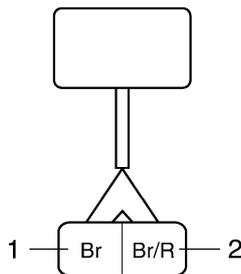
**Air induction system solenoid resistance**  
**18–22 Ω at 20°C (68°F)**

- a. Remove the Air induction system solenoid coupler from the wire harness.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the Air induction system solenoid terminal as shown.



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

- Positive tester probe  
Brown “1”
- Negative tester probe  
Brown/Red “2”



- c. Measure the Air induction system solenoid resistance.

EAS28380  
**CHECKING THE ATMOSPHERIC PRESSURE SENSOR**

1. Check:
  - Atmospheric pressure sensor output voltage
 Out of specification → Replace.



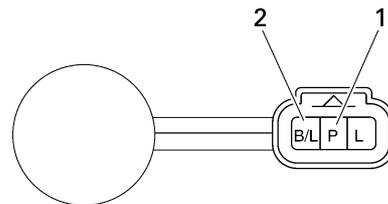
**Atmospheric pressure sensor output voltage**  
**3.75–4.25 V**

- a. Connect the pocket tester (DC 20 V) to the atmospheric pressure sensor coupler (wire harness side) as shown.



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

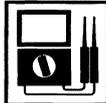
- Positive tester probe  
Pink “1”
- Negative tester probe  
Black/Blue “2”



- b. Set the main switch to “ON”.
- c. Measure the atmospheric pressure sensor output voltage.

EAS28390  
**CHECKING THE CYLINDER IDENTIFICATION SENSOR**

1. Check:
  - Cylinder identification sensor output voltage
 Out of specification → Replace.



**Cylinder identification sensor output voltage**  
**When sensor is on**  
**4.8 V or more**  
**When sensor is off**  
**0.8 V or less**

- a. Connect the pocket tester (DC 20 V) to the cylinder identification sensor coupler (wire harness side) as shown.



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

- Positive tester probe  
White/Black “1”
- Negative tester probe  
Black/Blue “2”





---

## TROUBLESHOOTING

<b>TROUBLESHOOTING</b> .....	9-1
GENERAL INFORMATION.....	9-1
STARTING FAILURES.....	9-1
INCORRECT ENGINE IDLING SPEED .....	9-1
POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE .....	9-2
FAULTY GEAR SHIFTING.....	9-2
SHIFT PEDAL DOES NOT MOVE.....	9-2
JUMPS OUT OF GEAR.....	9-2
FAULTY CLUTCH .....	9-2
OVERHEATING .....	9-2
OVERCOOLING .....	9-3
POOR BRAKING PERFORMANCE .....	9-3
FAULTY FRONT FORK LEGS .....	9-3
UNSTABLE HANDLING.....	9-3
FAULTY LIGHTING OR SIGNALING SYSTEM .....	9-4

EAS28450

## TROUBLESHOOTING

EAS28460

### GENERAL INFORMATION

#### NOTE:

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAS28470

### STARTING FAILURES

#### Engine

1. Cylinder(s) and cylinder head(s)
  - Loose spark plug
  - Loose cylinder head or cylinder
  - Damaged cylinder head gasket
  - Damaged cylinder gasket
  - Worn or damaged cylinder
  - Incorrect valve clearance
  - Improperly sealed valve
  - Incorrect valve-to-valve-seat contact
  - Incorrect valve timing
  - Faulty valve spring
  - Seized valve
2. Piston(s) and piston ring(s)
  - Improperly installed piston ring
  - Damaged, worn or fatigued piston ring
  - Seized piston ring
  - Seized or damaged piston
3. Air filter
  - Improperly installed air filter
  - Clogged air filter element
4. Crankcase and crankshaft
  - Improperly assembled crankcase
  - Seized crankshaft

#### Fuel system

1. Fuel tank
  - Empty fuel tank
  - Clogged fuel filter
  - Clogged fuel strainer
  - Clogged fuel tank drain hose
  - Clogged rollover valve hose
  - Deteriorated or contaminated fuel
2. Fuel pump
  - Faulty fuel pump
  - Faulty fuel pump relay
3. Throttle body (-ies)
  - Deteriorated or contaminated fuel

- Sucked-in air

#### Electrical system

1. Battery
  - Discharged battery
  - Faulty battery
2. Fuse(s)
  - Blown, damaged or incorrect fuse
  - Improperly installed fuse
3. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
  - Fouled spark plug
  - Worn or damaged electrode
  - Worn or damaged insulator
4. Ignition coil(s)
  - Cracked or broken ignition coil body
  - Broken or shorted primary or secondary coils
5. Ignition system
  - Faulty ECU
  - Faulty crankshaft position sensor
6. Switches and wiring
  - Faulty main switch
  - Faulty engine stop switch
  - Broken or shorted wiring
  - Faulty neutral switch
  - Faulty start switch
  - Faulty sidestand switch
  - Faulty clutch switch
  - Improperly grounded circuit
  - Loose connections
7. Starting system
  - Faulty starter motor
  - Faulty starter relay
  - Faulty starting circuit cut-off relay
  - Faulty starter clutch

EAS28490

### INCORRECT ENGINE IDLING SPEED

#### Engine

1. Cylinder(s) and cylinder head(s)
  - Incorrect valve clearance
  - Damaged valve train components
2. Air filter
  - Clogged air filter element

#### Fuel system

1. Throttle body (-ies)
  - Damaged or loose throttle body joint
  - Improperly synchronized throttle bodies
  - Improperly adjusted engine idling speed (idle adjusting screw)

# TROUBLESHOOTING

- Improper throttle cable free play
- Flooded throttle body
- Faulty air induction system

## Electrical system

1. Battery
  - Discharged battery
  - Faulty battery
2. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
  - Fouled spark plug
  - Worn or damaged electrode
  - Worn or damaged insulator
3. Ignition coil(s)
  - Broken or shorted primary or secondary coils
  - Cracked or broken ignition coil
4. Ignition system
  - Faulty ECU
  - Faulty crankshaft position sensor

EAS28510

## POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURES" on page 9-1.

## Engine

1. Air filter
  - Clogged air filter element

## Fuel system

1. Fuel pump
  - Faulty fuel pump

EAS28530

## FAULTY GEAR SHIFTING

### Shifting is difficult

Refer to Clutch drags.

EAS28540

## SHIFT PEDAL DOES NOT MOVE

### Shift shaft

- Improperly adjusted shift rod
- Bent shift shaft

### Shift drum and shift forks

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

### Transmission

- Seized transmission gear
- Foreign object between transmission gears

- Improperly assembled transmission

EAS28550

## JUMPS OUT OF GEAR

### Shift shaft

- Incorrect shift pedal position
- Improperly returned stopper lever

### Shift forks

- Worn shift fork

### Shift drum

- Incorrect axial play
- Worn shift drum groove

### Transmission

- Worn gear dog

EAS28560

## FAULTY CLUTCH

### Clutch slips

1. Clutch
  - Improperly assembled clutch
  - Improperly adjusted clutch cable
  - Loose or fatigued clutch spring
  - Worn friction plate
  - Worn clutch plate
2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity (low)
  - Deteriorated oil

### Clutch drags

1. Clutch
  - Unevenly tensioned clutch springs
  - Warped pressure plate
  - Bent clutch plate
  - Swollen friction plate
  - Bent clutch push rod
  - Broken clutch boss
  - Burnt primary driven gear bushing
  - Match marks not aligned
2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity (high)
  - Deteriorated oil

EAS28600

## OVERHEATING

### Engine

1. Clogged coolant passages
  - Cylinder head(s) and piston(s)
  - Heavy carbon buildup

2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity
  - Inferior oil quality

## Cooling system

1. Coolant
  - Low coolant level
2. Radiator
  - Damaged or leaking radiator
  - Faulty radiator cap
  - Bent or damaged radiator fin
3. Water pump
  - Damaged or faulty water pump
  - Thermostat
  - Thermostat stays closed
  - Oil cooler
  - Clogged or damaged oil cooler
  - Hose(s) and pipe(s)
  - Damaged hose
  - Improperly connected hose
  - Damaged pipe
  - Improperly connected pipe

## Fuel system

1. Throttle body (-ies)
  - Damaged or loose throttle body joint
2. Air filter
  - Clogged air filter element

## Chassis

1. Brake(s)
  - Dragging brake

## Electrical system

1. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
2. Ignition system
  - Faulty ECU

EAS28610

## OVERCOOLING

### Cooling system

1. Thermostat
  - Thermostat stays open

EAS28620

## POOR BRAKING PERFORMANCE

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit

- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

EAS28660

## FAULTY FRONT FORK LEGS

### Leaking oil

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Cracked or damaged cap bolt O-ring

### Malfunction

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS28670

## UNSTABLE HANDLING

1. Handlebar
  - Bent or improperly installed handlebar
2. Steering head components
  - Improperly installed upper bracket
  - Improperly installed lower bracket (improperly tightened ring nut)
  - Bent steering stem
  - Damaged ball bearing or bearing race
3. Front fork leg(s)
  - Uneven oil levels (both front fork legs)
  - Unevenly tensioned fork spring (both front fork legs)
  - Broken fork spring
  - Bent or damaged inner tube
  - Bent or damaged outer tube
4. Swingarm
  - Worn bearing or bushing
  - Bent or damaged swingarm
5. Rear shock absorber assembly(-ies)
  - Faulty rear shock absorber spring
  - Leaking oil or gas
6. Tire(s)

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

### 7. Wheel(s)

- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

### 8. Frame

- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

EAS28710

## **FAULTY LIGHTING OR SIGNALING SYSTEM**

### **Headlight does not come on**

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

### **Headlight bulb burnt out**

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

### **Tail/brake light does not come on**

- Wrong tail/brake light bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

### **Tail/brake light bulb burnt out**

- Wrong tail/brake light bulb
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

### **Turn signal does not come on**

- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness

- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

### **Turn signal blinks slowly**

- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

### **Turn signal remains lit**

- Faulty turn signal relay
- Burnt-out turn signal bulb

### **Turn signal blinks quickly**

- Incorrect turn signal bulb
- Faulty turn signal relay
- Burnt-out turn signal bulb

### **Horn does not sound**

- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

**WIRING DIAGRAM****FZ1-N (V) 2006**

1. Main switch
2. Rectifier/regulator
3. A.C.magneto
4. Fuse (backup)
5. Immobilizer unit
6. Fuse (main)
7. Battery
8. Fuse (fuel injection)
9. Starter relay
10. Starter motor
11. Relay unit
12. Starting circuit cut-off relay
13. Fuel pump relay
14. Neutral switch
15. Sidestand switch
16. Fuel pump
17. Crankshaft position sensor
18. Cylinder identification sensor
19. Speed sensor
20. Atmospheric pressure sensor
21. Lean angle sensor
22. O2 sensor
23. E.C.U.
24. Ignition coil #1
25. Ignition coil #2
26. Ignition coil #3
27. Ignition coil #4
28. Spark plug
29. Injector #1
30. Injector #2
31. Injector #3
32. Injector #4
33. Air induction system solenoid
34. Sub-throttle position sensor
35. EXUP servo motor
36. Intake air pressure sensor
37. Throttle position sensor
38. Coolant temperature sensor
39. Air temperature sensor
40. Meter assembly
41. Immobilizer indicator light
42. Fuel level warning light
43. Oil level warning light
44. Neutral indicator light
45. Tacho meter
46. Multi function meter
47. Engine trouble warning light
48. Coolant temperature indicator light
49. Hi beam indicator light
50. Turn signal indicator light (left)
51. Turn signal indicator light (right)
52. Meter light
53. Oil level switch
54. Right handlebar switch

55. Front brake light switch
56. Engine stop switch
57. Start switch
58. Rear brake light switch
59. Left handlebar switch
60. Clutch switch
61. Pass switch
62. Dimmer switch
63. Hazard switch
64. Turn signal switch
65. Horn switch
66. Horn
67. Turn signal relay
68. Front turn signal light (left)
69. Front turn signal light (right)
70. Rear turn signal light (left)
71. Rear turn signal light (right)
72. Auxiliary light
73. Headlight
74. License plate light
75. Tail/brake light
76. Headlight relay (on/off)
77. Fuse (tail light)
78. Fuse (ignition)
79. Anti safety alarm (option)
80. Fuse (signal)
81. Fuse (headlight)
82. Radiator fan motor relay
83. Fuse (radiator fan motor left)
84. Fuse (radiator fan motor right)
85. Radiator fan motor (left)
86. Radiator fan motor (right)
87. Ground

Br/W	Brown/White
Br/Y	Brown/Yellow
G/B	Green/Black
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/G	Gray/Green
Gy/R	Gray/Red
L/B	Blue/Black
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
O/B	Orange/Black
O/G	Orange/Green
O/Y	Orange/Yellow
P/B	Pink/Black
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
Sb/W	Sky blue/White
W/B	White/Black
W/R	White/Red
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue
Y/R	Yellow/Red
Y/W	Yellow/White

**COLOR CODE**

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red

---

**FZ1-S (V) 2006**

1. Main switch	58. Rear brake light switch	G/B	Green/Black
2. Rectifier/regulator	59. Left handlebar switch	G/R	Green/Red
3. A.C.magneto	60. Clutch switch	G/W	Green/White
4. Fuse (backup)	61. Pass switch	G/Y	Green/Yellow
5. Immobilizer unit	62. Dimmer switch	Gy/G	Gray/Green
6. Fuse (main)	63. Hazard switch	Gy/R	Gray/Red
7. Battery	64. Turn signal switch	L/B	Blue/Black
8. Fuse (fuel injection)	65. Horn switch	L/R	Blue/Red
9. Starter relay	66. Horn	L/W	Blue/White
10. Starter motor	67. Turn signal relay	L/Y	Blue/Yellow
11. Relay unit	68. Front turn signal light (left)	O/B	Orange/Black
12. Starting circuit cut-off relay	69. Front turn signal light (right)	O/G	Orange/Green
13. Fuel pump relay	70. Rear turn signal light (left)	O/Y	Orange/Yellow
14. Neutral switch	71. Rear turn signal light (right)	P/B	Pink/Black
15. Sidestand switch	72. Auxiliary light	P/W	Pink/White
16. Fuel pump	73. Headlight	R/B	Red/Black
17. Crankshaft position sensor	74. License plate light	R/G	Red/Green
18. Cylinder identification sensor	75. Tail/brake light	R/L	Red/Blue
19. Speed sensor	76. Headlight relay (on/off)	R/W	Red/White
20. Atmospheric pressure sensor	77. Headlight relay (dimmer)	R/Y	Red/Yellow
21. Lean angle sensor	78. Fuse (tail light)	Sb/W	Sky blue/White
22. O2 sensor	79. Fuse (ignition)	W/B	White/Black
23. E.C.U.	80. Anti safety alarm (option)	W/R	White/Red
24. Ignition coil #1	81. Fuse (signal)	W/Y	White/Yellow
25. Ignition coil #2	82. Fuse (headlight)	Y/B	Yellow/Black
26. Ignition coil #3	83. Radiator fan motor relay	Y/G	Yellow/Green
27. Ignition coil #4	84. Fuse (radiator fan motor left)	Y/L	Yellow/Blue
28. Spark plug	85. Fuse (radiator fan motor right)	Y/R	Yellow/Red
29. Injector #1	86. Radiator fan motor (left)	Y/W	Yellow/White
30. Injector #2	87. Radiator fan motor (right)		
31. Injector #3	88. Ground		
32. Injector #4			
33. Air induction system solenoid			
34. Sub-throttle position sensor			
35. EXUP servo motor			
36. Intake air pressure sensor			
37. Throttle position sensor			
38. Coolant temperature sensor			
39. Air temperature sensor			
40. Meter assembly			
41. Immobilizer indicator light			
42. Fuel level warning light			
43. Oil level warning light			
44. Neutral indicator light			
45. Tacho meter			
46. Multi function meter			
47. Engine trouble warning light			
48. Coolant temperature indicator light			
49. Hi beam indicator light			
50. Turn signal indicator light (left)			
51. Turn signal indicator light (right)			
52. Meter light			
53. Oil level switch			
54. Right handlebar switch			
55. Front brake light switch			
56. Engine stop switch			
57. Start switch			

EAS28750

**COLOR CODE**

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
Br/Y	Brown/Yellow



YAMAHA MOTOR CO., LTD.  
2500 SHINGAI IWATA SHIZUOKA JAPAN

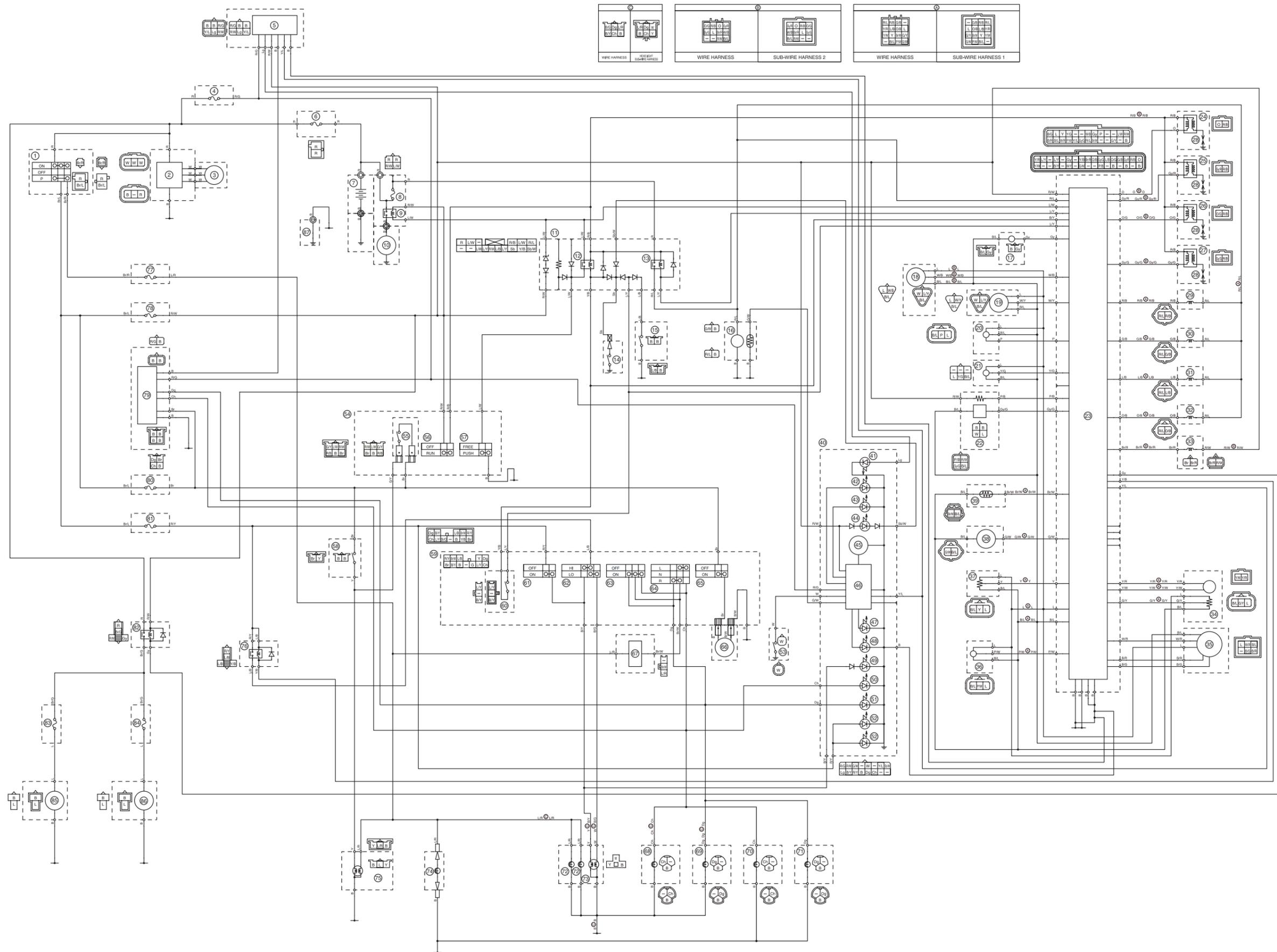
FZ1-N (V) 2006  
WIRING DIAGRAM

FZ1-N (V) 2006  
SCHEMA DE CABLAGE

FZ1-N (V) 2006  
SCHALTPLAN

FZ1-N (V) 2006  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-N (V) 2006



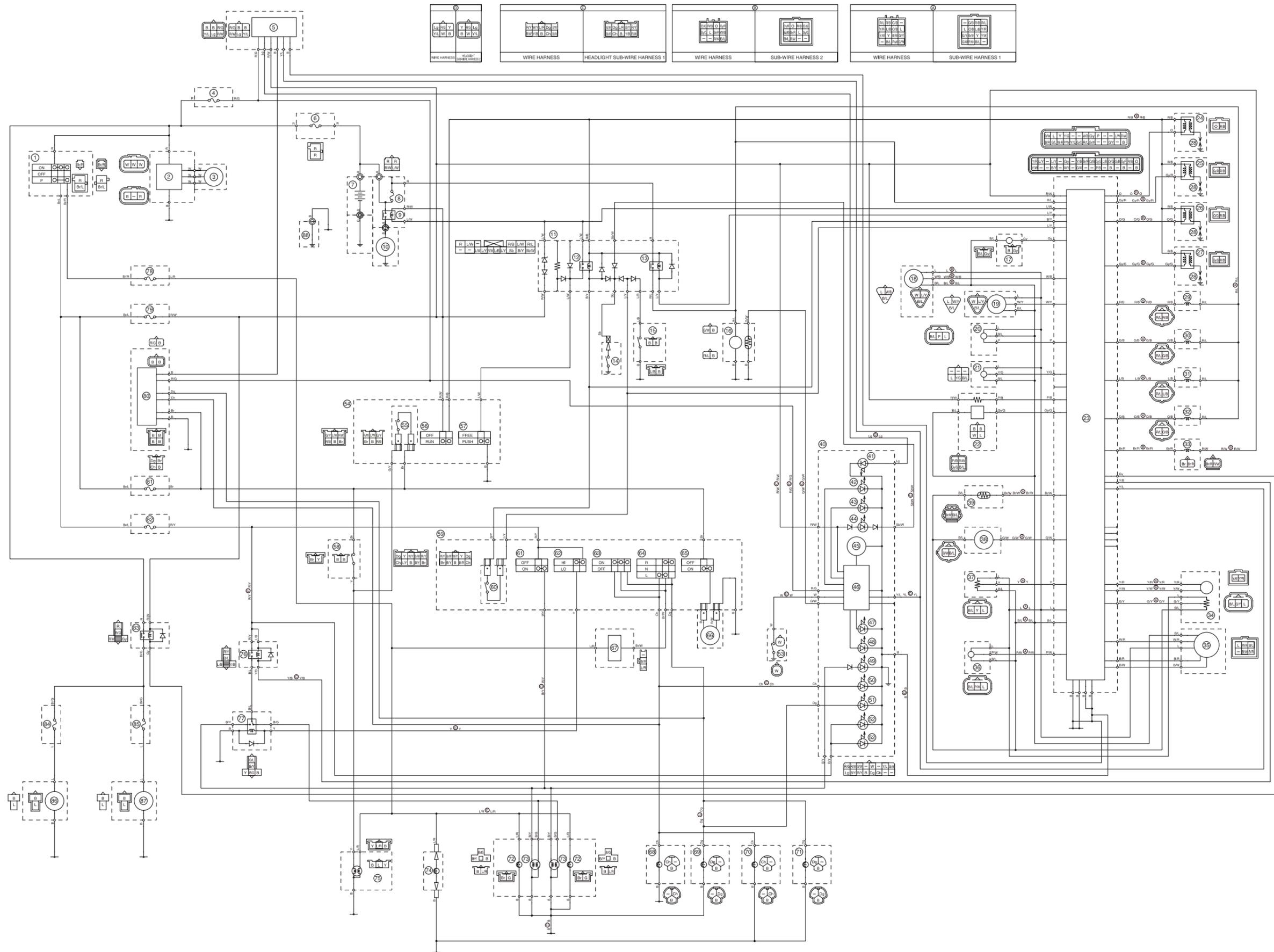
**FZ1-S (V) 2006  
WIRING DIAGRAM**

**FZ1-S (V) 2006  
SCHEMA DE CABLAGE**

**FZ1-S (V) 2006  
SCHALTPLAN**

**FZ1-S (V) 2006  
SCHEMA ELETTRICO**

**DIAGRAMA DE CONEXIONES  
DE FZ1-S (V) 2006**



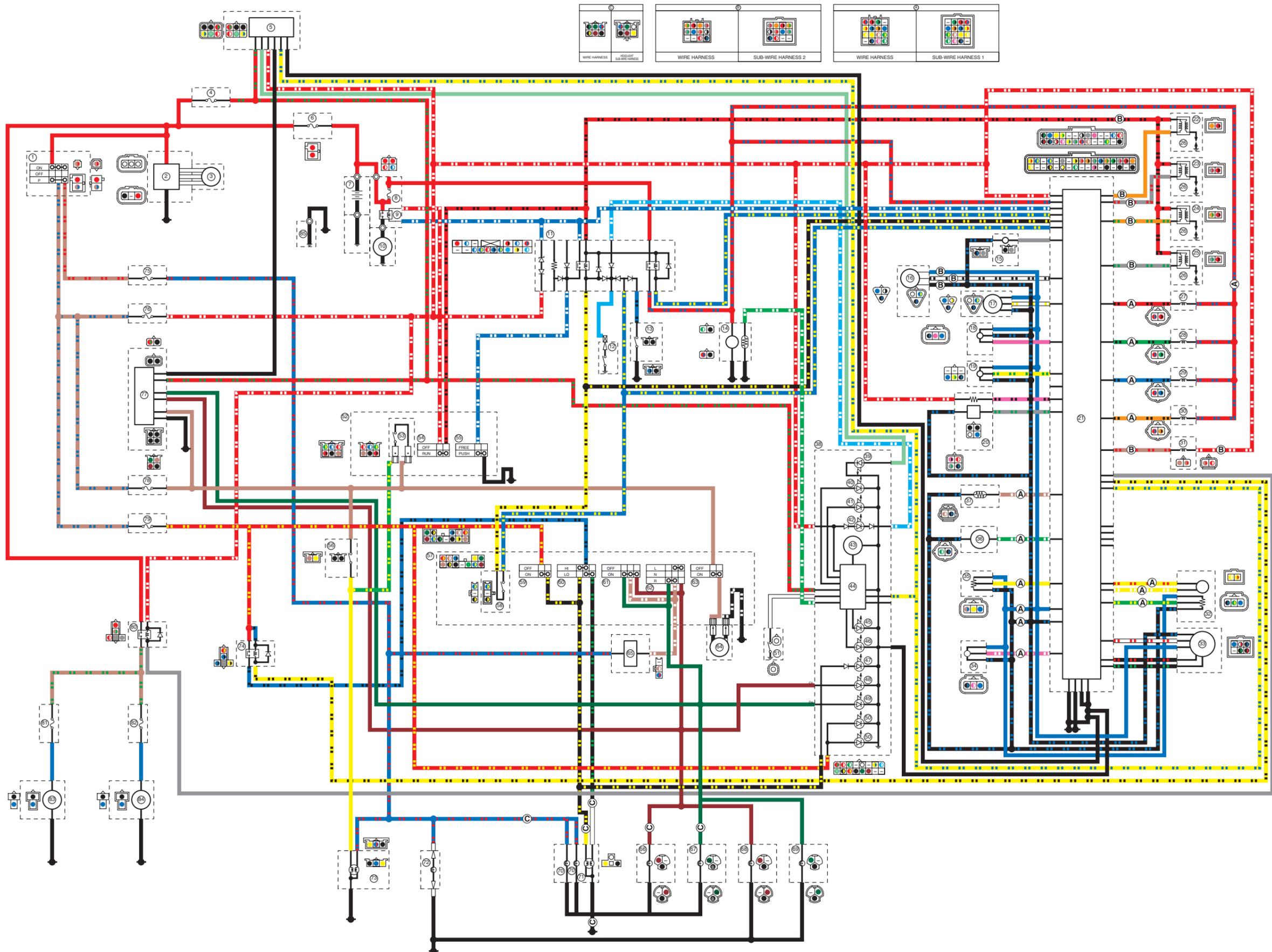
FZ1-N (V) 2006  
WIRING DIAGRAM

FZ1-N (V) 2006  
SCHEMA DE CABLAGE

FZ1-N (V) 2006  
SCHALTPLAN

FZ1-N (V) 2006  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-N (V) 2006



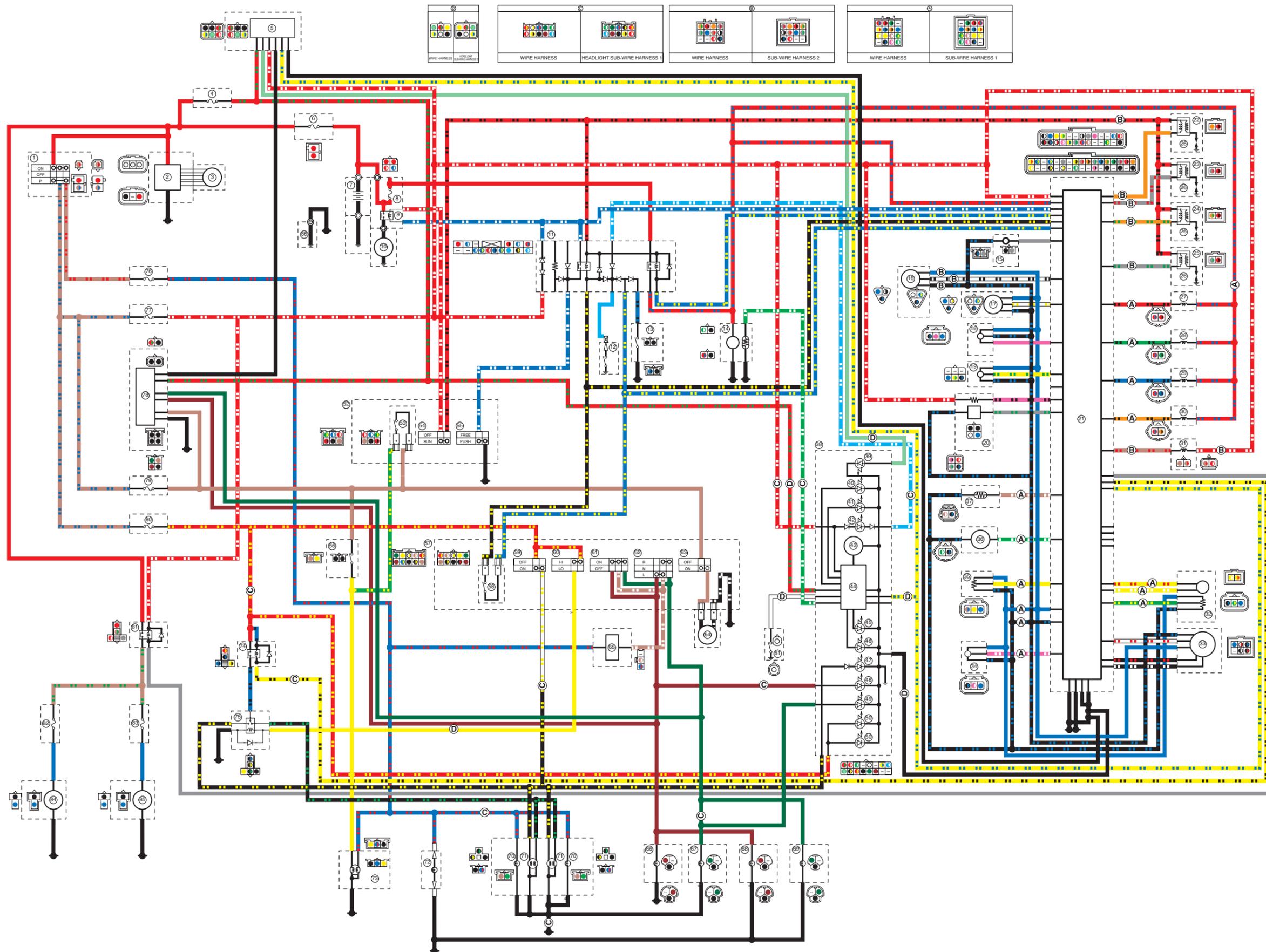
FZ1-S (V) 2006  
WIRING DIAGRAM

FZ1-S (V) 2006  
SCHEMA DE CABLAGE

FZ1-S (V) 2006  
SCHALTPLAN

FZ1-S (V) 2006  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-S (V) 2006



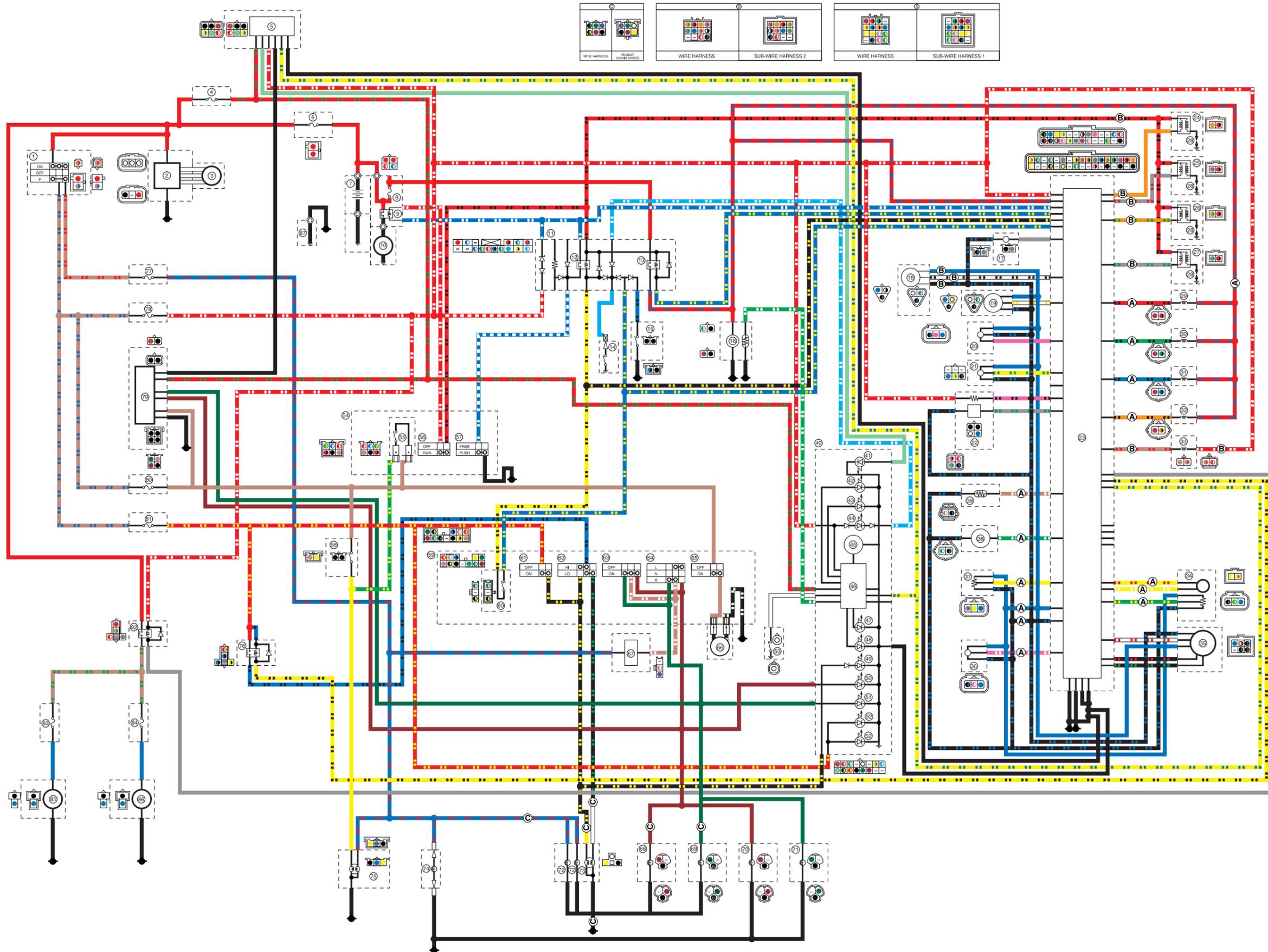
FZ1-N (V) 2006  
WIRING DIAGRAM

FZ1-N (V) 2006  
SCHEMA DE CABLAGE

FZ1-N (V) 2006  
SCHALTPLAN

FZ1-N (V) 2006  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-N (V) 2006



FZ1-S (V) 2006  
WIRING DIAGRAM

FZ1-S (V) 2006  
SCHEMA DE CABLAGE

FZ1-S (V) 2006  
SCHALTPLAN

FZ1-S (V) 2006  
SCHEMA ELETTRICO

DIAGRAMA DE CONEXIONES  
DE FZ1-S (V) 2006

